

A DECADE OF TRANSFORMATION

The Indian Navy 2011-2021



2011
Sagar Prahari Bal commences operations

2012
INS *Chakra* inducted

2013
GSAT-7 satellite launched
INS *Vikramaditya* commissioned
First Maritime Patrol Aircraft P8-I inducted

2014
First Kolkata-class ship commissioned

2015
Indian Maritime Security Strategy unveiled
Operation Rahat: Evacuation from Yemen

2016
Indigenously built Strategic Strike Nuclear Submarine INS *Arihant* commissioned
International Fleet Review held

2017
First Scorpene-class submarine INS *Kalvari* commissioned
All-women sailing expedition, Navika Sagar Parikrama, held

2018
Information Fusion Centre-Indian Ocean Region established

2019
Aircraft Carrier Dock commissioned at Naval Dockyard, Mumbai

2020
Maiden arrested landing of Light Combat Aircraft on INS *Vikramaditya*
Operation Samudra Setu I in support of Vande Bharat Mission
Mission Sagar

2021
Operation Samudra Setu II
Mission Sagar
Cyclone Tauktae Search and Rescue operation

SIGNALLING POWER AND PARTNERSHIPS

CAPTAIN M DORAIBABU, NM

COMMANDER AMRUT DILIP GODBOLE



CAPTAIN M DORAIBABU, NM joined the 52nd Naval Academy Course in 1993, after schooling from Rashtriya Military School, Bengaluru. Commissioned in 1997 and specialized in Communications and Electronic Warfare, he is an alumnus of the Defence Services Staff College, Wellington and the College of Air Warfare, Secunderabad. He has the distinction of serving on frontline ships and has commanded three warships. He was awarded the Nao Sena Medal (Gallantry) in 2005 in the aftermath of the Tsunami in the Andaman and Nicobar Islands and the Chief of the Naval Staff commendation for contribution to the International Fleet Review 2016 for publishing three coffee table

books for the occasion as the Executive Editor. He authored a coffee table book on INS *Sudarshini's* epic ASEAN voyage, tracing the eighteenth century trade routes used by seafarers visiting countries of the ASEAN. He was part of the team that collaborated with Amar Chitra Katha to publish three illustrated books on the maritime history of India and the Indian Navy. An avid reader and writer, he is a regular contributor to journals of think tanks such as the MPIDSA and the Indian Naval Despatch Foundation, and to in-house journals.



COMMANDER AMRUT DILIP GODBOLE of the 12th Naval Engineering Course was commissioned on 1 January 2000. A mechanical engineer by profession, his afloat appointments include Engineer Officer onboard *IN* ships *Rajput*, *Nishank*, *Nipat*, *Prabal* and *Mysore* and Staff Officer (Engineering) at Local Work Up Team (West). His ashore appointments include Senior Instructor at INS *Shivaji*, Lonavala, and Manager (Quality Assurance) at INS *Eksila*, the Gas Turbine Repair and Overhaul Facility of the Navy in Visakhapatnam. He did his master's in mechanical engineering from the Indian Institute of Technology, Bombay (2008). He is a former Fellow, Indian Navy Studies Programme at

Gateway House: Indian Council on Global Relations (2019–21). Some of the prominent papers authored/co-authored by him include 'Development of a PLC Based Controller for Marine Gas Turbine Generator', 'AI and Machine Learning for the Indian Navy', 'Digital Manufacturing in India', 'Extending India's Maritime Security Strategy in the Indo-Pacific' and 'Undersea Communications Cables' as part of the Quad Economy and Technology Task Force. He is an alumnus of the Naval College of Engineering, INS *Shivaji*, Lonavla. His areas of interest include technology- absorption and adaptation techniques, disruptive technology and geopolitics.

There have been many historic firsts for the Indian Navy (*IN*) in the period 2011–21, be it the induction of indigenously built submarines, both conventional and SSBN INS *Arihant*, the commissioning of INS *Vikramaditya*, the addition of Maritime Patrol Aircraft P-8I, and induction of many more indigenously built potent platforms. A total of forty-four warships of varying sizes and capabilities were commissioned in this period, of which thirty-seven were indigenously built. Despite fiscal constraints, the pivotal role played by the *IN* in the growth of domestic warship-building capabilities by effectively dovetailing with national initiatives such as Make in India and Aatmanirbhar Bharat have enabled its transformation from 'A Buyer's Navy' to a 'A Builder's Navy'.

The significant growth in capabilities and the induction of cutting-edge technology required matching transformation in support facilities and human capital. The addition of new operational, maintenance and training infrastructure such as the Aircraft Carrier Dock, MI5 Gas Turbine Test House, Shore-Based Test Facility, simulators, ARNAV wargaming software, the increasing thrust towards digitalization for process optimization and the shift to an 'All BE/B-Tech' officer cadre have been some of the significant transformation markers during this period.

The period 2011–21 also witnessed the *IN* platforms operating for longer periods and farther than ever before. The *IN*, through its mission-based deployments, has ensured sustained presence in the Indian Ocean Region (IOR). Today, the *IN* exercises with more countries than ever before, both in the IOR and beyond. For long, the *IN*, considered as the principal manifestation of India's maritime power, has significantly scaled up its diplomatic role through training assistance, capability and capacity addition, Humanitarian Assistance and Disaster Relief (HADR) and Search and Rescue (SAR) assistance. Mission Sagar and Operation Samudra Setu I and II have been the *IN's* highlight operations in recent years in response to the COVID-19 pandemic. The capability, reach and, more fundamentally, the *IN's* intent anchored in India's vision of Security and Growth for All in the Region through collective maritime security continues to drive the *IN's* transformation to that of a 'Preferred Security Partner' in the IOR.

The title of this volume, *A Decade of Transformation: Signalling Power and Partnerships*, thus appropriately embodies the *IN's* journey and intent in the period under review. The book captures the *IN's* journey of growth and transformation against the backdrop of multiple challenges and the mitigating measures adopted in its continued evolution into a combat-ready, capable, cohesive and future-ready force.

A DECADE OF
TRANSFORMATION

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THE INDIAN NAVY 2011–2021



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CAPTAIN M DORAIBABU, NM

COMMANDER AMRUT DILIP GODBOLE



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Captain M Doraibabu, NM and Commander Amrut Dilip Godbole
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FOREWORD

The Indian Navy owes its present to the vision, planning, execution, and changes carried out by our forebearers over the passage of time. In order to carry forward their legacy, sound understanding of the events of the past becomes essential in charting the course for the future.

With that view, the Indian Navy has, thus far, published six volumes of recorded history covering its journey from 1945 to 2010. These books capture the Indian Navy's evolution from a brown water, coastal Navy into a multi-dimensional and multi-mission capable blue water Navy.

In the period 2011-2021, the Indian Navy witnessed further growth and consolidation as it evolved into an even more technologically advanced, networked and deployable force. In this transformative decade, the Navy catapulted its capabilities – physical, conceptual and human – to consolidate as a 'combat-ready, credible, cohesive, and future proof' force.

In the physical domain, addition of assets such as the aircraft carrier *INS Vikramaditya*, Kolkata-class ships, *Kalvari* class submarines, aircraft such as the P8I, the MiG-29K, or the Remotely Piloted Aircraft (RPA), provided the Navy with the tools necessary to undertake a diverse range of missions. Development of critical enablers such as world-class infrastructure and capacity, improved Maritime Domain Awareness, Cooperative Engagement Capability (CEC), etc. contributed in furthering the Navy's mission capabilities.

In this decade, the overarching conceptual underpinnings that govern the utilization of the naval power, were encapsulated through strategic documents such as 'India's Maritime Security Strategy, 2015'. The Navy also adopted transformative operational concepts such as 'Mission Based Deployments' and 'Maintenance-Training-Operations-Drawdown Cycle'.

While physical and conceptual capabilities evolved, commensurate attention was paid to the Navy's human resource development through formulation and execution of the Human Capital Strategy, 2013.

This three-pronged capability development, enabled the Navy to undertake multiple notable endeavours. A few examples include, sustained deployments in far reaches of the areas of interests, Non-Combatant Evacuation through Operation *Rahat*, playing a pivotal role in helping friends and partners across the region during CoVID-19 through Mission *Samudra Setu* and *Sagar*, commissioning of Information Fusion Centre - Indian Ocean Region (IFC-IOR), and the conceptualization and materialization of Goa Maritime Conclave.

This book, 'Decade of Transformation : Signalling Power and Partnerships', therefore, encompasses the Navy's transformative evolution into a formidable force and reaffirmation of its standing as the key instrument of India's maritime power.

In capturing the events of this transformative decade, I must compliment the authors and the Naval History Project Team on their commendable effort. I am confident that the reader will find answers to the who, why, when, and how of the Navy that sailed the decade 2011-2021.



(R Hari Kumar)
Admiral
Chief of the Naval Staff

Preface

‘सीख हम बीते युगों से, नये युग का करें स्वागता’
‘Learn from the past to shape the future.’

—*The Mahabharat*

The Indian Navy (*IN*) has had the unique distinction of publishing its official history on a regular basis. Till date, six volumes encompassing the period from 1945–2010, have been published. Each volume charts the *IN*'s journey, and is aptly reflective of the growing scope and complexity—threshold at which the *IN* operates. Further, as one peruses the respective volumes, one realizes the institutional impetus which the *IN* gives to preserving its part of military history.

This volume by the Naval History Project is the seventh in the series and aims to capture the official institutional history of the *IN* for the decade 2011–21. Earlier volumes include the ‘Transition’ series by Late Vice Admiral Hiranandani, and prior to that, by Late Rear Admiral Satyindra Singh. In 2018, the *IN* released *Blue Waters Aboy! The Indian Navy 2001–2010*, authored by Vice Admiral Anup Singh (Retd).

‘To be secure on land we must be supreme at sea,’ said the first Prime Minister (PM) of independent India, laying a vision for the *IN* to become a naval force to reckon with.¹ Post Independence, the assets and personnel of the erstwhile Royal Indian Navy were split between India and Pakistan. Starting afresh, the *IN* led its first mission in the accession of Junagadh in 1947; acquired its first capital ship—

the cruiser, *INS Delhi*—in 1948; and its first aircraft carrier *INS Vikrant*, in 1961.

The 1950s and '60s saw the *IN* build itself by acquiring frigates and destroyers and establishing *INS Garuda*, the first naval air station. Simultaneously, the *IN* laid stress on indigenous shipbuilding—*INS Ajay* being its first indigenously built ship and was commissioned in September 1960. Operation Vijay in 1961 (the liberation of Goa) and the wars of 1965 and 1971 provided the *IN* with a much-needed opening to allow it to determine its capabilities and work on its challenges to develop as a force that would not just safeguard national security and safety, but also India's maritime interests. The late 1960s marked the onset of building a capable submarine arm to develop a competent submarine wing.

Going forward, 1987 saw a prominent event for the *IN*—the creation of the Indian Marine Special Force later rechristened the Marine Commando Force, also called MARCOS. The MARCOS participated in Operation Pawan (1987), the Kargil War (1999), Counter Insurgency/Counter Terrorism ops in the Kashmir valley and in anti-piracy operations in the Gulf of Aden and off the Somali coast.

Further, since its inception the *IN* has also been involved in several Humanitarian Assistance and Disaster Relief (HADR) missions, assisting and aiding both foreigners and Indians. The Lebanon War of 2006, the Libyan Civil War in 2011, and

the Yemen crisis of 2015 are some recent events in which the *IN* has been an efficient maritime force-responder. Natural disasters such as cyclones, earthquakes and the most recent, the pandemic of 2020, have all seen the *IN* at the forefront, be it conducting rescue and repatriation missions or providing medical and other support.

By engaging in strategic diplomatic interactions, participating in personnel training and exchange in form of exercises and port visits, the *IN* has marked its presence in the Indian Ocean Region (IOR) as a capable, responsive and professional Naval Force. As the *IN* matures in its goals of self-reliance and becoming a multidimensional Navy, it has largely established itself as a 'Builders' Navy' with a majority of its warships being built indigenously. As maritime security rapidly gains importance internationally, it is a period of opportunity for the *IN* to fulfil its ambitions and establish its role in the global maritime space.

The Story So Far

This volume is a continuation of the 'story so far'. Therefore, it would be fruitful to briefly recap milestones covered in the previously published volumes to help our distinguished readers place the present volume in the larger setting of the *IN*'s history since 1945.

Under Two Ensigns: The Indian Navy 1945–50, Volume I

Authored by (Late) Rear Admiral Satyindra Singh (Retd), AVSM, this volume was the first official narrative to document the historical journey of the *IN* from 1945–50—the period immediately pre- and post-Independence. Published in 1985, *Under Two Ensigns* also goes back much further in time to give readers an insight into India's rich maritime and seafaring exploits dating back to 3000 BCE onwards.²

The volume looks into the pre-history of India's maritime legacy, including its tradition of shipbuilding. It also extensively traces the origins, growth and transition of the *IN* from a motley group of ships under the British Crown and called the Indian Navy, to its rechristening as the Royal Indian Navy, and then becoming the now-independent Indian Navy; though until about 1958, the *IN* continued to have British Naval Chiefs of Staff.

Spanning a timeline over six years, *Under Two Ensigns* covers crucial events that contributed to laying the foundation of the *IN*, such as end of World War II and the division of the Royal Indian Navy into the Royal Indian Navy and the Royal Pakistan Navy. Following the partition of the two Navies, the *IN*'s essential roles were laid out through the 'Outline Plan for the Reorganization and Development of the Indian Navy'. The aim was to build a strong and powerful *IN*, which would cater to the maritime security of the nation. This led to the development of the *IN*—to form two fleets centred on a (light) aircraft carrier.

Volume I established the foundation for understanding the formation, organization and development of the *IN* into the force that it is today. The volume highlights the rationale behind many a major decision taken to establish the fledgling *IN* as more than just a defensive force, through Committee recommendations, Plan Papers and organizational changes. Everything from operational philosophy to manpower recruitment, training and capability-building had to be put in place through diligent planning and processes. With a bare-bones budget every expenditure had to be weighed to get the best bang for the buck, as to what force levels the *IN* would need and when. The volume dwells on the visionary leaders of that time who set the process in motion with audacious foresight that stood the test of time. *Under Two Ensigns* thus looks cohesively at all these themes,

and can be described as an introduction to the background, creation and establishment of the *IN* in a most succinct manner.

Blueprint to Bluewater: The Indian Navy 1951–65, Volume II

Authored by (Late) Rear Admiral Satyindra Singh (Retd), AVSM, the second volume was published in 1992 and picks up from where the first volume left off. It covers the *IN*'s setting-up of training establishments and maintenance facilities on both coasts—east and west; and inception of warship design and construction indigenization, along with the development of associated propulsion systems, weapons and equipment.

The period under discussion in the previous volume saw a significant restructuring of the *IN*'s strategic and tactical doctrine to suit the maritime requirements of the region. Volume II thus covers:

- The expansion of the *IN* into a fleet (mostly through British and Soviet acquisitions from the then USSR),³ with the first cruiser INS *Delhi* procured in 1948 followed by three R-class destroyers in 1949 and three Hunt-class destroyers in 1953 amongst other ships. The *IN*'s second cruiser, INS *Mysore*, was acquired in 1957.
- The setting up of the Naval Aviation wing with the acquisition of a squadron of Sealand aircraft and the commissioning of INS *Garuda*, the first naval air station, in 1953.
- The commissioning of the *IN*'s first aircraft carrier, INS *Vikrant* (formerly HMS *Hercules*) in 1961; its integral flight consisted of ten Seahawk fighters, six Alizé reconnaissance aircraft and two Alouette helicopters.

As is stated in *Blueprint to Bluewater*, these procurements allowed the *IN* to present itself as a 'balanced naval force' in the region for the first time. The volume also delves into the *IN*'s building

of its third arm—the submarine arm—in terms of technology and personnel training, for which it turned to Russia. The volume further covers the re-development of Bombay Port, the reorganization of personnel post-partition, the strategic harnessing of human resources (HR) through training establishments, the review of colonial Naval Law, and changes that came with the Navy Act of 1957.

Blueprint to Bluewater also discusses budgetary allocation to the *IN* from the overall defence budget during this crucial period. Through 1950–60 for instance, the *IN* received 9–12 per cent allocation of the defence budget, which dropped sharply to 3 per cent in 1960–61 probably because it was felt that the major acquisitions had already been made.

The volume also highlights the fact that the *IN* envisioned itself as a balanced force—with integral air power and submarines, capable of operating in the Indian Ocean—which would be achievable through selective defence procurements. However certain nations, from whom India wanted to procure assets, chose to be even more selective in transferring these assets to the *IN*. Volume II explains how this became the watershed moment for the *IN*'s acquisition programme.

Blueprint to Bluewater closes with the *IN* becoming fully 'Indianized' on 22 April 1958, when the first Indian Chief of Naval Staff (CNS), Vice Admiral RD Katari, assumed command of the Service—nearly eleven years after Independence. Volume II thus brings out the growth of the *IN* during this period, highlighted by plans on paper being effectively executed.

Transition to Triumph: Indian Navy 1965–1975, Volume III

Authored by (Late) Vice Admiral GM Hiranandani (Retd), PVSM, AVSM, NM, this is the first in the 'Transition' series, and was published in 1999. *Transition to Triumph* covers the several major developments that occurred during this decade.

The erstwhile USSR started meeting the *IN*'s requirements. The latest design of the Royal Navy's Leander-class frigates started being produced in Mazagon Docks with British collaboration. The first submarine INS *Kalvari* was commissioned in December 1967, and by 1975 the Submarine Arm had grown to eight submarines. The Air Arm was augmented by additional Seahawks, Alizés and the latest British Sea King anti-submarine warfare (ASW) helicopters equipped with dunking sonars. Along with the induction of modern fire-control systems in ships, submarines and aircraft, the *IN* acquired its first guided missiles and homing torpedoes during the decade.

Volume III also looks at the *IN*'s role during the 1971 India–Pakistan War. It documents the *IN*'s audacious missile-boat attacks on Karachi, the Naval Air Arm's sustained attacks on Chittagong and Cox's Bazaar, and the extensive contraband control in the Bay of Bengal and the Arabian Sea, which enabled the respective Fleets to dominate the seaward approaches to the Western and Eastern wings of Pakistan.

The sinking of Pakistani submarine *Ghazi* outside Visakhapatnam harbour, the torpedoing of the Indian frigate INS *Khukri*, the amphibious operations near Cox's Bazaar and the foray of the American Navy's Enterprise Task Group into the Indian Ocean, are some of the events that find deep reflection in this volume.

Transition to Eminence: The Indian Navy 1976–1990, Volume IV

This is the second volume in the 'Transition' series. Authored by (Late) Vice Admiral GM Hiranandani (Retd), PVSM, AVSM, NM and published in 2004, it covers a decade that witnessed a most extraordinary transition in the *IN*'s journey. Swift changes in its neighbourhood—such as China falling out with the USSR and moving closer to USA (more of which has been explored

in following volumes), the disrupted Russian economy post the end of the Cold War, and the fluctuating oil prices owing to the Israel–Arab war—all significantly impacted the *IN*'s growth. These challenges led India towards self-reliance and gave an impetus to indigenous projects.

In a decade-and-a-half of innovation, the *IN* equipped itself with indigenously built frigates, corvettes and other vessels with combinations of the latest available weapons and equipment from the USSR and from Europe. A tiny ship design cell that in 1965 was designing yard craft, was by 1990, designing an aircraft carrier, submarines and guided missile destroyers.

The new acquisitions from the USSR ranged from the R-class missile destroyers, conventional submarines and long-range marine reconnaissance (LRMR) aircraft, to coastal minesweepers. Acquisitions from Britain included the aircraft carrier INS *Viraat*, and the vertical/short take-off and landing (V/STOL) aircraft Sea Harrier. The INS *Viraat* carried these fighter aircraft and Sea King helicopters in anti-submarine and commando versions.

A fleet tanker, landing ships and conventional submarines were acquired from European nations; the submarines served as a precursor for commencing their construction in India.

Volume IV tracks how new maintenance, repair and refit facilities had to be created, along with commensurate HR development measures because these hi-tech inductions needed to be operated and manned by better educated and trained personnel. The volume also highlights how the increase in the volume of spares and the diversity of sources, compelled modernization of the logistics system.

Transition to Eminence closes by assessing the exposure and experience gained between 1987 and 1990 during Operation Pawan in Sri Lanka and Op Cactus in the Maldives, which provided valuable experience in seaward support of troops and of facing a low-intensity conflict in confined waters.

Transition to Guardianship: The Indian Navy 1991–2000, Volume V

Authored by (Late) Vice Admiral GM Hiranandani (Retd), PVSM, AVSM, NM, *Transition to Guardianship* was published in 2009 and is the last volume in the 'Transition' series. It spans a period that was globally challenging due to the sweeping global changes on the geopolitical and economic fronts. In wake of the Gulf War, the world witnessed the spectre of spiralling inflation due to a hike in oil prices. The unprecedented spike deeply impacted India's defence budget and called for extraordinary abilities to cope with grim circumstances in the face of limited funding for projects.

Transition to Guardianship documents this time of trial and tribulations, when the *IN* was called upon to do 'much more with much less'; a situation further aggravated by the disintegration of the USSR in 1991, India's biggest defence supplier. It is testimony to the *IN's* tenacity and resolve that it nevertheless performed commendably.

Volume V traces how force-level decline was effectively arrested by using innovative means: to preserve equipment, to produce innovative in-house designs, to encourage indigenous production, and to move toward improved Public-Private partnership in defence production. The *IN's* efforts were in tune with the imperative of a realigned geopolitical world order that necessitated the forging of new relations.

The initiation of the 'Look East Policy' helped fashion strong bonds with IOR countries. The assistance in the United Nations (UN) Peacekeeping Mission in Somalia (1992–94) and the emphatic intervention in safely de-inducting forces was a prime example of the *IN's* maturing blue-water capabilities, as *Transition to Guardianship* notes. The interception and recapture of pirated Japanese vessel *MV Alondra Rainbow* on the high seas, in 1999, only served to underscore the eminent role that the *IN* was to play in safeguarding the

Indian Sea Lines of Communication (SLOCs). *Transition to Guardianship* brings to the fore how the decade marked the coming of age of the *IN*—showcasing it as an able, professional, powerful, and balanced entity.

Blue Waters Ahoy! The Indian Navy 2000–2010, Volume VI

Authored by Vice Admiral Anup Singh (Retd), PVSM, AVSM, NM, and published in 2018, *Blue Waters Ahoy!* encapsulates the many momentous transformations and challenges faced by the *IN* during the period from 2001–10. Following on the heels of the preceding five volumes, this volume too records the entire spectrum of activities, including shipbuilding, operations, maritime diplomacy, HRD, organizational challenges, ceremonial events and welfare measures.

Blue Waters Ahoy! re-emphasizes the *IN's* impetus towards becoming a Builders' Navy from a Buyers' Navy, and throws light on the ultimate achievement of designing and building its own aircraft carrier, the IAC-1. The volume discusses events spanning combat conditions to those conducted in support of humanitarian causes on our own shores as well as those afar.

Strengthening maritime diplomacy ties with other nations has been an important *IN* endeavour. In this context, *Blue Waters Ahoy!* offers a detailed analysis of, among other initiatives, the launch of the Indian Ocean Naval Symposium (IONS), as well as the *IN's* training of personnel from friendly foreign countries (FFCs). The *IN's* HRD measures underwent a paradigm shift at this juncture, which the volume adequately highlights.

In addition, the seminal changes that occurred in the terms and conditions of Service following the recommendations of the Ajai Vikram Singh Committee, have been specially covered—apart from other changes in pursuit of greater delegation of authority and motivational measures across ranks.

⚓ Reflections on the 'Present'

Having located the present volume in relation to its predecessors, I will now briefly reflect on certain challenges and unavoidable complexities that this present volume is heir to.

Chronicling the official history of an organization as vast and multifarious as the *IN*, is riddled with inherent intellectual and philosophical challenges. For instance, the question of 'depth and breadth of details' to be covered is something that each historian grapples with. If one goes too deep, one runs the risk of losing sight of the big picture; if one remains on the surface, one risks missing out important pieces in the bigger jigsaw puzzle.

My team and I realized that the question of depth and breadth became particularly relevant while researching for the book, given the many Verticals/Cadres/Arms that constitute the Navy. Each of these arms has had its own set of journeys, challenges, tribulations and triumphs and the challenge for us was to not only unearth and organize these disparate narratives, but also to place them in the larger context of the *IN's* growth and increasing profile. After all, when one is analysing historical incidents, episodes and finer details, say for instance, an exercise at sea, the visit of a foreign dignitary, or the acquisition of a specific equipment/platform, placing these details within the overarching institutional and geopolitical contexts becomes ever-imperative.

The second challenge that any kind of historical research is heir to, relates to the presence (or absence) of authentic, dependable sources. The early official history volumes had been published in the pre-internet-age, and hence grappled with a different set of challenges.

The author of *Under Two Ensigns*, (Late) Rear Admiral Satyindra Singh (Retd), AVSM, cogently articulated this problem in his Preface to the volume, when he wrote, 'there is even

less material available on the earlier period—of the evolution of our Service from the Indian Marine, Bombay Marine, Bombay Marine Corps, Indian Navy, Bombay Marine-Bengal Marine ... very little is known about our various regional maritime forces which fought among themselves.' However, in regard to the present volume, we found ourselves on the opposite side of the spectrum. Which is to say, the internet age has catalysed an explosive proliferation of information in the form of research articles, monographs, newspaper columns and the like, all easily available, and all of these, to varying degrees affecting, or having a bearing on contemporary maritime and national security discourse.

We recognized early on that if we were to do justice to *IN's* role in contemporary geopolitical debates and discussions, as well as its larger significance to nation building, we would have to—in addition to primary sources (inputs from within the *IN*)—plumb through the multitudinous corpus of secondary sources online to select and analyse authentic, albeit divergent, perspectives. For instance, we continue the story of the IAC-1 from the previous volume, and shine a light on how it has emerged as a significant testimonial to 'Aatmanirbhar Bharat'. Over 76 per cent of material and equipment onboard *Vikrant* is indigenous, with more than 80 per cent of the project cost being ploughed back into the economy.

The project has also given enormous boost to 'Make in India' and 'Skill India' initiatives; creating extensive job opportunities, encouraging indigenous shipbuilding and businesses to large number of Micro, Small and Medium Enterprises (MSMEs). If we are to recognize the importance of transitioning from a Buyer's to a Builder's Navy, then these aspects become critical towards such recognition.

The third challenge which merits attention is that of 'temporal distance'. The previous volumes were all written and published after significant

period of time had elapsed since the decade being written about. Such a gap is essential to reflect upon, gauge and grasp the full implications of historical events. It can only be done when these events and their after effects are dispersed over a long-enough timeline. To illustrate, (Late) Rear Admiral Satyindra Singh's *Under Two Ensigns: The Indian Navy 1945–50* was published in 1986 (with a gap of thirty-five years from the concerned period), whereas the most recent volume by Vice Admiral Anup Singh (Retd), *Blue Waters, Ahoy! The Indian Navy, 2000–2010*, was published in 2018 (with a gap of eight years from the concerned period).

The present volume is being published closest to the decade it deals with (2011–21)—a gap of one year. Therefore, there are bound to be issues spilling over into the next decade. There are also bound to be events/occurrences, the full purport of which will only be revealed in the decades to come. Therefore, while we have conducted as close an analysis as can be undertaken within the bounds of a temporally limited perspective, a reader ten or fifteen years from now may be surrounded by realities that have shaped up quite differently from how this volume imagines them to be.

A caveat here for the discerning reader is that in certain chapters and events, the scope of the subject has not been restricted to only the end of year 2021 but amplified to even early 2022. This has been so for the black swan event of the COVID-19 pandemic and its far-reaching consequences on operations, HR, supply chains, self-reliance efforts et al., which continued beyond 2020 and is still present as this volume goes to print. Another factor is fast and ever-metamorphosing international relations and crises that permeate beyond year-end deadlines.

Foundational Issues

The aim of historical writing is to present historical occurrences as a coherent, compelling

narrative without presenting facts and evidence in a pre-determined analytical structure, implying that we must not reach predetermined obvious conclusions. The need for authenticity and accuracy is paramount and pursuit of the truth, as objectively as possible, would need to be anchored in facts. While readability, aesthetic design and visual appeal are necessary, the overall credibility of a history volume will be dependent on how different strands of thought and interpretations have been harmonized objectively, accurately and truthfully. Credibility would also require that the history volume is distinct from photo-essay books, and eschews hype, triumphalism and other 'feel good' aspects (which could be nuanced inherent to the narrative). This was, therefore, conceived to be the first 'principle' while bringing out this volume.

As brought out earlier, there was also the associated issue of the distance/time interval between the period being chronicled and release of the volume. In previous instances, several years separated the publication of the volume from the epoch it was written for, bestowing an element of space to exercise/evaluate issues with a degree of detachment, which is necessary for historical analysis. This volume, however, is to be published almost immediately at the end of the period it documents and might therefore risk being an 'informed narrative' or a 'first draft of history'. However, this is an issue we have to take in our stride to meet the deadline.

Themes

The volume has endeavoured to archive nearly everything that has occurred in this period including operations, structural re-organizations, building of infrastructure, growth of fleet units, HR, automation of procedures, materiel management, dockyards, headquarters, ancillary units etc. It needs emphasis that this volume is based on unclassified

records of the Navy. It was our endeavour to write it in a free-flowing narrative with global military and enlightened civilian personnel as our target audience.

A broad outline providing an idea of how the narrative and story developed is listed below.

Geo-strategic Environment: This section seeks to cover the contemporary geo-strategic environment (global and national), establishes how it has evolved and how it influenced the *IN* through the decade. Changes in India's foreign policy, with increased emphasis on the neighbourhood, form a significant strand in this section since it has provided an increased impetus to the use of the *IN* in its Diplomatic role. This has led to increasing HADR missions and deployment of naval assets to the far seas, in pursuance of foreign policy. This section aims to set the tone for what the *IN* did through the decade.

Why We Did What We Did: This volume seeks to highlight the rationale behind the *IN*'s decisions and actions. For example, it is important to establish why the *IN* undertook Mission-Based Deployments or why it felt the need for an integral submarine rescue capability. Every aspect of growth in the *IN*, covered in this volume, has been underpinned by the 'why', be it for operations, procurements or HR policies.

How We Did It: We endeavour to bring out stories of how we achieved what we did. These stories encompass the acquisitions, dockyards, Defence Research and Development Organization (DRDO) projects, naval construction etc. These have been spread out into different chapters which cover capabilities, units etc., depending on the further research on the developments of the decade.

Facilitators to Do What We Did: The facilitators that enabled the *IN* to achieve what it did in the decade, include the HR component and its growth and evolution, the support units, logistics

and supply chains, training, special forces, Naval Armament Inspection (NAI) organization, Medical, etc. All of them are included in different chapters, depending on information available.

Academia Outreach, Sports, Adventure and Welfare Activities: The *IN*, being a part of the larger Indian community, interacts with and contributes to society in various ways. In the policy formulation space, the *IN*'s interactions with various think tanks, viz., the National Maritime Foundation (NMF), the Manohar Parrikar Institute for Defence Studies and Analysis (MPIDSA), the Observer Research Foundation (ORF) etc., have brought out the *IN*'s influence (if any) on policy issues. Such interactions, their impact and their implications are considered necessary and are chronicled in this volume.

The achievements of our sportsmen, teams and naval adventurers also find place in the narrative. This has ensured that the increased participation by *IN* personnel in sports and adventure activities, which include the non-stop solo-circumnavigation by Commander Tomy, and the circumnavigation by the *Tarini* crew, all find a mention in the appropriate section. The background preparations behind such endeavours have also been analysed/mentioned. The section also incorporates aspects of our interaction with external agencies in the country such as the Sea Cadet Corps (SCC) and the National Cadet Corps (NCC), to highlight the *IN*'s contributions towards influencing the youth.

Challenges

In order to provide credibility to the narrative, we have undertaken a nuanced coverage of the accidents that happened in the *IN* in the early part of the decade. We have kept the narrative restricted to unclassified aspects of the accidents but have also included the repercussions of those accidents, including the resignation of then CNS, Admiral DK Joshi.

This volume also includes the challenges of the management of spares of imported equipment and mitigation efforts by the *IN* through indigenization. Gaps in certain areas—such as multi-role helicopters, Mine Countermeasure (MCM) vessels or the problems in inducting the Light Combat Aircraft (LCA) and utility helicopters—have also been studied.

Wide Scope of Review

This work endeavours to spread the proverbial net wide, so as to capture the various facets of the *IN* and its organizations. Building upon the early volumes chronicling our history, this volume will—apart from concentrating on the operations and tech support of those operations—also try to give adequate column space to the various support and ancillary units that have hitherto not found mention in the ‘official’ history of the Indian Navy. Branches/Organizations, for example, like the Naval Trials and Acceptance Authority (NATAA), Quality Assurance (QA).

Indigenization Unit (IU), etc., have been brought out so as to highlight the vast array of tech and material support that our operational units are provided.

Conclusion

This Preface aims to be a distillation of the authors’ ideas and thoughts, about the overarching aspects of the volume. To the discerning reader of the future we would urge, treat this volume gently and as the first draft of a history of the period the volume seeks to cover.

Capt M Doraibabu, NM
Officer-in-Charge
Naval History Project

Notes

- 1 Pandit Nehru quoted (n.d.) in section ‘Why Do We Need a Navy’, on the Join Indian Navy website; <https://www.joinindiannavy.gov.in/en/page/why-do-we-need-a-navy.html>
- 2 Before Common Era
- 3 Union of Soviet Socialist Republics until 1991, when it dissolved into independent countries, the largest being Russia.



1

Indian Navy in a Decade of Geopolitical Churn



1 | A Geopolitical Overview

⚓ Introduction

A nation's well-being and prosperity depend upon a host of factors related to the political, economic, social, technological and other domains. To achieve the same, national goals and objectives are set out in various documents, vision statements and policy pronouncements by our political apex and other authorities, and national strategies are accordingly devised. A country's military strategy, axiomatically, is a subset of the national strategy. The Indian Navy (*IN*)—as the principal manifestation of India's maritime power—plays a key role in safeguarding and promoting national security and national interest in the maritime domain. Our maritime security strategy is thus premised upon the need to protect, preserve and promote India's interests in the maritime domain.

India enjoys an enviable geo-strategic position in the Indian Ocean. Located at the centre of the Indian Ocean Region (IOR), with a pre-eminent peninsular thrust that shapes the maritime routes across IOR, India is well-positioned to influence the maritime space in the IOR. It has a natural reach in all directions, further extended by its island territories in the Andaman and Nicobar (A&N), and Lakshadweep and Minicoy (L&M) islands. Additionally, the Indian Ocean—through which much of the world's shipping transits—is distinguished by a land rim on three sides, and maritime access to the region is possible only through certain 'choke points' leading to and from the Arabian Sea and the Bay of Bengal, and from the southern Indian Ocean.

India's central position in the IOR, astride the main international shipping-lanes, accords distinct advantages. It places the outer fringes of the IOR and most choke points almost equidistant from India, thereby facilitating reach, sustenance and mobility of its maritime forces across the region. This advantage was accentuated in the past decade, when piracy and armed robbery at sea flared up in new regions, and which continues to remain a significant threat to international shipping and seafarers.

The IOR and its hinterland also form the locus of about 70 per cent of the world's natural disasters,¹ resulting from earthquakes, tsunamis, cyclones and floods. Humanitarian Assistance and Disaster Relief (HADR), Non-combatant Evacuation Operations (NEOs), and anti-piracy—all three have necessitated the increased deployment of not just the *IN*, but also that of other extra-regional navies. This trend has led to high militarization of the IOR, as a large number of leading military powers maintain a presence here, through military bases and forward deployed units. At any given point in time, there are more than a hundred warships of about twenty extra-regional navies operating in this vital maritime domain.

The maritime domain is vast, varied, complex and multilateral, since the oceans and seas are considered 'global commons' and primary agents of connectivity across the globe. Developments in international and national spheres impact the maritime environment and draw responses from maritime stakeholders and policymakers. Thus, geopolitical and geo-economic

factors are often the key determinants that shape the maritime environment.

This chapter seeks to provide the reader an overview of these factors during 2011–21, to situate and analyse the *IN*'s growth and development in this period.

Post-independence, the *IN* made a modest beginning with six frigates (sloops), and about fourteen other smaller ships.² Today, the *IN*'s inventory of ships and submarines has grown to more than 150, which includes an aircraft carrier, an SSBN submarine, conventional submarines, Destroyers, Stealth Frigates, missile Corvettes, Tankers, Offshore Patrol Vessels, and a range of many more combatant platforms. The *IN* also operates an equally impressive mix of over 200 air assets that includes air-interception fighter aircraft, maritime reconnaissance aircraft, unmanned aerial vehicles (UAVs), helicopters and many others.

The *IN*'s growth and development are also contingent upon the roles it routinely performs, or is specifically assigned, or those it additionally considers part of its mandate. Therefore, a very brief look at the roles and responsibilities of the *IN* is essential. While the classic roles of the Navy are well

known to military and maritime experts, they bear repetition for other readers, especially in the context of the changing maritime environment. As the Foreword to *Indian Maritime Security Strategy* (2015) brings out, 'The Navy's roles and responsibilities have also expanded significantly in response to changing geo-economic and geo-strategic circumstances.'³ While these are covered in detail in this volume, a brief outline is given in the succeeding paragraphs, with some illustrative examples.

The Indian Navy's Roles⁴

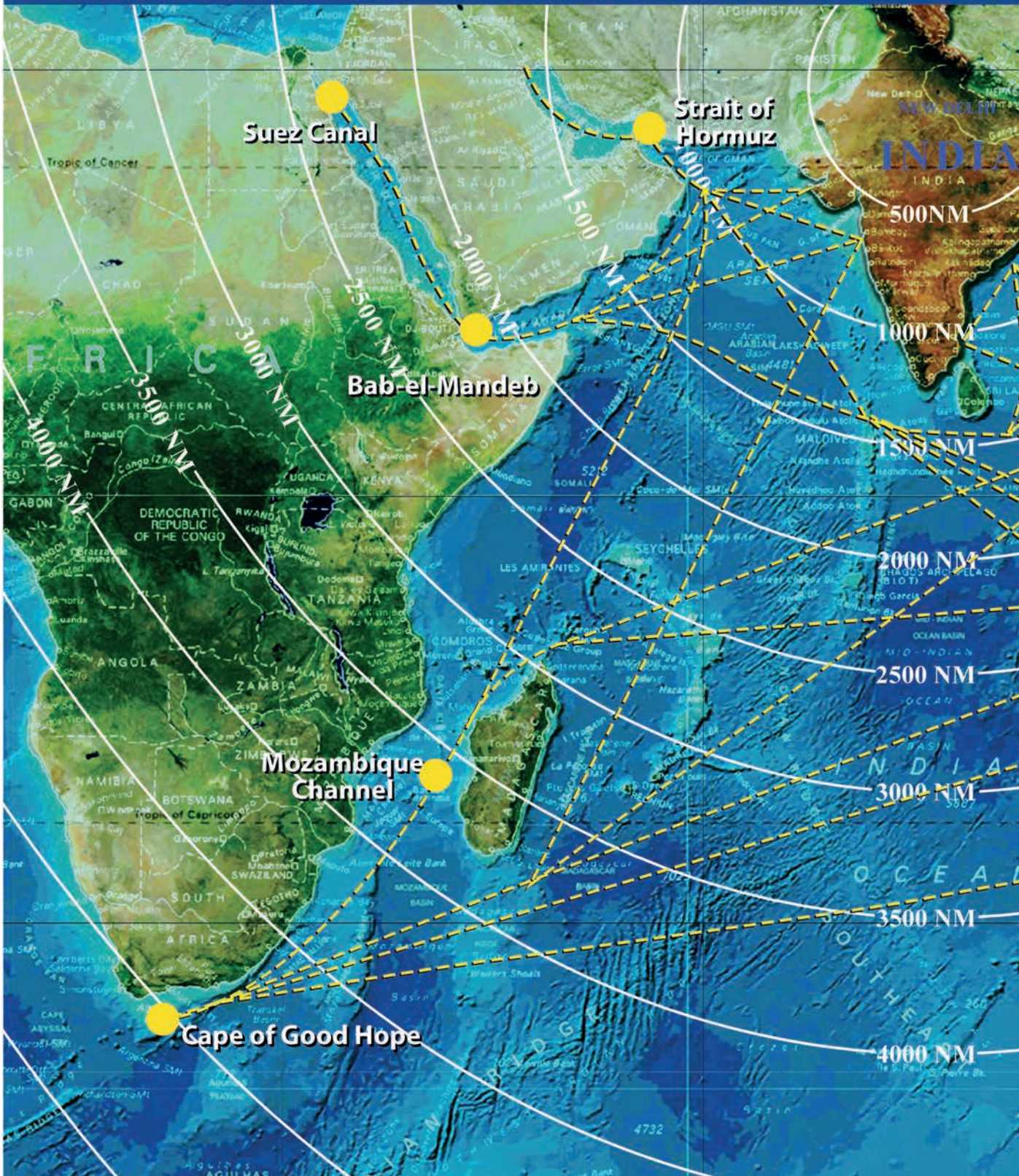
We begin with a definition of the *IN*'s main roles. Their performance in the period under review is discussed in a later section of this chapter.

The *IN* discharges four main roles—military, diplomatic, constabulary and benign. The *IN*'s strategy in discharging its roles is centred on: (i) providing deterrence against nuclear, conventional, sub-conventional and increasingly grey-zone operations against our national interests; and, in case deterrence fails, (ii) the *IN* will, either singularly or jointly, counter and neutralize threats to achieve political objectives.

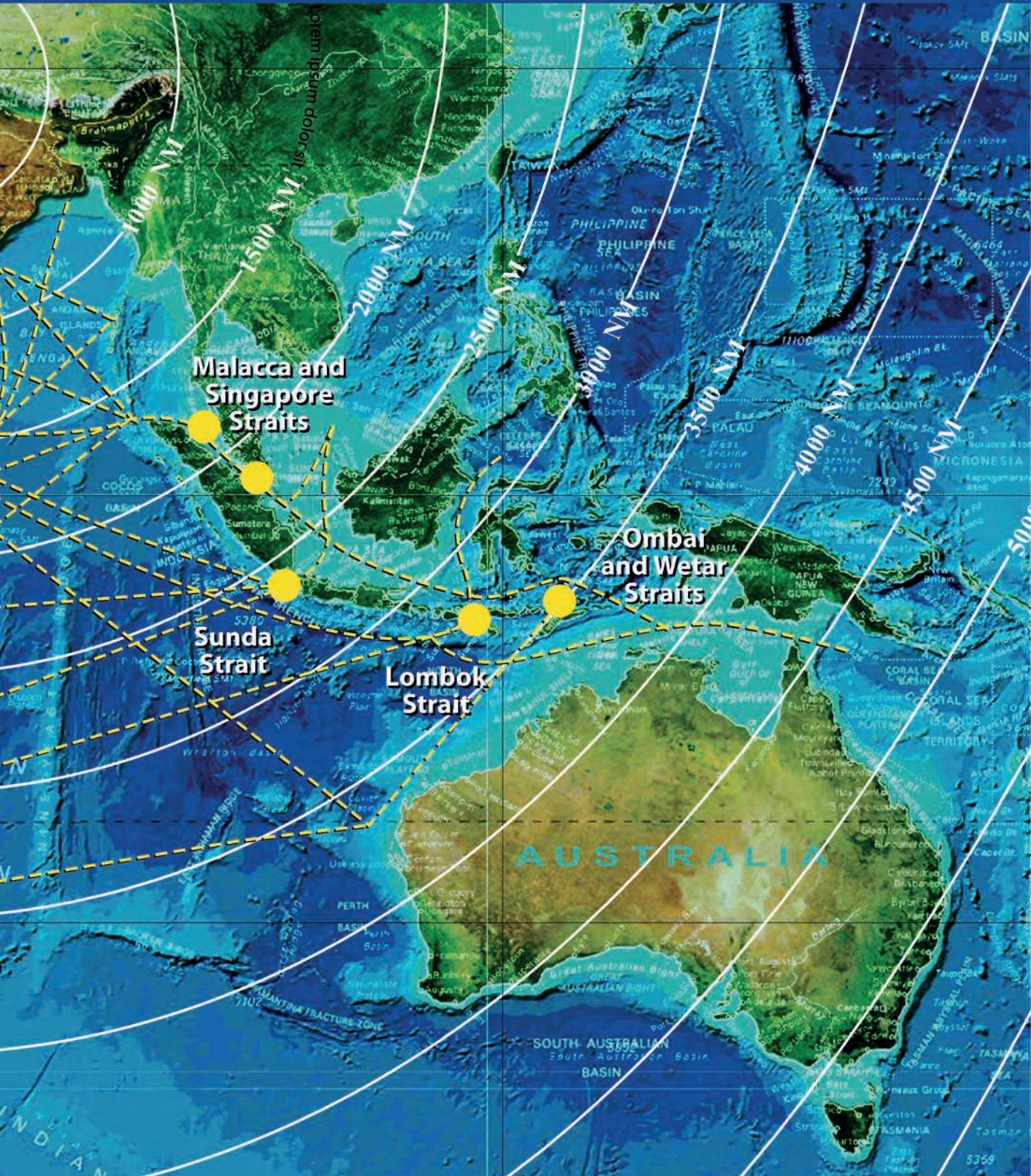


Indian Navy: Ensuring Secure Seas

IOR : India's Geost



Strategic Advantage



Military: Maintenance of peace, security and stability in the maritime domain is vital to the creation of a peaceful periphery, to facilitate unhindered economic growth and socio-economic well-being. The *IN*'s military role is characterized by threat or use of force at or from the sea. This includes the application of maritime power in both offensive operations (against enemy forces, territory and trade), and defensive operations (to protect own forces, territory and trade). The military role is performed through the accomplishment of specific military objectives, missions and tasks.



Indian Navy: A Multi-Domain Force

Diplomatic: Naval diplomacy entails the use of Naval forces in support of foreign policy objectives to build 'bridges of friendship' and strengthen international cooperation on the one hand, and to signal capability and the intent to deter potential adversaries on the other. Navies inherently lean towards performing a diplomatic role on account of two main characteristics. The first is their status as a comprehensive instrument of their nation's sovereign power, whereupon their very presence in or off a certain area signals the nation's political intent and commitment to pursue national interests in that region. Hence, their presence or absence can be calibrated to send a political message to potential friends and foes alike. The second characteristic that facilitates the Navy's diplomatic role lies in the attributes of the maritime forces, such as access, mobility, sustenance, reach, flexibility and versatility.



INS *Mumbai* at Anchorage off Comoros

Constabulary: Increasing incidence and range of maritime crime has brought into sharp focus the constabulary role that navies have to perform. The significance of this role may be gauged from the fact that for a third of the world's navies, this is a major facet of their functioning. In the constabulary role, forces are employed to enforce the law of the land, or to implement a regime established by an international mandate. The range of tasks that the *IN* has to undertake in the constabulary role range from Low Intensity Maritime Operations (LIMO) to maintaining good order at sea. This further includes the aspect of coastal security, as part of India's overall maritime security.



IN Armed RHIB on Patrol

Constabulary tasks at sea are neither the *IN*'s primary nor sole mandate. With the establishment of the CG in February 1977, law enforcement aspects of the constabulary role within the Maritime Zones of India (MZI) have been transferred to the CG.

Benign: The ‘benign’ role is so named because violence has no part to play in its execution, nor is the potential to apply force a necessary prerequisite for undertaking these operations. Examples of benign tasks include HADR, Search And Rescue (SAR), ordnance disposal, diving assistance, salvage operations and hydrographic surveys. Maritime forces, because of their quick mobilization, are especially useful in the early stages of a crisis for providing relief material, first aid and succour in coastal areas. Much of the capacity to perform these functions is derived from the mobility, reach and endurance inherent in Naval task forces, coupled with their unique sealift capability.



First Responder: INS *Airavat* at Madagascar under Operation Vanilla

⚓ Global Scan

A Decade of Geopolitical Churn: While we may make attempts to describe the geopolitical and geo-economic events in the span covering this volume, viz. 2011 to 2021, it is difficult to circumscribe them within a set period, given the fluid nature of such developments and given that they are invariably linked to certain preceding activities or events. Therefore, due allowance has been made for events before 2011 too, and events up to 2008 have been considered in etching the geopolitical canvas for this volume.

The year 2008–09 was particularly significant as it witnessed the global economic crisis; the terror attacks in Mumbai on 26 November 2008; the rise in piracy off the Gulf of Aden, which in turn resulted in a global response through increased maritime presence in the western IOR, including Chinese deployment of ships in this region on a continuous basis; and the signing of a civil nuclear energy cooperation agreement deal signed by between India and the United States of America (USA) were all consequential in shaping the strategic and economic alignments in the IOR over the last decade.

Similarly, events up to 2020–21 have also been considered—in particular the COVID-19 pandemic, a ‘black swan’ event and its many consequences; the border tensions between China and India; and new moves on the diplomatic chessboard, which saw several pieces being rearranged.

The events in between these two sets of years (2008–09 and 2020–21) have been described in some detail in the succeeding paragraphs and, when taken together, are seen to characterize a decade of geopolitical churn. The geo-strategic environment during this period is also characterized by simultaneous competition and cooperation, resulting in the blurring of conventional divisions.

As a result, today, nations with vastly differing international views and divergent national interests can be significant trade partners and share many areas of convergence. There can also be issues of wide divergence, including security perceptions, with nations that may be traditional friends. This could emanate from their policies concerning a third country that may maintain postures that are inimical to India’s security interests.

This chapter focuses on the global geopolitical changes that moulded India’s choices in the decade under review and ultimately shaped the *IN*’s missions, objectives and operational trajectory.

The Geo-economic Dimension of Maritime Security: The global financial crisis of 2008 can be considered a turning point in history, as it marked a shift in the centre of gravity of economic activity from USA and Europe, to Asia. China, on the back of its entry to the World Trade Organization (WTO) in 2001, recorded high gross domestic product (GDP) growth and emerged relatively unscathed from the global financial crisis. In 2008, it successfully hosted the Olympics, seen by many as a huge success in sharp contrast to the global economic turmoil.

China's annual GDP, which stood at US \$2.77 trillion in 2000, almost tripled to US \$7.55 trillion by the end of 2010. By 2020, its GDP stood at US \$14.62 trillion.⁵ To set things in perspective, USA's annual GDP in 2000 stood at US \$13.7 trillion, in 2010 at US \$16.32 trillion, and in 2020 at US \$19.27 trillion.⁶ In 2010, China surpassed Japan to emerge as the world's second-largest economy, and is now increasingly competing to displace USA as the world's largest economy.

India's GDP touched US \$468.39 billion in 2000, US \$1.675 trillion in 2010, and US \$2.62 trillion in 2020.

This global economic rebalancing has resulted in realigning trade globally. In 2001 over 80 per cent of nations had a larger volume of trade with USA, than with China. By 2018, it was down to a little over 30 per cent—with 128 out of 190 countries trading more with China than with USA.⁷ Similarly, in 2001, global seaborne trade stood at 5.83 billion tonnes;⁸ by 2020, it had reached 10.7 billion tonnes.⁹ Over 50 per cent of global trade passes through the waters of the Indo-Pacific region and contributes to over 62 per cent of global GDP. Emerging Asian economies have clearly become the primary drivers of global growth, shifting the economic centre of gravity to this region.¹⁰

India's trade with China grew from US \$3.6 billion (in 2001)¹¹ to US \$86 billion (in 2020).¹² Approximately 95 per cent of India's trade by

volume, 68 per cent by value,¹³ and almost all of its energy imports are moved through the sea.

The South China Sea has emerged as a maritime area of contestation as China asserted historic claims on the basis of a 'nine-dash line' at the United Nations (UN) in 2009.¹⁴ Among many economic interests and trade linkages in this region, India has always espoused the need for removing barriers from legitimate maritime trade and economic activity¹⁵ and has also emphasized the need to adhere to the UN Convention on the Law of the Sea (UNCLOS) 1982.¹⁶

In 2011, reports emerged that China had objected to an investment by India's Oil and Natural Gas Corporation (ONGC) in oil exploration blocks off Vietnam.¹⁷ While India maintained its right to engage in the region in line with international laws, norms and conventions, (then) Chief of Naval Staff Admiral DK Joshi noted, 'Not that we expect to be in those waters very frequently, but when the requirement is there for situations where the country's interests are involved, for example ONGC Videsh, we will be required to go there and we are prepared for that.'

India's trade and energy security, development of its deep-sea mining areas, and supporting its scientific research stations in Antarctica are all dependent on its Sea Lines of Communication (SLOCs). This has lent a pivotal role to the security of India's SLOCs and increased the importance of sea routes, international shipping and freedom of navigation to India's national interests. The *Indian Maritime Security Strategy* (2015), therefore, prioritizes increased focus on safety and security of seaborne trade in the IOR, freedom of navigation and increased cooperation with regional navies, to counter common threats at sea.¹⁸

Unipolarity, Bipolarity, Multipolarity and the Rise of the Indo-Pacific: Consequent to the disintegration of the erstwhile Union of Soviet

Socialist Republics (USSR) towards the end of 1991, USA remained the sole economic and military superpower for almost two decades. However, China increasingly bridged the gap in this period, both in economic and military strength. On the economic front, China committed itself to greater economic integration through trade pacts such as the Regional Comprehensive Economic Partnership (RCEP) and through its flagship Belt and Road Initiative (BRI).

On the military front, while USA remained focused on terrestrial counter-insurgency and counter-terrorism (CI/CT) operations, China, on the back of its unprecedented economic growth and deep entrenchment into global supply chains via the BRI and the Maritime Silk Route (MSR), turned its attention towards the modernization of the People's Liberation Army (PLA).

Of the PLA's branches, the PLA Navy, in the last five years alone, has added more than ninety major combatant platforms and is expected to grow to 400 ships by 2025.¹⁹ It has now surpassed the US Navy in terms of the number of ships and also operates the largest fleet of CG and maritime militia vessels. This shrinking power differential between USA and China—coupled with China's activities in

the western Pacific, such as building artificial islands; their militarization; its disregard for the June 2016 Permanent Court of Arbitration award as null and void;²⁰ increased grey-zone tactics in the South²¹ and East China Sea²²—has led USA to undertake a 'strategic recalibration'²³ of its priorities.

The USA's pivot to Asia, its trade war with China, the re-architecting of the US Pacific Command (PACOM) to Indo-Pacific Command (INDOPACOM) in May 2018,²⁴ the signing of the Abraham Accords,²⁵ its withdrawal from Afghanistan in August 2021, the repositioning of Israel from the US European Command to the US Central Command in September 2021,²⁶ a greater emphasis on burden-sharing by allies and partners, the implementation of the Pacific Deterrence Initiative (PDI),²⁷ Global Force Posture Review,²⁸ and the rebranding of the Hub-and-Spoke model to Integrated Deterrence,²⁹ are all efforts to reprioritize in an increasingly bipolar world.

While the global geopolitical canvas may increasingly look bipolar, there is a noticeable tilt against choosing sides. This has led to the rise of many interest-based minilaterals. The resurgence of the Quad, the announcement of AUKUS,³⁰ Indo-Pacific strategies by the Association of Southeast



Exercise Malabar 2020

Asian Nations (ASEAN), USA, Japan, Australia, France, Germany, the Netherlands and the European Union (EU), as well as the United Kingdom's (UK's) tilt to the Indo-Pacific and its exit from the EU, have all contributed to the rise of multipolarity.

Indian Maritime Security Strategy (2015) notes:

Shaping a broader maritime environment to counter the flow of threats and challenges from one area to another requires inclusive and cooperative efforts between the nations concerned and their maritime forces. These efforts are facilitated by maritime engagements, as a principal means of conducting maritime diplomacy. Interaction with maritime forces of different nations will be pursued by the Indian Navy to mitigate traditional concerns and address non-traditional threats for mutual benefit. These will also serve to enhance mutual understanding, cooperation, and interoperability between the maritime forces. These engagements will come in the form of Port Visits, Personnel Exchanges, Staff Talks and Interactions, Exercises with Foreign Navies, Maritime Assistance, Operational Interactions, High-Level Maritime Strategic Interactions.³¹

Climate Change: The Inter-governmental Panel on Climate Change (IPCC)—a UN body for assessing the science related to climate change—in its Working Group I, *Sixth Assessment Report* of August 2021,³² notes that the world will probably reach or exceed 1.5 degrees Celsius of warming within the next two decades, and not by the end of the century as forecast by the Paris Agreement on Climate Change in 2015.³³

Limiting global warming to 1.5 degrees Celsius by the end of the century is still within reach, notes the report, but this will require transformational change. It emphasizes that no region will be left untouched by the impacts of climate change, with enormous human and economic costs that far outweigh the costs of action. Many consequences of

climate change will become irreversible over time, most notably melting ice sheets, rising seas, species loss and more acidic oceans.

The fact that about 40 per cent of humanity lives within 100 kilometres (km) of a coast, further accentuates the vulnerability of the coastal population.³⁴ The report also predicts that the frequency of more dangerous and destructive extreme weather events (than we are seeing today in 2022) is likely to increase, and therefore a sense of urgency must prevail to invest much more in building resilience.

All of these consequences have a maritime or littoral dimension.

As far as India is concerned, there are both external and domestic dimensions to its Climate Change policy. This has been articulated through two key documents: (i) the *National Action Plan on Climate Change* (NAPCC), adopted in June 2008; and (ii) [India's] *Intended Nationally Determined Commitments* (INDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in October 2015.

The NAPCC has an essentially domestic focus, while the INDC is a statement of intent on Climate Change action.³⁵ As the IOR is the locus of natural disasters, accounting for about 70 per cent of the world's share,³⁶ it was imperative for India to take the initiative, albeit without compromising on economic growth or the needs of its population.

In November 2015, India and France launched the International Solar Alliance (ISA), at the twenty-first session of the United Nations Climate Change Conference of the Parties (COP21) in Paris. Heads of about 120 nations affirmed their participation in the ISA to dedicate efforts for the promotion of solar energy. In a sign of increasing acceptance of the India-led ISA initiative, in November 2021, USA became the 101st country to sign the framework agreement of the ISA, to catalyse global energy transition through the use of solar energy.³⁷

In September 2019, India announced a global Coalition for Disaster Resilient Infrastructure (CDRI) at the UN Climate Action Summit. Developed through consultations with more than thirty-five countries, the CDRI envisions enabling a measurable reduction in infrastructure losses from disasters, including extreme climate events.³⁸ In November 2021, at the twenty-sixth meeting of the Conference of the Parties in Glasgow (COP26), India declared that by 2030 it would enhance non-fossil energy capacity to 500 GW, meet 50 per cent of its energy requirements from renewable energy, reduce its total projected carbon emissions by one billion tonnes, reduce the carbon intensity of its economy by less than 45 per cent over 2005 levels, and aim to achieve Net Zero by 2070.³⁹

India has also invested in overseas scientific research stations. It has two stations in Antarctica: Maitri (set up in 1989), and Bharati (commissioned in 2012). These are valuable research sources that provide crucial information about climate and weather patterns on which the Indian monsoon and, consequently, a substantial portion of the nation's economy depends. India commissioned its first Arctic research station, Himadri, in 2008, which also conducts research in various fields with an emphasis on climate change.

Indian Maritime Security Strategy (2015) notes:

While the magnitude of change and consequences may remain largely speculative, their impact may be suddenly experienced, across dispersed areas. The current trends of natural disasters, which may get exacerbated with climate change, place increased demands on capability for HADR, SAR, and aid to civil authorities, all under the benign roles of the Indian Navy and Coast Guard. At the same time, in keeping with domestic laws and international trends, the need for imbibing 'clean and green' marine technologies in naval projects and infrastructure will need to be addressed.

The document also adds:

In line with the growing global and national requirement to balance environmental and security concerns, the Indian Navy will progress incorporation of sustainable green technologies, towards achieving a zero-carbon footprint. In this regard, the Indian Navy has already implemented an 'Environment Conservation Roadmap' for its bases, which seeks to achieve charted 'green initiatives'. These include Green Rating for Integrated Habitat Assessment (GRIHA), Leadership in Energy and Environmental Design (LEED), and Indian Green Building Council (IGBC) norms.



IN on the Green Path

The COVID-19 Pandemic: The COVID-19 pandemic was the most catastrophic global event since the Second World War, with more than 5.4 million deaths globally by end of 2021 and counting. As the virus spread around the world, borders and supply chains were shut down, oil prices crashed, the aviation industry was grounded, and the world turned inwards. Lockdowns were announced in most countries, with the objectives of flattening the virus-spread curve, freeing the healthcare system from overloading, thus saving precious lives. However, lockdowns led to severe disruption in economic activities. The grounding of the aviation sector meant greater dependence on seaborne trade.

The pandemic brought to the fore issues such as supply chains, global governance, social responsibility and even ethics. National security acquired a more expansive definition, which in the pre-COVID era focused on defence, politics, diplomacy, intelligence, resources and technology. In the expansive definition, health security, food security, resilience of supply chains and self-reliance gained currency—all under the umbrella of strategic autonomy.

In response to COVID-19, India invoked Epidemic Act 1897, in March 2020. The country also went into a nationwide lockdown from 24 March 2020. The Armed Forces, including the *IN*, continued to operate during this challenging time. Protocols were established especially keeping in mind the contagious nature of the disease, and closed working environments were established onboard ships and submarines. While details of the actions taken by the *IN* during the COVID-19 pandemic are dealt with in a separate chapter in this volume, it is crucial to mention that the *IN*, and the nation as a whole, treated the pandemic not just as a disaster requiring HADR but also as a means of issuance of a non-traditional threat to India's security interests.

In October 2021, speaking at the Pune International Centre, India's National Security Adviser (NSA) Ajit Doval noted that 'the COVID pandemic has the potential of impacting the collective psyche of the people, economic well-being... [it] generates social imbalances that can threaten political stability, economic growth and the capacity of a nation to resolutely meet external and internal threats.'⁴⁰

Technology and Geopolitics: Until a few decades ago, the development of new technologies was commercially driven. Today technology has become a driver of international contestation and a premium element of national security. Autonomous weapons, bio-weapons, artificial intelligence (AI)

and cyber warfare are receiving increasing attention. Technological advances create asymmetries that could be exploited in warfare.

The successful use of UAVs during the Azerbaijan-Armenia conflict in end-2020 provided the world with a glimpse into the future of warfare asymmetry. The ability of drones to operate autonomously and in swarm configuration has thrown up new challenges, as counter-strategies lag in technological advancement. The increasing proliferation of unmanned systems to non-state actors has also been a growing cause of concern. The use of drones in the September 2019 attack on the Saudi Arabian Aramco oil facilities, destroying nearly 50 per cent of that country's global supply of crude oil, as well as the attack back home on the Jammu Air-Force Base in June 2021, are examples of the use of unmanned systems by non-state actors.

The risk of cyber-attacks on critical installations has been a cause of concern, once again by both state and non-state actors. As per IBM's *X-Force Threat Intelligence Index 2020*, attacks on Operational Technology saw a 2000 per cent year-on-year increase in 2019.⁴¹

Indian Maritime Security Strategy (2015) notes:

The Indian Navy will opt for 'leapfrogging' technologies, to ensure that a high percentage of assets with contemporary equipment remains capable of combating emergent threats. This will be pursued by encouraging building of partnerships with suitable Organizations, both national and foreign, and supporting focused investments in R&D of new technologies, preferably with a compatible market interface for product support.⁴²

It goes on to add that the applications of Unmanned Marine Systems (UMS) in warfare have been steadily growing in recent years. Investments in UMS (air, surface and underwater)

technology and military application systems will accordingly be pursued towards uses for maritime security. It also notes that the increasing role of cyber space and technologies in our security architecture makes cyber security of critical importance. The development of cyber security technologies and systems will be a priority area for the Indian Navy.

⚓ Regional Scan

Threats to India's national security can be categorized as 'traditional' or 'non-traditional'. Traditional sources of threat refer to states with organized military capability and resources, which harbour adversarial posture and inimical intent towards India. Hostile actions by such states, in terms of scale, scope and intensity of force that may be applied, would potentially be of a higher order. Traditional sources, therefore, pose a higher level of threat to India's national security interests. The likely sources of traditional threats would be from states with a history of aggression against India, and those with continuing disputes or maintaining adversarial postures to India's national interests. Traditional sources of threat could also include nations that have the capability to harm Indian interests and display inimical intent against India.

The possibility of sudden politico-economic and military events leading to changes in the regional security environment would also need to be considered. The decade under review has seen no reduction in the potential threat from traditional sources, necessitating continued focus on appropriate military preparedness for all contingencies.

On the other hand, non-traditional threat sources do not have the capability of a state actor, but non-traditional threats receiving cooperation, support and sponsorship from traditional entities, has resulted in blurring the distinct separation between the two sources of threat. This change has

necessitated a strategic and tactical reframing of India's national security paradigm.

Regional geopolitical changes have affected India and, in turn, the *IN's* maritime security strategy.

Indian Maritime Security Strategy (2015) notes:

The prevailing geo-strategic environment is characterized by simultaneous competition and cooperation, resulting in the blurring of conventional divisions. Increased tension in our areas of interest can adversely impact maritime security and prosperity in those areas and adjacent waters, with a consequent effect on India's maritime interests.⁴³

Cross-Border Terrorism: India's security-cum-threat calculus has seen considerable change in the last two decades.

■ **The Mumbai '26/11' Attacks (2008):** In addition to persisting threats and challenges of the 'traditional' nature, such as border engagements with Pakistan and China, and the emerging threat of a two-front war, the 'non-traditional' threat of cross-border terrorism presented a new dimension to security calculus when Pakistani terrorists carried out the cowardly '26/11' terrorist attacks in Mumbai in 2008. As a nation that traditionally focused on terrestrial security threats, India was jolted in the maritime domain.

The Cabinet Committee on Security (CCS), in February 2009 considered a proposal by the Ministry of Defence (MoD) for strengthening the nation's maritime security. The proposal had been formulated after due consultation with all the concerned ministries, including the Ministry of Home Affairs (MHA). It was decided therein that the *IN* would be designated as the authority responsible for overall maritime security. Additionally, a decision was taken towards the formation of a National Command Control

Communication and Intelligence (NC³I) Network, an Information Management and Analysis Centre (IMAC), and Joint Operations Centres (JOCs) with fifty-one nodes connecting various *IN* and CG stations all along the Indian coastline, including island territories.

Despite the global outcry post the Mumbai-2008 attacks, cross-border terror attacks on Indian soil continued in the last decade: Mumbai (2011),⁴⁴ Delhi (2011), Hyderabad (2013),⁴⁵ Srinagar (March,⁴⁶ and June 2013), Jammu (2015 and 2018), Punjab (2015),⁴⁷ Pathankot (2016),⁴⁸ Pampore, Nagrota,⁴⁹ and Sunjuwan (2016), Uri (2016),⁵⁰ Amarnath Yatra (2017),⁵¹ and Pulwama (2019),⁵² among others.

- **Afghanistan Post-August 2021:** The withdrawal of NATO and allied forces from Afghanistan in August 2021 affected India's security concerns not only in the terrestrial domain but also in the maritime domain. This was evident through the increase in the illegal activities and narcotics flow from the Makran coast. The *Indian Maritime Security Strategy* (2015) notes: 'The Indian Navy has duly evolved, and revised strategy that provides dedicated focus on: (i) Combating the persisting nature of threats emanating at and from the sea; (ii) Strengthening mechanisms for interagency coordination and cooperation; and (iii) Developing a seamless, cohesive maritime security framework'.⁵³

China in the IOR and South Asia: China has increased its economic and military presence in the region. It is now the largest trading partner of all of India's neighbours, barring Bhutan. On the military front, the PLA Navy has stationed a task force of three ships in the Gulf of Aden for anti-piracy operations since 2008. In 2014, a Chinese submarine docked at Colombo Port in Sri Lanka,⁵⁴

China opened a military base in the Republic of Djibouti, and in 2017, China acquired a ninety-nine-year lease right over Sri Lanka's Hambantota Port.

In pursuit of its stated goal to transform its mission—from 'defence of near seas to protection missions in the far seas'⁵⁵—PLA Navy ships have made twenty port visits to the IOR every year since 2010.⁵⁶ Under its current force posture, the PLA Navy is capable of maintaining eighteen ships in the region.⁵⁷ Speaking at the Raisina Dialogue in January 2020, (then) Chief of Naval Staff Admiral Karambir Singh noted that over 80 per cent of Chinese defence exports are to countries in the IOR.⁵⁸ Additionally, seabed mining areas in the Indian Ocean have also been allocated to China (South-West Ridge), thus resulting in increased presence of Chinese scientific and hydrographic survey vessels in the IOR.

India and China were also involved in military stand-offs—at Doklam in June 2017,⁵⁹ and the ongoing stand-off at India's Northern and North-Eastern frontier beginning early 2020.⁶⁰

Being a resident, responsible and capable maritime power within the IOR, the *IN*'s engagement with its maritime neighbours is multifaceted. The thrust has been on promoting collective maritime security through collaborative capacity building.

***Indian Maritime Security Strategy* (2015) notes:**

The Navy will effectively engage friendly maritime forces in the Indian Ocean Region and beyond, through port visits, bilateral interactions, training initiatives, operational exercises and technical support arrangements, in order to establish a cooperative framework that promotes mutual understanding and enhances security and stability in the region, helps in shaping a favourable and positive maritime environment, to enhance net security therein and to also counter common threats at sea.⁶¹



Creating Bridges of Friendship

Non-traditional Threats and Growing Concentration of Military Forces: There has been a rise in regional tensions and instabilities in some areas of maritime interest to India, particularly in the Persian Gulf and Gulf of Aden littoral, in recent years. These have already had a spillover effect from land to sea, giving rise to non-traditional threats and maritime security challenges, such as piracy, terrorism, and humanitarian crises necessitating NEOs. A number of leading and regional powers maintain a military presence in the IOR to safeguard their interests, through military bases and forward-deployed units. Over the past few years, the *IN* has observed the presence of over a hundred warships from about twenty-plus extra-regional navies operating in the IOR, at any time. There has been continued militarization of the region and proliferation of weapons among non-state groups, including private security organizations.

These factors have complicated the regional maritime security environment. Increased tension in areas of interest, adversely impacting maritime security and prosperity in those areas

and in adjacent waters, with a consequent effect on India's maritime interests.

- **Piracy and Armed Robbery:** Piracy and armed robbery at sea have flared up in new regions over the past decade, and remain a significant threat to international shipping and seafarers. The constant challenge of unregulated activities and inherent limitations in Maritime Domain Awareness (MDA) on the seas, hold a possibility of their linking with or enabling other threats. Since the turn of this century, piracy has seen a rise in areas of maritime interest to India. These include the Gulf of Aden and the Somali Basin, from where piracy has spread across the Arabian Sea.

Piracy stemming from Somalia has many more dimensions, such as collaboration between pirates and Islamist insurgent groups,⁶² increased incidences of illegal, human and arms trafficking, and Illegal, Unreported and Unregulated (IUU) fishing among others. The ability of non-state actors to link up together and the relative insufficiency of legal measures

and mechanisms pose a recurring threat to seaborne trade and maritime security.

By 2011, the High-Risk Area (HRA) denoted for high incidences of piracy came to within 500 nautical miles (nm) of the Indian mainland. Capacity building, intelligence sharing, global cooperative mechanisms and sustained maritime presence by foreign military powers, including India, has resulted in substantial decrease in incidences of piracy, thus pushing the HRA envelope westwards and away from India's maritime zones. Notwithstanding this success, its resurgence continues to remain a challenge and will continue to be a traditional tasking of navies, as has been the case for over hundreds of years.



Ready to Protect India's Maritime Interests

- **Smuggling and Trafficking:** The use of unregulated movements at sea for seaborne trafficking in narcotics and arms remains a constant threat to India, with the 'Golden Crescent' to its west and 'Golden Triangle' to its east. The modus operandi of trafficking/smuggling by sea is transshipment of consignments on the high seas into local craft, which then mingle with dense fishing activity offshore and can land at any of the myriad landing points ashore.

The menace of drug trafficking could throw up new challenges with the withdrawal of NATO and allied forces from Afghanistan in August 2021. The sea route has been in use

for human trafficking/smuggling, not only in relation to India's close maritime neighbours, but also across the seas and into extended maritime neighbourhood. This places a constant demand on various maritime agencies and their resources. The threat of nuclear material being smuggled in, or from, our maritime neighbourhood also needs to be a constant consideration, requiring monitoring of the maritime spaces.

- **Illegal, Unreported and Unregulated Fishing:** Such fishing activities disregard established international and national laws on conservation and management of living marine resources. Today, IUU fishing is a global issue, threatening ocean ecosystems and sustainable fishing. It carries the risk of seriously damaging or even destroying living resources, marine environment and biodiversity. Thus, IUU fishing works to the detriment of the marine ecosystem and the future livelihood of the coastal populace, and could lead to shortages, tensions and further activities that increase insecurity.

The advent of piracy off Somalia has been linked to the fall in fish stocks and hence sustenance of traditional fishermen, due to substantial IUU fishing by mechanized foreign vessels. Such fishing also affects India, as it impacts food and related economic security, as well as the livelihood of the Indian fishing community. Fisherfolk from India, Pakistan and Sri Lanka, inadvertently transgressing into each other's fishing territories, are also a source of tension.

The June 2020 report on China's distant-water fishing fleet by the Overseas Development Institute, UK, notes:

[...] fishing fleets of many industrialised nations, having depleted fish stocks in domestic waters, are now travelling further to meet the rising demand for seafood. Much of this distant-water fishing (DWF) takes place

in the territorial waters of low-income countries. As well as competing against the interests of local people, DWF in low-income countries is often associated with unsustainable levels of extraction, and with illegal, unreported and unregulated (IUU) fishing activities.⁶³

Over 600 Chinese fishing vessels operated in the IOR, beyond India's Exclusive Economic Zone (EEZ), every year from 2015 to 2019.

The UN's Food and Agriculture Organization (FAO) notes:

IUU fishing undermines national and regional efforts to conserve and manage fish stocks and, as a consequence, inhibits progress towards achieving the goals of long-term sustainability and responsibility. Moreover, IUU fishing greatly disadvantages and discriminates against those fishers that act responsibly, honestly and in accordance with the terms of their fishing authorizations.⁶⁴

Indian Maritime Security Strategy (2015) notes:

In formulating the overall maritime security strategy and its constituents, there are certain aspects that would overlap and others that would remain common, as these are essential to the viability and success of each strategy, in an interlinked manner.⁶⁵

Energy Security: India's energy security has a vital role in national development, and is highly dependent on the seas. Nearly 80 per cent of the country's crude oil requirement is imported by sea, using the international sea-lanes across the Indian Ocean. Another 11 per cent of national crude-oil requirement is met from offshore energy sources within the Indian EEZ. Offshore gas fields also contribute to 80 per cent of India's domestic natural gas production. In addition, India has built up substantial refining

capacity and exports refined petroleum products to many other countries by sea. The products of the petroleum industry account for about 15 per cent of our GDP. Taking into account the total oil imports by sea, offshore oil production and petroleum exports, the country's cumulative 'sea dependence' for oil is estimated to be about 93 per cent.⁶⁶



Protecting Vital Offshore Assets

In May 2019, USA decided not to extend the six-month secondary sanctions waiver for countries importing Iranian oil. Consequently, India—which imported 430,000 barrels per day (bpd) from Iran in 2017—virtually stopped all oil imports from Iran. This gap was partly fulfilled by India increasing its imports from USA, from 40,000 bpd in 2018 to 184,000 bpd in 2019. Extended energy sourcing chains required the *IN* to provide an extended security net. The September 2019 attack by non-state actors on the Saudi Arabian Aramco oil facilities, destroying nearly 50 per cent of its global supply of crude oil, also served as a stark reminder of the growing risks of some of the prominent oil installations, refineries, and other critical infrastructure, especially near the coastline.

The major issues highlighted in the global and regional geopolitical scans earlier have had a multifold impact on the way India interacts with other nations regionally and globally. India has undertaken a series of policy adjustments that will have a lasting impact on the current decade and

beyond. These national-level readjustments have been complemented by a corresponding refining of maritime strategies by the Indian Navy.

The following section looks briefly at some prominent strategic readjustments—external and internal—undertaken during the decade under review.

⚓ External Readjustment

India has recalibrated its engagements, not only with the world but also regionally. These include policies and initiatives such as: Neighbourhood First,⁶⁷ Look East and Act East,⁶⁸ Look West,⁶⁹ India–EU Connectivity Partnership,⁷⁰ India–EU Maritime Security Dialogue,⁷¹ and India–UK Maritime Dialogue.⁷²

India has also undertaken trilateral dialogues: India–Australia–Japan for Supply Chain Resilience Initiative (SCRI),⁷³ India–Japan–Italy,⁷⁴ India–Australia–France,⁷⁵ and India–Sri Lanka–Maldives (and revitalization of the Colombo Security Conclave).⁷⁶

The inception of the Forum for India–Pacific Island Cooperation (FIPIC) in 2014,⁷⁷ the admission of India as a member to the Shanghai Cooperation Organization in June 2017, and as an Observer to the Indian Ocean Commission in March 2020, along with other initiatives at a bilateral level, have all

served to shape India’s global and regional outlook. As India’s External Affairs Minister S Jaishankar noted in October 2019, ‘The global order... will be increasingly multipolar as distribution of power broadens and alliance discipline dilutes.’⁷⁸ India, once the principal proponent of non-alignment, has now moved into strategic multi-alignment. Some of the major initiatives mentioned above and having connotations for India’s maritime security and interests are discussed below.

Neighbourhood First: In pursuit of maintaining its position as ‘First Responder’ and ‘Preferred Security Partner’ in the region, India’s maritime vision for its Neighbourhood First policy is: Security and Growth for All in the Region (SAGAR). In March 2015, speaking at the commissioning ceremony of MCGS *Barracuda*, Prime Minister Narendra Modi, stated, ‘We often define regional groupings around landmass. The time has come for a strong grouping around the Indian Ocean. We will pursue this with new vigour in the years ahead.’⁷⁹ Advantage of geography and capacity allows India to utilize maritime diplomacy as a vector for some of the salient initiatives steered by India towards this inclusive maritime security and prosperity. These initiatives are enumerated in the succeeding paragraphs.

■ **Bangladesh:** India was one of the first countries to recognize Bangladesh and establish



INS *Sumedha* and *Kulish* in Bangladesh: Hosts Veterans of 1971 Liberation War

diplomatic relations immediately after the latter's independence in December 1971. As part of development assistance, India has extended three Lines of Credit to Bangladesh in the last eight years amounting to US\$ 8 billion, for the development of infrastructure in various sectors, including roads, railways, shipping and ports.⁸⁰ The longstanding maritime boundary dispute between India and Bangladesh was settled as per the arbitration award of 7 July 2014,⁸¹ in which the UN tribunal awarded Bangladesh 19,467 sq. km of the 25,602 sq. km sea area under dispute within the Bay of Bengal.⁸²

While acknowledging the verdict, India stated:

The settlement of the maritime boundary will further enhance mutual understanding and goodwill between India and Bangladesh by bringing to closure a long pending issue. This paves the way for the economic development of this part of the Bay of Bengal, which will be beneficial to both countries.⁸³

This settlement paved the way for cooperation in the maritime sector. The conduct of the Indian Navy–Bangladesh Navy Co-ordinated Patrol (CORPAT) since July 2018,⁸⁴ is a step towards enhancing collective maritime security and capability. Subsequently in 2019, India and Bangladesh also commenced bilateral naval exercise Bongsagar.

- **Sri Lanka:** India and Sri Lanka share a long history of cooperation. However, relations have been marred by the following: frequent fishing transgressions by both sides; Sri Lanka's hosting of a Chinese submarine in 2014; the issue of national reconciliation of Sri Lanka's ethnic issue; the leasing out by Sri Lanka of Hambantota Port to China Merchants Ports Holding Company Ltd. for a period of ninety-nine years;⁸⁵ and the

more recent cancellation of the tripartite MoU between Sri Lanka, India, and Japan for the development of the East Container Terminal (ECT) at Colombo Port, in February 2021.

Notwithstanding these issues, India and Sri Lanka strive to cooperate at multiple levels. Given the proximity of the territorial waters of both countries, especially in the Palk Straits and the Gulf of Mannar, incidents of straying of fishermen are common. Both countries have agreed on certain practical arrangements to deal with the issue of bona fide fishermen of either side inadvertently crossing the International Maritime Boundary Line.⁸⁶ India and Sri Lanka strive to cooperate at multiple levels. Seats for the largest contingent of foreign trainees, in Indian defence training establishments, are reserved for Sri Lanka. Ships for the Sri Lankan Navy are being built by Indian shipyards. As two maritime countries in the Indian Ocean, India and Sri Lanka have a shared interest in ensuring maritime security and safety. Identifying the value of such cooperation, India, along with Sri Lanka and the Maldives, established the Colombo Security Conclave in 2020 (discussed further below). SLINEX (Sri Lanka India Naval Exercise) is a series of bilateral exercises between the navies of the two countries. The first edition of the Exercise took place in 2005, and the eighth edition took place in 2020.



SLINEX 2019

- **Myanmar:** Over the years, the security dimension has been one of the principal pillars

of cooperation between India and Myanmar. India has cooperated with Myanmar to subdue separatist elements in northeastern Indian states, while in June 2015, the Indian

Fast Attack Craft for Mauritius. More recently, in 2020, the transfer of a Dornier aircraft and an Advanced Light Helicopter, Dhruv, on lease were also announced.



6th Indo-Myanmar CORPAT (March 2018)

Army conducted operations across the border in Myanmar against separatist insurgents.⁸⁷ Indian shipyards have also constructed fast-attack craft for Myanmar, while in October 2020, a Kilo-class submarine was transferred to Myanmar on lease. Since 2013, India and Myanmar have also conducted CORPAT jointly, to address issues of terrorism, IUU fishing, drug trafficking, human trafficking, poaching and other illegal activities inimical to the interest of both nations.

- **Mauritius:** As a key part of India's Neighbourhood First policy, Mauritius has received India's support for a wide range of projects over the years. As part of enhancing collective maritime security, India has helped establish the Coastal Surveillance Radar System (now rechristened as Coastal Radar System); transferred Dornier 228 aircraft and Chetak Helicopters; and Indian shipyards have built Fast Interceptor Boats and



Indian Navy Divers Operating with Mauritius National Coast Guard

In his analysis of India–Mauritius ties in a paper written in 2015, *Modi in Mauritius: Renewing a Special Relationship*, former diplomat M. Ganapathi notes:

On the basis of a request from Mauritius, an agreement was concluded in 1974, whereby Indian Naval and Air Force officers have been posted in Mauritius. An Indian Naval officer commands

the MNCG. A mixed team of Naval and Coast Guard officers are seconded to the MNCG. The Head of the MPHS is an officer of the Indian Air Force. He is assisted by a couple of Air Force officers. A team of Marine Commandos officers has also helped the MNCG with commando and deep-sea diving training. Indian Army officers have been deputised to Mauritius under India's ITEC programme to assist in setting up defence infrastructure. An Indian officer has advised the Mauritius government on national security. India also provides assistance for undertaking EEZ surveillance and hydrography survey.⁸⁸

- **Maldives:** India and the Maldives share ethnic, linguistic, cultural, religious and commercial links steeped in antiquity. India was among the first to recognize the Maldives after its independence in 1965 and to establish diplomatic relations with the country.⁸⁹ The Maldives' proximity to the west coast of India (it is barely 70 nm away from Minicoy and 300 nm away from India's west coast), and its situation at the hub of commercial

sea-lanes running through the Indian Ocean (particularly the 8-degree North and 1.5-degree North channels) imbues it with significant strategic importance to India. India also provides the largest number of training opportunities for the Maldivian National Defence Force (MNDF), meeting around 70 per cent of its defence training requirements. A comprehensive Action Plan for Defence was also signed in April 2016 to consolidate a defence partnership.

Defence cooperation extends to the areas of Joint Exercises, MDA, gifting of hardware, and infrastructure development. Key projects underway include a Composite Training Centre for MNDF, Coastal Radar System and the construction of a new Ministry of Defence headquarters. Additionally, identifying the value of such cooperation, India along with Sri Lanka and Maldives established the Colombo Security Conclave in 2020 (discussed further below). India also provides assistance for undertaking EEZ surveillance and hydrography survey.



Handing Over of Expanded Coastal Radar System to the Maldives
Source: External Affairs Minister, Dr S Jaishankar

■ **Vietnam:** The bilateral relationship was elevated to the level of a Strategic Partnership in 2007, and in 2016, further to a Comprehensive Strategic Partnership. Speaking at the India–Vietnam leaders’ (Virtual) Summit in December 2020, Prime Minister Narendra Modi viewed the bilateral relationship through a ‘long-term and strategic view’, adding that ‘Peace, Stability and Prosperity are our shared purpose in the Indo-Pacific region.’⁹⁰

During the (Virtual) Summit, the two countries also adopted the Joint Vision for Peace, Prosperity and People,⁹¹ a framework to guide the future development of bilateral relations. Embedded in this vision is the bilateral endorsement of UNCLOS, and it stated, ‘Both leaders emphasized the legal framework set out by the UNCLOS within which all activities in the oceans and seas must be carried out, and that UNCLOS is the basis for determining maritime entitlements, sovereign rights, jurisdiction and legitimate interests over maritime zones.’

Defence cooperation has grown in the last decade, with wide-ranging contacts between the Services and military-to-military exchanges, including visits of senior military leaders, capacity building and training programmes, and bilateral exercises. The well-established bilateral annual exchange framework includes Defence Policy Dialogue at the deputy-ministerial level; Services staff talks; and high-level meetings between the two CGs. Cooperation in UN Peacekeeping Operations is also a key area of our cooperation.

Defence industrial collaboration is another fast-growing facet of Indo-Vietnamese defence engagements. The collaboration focuses on defence modernization and capacity building driven by India’s Defence Line of Credit to Vietnam, totalling US \$600 million. As part of this Defence Line of Credit, India handed over

the first High-Speed Guard Boats to Vietnam in December 2020. This delivery is part of the twelve High-Speed Guard Boats being constructed for Vietnam Border Guard Command. Five boats are being built by M/s Larsen & Toubro (L&T) in India, and seven by Hong Ha Shipbuilding Company in Vietnam,⁹² with the transfer of technology to aid capacity building.



Defence Minister at the Handing Over Ceremony of L&T Built High-Speed Guard Boats

Tabulated below are the Defence Line of Credits extended to Mauritius, Vietnam, Bangladesh, Comoros and the Maldives during 2011–21.

Country	Year	Amount (US\$ million)
Mauritius	February 2014	46
Mauritius	May 2014	18
Vietnam	September 2014	100
Vietnam	September 2016	500
Bangladesh	April 2019	500
Comoros	October 2019	20
Mauritius	February 2021	100
The Maldives	February 2021	50

Source: EXIM India Bank and Other Government of India Open Sources

India–Russia Relations: Russia has been a longstanding and time-tested partner for India. Since the signing of the Declaration on the India–Russia Strategic Partnership in October 2000, ties between the two countries have acquired a qualitatively new character with enhanced levels of cooperation in almost all areas of the bilateral relationship, including political, security, defence, trade and economy, science and technology, and culture.

Under the Strategic Partnership, several institutionalized dialogue mechanisms operate at both political and official levels to ensure regular interaction and follow-up on cooperation activities. In 2010, the Strategic Partnership was elevated to the level of a Special and Privileged Strategic Partnership. In 2012, India leased the nuclear submarine *Chakra* from Russia,⁹³ which was used by the *IN* till the end of 2021. India’s new aircraft carrier, *INS Vikramaditya*, and three ships of the *Teg* Class were also purchased from Russia and inducted into the *IN* in last decade.

Indo-Russian military technical cooperation has evolved from a buyer-seller framework to one involving joint research, development and production of advanced defence technologies and systems. The BrahMos Missile System, as well as the licensed production in India of SU-30 aircraft and T-90 tanks, are examples of such flagship cooperation.



IN Ship Undertakes BrahMos Missile Firing

Furthering this, an agreement on cooperation for the production of spare parts for Russian/

Soviet military equipment was signed during the Twentieth Annual Bilateral Summit in Vladivostok in September 2019.⁹⁴ The first meeting of the 2+2 Dialogue of Foreign and Defence Ministers, and the meeting of the Inter-Governmental Commission on Military & Military-Technical Cooperation, were both held in New Delhi on 6 December 2021.⁹⁵ In December 2021, India also started receiving the delivery of the S400 Triumph Missile System.⁹⁶

Exercise Indra Navy is a series of biennial bilateral exercises between the navies of the two countries. The first edition of the Exercise took place in 2003 and the twelfth edition took place in 2021.

India–USA Relations: The Civil Nuclear Agreement between India and USA that culminated in 2008 was a landmark event in the history of Indo-US relations. Nearly thirty years after USA imposed sanctions on India for testing its first nuclear weapon in 1974, this deal in 2008 had paved the way for further defence and technology cooperation. In the decade under review, India and USA have signed multiple agreements to cement cooperation in the areas of defence and technology.

Some salient agreements are: the Defence Technology and Trade Initiative (2012);⁹⁷ Framework for India-US Defence Relationship (initially signed in 2005 and renewed in 2015);⁹⁸ Joint Strategic Vision for Asia Pacific and Indian Ocean Region (2015);⁹⁹ Logistics Exchange Memorandum of Agreement (2016);¹⁰⁰ Framework for US–India Cyber Relationship (2016);¹⁰¹ Communications Compatibility and Security Arrangement (2018);¹⁰² Industrial Security Annex (2019);¹⁰³ and the Basic Exchange and Cooperation Agreement (2020).¹⁰⁴

In June 2016, USA recognized India as a Major Defence Partner, and this commits the former to: (i) facilitate technology-sharing with India to a level

commensurate with that of its closest allies and partners; and, (ii) develop industry collaboration for defence co-production and co-development.¹⁰⁵ In July 2018, USA granted Strategic Trade Authorization Tier 1 status to India, enabling American companies to export more high-technology items to India. In September 2018, India and USA launched the inaugural ministerial-level 2+2 Dialogue (Defence and Foreign Affairs).¹⁰⁶ Subsequently, in January 2020, India and USA elevated their relation to a Comprehensive Global Strategic Partnership.¹⁰⁷

The maiden Indo-US joint Tri-Services HADR Exercise—Tiger Triumph—was held in November 2019.¹⁰⁸ The induction of Landing Platform Dock INS *Jalashwa* in 2007,¹⁰⁹ Long-Range Maritime Patrol Aircraft (P-8Is) since 2013,¹¹⁰ and MH-60R Multi Role Helicopters (MRH) first delivered in 2021,¹¹¹ are some of the prominent milestones. The two countries also concluded an MoU on Space Situational Awareness in April 2022.¹¹²

In November 2019, USA brought out a document—*A Free and Open Indo-Pacific: Advancing a Shared Vision*¹¹³—that identified a strong Indo-US partnership as vital to USA's Indo-Pacific vision. Additionally, the US Strategic Framework for the Indo-Pacific,¹¹⁴ declassified in January 2021, aims to accelerate India's rise and capacity to serve as net provider of security in the IOR.

India–France Relations: India and France have traditionally had close and friendly relations. In 1998, the two countries entered into a Strategic Partnership, which reflects their convergence of views on a range of international issues and their close and growing bilateral relationship. The principal areas of cooperation are Defence and Security, Space, and the use of Civil Nuclear Energy. New areas of cooperation include security in the IOR, working together on climate change (including the ISA), and sustainable growth and development among others.¹¹⁵



Exercise Tiger Triumph 2019
Source: US Embassy in India

Following a contract signed in 2012 for six Scorpene submarines from M/s DCNS (now Naval Group) to be built under technology transfer at Mazagaon Docks Ltd.¹¹⁶ The first submarine, INS *Kalvari*, was commissioned in December 2017.¹¹⁷ The most recent to be commissioned was INS *Vela* (the fourth) in November 2021.¹¹⁸

In September 2016, India and France entered into an inter-governmental agreement for purchase of thirty-six Rafale jets by India in flyaway condition. By end-2021, thirty jets were delivered to India, and the delivery of the remaining six was being progressed as per schedule in 2022. In March 2018, India and France also released the 'Joint Strategic Vision of India-France Cooperation in the Indian Ocean Region',¹¹⁹ as well as the reciprocal logistics support agreement for the Armed Forces.¹²⁰ The *French Indo-Pacific Strategy*,¹²¹ published in May 2018 and later updated in August 2021, identifies India as a central partner to France's strategy on the Indo-Pacific.



A P75 Class Submarine Underway

Exercise Varuna comprises a series of biennial bilateral exercises between the navies of the two countries. The first edition of the Exercise took place in 1993 and the twentieth edition took place in 2022. In 21 April, the *IN* also participated in the French-hosted multi-lateral maritime Exercise La Pérouse.

India–Israel Relations: Prime Minister Narendra Modi undertook a historic first-ever visit to

Israel by an Indian Prime Minister from 4–6 July 2017.¹²² During this visit the relationship between the two countries was upgraded to a Strategic Partnership. India and Israel have established bilateral consultation mechanisms in all sectors of collaboration, including water, agriculture, counter-terrorism, and defence.¹²³ Traditionally, Israel has been a dependable and major supplier of advanced defence equipment and systems catering to a range of military needs. Some of the major supplies include missile systems, air-defence systems, Heron, Searcher and Haroop UAVs, and a range of sensor and radar suites.



Eye in the Sky: Heron UAV

In February 2014, India and Israel signed three important agreements—Mutual Legal Assistance in Criminal Matters; Cooperation in Homeland Security; and Protection of Classified Material. There is a Joint Steering Committee under the Cooperation in Homeland Security, aided by thematic Joint Working Groups.

Since 2015, Indian Police Service (IPS) officer trainees have been visiting the Israel National Police Academy every year for a week-long 'foreign exposure' training at the end of their training at the National Police Academy, Hyderabad.¹²⁴ Israel has been one of India's top sources of high-end defence technologies such as drones, air defence systems, a wide range of missiles and other advanced weapons

and sensors. Additionally, as many as nine Israeli defence manufacturing companies have entered into joint ventures with their counterparts in India to manufacture a wide range of weapon systems, including missiles, communications, electronic warfare, homeland security systems, UAVs, cyber-security systems and many others.¹²⁵

India–Japan Relations: In August 2000, India and Japan assigned their relationship the status of a Global Partnership. This was elevated to a Global and Strategic Partnership in 2006, and then to a Special Strategic and Global Partnership in 2014. There are also various frameworks of security and defence dialogue between India and Japan, including meetings between the foreign and defence ministers (2+2 meeting), annual dialogue between the defence ministers, and a dialogue between CGs of both nations. In November 2019, the first 2+2 ministerial meeting was held in New Delhi.¹²⁶

Many agreements were concluded with Japan in the last decade including: the Comprehensive Economic Partnership Agreement (2011); Agreement on Transfer of Defence Equipment and Technology (2015); Security Measures for the Protection of Classified Military Information (2015); Agreement on Social Security (2016); and Agreement for Cooperation in the Peaceful Uses of Nuclear Energy (2017).

India and Japan also concluded an Acquisition and Cross-Servicing Agreement (ACSA) in September 2020, which concerns reciprocal provision of supplies and services between the Self-Defence Forces of Japan (JSDF) and the Indian Armed Forces (IAF). India has been the largest recipient of Japanese Overseas Development Assistance (ODA) Loans for the past two decades.¹²⁷

JIMEX series of exercises between the two countries commenced in January 2012, with special focus on maritime security cooperation. Japan also formally joined the annual Exercise Malabar in

2015,¹²⁸ and in August 2016 the Japanese Free and Open Indo-Pacific Vision¹²⁹ identified India as a key partner for maritime safety, security and connectivity.



INS *Shakti* and JMSDF Ship *Inazuma*
Participate in JIMEX-2018

India–Australia Relations: The bilateral relationship between the two countries has undergone evolution in recent years, developing along a positive track into a friendly partnership. The two nations have much in common, each being a pluralistic democracy looking to expand economic engagement and increase high-level interaction. The two countries now share greater convergence of views on various international issues, such as international terrorism and a shared approach to rules-based order in the Indo-Pacific.

In 2009, India and Australia established a Strategic Partnership, including a Joint Declaration on Security Cooperation. This was further elevated to a Comprehensive Strategic Partnership in 2020. The first-ever bilateral maritime exercise, AUSINDEX, was conducted in Visakhapatnam and the Bay of Bengal in September 2015.

In June 2020, Australia and India decided to upgrade their Secretaries 2+2 Dialogue (Defence and Foreign Affairs) to the ministerial level.¹³⁰ A major threshold of defence engagement was crossed when, for the first time, the IAF participated in Exercise Pitch Black in Darwin in 2018, involving air forces from several countries. India's participation was additionally significant for staging the first mid-air refuelling

of an IAF combat aircraft (Su-30MKI) by a Royal Australian Air Force (RAAF) aircraft (KC-30A), revealing a degree of coordination not previously demonstrated. India and Australia also concluded a Mutual Logistic Support Arrangement in 2020.¹³¹

Australia's *Foreign Policy White Paper*, published in November 2017,¹³² identifies India as a pre-eminent maritime power among Indian Ocean

after progressing from its earlier roles of Sectoral Partner (1992), Dialogue Partner (1996) and Summit-Level Partner (2002). ASEAN and India share land and maritime borders, which provides significant scope for enhancing connectivity through land, air and the sea.

At the 2015 ASEAN-India Summit, India announced a US \$1 billion Line of Credit for



Indian and Australian Navies at AUSINDEX: Forging Deeper Cooperation

countries and as being of first order importance to Australia.

India–ASEAN Relations: India's relationship with ASEAN is a key pillar of its Act East Policy. India became a Strategic Partner of ASEAN in 2012,

connectivity and infrastructure projects in ASEAN.¹³³ Currently, there are thirty Dialogue Mechanisms between India and ASEAN, cutting across various sectors. Prominent ones at the multilateral level include the East Asia Summit; the ASEAN Regional Forum; the Expanded



India-ASEAN: Converging Strategic Interests

ASEAN Maritime Forum;¹³⁴ and ASEAN Defence Ministers' Meeting-plus-Dialogue, which is an extension of the ASEAN Defence Ministers' Meeting (ADMM; the highest defence consultative and cooperative mechanism in ASEAN).¹³⁵ The *ASEAN-India Joint Statement on Cooperation on the ASEAN Outlook on the Indo-Pacific for Peace, Stability, and Prosperity in the Region* was released in October 2021.¹³⁶ ASEAN has also published the *ASEAN Outlook on the Indo-Pacific (AOIP)* in June 2019.¹³⁷

The Quad: The Quadrilateral Security Dialogue traces its roots to the 2004 tsunami in the Indian Ocean, when officials of four countries—India, USA, Japan and Australia—came together to coordinate relief response. Despite the convergences between the four on a wide range of issues, the Quad launched in 2007 ended in early 2008, largely due to apprehensions voiced by China, and the nature of the bilateral relation of each of the Quad countries with China.

However, the nature of the bilateral relation of each of these countries with China, has since changed. For India—repeated border stand-offs with China; the China Pakistan Economic Corridor impinging on India's sovereignty;¹³⁸ China blocking India's bid for Nuclear Supplier's Group membership;¹³⁹ China blocking the designation of Masood Azhar as 'global terrorist';¹⁴⁰ the unexplained massing of PLA troops in violation of agreements, and the unilateral change by China in the status-quo at the Line of Actual Control (LAC) starting early 2020¹⁴¹—have all put India-China relations 'under significant stress'.¹⁴²

Similarly, USA has now identified China as a strategic competitor,¹⁴³ and has concerns about the latter's economic abuses, aggressive, coercive action, human rights, intellectual property, and global governance.¹⁴⁴

Australia–China relations also faced significant headwinds following—the call by Australia for an enquiry into the zoonotic source of the COVID-19 pandemic;¹⁴⁵ the ensuing trade restrictions placed by China;¹⁴⁶ its detention of Australian citizens;¹⁴⁷ and its political interference in Australia.¹⁴⁸



Growing Strategic Convergence:
Quad Leader's Summit (September 2021)

Source: PMO

The re-emergence of the Quad can be seen by many, including China, as a response to Chinese assertiveness. On the other hand, the deliverables announced by the Quad after its elevation to a leaders-level summit in March 2021,¹⁴⁹ and their further amplification in September 2021,¹⁵⁰ are deliverables for global goods. Officials from the Quad countries have emphasized that the grouping is not anti-China,¹⁵¹ but intended as a diplomatic network of democratic polities, market economies and pluralistic societies.¹⁵² The Quad countries have now committed to meet annually at the foreign ministers and leaders level every year.¹⁵³

India–EU Relations: The first India–EU Summit was held in Lisbon on 28 June 2000. The relationship was upgraded to a Strategic Partnership during the fifth India–EU Summit held at the Hague in 2004. On 20 November 2018, EU's strategy on India—*A Partnership for Sustainable Modernization and Rules-based Global Order*¹⁵⁴—was issued by the

European Commission. The strategy views India as an emerging global power that plays a key role in the current multipolar world and a factor of stability in a complex region and calls for greater political, security and defence cooperation between the EU and India.

As a result, India and the EU have gradually enhanced bilateral exchanges and cooperation in the field of defence and security. This includes mutual ship visits, collaboration in escorting humanitarian-aid ships and exchanges among military officials, including the EU Military Committee. The Information Fusion Centre–Indian Ocean Region in New Delhi (IFC-IOR) has also linked-up with the Maritime Security Centre–Horn of Africa (MSC-HOA) established by the EU Naval Force (NAVFOR).¹⁵⁵

At the fifteenth India–EU Summit in July 2020, the two countries endorsed the ‘India–EU

Strategic Partnership: A Roadmap to 2025’ as a common roadmap to guide joint action and further strengthen the India–EU Strategic Partnership. The roadmap identified maritime security and connectivity as key areas of cooperation.¹⁵⁶ Subsequently, India and the EU held their first maritime security dialogue in January 2021¹⁵⁷ and launched the India–EU connectivity partnership in May 2021.¹⁵⁸ In June 2021, the *IN* and EUNAVFOR conducted their maiden Exercise *IN-EUNAVFOR*, a joint Naval exercise.¹⁵⁹

The EU strategy for cooperation in the Indo-Pacific published in September 2021,¹⁶⁰ identifies India as a partner for deeper engagement, a core connectivity partner, and a pilot partner for engagement under Enhancing Security Cooperation in and with Asia, which covers counter terrorism, cyber security, maritime security and crisis management.



Shaping the Maritime Security Environment Together

The Colombo Security Conclave: A decision to establish the Colombo Security Conclave was taken in November 2020 at a National Security Advisers-level meeting of India, Sri Lanka and the Maldives to forge closer cooperation on maritime and security matters among the

with the Bay of Bengal Initiative for Multi-Sectorial Technical and Economic Cooperation (BIMSTEC), would seek to revitalize and crystallize regional cooperation affected by stagnation at the South Asian Association for Regional Cooperation (SAARC).



Colombo Security Conclave: Fostering Collective Maritime Security
Source: High Commissioner of India in the Maldives

three Indian Ocean countries.¹⁶¹ Subsequently, at the fifth Deputy-NSA Level Meeting of the Colombo Security Conclave held on 4 August 2021, members (India, Sri Lanka and the Maldives) and Observer States (Mauritius, Seychelles, and Bangladesh) agreed on four pillars of cooperation: Maritime Safety and Security; Terrorism and Radicalization; Trafficking and Organized Crime; and Cyber Security and Protection of Critical Infrastructure.¹⁶² In March 2022, Mauritius was included as the fourth member nation at the fifth NSA-level meeting in the Maldives, where HADR was added as the fifth pillar of cooperation.

With the expansion, both in scope and quorum, the Colombo Security Conclave along

‘The Quad’ in the West (I2U2): The geopolitical space created by the Abraham Accords,¹⁶³ and more specifically by the ‘Treaty of Peace, Diplomatic Relations and Full Normalization between the United Arab Emirates and Israel’¹⁶⁴ signed in September 2020, provided an opportunity for India, Israel, USA and the UAE to hold the first-ever meeting of foreign ministers in October 2021¹⁶⁵—a proposition that may have seemed improbable a few years back. The four countries agreed to expand economic and political cooperation in the West, East, and Asia, including through trade, combating climate change, energy cooperation, increasing maritime security, and global public health in relation to the COVID-19 pandemic.

Maritime Security: India continues to engage with partners on maritime security through a range of bilateral and multilateral frameworks such as the *IN*-conceived Indian Ocean Naval Symposium (IONS),¹⁶⁶ the Indian Ocean Rim Association (IORA) and the Indian Ocean Commission (IOC). In 2011, when India held the IORA chair, maritime safety and security was included as a key focus area for the forum.¹⁶⁷ SAGAR, espoused in March 2015,¹⁶⁸ and the Indo-Pacific Oceans Initiative (IPOI),¹⁶⁹ announced at the November 2019 East Asia Summit, have become India's holistic strategies for IOR and the larger Indo-Pacific.

India established IFC-IOR in December 2018 to enhance collaborative maritime safety and security through better information sharing. In September 2020, India also joined the Djibouti Code of Conduct/Jeddah Amendment as an Observer;¹⁷⁰ the code provides a basis for cooperation against piracy and armed robbery. In August 2021, India, serving as the chair at the United Nations Security Council, chaired an open debate on 'Enhancing Maritime Security: A Case for International Cooperation'.¹⁷¹ India's key recommendations for enhanced maritime security included:

- Elimination of barriers to legitimate maritime trade;
- Peaceful settlement of disputes;
- Response to natural disasters and threats from non-state actors;
- Conservation of maritime environment; and
- Responsible maritime connectivity.

Indo-Pacific Division in MEA: Given the increasing salience of the Indo-Pacific construct in global discourse, MEA established a new Division for the Indo-Pacific in April 2019. Its twofold purpose is to help consolidate India's vision of the Indo-Pacific across all Government of India bodies; and to provide substantive policy elements

and programmes for that vision. The Indo-Pacific Division deals with matters relating to the Indo-Pacific, India-ASEAN relations, East Asia Summit, Indian Ocean Rim Association, Asia-Europe Meeting, Mekong-Ganga Cooperation and Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy.¹⁷²

⚓ Internal Readjustment

The profound geopolitical changes of the last decade have resulted in India undertaking significant internal readjustments. As NSA Ajit Doval noted at the sixth Pune Dialogue in October 2021,¹⁷³ the very definition of national security has now broadened significantly to include social, economic, technology, digital, health and cultural dimensions, post the events of the last few years. Though there are many layers to this overall concept of national security, this section would primarily focus on the domain of national security from a military perspective, with some interplays in other domains especially in the field of technology and critical infrastructure.

Defence Reforms

- **Appointment of CDS and Creation of DMA:** The February 2000 Kargil Review Committee recommended a comprehensive review of the National Security framework for improved decision-making in defence matters. The Committee recommended the creation of the post of Chief of Defence Staff (CDS). In December 2019, the Cabinet Committee on Security decided to implement this decision and also to create the Department of Military Affairs (DMA), which would operate within the MoD with effect from 1 January 2020.¹⁷⁴

Additionally, the CDS is also Secretary, DMA; Permanent Chairman of the Chiefs of Staff Committee; and acts as the Principal

Military Adviser to Raksha Mantri (RM) on all Tri-Services matters, so as to provide impartial advice to the political leadership. The overarching principle of this arrangement is that work related to military affairs is to be done only by the DMA, while the Department of Defence, MoD will deal with issues related to the defence of the country, including defence policy.

Specifically, the DMA has been mandated to:

- Promote jointness in procurement, training and staffing for the Services through joint planning and integration of their requirements (through Integrated Capability Development Plan);
 - Facilitate restructuring of Military Commands for optimal utilization of resources by bringing about jointness in operations, including through establishment of joint/theatre commands; and
 - Promote use of indigenous equipment by the Services.
- **Theatre Commands:** The Armed Forces currently have seventeen single-Service commands spread across the country. The Indian Army and the IAF have seven commands each, while the *IN* has three. It is envisaged that the creation of theatres would involve merging the existing commands (except the Udhampur-based Northern Command). In 2001, the Government of India created an integrated theatre command at the Andaman and Nicobar Islands—the first unified Command in the Indian Armed Forces with all three wings and the CG included in this command.

Currently, the work of establishing Theatre/Joint Commands is in progress based on Study Group reports and an Implementation Roadmap is under deliberation. A Tri-Services Joint Working Group has also been setup to study and work out the nuances of integrating

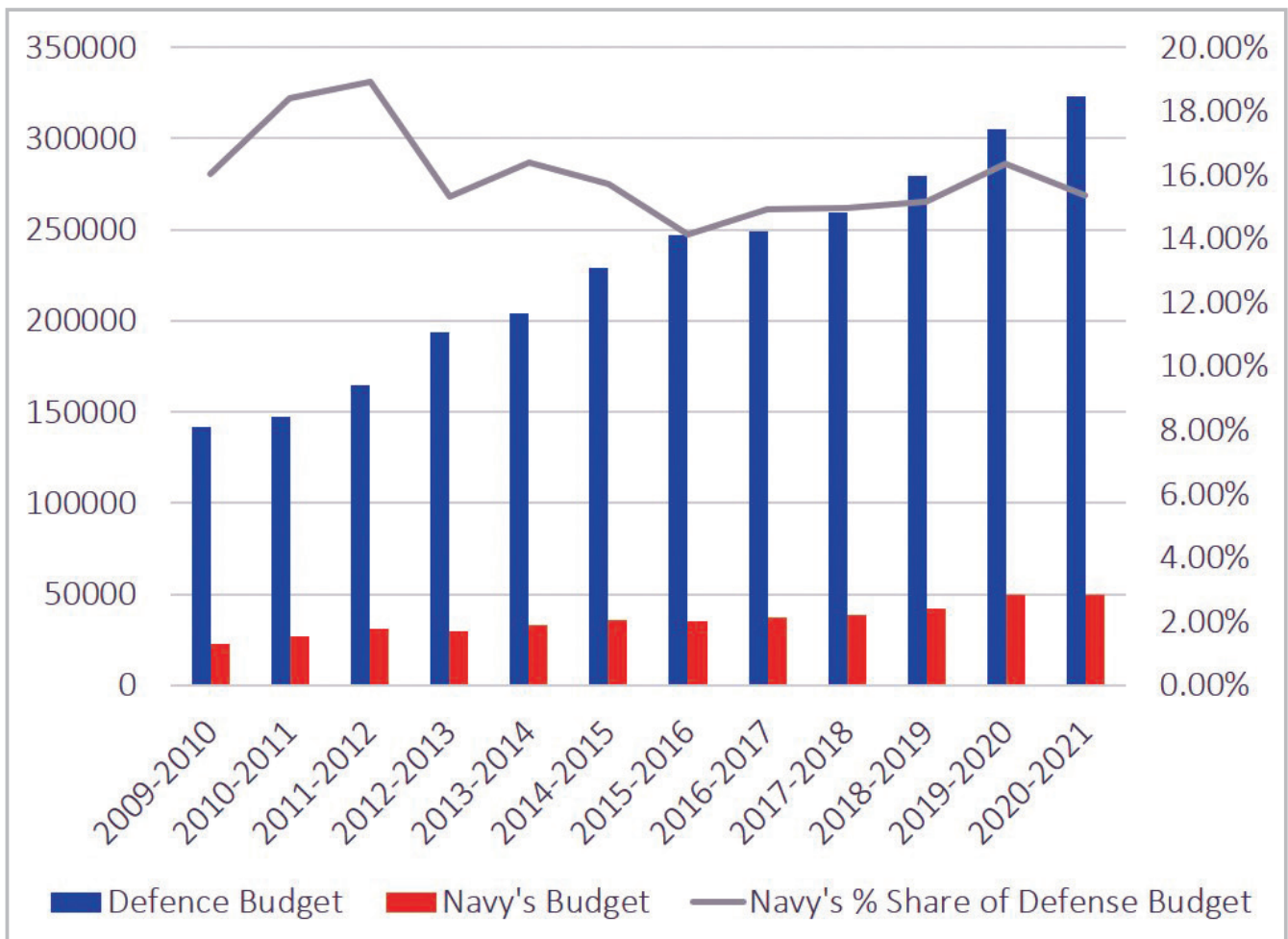
Communication Networks between the Services. Speaking at the India International Centre in September 2021 at the conclave on ‘Towards Progressive Defence Reforms’,¹⁷⁵ (then) Chief of Defence Staff (Late) General Bipin Rawat had stated that:

‘In the unified theatre command structure, the theatre commanders will be the operational commanders and will report to the Chairman Chief of Staff Committee (CCSC), where the Service chiefs are members along with the CDS that makes the war-plans. Additionally, the three service Chiefs focus on the ‘Raise, Train, Sustain’ functions of the individual services.’

He also added that once implemented, the three services will be unified under the

- Air Defence Command;
 - Maritime Theatre Command;
 - Western Theatre Command; and
 - North Eastern Theatre Command.
- **Capital Management for Defence Forces:** The Defence Budget for the year 2020–21 represented 2.1 per cent of India’s GDP.¹⁷⁶ Growing impetus on socio-economic development goals and the expanding definition of national security is likely to present budgetary constraints for the Defence Services going ahead. In order to mitigate these challenges without compromising on capabilities, in September 2020 the Government of India introduced the option to lease equipment and systems under the Defence Acquisition Procedure 2020.

The three Services are actively pursuing leasing options to bridge immediate gaps in capabilities, and some of the examples include leasing of the Predator Drones from General Atomics (US) and a Request for Information for leasing of Mine Counter Measure Vessels.¹⁷⁷ The Integrated Capability Development Plan,



Share of Navy's Budget in Defence Budget

being formulated at the DMA, will also aid in bringing in optimal resource allocation to the three services vis-à-vis capability needed. Additionally, in light of the border stand-off with China, in July 2020,¹⁷⁸ the Government of India authorized the Services with emergency procurement powers for progressing urgent Capital Acquisition Cases up to Rs 300 crore. In September 2021, the MoD also promulgated the Delegation of Financial Powers to Defence Services (DFPDS) 2021—a revision to the previous version published in 2016. The financial powers of field organizations have increased by five to ten times, whereas a 10 per cent increase was authorized for the Service Vice Chiefs.¹⁷⁹

- **Technology Adoption:** Acknowledging the potential of AI to drive military advantage, the Government of India set up a multi-stakeholder

Task Force to study issues surrounding the strategic implications of AI in the national security perspective, and in the global context. The Task Force was constituted in February 2018, under the Chairmanship of Shri N. Chandrasekaran, Chairman, Tata Sons. It comprised members from the Government, Services, Academia, Industry Professionals, and Start-ups.

The Task Force submitted its final report and recommendations on 30 June 2018.¹⁸⁰ An annual sum of Rs 100 crore has been earmarked for AI-based projects from the budgetary allocations of each of the three services.¹⁸¹

- **Indigenous Defence Industry:** India has actively pursued indigenization in the defence sector through 'Make in India' by laying greater emphasis on setting up its own defence manufacturing facilities. An early attempt to create capacity for

cutting-edge defence manufacturing in India, was the adoption of the Offset Policy in 2005, which mandated foreign vendors to invest 30 per cent of the purchase value in India for purchases above Rs 300 crore. In 2016, the Government of India expanded the offset clause to include Government-to-Government deals, which was however subsequently waived in the *Defence Acquisition Procedure (DAP) 2020* published in September 2020.¹⁸² All purchases above Rs 2,000 crore are now required to meet 30 per cent offset commitments.

Externally, despite not being a signatory to the Nuclear Non-Proliferation Treaty (NPT), India was admitted to the Missile Technology Control Regime (MTCR) in June 2016,¹⁸³ as the thirty-fifth member; and in December 2017 as the forty-second member of the Wassenaar Agreement.¹⁸⁴ This will help Indian companies undertake exports and boost their effort to be a part of the global supply chain on defence products. These readjustments are particularly vital, as India has set out an ambitious target of US \$5 billion in defence exports by 2024–25.¹⁸⁵ India has actively pursued increasing defence exports through the biennial DEFEXPO organized by the MoD, in collaboration with the three Services, DRDO, and other stakeholders. With the aim of leveraging the economic opportunities present and achieving self-reliance in aerospace and the defence sector, the Government of India announced the setting up of two Defence Industrial Corridors, one in Uttar Pradesh and the other in Tamil Nadu, in the Union Budget of 2018–19.¹⁸⁶

In 2018 the testing facilities—with DRDO, Directorate General of Quality Assurance (DGQA), Ordnance Factory Boards (OFBs), DPSUs, Service Headquarters (SHQs)—were opened to private sector players carrying out development of defence products; OFBs were corporatized¹⁸⁷ in October 2021; a ‘negative import list’¹⁸⁸ was promulgated for defence; and financial

powers for indigenization/R&D were tripled as per the DFPDS 2021. All these initiatives have paved the way for greater efficiency and higher productivity for indigenous defence manufacturing. Arms imports in the last five years have seen a significant 33 per cent decline.¹⁸⁹ The following will consolidate India’s position as a prominent defence exporter in the coming years:

- The contract signed with Myanmar for supply of lightweight torpedo tubes, torpedoes and fire-control systems for indigenous Frigates;
- India entering the list of the world’s top-twenty-five defence exporters;¹⁹⁰
- The extension of Defence Lines of Credit to Vietnam (2014, 2016), Seychelles (2018), Bangladesh (2019), Comoros (2019), the Maldives (2021), and Mauritius (2014, 2021); and
- The more recent announcement of the big-ticket sale of shore-based, anti-ship missile system to the Philippines.¹⁹¹

In December 2021, Defence Minister Rajnath Singh noted: ‘India cannot depend on other countries for defence technologies... countries across the world have friendly relations with us and we have told them that we wish to manufacture defence equipment in India as national security is our top priority.’¹⁹² This was further accentuated during the Russia–Ukraine conflict of early 2022, with both sides being suppliers of military hardware and technology to all three Indian Military Services.



Signing of the contract for acquisition of BrahMos Missile Complex by the Philippines
Source: Embassy of India in Manila

Acknowledging its dependence on other countries, the Government of India had already set in motion efforts to increase indigenous defence production over the past two decades. The Foreign Direct Investment ceiling in the defence sector had been raised from 26 per cent (2001), to 49 per cent (2016), to 75 per cent (2020). More recently, the Budget for the year 2022–23 allocated 68 per cent of the Defence Budget’s capital expenditure for the domestic industry, an increase of 10 per cent over the previous year. Additionally, 25 per cent of the R&D budget for the defence forces, traditionally reserved for DRDO and defence PSUs, will now be available to industry, start-ups and academia.

- **National Maritime Security Coordinator:** In February 2022, former Vice Chief of Naval Staff, Vice Admiral G Ashok Kumar (Retd) was appointed as the first National Maritime Security Coordinator (NMSC). The NMSC acts as an interface between the civilian and military sections of the maritime domain, and a part of larger national security objective, and works under the NSA. Speaking at the United Services Institution of India event in August 2021, (then) Chief of Naval Staff Admiral Karambir Singh noted that the appointment of the NSMC would go a long way in developing integrated maritime capability through closer integration with various stakeholders involved in maritime security.

Project Sagarmala: Indian ports handle more than 90 per cent of India’s total trade volume. However, the current proportion of merchandise trade is only 42 per cent of India’s GDP, as compared to 75 per cent for some developed countries and regions in the world. Recognizing the great scope to increase the share of merchandizing trade in India’s GDP, as also the overwhelming reliance of India’s economic trade on maritime routes and infrastructure, the Government of India gave its ‘in-principle’ approval

in March 2015 to the concept and institutional framework of the Project Sagarmala.



The prime objective of the Project is to promote port-led direct and indirect development, and to provide infrastructure to transport goods to and from ports quickly, efficiently and cost-effectively.¹⁹³

As of November 2021, a total of 802 projects worth Rs 5.53 lakh crore are part of Sagarmala. Of these, 172 projects worth Rs 88,235 crore have been completed and 235 projects worth Rs 2.17 lakh-crore are under implementation.¹⁹⁴ The Project aims to increase the current cargo-handling capacity of Indian ports from 1,500 million metric tonnes per annum (MMTPA) to 3,300 MMTPA by 2025.

⚓ Indian Navy During the Decade

To protect India’s territory, trade and citizens, and serve our national interests, the *IN* in the decade

under review significantly scaled up its presence not only in the IOR but also in the west and south Pacific Ocean, and the north Atlantic Ocean. The operational deployment philosophies were adjusted to new and emerging threats (with increased focus on mission-based deployments) to ensure near-continuous presence in IOR, joint exercises with the CG, the IAF and the Indian Army, as well as increasingly complex joint Naval exercises with friendly foreign countries.

Optimization of deployments and maintenance resulted in *IN* ships being deployed thrice as much as they were in the previous decade, and their availability for operational deployment also tripled during the same period. The following paragraphs look at the increased capabilities of the *IN* vis-à-vis the four roles envisaged: military, diplomatic, constabulary and benign.

Military: The induction of aircraft carrier *Vikramaditya*, SSBN *INS Arihant*, SSN *INS Chakra* (taken on lease from Russia till 2021), *Kalvari*-class submarines, P-8I aircraft, Shivalik-class Stealth Frigates, Kolkata-class Destroyers, follow-on ships of Talwar-class Frigates, and many more, have significantly added to the *IN*'s military muscle.

Notwithstanding these inductions, the *IN* faced certain critical shortfalls with respect to shipbuilding/acquisition. Prominent shortfalls include: an Indigenous Aircraft Carrier 2 (IAC-2), Mine Sweepers, Naval Offshore Patrol Vessels (NOPVs), Cadet Training Ships (CTS), Landing Platform Docks (LPDs), and Fleet Support Ships (FSS). These shortfalls are likely to be overcome in the coming decade owing to continued recognition and emphasis on upgrading maritime capability to match the changing geopolitical environment.

Significant impetus was given in the decade towards the creation of a long-term strategy for enhancement in capability and capacity. This was done by developing the following—the Maritime

Capability Perspective Plan (2012–27), Human Capital Strategy (2013 and 2018), Indian Navy Space Vision (2014), Technology Perspective and Capability Roadmap (2015–35), Maritime Infrastructure Perspective Plan (2015–27), Indian Naval Indigenization Plan (2015–30), Foreign Cooperation Roadmap (2011 and 2014), and the overarching Indian Maritime Security Strategy (2015).

The *IN* continues to be looked upon as the 'Preferred Security Partner' in the IOR¹⁹⁵ and has actively participated in anti-piracy operations in the Gulf of Oman and the Persian Gulf. Since 2008, the *IN* has deputed ships on more than eighty occasions for anti-piracy operations,¹⁹⁶ and has thwarted more than fifty piracy attacks. Since 2010, India has sent more than forty warships to the South China Sea,¹⁹⁷ averaging four warships a year. India has also significantly increased the number of bilateral maritime exercises with nations in the Indo-Pacific. The reciprocal logistics agreements signed with USA, France, Japan, Australia, South Korea and Singapore have served to increase the *IN*'s operational reach and presence in the Indo-Pacific.

In response to national security situations, like Pulwama, Pathankot, and the ongoing border stand-off with China, the *IN* deployed its assets both at sea and in air as a measure for deterrence, as also towards optimal usage of its strategic capabilities, especially in the field of intelligence, surveillance and reconnaissance.

The addition of Japan to the annual Exercise Malabar in 2015 and Australia in 2020, has helped build greater interoperability between the four navies. The Exercise has increased in both scope and complexity over the decade. Speaking on the eve of the twenty-fifth edition of the Exercise in October 2021, (then) Chief of Naval Staff Admiral Karambir Singh emphasized the need for the four navies to scale up cooperation from interoperability to interchangeability.

Diplomatic: The *IN* continued to engage with regional and extra-regional powers to safeguard its security interests in the maritime domain. Recently, India has significantly ramped up its Naval engagements with USA, France, Russia, Japan, Australia, EU, Singapore, Indonesia, Vietnam, Myanmar, Thailand, Sri Lanka, Bangladesh, the Maldives, Mauritius, Seychelles, Saudi Arabia, UAE and Oman, thus building interoperability and moving towards interchangeability.

In support of India's Neighbourhood First policy, the *IN* continued joint EEZ patrols with the Maldives, Seychelles and Mauritius, as well as coordinated patrols with Myanmar, Bangladesh, Thailand and Indonesia. The *IN*'s portfolio of just eight bilateral/multilateral exercises in 2015, grew to more than thirty by the end of 2020,¹⁹⁸ with new partners such as Australia, Bangladesh, Qatar, Saudi Arabia, Singapore, Thailand, and Algeria.

Significant milestones in Naval diplomacy include the International Fleet Review 2016 (theme 'United Through Oceans'), which was attended by twenty-four foreign warships and delegations from nearly fifty nations; the growing numbers of countries participating in Exercise Milan (more than forty countries participated in the 2022 edition); India's continued leadership at the Indian Ocean Naval Symposium (IONS); setting up of IFC-IOR in December 2018; and the introduction of the Goa Maritime Conclave (2017). All of these endeavours have helped cement the *IN*'s diplomatic profile in the region.

The *IN* also continued and enhanced its deployments in support of smaller maritime nations in the IOR. Ships, aircraft and helicopters have undertaken surveillance and patrols in the EEZ of friendly foreign countries such as Mauritius, the Maldives, Seychelles and East African nations. Other prominent initiatives include, the transfer of maritime assets such as a Landing Craft Auxiliary (2014) and a patrol boat (2019) to the Maldives;

INS *Tarasa* (2012), a Fast Interceptor Boat (2015), and a patrol vessel *Zoroaster* (2021) to Seychelles; patrol boats to Mauritius (2016 and 2017); diesel-electric submarine INS *Sindhuvir* to Myanmar (2020); and the building of Coastal Radar Systems in Seychelles, Mauritius, the Maldives, Sri Lanka and Myanmar. These Coastal Radar Systems are also under consideration for implementation in Bangladesh, Mozambique and Tanzania.

India has increased the number of defence training programmes and stepped them up to enhance the capabilities of neighbouring countries. The Navy has deputed mobile training teams to various countries including South Africa and Vietnam, as well as Sri Lanka, Bangladesh and Myanmar and others in our immediate neighbourhood. Commencing 2016, the Naval War College (Goa) has been regularly conducting a Regional Maritime Security Course. The inaugural edition was attended by participants from Sri Lanka, Oman, the Maldives, Myanmar and Bangladesh. All these initiatives have significantly contributed in enhancing India's credibility as a responsible maritime power and a proponent of 'Collective Maritime Security'.¹⁹⁹

The prominence of IOR in global affairs has mandated many nations establishing a presence in the region to ensure their strategic interests and to assist in overcoming challenges in the maritime domain, viz., piracy, maritime terrorism, human trafficking, IUU fishing, loss of biodiversity and battling climate change. In order to ensure collective growth and prosperity it is crucial to build competence in the maritime domain on a collective basis. India, due to its geo-strategic location in IOR—and its quintessential maritime character, historical and cultural ties with the littoral states—considers it obligatory to keep the maritime neighbourhood safe and secure through unity and togetherness, against menace originating from the maritime domain. In pursuit of this aim, in February 2021 the *IN* conducted an IOR Seminar on

‘Building Collective Maritime Competence towards Security and Growth for All in the Region’ (SAGAR) during Aero India 2021.²⁰⁰

Constabulary: Post the 2008 Mumbai attacks, the Cabinet Committee on Security, in its meeting on 16 February 2009, considered an MoD proposal for strengthening the maritime security of the country. It was decided therein that the *IN* would be designated as the authority responsible for overall maritime security, which includes coastal security and offshore security. The *IN* Commanders in-Chief (Cs-in-C) were additionally designated as Cs-in-C Coastal Defence.

A three-tier security ring all along our coast is provided by the *IN*, the CG and the State Coastal Police. The *IN* patrols along the International Maritime Boundary Line (IMBL),²⁰¹ the CG is mandated to undertake patrolling and surveillance up to 200 nm (i.e., India’s EEZ), and the State Coastal Police performs boat-patrolling in shallow coastal areas, essentially upto 12 nm in the sea (territorial waters).

In response to its enhanced role of coastal security, by 2017 *IN* had inducted ninety-five Fast Interceptor Boats for a special force named Sagar Prahari Bal (SPB) comprising of 1,000 personnel for: force protection, and the security of naval bases and co-located Vital Areas and Vital Points. Additionally, twenty-three Immediate Support Vessels were also inducted by 2015 for strengthening security of the Oilfield Development Areas off the West and East Coast of India. The Navy has also been actively involved in the marine orientation training of Central Industrial Security Force (CISF) and Border Security Force (BSF) personnel.²⁰²

Apart from Coastal Security, the *IN* is also involved in constabulary roles in co-ordination with the CG such as patrols of island territories and undertaking anti-smuggling and anti-drug-trafficking operations. The *IN* also conducts CORPATs with Thailand, Indonesia, Myanmar

and Bangladesh as part of its constabulary role.

Benign: Notable HADR/SAR operations conducted by the *IN* internally, include provision of aid during the cloudburst in Uttarakhand (2013), during Cyclone Phailin in Odisha (2013), Cyclone Hudhud in Andhra Pradesh (2014), and during floods in Andhra Pradesh (2013), in the erstwhile state of Jammu and Kashmir (2014) and in Kerala (2018).

In the wider IOR, the *IN* conducted evacuation operations ex-Yemen (2015). It also gave ‘First Responder’ assistance during: the water crisis in the Maldives (2014), Cyclone Roanu in Sri Lanka (2016), Cyclone Mora in Bangladesh (2017), Cyclone Idai in Mozambique (2019), and Cyclone Diane in Madagascar (2020). The *IN* escorted vessels chartered by the UN World Food Programme (2020), and conducted operations Samudra Setu and Mission Sagar during the COVID-19 pandemic. In August 2019, *IN* hosted IORA delegates—from Bangladesh, Kenya, Somalia, Seychelles, Sri Lanka, Nepal, Australia, Singapore, and the ASEAN Secretariat—who participated in India’s fourth Annual HADR Exercise in Chennai.²⁰³

The *IN* also continued to provide hydrographic survey assistance to Mauritius, Seychelles, the Maldives, Sri Lanka, Kenya, Tanzania, Mozambique and Myanmar through the decade, 2011–21.

Anti-Piracy Operations: Piracy saw a rise in this period in areas of maritime interest to India. This includes the Gulf of Aden and the Somali Basin, from where piracy had spread across the Arabian Sea and to within 500 nm of the Indian mainland by 2011. Robust action by the *IN* and the CG pushed piracy away from India’s maritime zones. The *IN* has also maintained a ship on patrol in the Gulf of Aden continuously since October 2008, safely escorting more than 3,000 merchant ships and nearly 25,000 Indian seafarers, besides other nationalities. Cooperative efforts of international navies, adoption of ‘Best Management Practices’ by

transiting merchant vessels, and other stabilizing actions ashore in Somalia, have all resulted in a steady reduction of the Somali piracy threat since 2012. However, until the root causes ashore are addressed, the danger of resurgence will remain, with potential for instability in the littoral.

In response to an incident in July 2019—when Iranian authorities seized the British-flagged tanker *Stena Impero*²⁰⁴—the *IN* stepped up its presence in the Straits of Hormuz through Operation Sankalp.²⁰⁵ This was done primarily to provide a sense of reassurance to Indian merchantmen, to monitor the situation, and to respond to any emergent crises. The *IN* has maintained an unbroken presence in this region since July 2019.

Since its inception till December 2021, the *IN* has deployed twenty-seven warships and escorted approximately 305 lakh tonnes of cargo onboard 375 Indian Flag Merchant Vessels (IFMVs).²⁰⁶ The *IN* coordinates its anti-piracy operations with other navies (deploying their ships independently) and with the Combined Task Force members (through the Shared Awareness and Deconfliction [SHADE] mechanism).²⁰⁷

Maritime Domain Awareness: MDA is key to creating a common operational picture. In the last decade, the *IN* has systematically invested in data

generation and fusion. The establishment of the Coastal Security Radar System, induction of coastal security Dornier 228 aircraft, enabling of satellite communication between ships for faster exchange of data, stepping up of continuous maritime presence through mission-based deployments, have all aided in providing comprehensive real-time data on the maritime domain.

In December 2018, the *IN* set up the IFC-IOR, which now hosts liaison officers from eleven countries. The *IN* has secured White Shipping agreements with twenty-two countries and is also linked with thirty-four maritime security centres (MARSEC) and aims to build confidence and capacity among partner nations, thereby ensuring swift and accurate exchange of information for comprehensive, real-time and shared MDA. The *IN* has also been working with EU NAVFOR Operation Atlanta to assure freedom of navigation in the Horn of Africa, and to address the issue of piracy in the region. In addition, to carry out joint exercises, *IN* IFC-IOR Gurugram and EU NAVFOR Maritime Operations Centre have established a virtual information-sharing communication system for information-sharing networks for robust mission-based deployments (MDA), induction



Release of the *Integrated Unmanned Roadmap for IN*

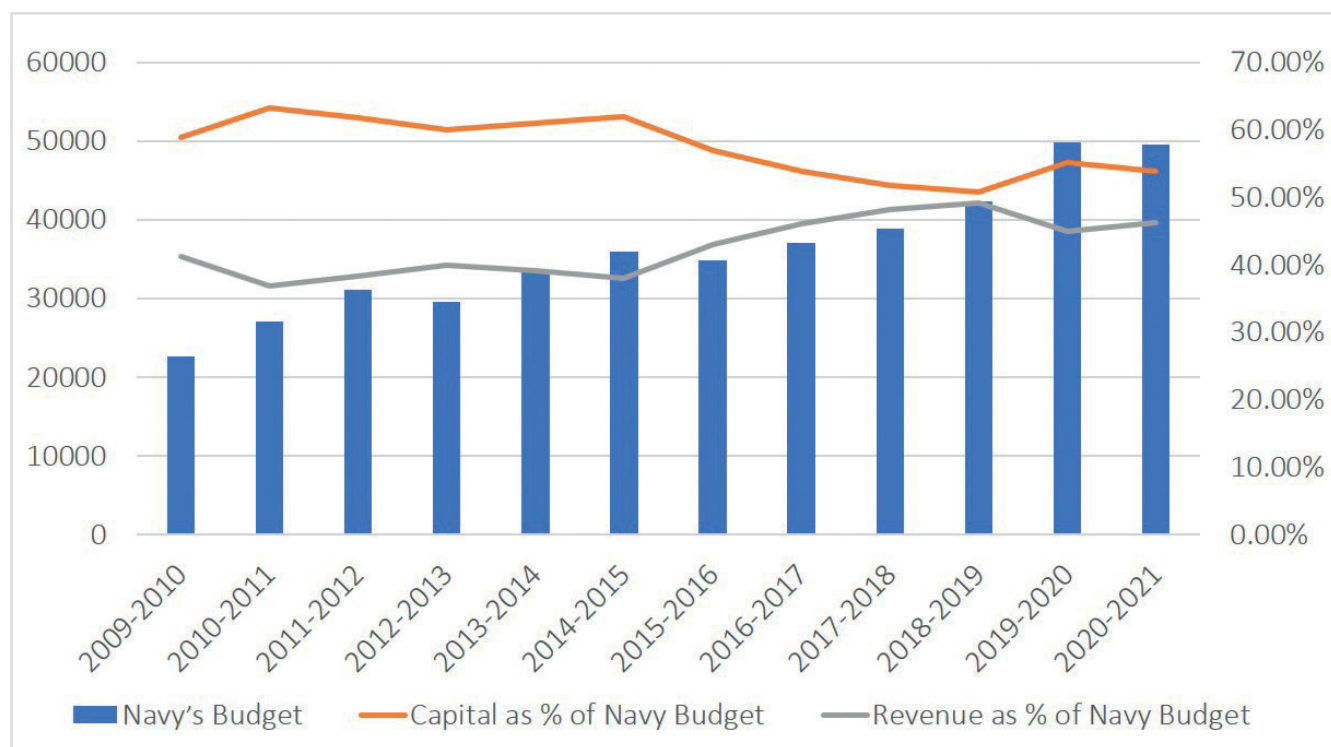
of P-8I aircrafts and the leasing of the Sea Guardian surveillance drones from USA, have also added to the *IN*'s capabilities in building comprehensive MDA.

Response to Unmanned System Threats: The *IN* has been privy to risks arising due to increased proliferation of unmanned systems both to its ships at sea and shore establishments. In July 2021, the *IN* designated an area of 5 km from the perimeter of all Naval installations in Mumbai as a 'No Fly Zone'.²⁰⁸

Also commencing December 2020, the *IN* has placed orders for the Naval Anti-Drone System and SMASH 2000 Plus fire-control optical systems. In keeping with the evolving technological transformation globally, an *Integrated Unmanned Roadmap for IN* was prepared and released by the RM on 18 October 2021 during the annual Commander's Conference. An unclassified version of the same was also released in July 2022 for reference by industry for focusing their R&D efforts.

Indigenous Shipbuilding: In the face of renewed terrestrial security concerns, the *IN* expects to operate under budgetary constraints as highlighted in December 2019, by (then) Chief of Naval Staff Admiral Karambir Singh. He emphasized that the Navy's share of the Defence Budget, having reduced from 18 per cent in 2012 to 13 per cent in Financial Year (FY) 2019–20,²⁰⁹ implied a need to extract the maximum bang from the available buck. In recognition of this challenge, the *IN* has shown leadership in indigenization efforts, especially in shipbuilding. Of the thirty-nine ships and submarines commissioned in this decade, thirty-three were built in India, and of the thirty-nine ships on order, thirty-seven ships are contracted with Indian shipbuilders.

Response to COVID-19 Pandemic: The *IN* played a crucial role through Mission Sagar²¹⁰ and Operation Samudra Setu.²¹¹ While Mission Sagar focused on providing food items and COVID-19-related medicines (including HCQ Tablets and Special Ayurvedic Medicines), ships also embarked Medical



Revenue and Capital Expenditure of Indian Navy

MISSION SAGAR
India's helping hand across the Indian Ocean

Inspired by Prime Minister's vision of **SAGAR** - Security and Growth for All in the Region

INS Kesari on special Mission to deliver Covid-19 Assistance including Medicines, Medical Personnel, Food items to 5 Indian Ocean partners

- **Maldives** - 600 tonnes of food items
- **Mauritius** - Covid related essential medicines & a special consignment of Ayurvedic medicines along with a Medical Assistance Team
- **Madagascar** - Covid related essential medicines including HCQ tablets
- **Comoros** - Covid related essential medicines including HCQ tablets along with a Medical Assistance Team
- **Seychelles** - Covid related essential medicines

Covid-19 related essential medicines including HCQ tablets already sent earlier to Mauritius, Maldives and Seychelles. A team of select medical personnel was also dispatched earlier to Maldives to augment their preparedness to fight this crisis.

India's time-tested role as the first responder in the region continues.

Mission Sagar: Indian Navy Facilitating Expanded Diplomatic Reach

Source: MEA

Assistance Teams that rendered help to the smaller littoral nations in the IOR.

On the other hand, the initial phase of Operation Samudra Setu was part of the national effort to repatriate Indian citizens from overseas, while the later phases focused on the delivery of oxygen to India and other needy countries in the region.²¹²

In December 2020, whilst delivering the 'CNS Message to Indian Navy Personnel – COVID',²¹³ (then) Chief of Naval Staff Admiral Karambir Singh spoke on the continued aid provided by the *IN* to civil authorities across the country during the pandemic, which was reflective of the *IN*'s commitment and capacity to face such challenges. He also identified the *IN*'s contribution to Operation Samudra Setu for the repatriation of Indians, and Mission Sagar for the provisioning of medical aid and medical assistance teams as relief assistance—a critical element of the larger national

COVID-19 relief effort.

The CNS also acknowledged that the repatriation of Indians during Operation Samudra Setu was more challenging than the traditional NEOs, as the pandemic demanded a whole new set of protocols onboard confined warships deputed for the Operation.

Operation Samudra Setu was undertaken utilizing those of the *IN*'s ships best suited for the Operation, catering to COVID-19-related social distancing norms vis-à-vis medical arrangements and carrying capacity. Ships used for the Operation were specially provisioned, and the Sick Bay or the clinic onboard was especially equipped with COVID-19-related equipment and facilities. Women officers and military nursing staff were also embarked for the women passengers. Basic amenities and medical facilities were provided to all evacuees during sea passage on these ships. Among the expectant mothers who undertook passage on *INS Jalashwa*, one gave birth to a baby boy within



Samudra Setu I: Getting them Home



Samudra Setu II: Indian Navy's Oxygen Express

a few hours of reaching Kochi on International Mother's Day.²¹⁴

Notwithstanding the challenges, the *IN*'s assets continued to remain on patrol covering a vast oceanic swath from the Straits of Malacca in the East to Bab-el-Mandeb in the West, including undertaking Operation Sankalp to provide reassurance and protection to our merchant vessels and anti-piracy patrols in the Gulf of Aden. The standard operating procedures (SOPs) adopted by the *IN* were also hosted on the IONS website, with a view to share protocols with other navies.²¹⁵ Despite the disruption caused by the pandemic, the *IN*, in 2020, participated in thirteen bilateral and multilateral drills.

A P-8I aircraft was deployed to Port Louis (Mauritius) on 22 January 2021, to transport one lakh doses of COVID-19 vaccines, gifted by the Government of India. On 23 January 2021, one P-8I was deployed to Seychelles to transport 50,000 doses of COVID-19 vaccines, gifted by the Government of India.

This chapter is not an all-encompassing scan, but a snapshot of geopolitical events and the impact they had on India's national security perspective. The *IN*, being the principal manifestation of India's maritime power, aligned its capacities and capabilities to the changing geo-strategic

environment, additional details of which are covered in subsequent chapters in this volume.

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- 213 Indian Navy website: CNS Message to Indian Navy Personnel - COVID-19. <https://indiannavy.nic.in/content/cns-message-indian-navy-personnel-COVID-19>
- 214 PIB/MoD press release (8 July 2020): Indian Navy Completes 'Operation Samudra Setu'. <https://www.pib.gov.in/PressReleaseDetail.aspx?PRID=1637314>
- 215 Indian Navy webpage (n.d.): Indian Navy Continues to be Mission Deployed and Combat Ready. <https://indiannavy.nic.in/node/26161>



2 | The Making of a Combat-Ready, Credible, Cohesive and Future-Proof Force

The decade 2011–21 is squeezed right between the economic shocks originating from the Global Financial Crisis (GFC) of 2008 and the COVID-19 pandemic. Globally, both these events have had widespread ramifications at economic, diplomatic and geopolitical levels. While part of the economic response to the GFC was continuity and strengthening of globalization trends that had picked up pace pre-2008, the COVID-19 pandemic, in contrast, pushed countries to reassess the effects of rampant globalization, not only on their economy's resilience and ability to sustain, but also on newer dimensions impinging upon national security. For India, apart from the fiscal and social impact of these two events, the beginning and end of the decade 2011–21 were also marked by two very significant episodes. These were the Mumbai Terror Attacks (2008) and the ongoing India–China border standoff (2020) that set the tone for India's national security strategy during the decade and its likely trajectory for the next decade. The Indian Navy (*IN*) being the principal manifestation of India's military power in the maritime domain, also responded to these changes—and the opportunities and challenges

therein—in line with the larger rebalancing of national security frameworks and demands.

In parallel, international developments also played their own part, directly or indirectly, on the *IN* and on the Indian Armed Forces at large. The rise of China, the shift of global economic activity to the Indo-Pacific, the US' pivot to Asia, the continued spectre of terrorism, an increased number of extreme climatic events possibly due to climate change, political turmoil/change in several parts of the world and the unprecedented COVID-19 pandemic were some of the important developments.

Strategically, India was seen as a rising power and a countervailing force against China in some cases, and as a regional challenger to China in others. The *IN* was seen as one of the big cards in the nation's inventory, in making its presence felt and showcasing its intent. Consequently, the *IN* gathered more traction and far more column space in global and regional strategic forums. This factor, too, was taken into consideration while undertaking the writing of this volume.

While the *IN*'s inventory is identified by its ships, submarines and aircraft, its character,



How's the Josh?

capability and credibility are defined by the men and women, both uniformed and civilian, who operate, maintain and sustain these platforms that are ready for enhanced the tempo of operations—a hallmark of this decade. The growth of the *IN* through the decade must, therefore, be mapped both in terms of the growth in capabilities (combat and operational) and human capital. But before we delve into these two aspects in the last decade, it is essential to understand the larger underlining strategy driving the *IN*'s decadal and future growth.

⚓ **What Did We Do, Why and How?**

India's geographic location and dynamic security situation demands continuous vigil and readiness to respond to any contingencies in areas of our interest. In order to provide a strategic framework for the readiness, in 2006 the *IN* had formulated the 'Vision Statement of the Indian Navy'. In the

face of the evolving maritime environment and Naval deployments, the *IN* formulated a revised and amplified 'Indian Navy Vision Document' in 2014. The document provides broad 'Way Points' and 'Course to Steer' for the *IN*'s operations and its future growth trajectory. In March 2015, Prime Minister Narendra Modi enunciated India's vision for engagement within the Indian Ocean Region (IOR) through Security and Growth for All in the Region (SAGAR). Subsequently, in December 2015, the *IN* came out with its strategy document *Ensuring Secure Seas: Indian Maritime Security Strategy*¹ (IMSS 2015 in short), which provides strategic guidance for the growth, development and deployment of the Navy. The IMSS 2015 identifies three significant motives that have affected India's maritime security and consequently the role of the Navy. These essentially outline the 'whys?' behind 'what we did':

- The shift in the worldview from a Euro-Atlantic to an Indo-Pacific focus, and the repositioning of global economic and military power towards Asia, has resulted in significant political, economic and social changes in the IOR and has impacted India's maritime environment in tangible ways.
- The increase in the complexity and unpredictability of India's maritime security environment, with the expansion in scale and presence of a variety of 'non-traditional' threats; and
- The recognition of a national outlook towards the seas and the maritime domain, and a clearer recognition of maritime security being a vital element of national progress and international engagement.

Acknowledging its visionaries through the decades and basing on their foresight, the *IN* has seen constant growth. The Maritime Capability Perspective Plan—formulated in 2005 as an extension of the Naval Plans Paper first brought out in 1948—provided the strategic guidance and foresight on what the force structure needs to be and how it should be achieved. It is clear that indigenous development was a bedrock from the earliest Plan Paper on, as is evident from the growing domestic content of our warshipbuilding capabilities. This volume therefore details:

- What we did—capability and capacity building;
- Why we did what we did—transformational guidance and strategic thought;
- How we did what we did—the workings of the four verticals of Naval Headquarters (NHQ): Staff Branch-I, Staff Branch-II, Materiel, and Personnel; and the enablers that aided 'What, Why and How' in the overall scheme of things.

Enhancement in Capabilities

Prima facie, 2011–21 was a decade of further growth and transformation of the *IN* into a

technologically advanced, networked Force capable of global reach. In our mind, this volume needed to evaluate how the *IN* had built from the previous decades and whether it had developed the capabilities that were planned and sought. The *IN* has indeed grown significantly in the last decade with the addition of assets with varied capabilities in multiple dimensions—Aircraft-Carrier *INS Vikramaditya*; *Deepak* Class Fleet Tankers; SSBN *INS Arihant*; *Teg* Class Guided Missile Frigates; *Kolkata* Class Stealth Guided Missile Destroyers; *Kalvari* Class submarines; *Kamorta* Class ASW Stealth Corvettes; aircraft such as the P-8Is and MiG-29K, and the Remotely Piloted Aircraft (RPAs); communication satellites leading to a comprehensively networked force and not just a 'netted in' force; and more.

When faced with capability gaps, largely due to infancy in indigenous Research and Development (R&D), the defence industrial base and in the absence of technology transfer, the *IN* has been astute in managing precious capital by leasing capable platforms such as Nuclear-Powered Submarine *INS Chakra* from Russia and *Sea Guardian* drones from the United States of America (USA).

In addition, much has happened in terms of pursuing capability gaps in *IN*'s force capability enablers in terms of the helicopters, missiles, torpedoes and spares. Through all this, the *IN* has also continued to pursue the indigenous development of its strategic assets and the nuclear triad. Maritime Domain Awareness (MDA) has improved manifold, and Cooperative Engagement Capability (CEC) was proven for the first time during the last decade. Coastal and Maritime Security became even more important post the 26 November 2008 attacks on Mumbai, and thus Coastal and Maritime Security saw several developments in the decade under review.



Indian Navy: A Combat-Ready, Credible, Cohesive and Future-Proof Force

The decade was defined by technology-led social and societal changes, and this impacted the *IN*, too, in all domains. Capability addition employed a multi-layered approach, and we saw technology-led growth in communications, weapons systems, aviation, submarines, information security, cyber capabilities, deep-sea rescue and many more tech-driven aspects within the Navy. Therefore, we could surmise that the history of this decade would need to be underpinned by technology as one of the driving forces.

All these organic capabilities dovetailed into our other roles of Diplomacy and Humanitarian Assistance and Disaster Relief (HADR), and marked several ‘successes’ or landmark ‘events/achievements’. Some such salient operations included Rahat, Nistaar, Madad, Samudra Setu, and Mission Sagar.

Several other disciplines, from logistics to hydrography to diving to medicine, got a boost.

Mission-Based Deployments (MBD) and extended deployments—both in terms of time and distance from home port—became the new norm.

Transformation in training and HRD of personnel and personnel policies, such as the full-scale operation of the Indian Naval Academy (INA) at Ezhimala, the setting up or upgrading of other training establishments and institutions, an enhanced number of Services Selection Boards (SSBs), an increase in the number of women officers and their deployment on combat platforms, the conduct of online exams for career progression, as well as various personnel policies in the realm of Pay and Allowances including Pay Commission, were noteworthy.

Shortfalls

While there were successes aplenty, on the downside, capability voids in multi-role and Naval

Utility Helicopters (NUH), minesweepers and Landing Platform Docks (LPDs) as well as the series of accidents/incidents in the initial part of the decade leading to the resignation of the then CNS, Admiral DK Joshi, could be seen as the challenges/drawbacks/constraints the Service faced. The mitigating actions taken by the *IN* to overcome the capability/capacity shortfalls and revitalize the safety architecture have been dealt with in detail in this volume.

⚓ Focus Areas

Based on the emerging maritime security scenario, the Chiefs of Naval Staff through the decade have focused the *IN*'s efforts and energy on a variety of themes that have found continuity and growth with each passing year. Some of the prominent themes and key result areas included: 'combat readiness', 'accurate and effective ordnance delivery', 'imbibing safety culture', 'efficient utilization to maximize budget', 'large Navy mindset', 'credible stakeholder in maritime security', 'foreign cooperation initiatives', 'duty, honour and courage', 'acceptance as preferred partner and net provider of maritime security' and 'jointness and synergy'.

The succeeding sections and chapters of this volume intend to delve into an overarching view of the events of importance in the last decade, while also providing granular details of certain aspects to provide for both the avid Navy aficionado and those researching key instruments of India's maritime outlook.

⚓ Summary of *IN*'s Growth through the Decade

Based on the transformative changes in force levels, capabilities and capacities, the growth of the *IN* is characterized by five broad themes:

Leap in the *IN*'s Operational Profile and Combat Power: This manifested through landmark

production or significant material acquisitions including: Teg-class frigates, aircraft carrier, nuclear submarine, Kolkata-class destroyers, Kamorta-class corvettes, Kalvari-class submarines, P-8I aircraft, and many others; as well as through a robust and vigorous operational tempo in local, national and international spheres.

Transition to a Networked Navy: This was achieved through technical progression and breakthroughs, manifested in developments such as the indigenous *IN*-specific communication satellite Rukmani, the pan-*IN* secure data network NC³I, Action Information Organization Integration, situational domain awareness platform Trigun, Software Defined Radios (SDRs), Defence Communication Network (DCN)/Naval Communication Network (NCN), as well as institutions such as IFC-IOR, demonstration of CEC and huge leap in MDA both organically and architecturally.

The *IN* as the Preferred Security Partner and as Credible First Responder: This was characterized by the greater international profile of the Service, created by conducting Defence Diplomacy missions, NEOs, HADR missions, capacity building and capability enhancement of FFCs in the region, pioneering and steering IONS, other forums such as Exercise Milan, Goa Maritime Conclave (GMC), Exclusive Economic Zone (EEZ) patrols, hydrography assistance, joint exercises with strategic contours such as Malabar.

Transformation to a Learning Organization: This was achieved by the building of more robust knowledge frameworks, through the publication of IMSS 15 and Indian Maritime Doctrine, energizing of institutions such as INSOC, Flag Officer Doctrine and Concepts (FODC), revitalizing Strategic and Operations-level Table Top and Cogitation exercises, giving a fillip to wargaming through induction of the new software, establishment of a Naval War College (NWC)

at Goa and its revitalization, encouragement to scholarship and collaboration with think-tanks and academic institutions, technicalization of ab initio training at the Indian Naval Academy (INA) and at the National Defence Academy (NDA), and many such initiatives. The endeavour has been to link these initiatives in knowledge generation/scholarship with the tangible policy, strategic, operational and tactical developments that have occurred.

Spearheading Defence Indigenization: To counter the problems of spiralling imports costs of equipment spares, and embargoes/technology denial by foreign countries on a long-term basis, the *IN* has pioneered defence Indigenization in its capability perspective strategy since the early 1960s. Increasingly the aim is to achieve self-reliance in warship production, maintenance and

support capabilities. While varying degree of success has been achieved in the 'Float', 'Move' and 'Fight' matrix in the Shipbuilding industry, the *IN* is increasingly focussed on transforming itself from a Buyers' Navy to a Builders' Navy at a pace that can bolster India's defence export potential going ahead. Acquiring and evolving technical competence and processes required for indigenous defence production required a 'whole of nation' approach. The *IN* has hinged its indigenization efforts on national initiatives such as 'Make in India' and 'Aatmanirbhar Bharat'.

Note

1. Indian Navy (2015). *Ensuring Secure Seas: Indian Maritime Security Strategy*. Indian Navy Naval Strategic Publication (NSP). 1.2 New Delhi: Ministry of Defence (Navy), Government of India. https://www.indiannavy.nic.in/sites/default/files/Indian_Maritime_Security_Strategy_Document_25Jan16.pdf





2

A Decade of
Enhanced
Operational
Tempo



3 | Surface Operations

Expanding India's Maritime Presence

⚓ Introduction

Deployments form the core of the Indian Navy's (*IN*'s) operational design to achieve stated national interests. The expanse of the Indian Ocean Region (IOR) requires the presence of Naval forces to continuously monitor and control activities in a given maritime area over extended periods of time. The *IN* has assumed various approaches for safeguarding the country's maritime interests and furthering national objectives, such as the protection of Sea Lines of Communication (SLOCs)/Vital Areas (VAs)/Vital Points (VPs); addressing traditional and non-traditional threats; and developing an overarching regional security vision under the Security and Growth for All in the Region (SAGAR) initiative in the maritime domain. As part of SAGAR, the *IN* has been proactively engaging with other countries in the IOR and towards enhancing regional maritime security. These include foreign exercises in multilateral and bilateral format with like-minded nations, unilateral deployments of ships within the Area of Interest (i.e., IOR) and for international assistance during Humanitarian Assistance and Disaster Relief (HADR)/Search and Rescue (SAR) activities.

The following subsection chronicles the various Naval operations, deployments and missions undertaken by the *IN* since 2011. It provides a comprehensive, yet non-exhaustive, list of exercises that *IN* conducts and participates in each year, with the navies of other nations and

inter-Services exercises for confidence building, capability enhancement as well as achieving the common objective of a peaceful and secure IOR. Speaking at the 'IOR Seminar' held at Aero India 2021 on 'Building Collective Maritime Competence towards Security and Growth for All in the Region (SAGAR)', (then) Chief of Naval Staff, Admiral Karambir Singh, emphasized that India and the *IN*, 'endeavours to build collective competence [in the IOR]... Three key enablers assume significance, namely operational synergy, information sharing, along with Capability and Capacity Building.'

⚓ Exercises with Foreign Navies

The *IN* conducts exercises with the navies of numerous friendly foreign countries (FFCs), with the objective of enhancing maritime cooperation, bolstering interoperability and fostering international cooperation. Over the decades the *IN* has grown in strength and stature in the list of world's navies, with an ever-increasing number of maritime relations established with countries, to conduct bilateral and multilateral exercises to further common operability procedures and understanding. At his speech at the 'IOR Seminar' during Aero India 2021,¹ (then) Chief of Naval Staff Admiral Karambir Singh noted:

'Operating together at sea leads to a clearer understanding of each other. Increased operations and exercises lead to mutual trust

and a meeting of minds. Our navies exercise regularly with each other, both bilaterally and multilaterally. Understanding the operating philosophy of friendly navies goes a long way in fostering mutual confidence towards collective competence. This is also achieved through training together, both ashore and afloat.’

The ensuing paragraphs describe the multilateral and bilateral exercises that the *IN* has either been conducting or participating in, through the decade (2011–21). The descriptions also draw attention to the growth and development in terms of the scope and magnitude of each of these bilateral and multilateral exchanges. Beneath the description of these exercises is placed a tabulation of their details.

AUSINDEX: The biennial maritime defence Australia–India Exercise (AUSINDEX) commenced in 2015. It was aimed at strengthening

and enhancing mutual cooperation and interoperability between the *IN* and the Royal Australian Navy (RAN). While also providing opportunities for interaction and exchange of professional views between the personnel of two navies, it would also promote peace and prosperity in the IOR, given the shared mutual interests. AUSINDEX is a true representation of the Joint Guidance signed by India’s Chief of Naval Staff and Australia’s Chief of Navy, on 18 August 2021.²



AUSINDEX 2021

Duration	Indian Navy	Royal Australian Navy	Location	Nature of Exercises
11–21 September 2015	<i>IN</i> Ships <i>Shivalik</i> , <i>Ranvijay</i> , <i>Shakti</i>	HMA Ships <i>Arunta</i> , <i>Sirius</i> Submarine HMAS Sheean	Off the coast of Visakhapatnam	ASW, fleet manoeuvres, gun firing, VBSS, cross-deck operations, SAG procedures.
13–19 June 2017	<i>IN</i> Ships <i>Shivalik</i> , <i>Jyoti</i> , <i>Kamorta</i> ,	HMAS <i>Newcastle</i> , Submarine HMAS <i>Waller</i> UAV <i>Scan Eagle</i>	Off the Australian coast	Seamanship evolutions, live fire drills, VBSS, surface and sub-surface drills.
2–4 April 2019	<i>IN</i> Ships <i>Sahyadri</i> , <i>Ranvijay</i> , <i>Kora</i> , <i>Kiltan</i> Submarine INS <i>Sindhukirti</i> Aircraft Dornier 228, P-8I	HMA Ships <i>Newcastle</i> , <i>Paramatta</i> , <i>Success</i> Submarine HMAS <i>Collins</i>	Off the coast of Visakhapatnam	Warfare drills in 3 dimensions, live-fire drills, RAS, cross-deck flying.
6–10 September 2021	<i>IN</i> Ships <i>Shivalik</i> , <i>Kadmatt</i>	HMA Ships <i>Warramunga</i> Submarine HMAS <i>Rankin</i>	Off the Australian coast	Surface, sub-surface training operations, air operations.

ASW: Anti-Submarine Warfare; RAS: Replenishment at Sea; SAG: Surface Action Group; UAV: Unmanned Aerial Vehicle; VBSS: Visit, Board, Search and Seizure

Coordinated Patrol (CORPAT) with Indonesia: The India-Indonesia Coordinated Patrol (Ind-Indo CORPAT) and bilateral exercise started in 2002. To be held twice a year, it aimed to underscore India's peaceful presence and solidarity with friendly maritime neighbours to ensure good order in the maritime domain,

consolidate interoperability and strengthen existing bonds of friendship between India and Indonesia.³ The *IN* and the Indonesian Navy undertake CORPAT along their International Maritime Boundary Line (IMBL). The list of CORPATs conducted in the last decade is tabulated below.



30th India-Indonesia CORPAT

Duration	Indian Navy	Indonesian Navy
6-26 April 2011	<i>IN Ships Cheetah, Battimalv</i> Aircraft Dornier 228	KRI <i>Pattimura</i>
25 September-5 October 2011	<i>IN Ships Mahish, Baratang</i> Aircraft Dornier 228	KRI <i>Silas Papare</i>
7-28 April 2012	<i>IN Ships Bitra, LCU L-39</i> Aircraft Dornier 228	KRI <i>Silas Papare</i> Aircraft CASA-50
20 September-October 2012	<i>IN Ships Kumbhir, Baratang</i> Aircraft Dornier 228	KRI <i>Sultan Thaha Hasanuddin</i>
6-26 May 2013	<i>IN Ships Mahish, Bangaram</i> Aircraft Dornier 228	KRI <i>Pattinunas</i> Aircraft CASA-50
6-27 September 2013	INS <i>Kumbhir</i> Aircraft Dornier 228	KRI <i>Teiku Umar</i> Aircraft CASA-50
14 April-3 May 2014	INS <i>Kumbhir</i> Aircraft Dornier 228	KRI <i>Imam Bonjol</i> Aircraft CN-235
9-11 September 2014	INS <i>Kesari</i> Aircraft Dornier 228	KRI <i>Pattimura</i> Aircraft CN-235
16 April-6 May 2015	INS <i>Cheetah</i> Aircraft Dornier 228	KRI <i>Tjiptadi</i>
30 September-21 October 2015	INS <i>Saryu</i> Aircraft Dornier 228	KRI <i>Teuku Umar</i>

Duration	Indian Navy	Indonesian Navy
28 April–19 May 2016	INS <i>Karmuk</i> Aircraft Dornier 228	KRI <i>Imam Bonjol</i>
10–28 October 2016	INS <i>Cheetah</i> Aircraft Dornier 228	KRI <i>Wiratno</i>
9–25 May 2017	INS <i>Karmuk</i> Aircraft Dornier 228	KRI <i>Sutedi Senoputra</i> Aircraft CN-235
24 October–5 November 2017	INS <i>Sukanya</i> Aircraft Dornier 228	KRI <i>Imam Bonjol</i> Aircraft CASA P-862
27 May–5 June 2018	INS <i>Kulish</i> Aircraft Dornier 228	KRI <i>Sultan Thaba Saifuddin</i>
14–26 October 2018	INS <i>Kulish</i> Aircraft Dornier 228	KRI <i>Kapitan Pattimura</i>
12–18 November 2018 (See Note appended to table)	INS <i>Rana</i>	KRI <i>Sultan Iskandar Muda</i>
19–27 March 2019	INS <i>Kesari</i> Aircraft Dornier 228	KRI <i>Sultan Thaba Saifuddin</i> Aircraft CN-235
IIInd Bilateral 4–7 November 2019	INS <i>Kamorta</i> Aircraft Dornier 228	KRI <i>Usman-Harun</i>
15–16 June 2020	INS <i>Kulish</i>	KRI <i>Teuku Umar</i>
17–18 December 2020	INS <i>Kulish</i> Aircraft P-8I	KRI <i>Cut Nyak Dien</i> , and a Maritime Patrol Aircraft (MPA)
30–31 July 2021	INS <i>Saryu</i> Maritime Patrol Aircraft	KRI <i>Bung Tomo</i> Maritime Patrol Aircraft
23–24 November 2021	INS <i>Khanjar</i> Aircraft Dornier 228	KRI <i>Sultan Thaba Syaifuddin</i>

Note: The 28th edition of the India–Indonesia CORPAT (November 2018) was held alongside the first India–Indonesia bilateral exercise Samudra Shakti.

ASEAN Regional Forum (ARF DiREx): The seventh ASEAN Regional Forum Inter-Sessional meeting held in Helsinki, Finland from 9–12 October 2007, stated that a joint exercise needed to be carried out by ARF members to address disaster relief in the region. The ASEAN Regional Forum Disaster Relief Exercise (ARF DiREx) was a collaboration of efforts among civilian authorities and the military in organizing a large-scale disaster relief exercise. It promotes the exchange of expertise and practices in disaster management among ARF members, through operational/strategic (national governmental/regional organizations) focused on the Table-Top

Exercise (TTX) and a tactical-level (affected site) oriented Field Training Exercise (FTX).

First held in 2009, the ARF DiREx now takes place once every two years and is co-hosted by one ASEAN member state and one non-ASEAN ARF member.

The aim of ARF DiREx is to exercise information-sharing and networking among national agencies of this region towards providing HADR during natural calamities, such as earthquakes and tsunamis as well as SAR for ships and aircraft lost at sea.⁴ Though many countries and organizations participate in ARF DiREx, only Naval ships that have participated are mentioned in the following table:

Duration	Indian Navy	Other Navies	Location
14–19 March 2011	INS <i>Kesari</i>	Indonesia: KRI Ships <i>Tedong Naga</i> , <i>Soebarso</i> hospital ship. SAR Agency <i>Basarnas</i> Japan: JS <i>Osumi</i> USA: USS <i>Harpers Ferry</i>	ARF DiREx 2011 held at Manado city, Indonesia.
24–28 May 2015	INS <i>Saryu</i>	Malaysia: <i>KD Kelantan</i> PR China: <i>Jing Gang Shan</i> , <i>Haixun 31</i>	ARF DIREx 2015 at Penang, Malaysia.

India–Russia (INDRA) Exercise: Exercise INDRA between the navies of India and Russia epitomizes the long-term strategic relationship between the two countries. The Exercise has been held since 2003. A Joint Tri-Services exercise, INDRA is also being held once in two years since 2017. The Exercise has matured over the years with an increase in scope, complexity of evolutions and level of participation across the spectrum of maritime operations.



RuFN Ship Panteleyev arriving at Visakhapatnam for INDRA 2018

Duration	Indian Navy	Russian Navy	Location	Nature of Exercises
28 November–3 December 2012	IN Ships <i>Mysore</i> , <i>Tabar</i>	<i>Marshal Shaposhnikov</i> , <i>Irkut</i> , <i>Alatau</i>	Held off Mumbai	Asymmetric operations, seamanship evolutions, AD, gunnery exercises, embarkation of Sea riders, manoeuvres, cross-deck flying.
14–17 July 2014	IN Ships <i>Shivalik</i> , <i>Ranvijay</i> , <i>Shakti</i>	<i>Vinogradov</i> , <i>Varyag</i> , <i>Ilim</i> , <i>Peresvet</i>	Sea of Japan, Vladivostok	Tactical manoeuvring, ASW, AA and surface warfare exercises, cross-deck helo operations, SAR, RAS.
7–12 December 2015	IN Ships <i>Sahyadri</i> , <i>Ranvir</i> , <i>Shakti</i>	<i>Varyag</i> , <i>Bystry</i> , <i>Alatau</i> , <i>Boris Butoma</i>	Bay of Bengal	ASW, AA/AD, anti-surface fleet operations, manoeuvres, seamanship evolutions.
14–21 December 2016	IN Ships <i>Ranvir</i> , <i>Satpura</i> , <i>Kamorta</i> Aircraft P-8I, Dornier 228	<i>Admiral Tributs</i> , <i>Boris Butoma</i>	Bay of Bengal	ASW, AD, surface firings, VBSS, tactical procedures.
18–30 October 2017	IN Ships <i>Satpura</i> , <i>Kadmatt</i>	<i>Admiral Nevelsky</i> , <i>Ust Llimsk</i>	Off Vladivostok	First Tri-Services bilateral military exercises.
9–16 December 2018	IN Ships <i>Ranvir</i> , <i>Satpura</i> , <i>Kadmatt</i> , <i>Kuthar</i> , <i>Khanjar</i> , <i>Jyoti</i> IN Submarine: 1	<i>Varyag</i> , <i>Panteleyev</i> , <i>Boris Butoma</i>	Conducted off Vizag	ASW, AD, surface firing, VBSS, tactical procedures.
10–19 December 2019	IN Ships <i>Tarkash</i> , <i>Aditya</i> Aircraft P-8I, Dornier 228	Yaroslav Mudry, Yel'nya, Viktor Konetsky	Goa	RAS, AD, surface firing, VBSS.

Duration	Indian Navy	Russian Navy	Location	Nature of Exercises
4–5 September 2020	<i>IN Ships Ranvijay, Sahyadri, Shakti</i>	<i>Admiral Vinogradov, Admiral Tributs, Boris Butoma</i>	A 'non-contact, at sea only' passage exercise off Vizag, Bay of Bengal due to COVID restrictions.	Surface and anti-aircraft drills, firing exercises, helicopter operations, seamanship evolutions.
4–5 December 2020	<i>IN Ships Shivalik, Kadmatt</i>	<i>Varyag, Admiral Panteleyev, Pechenga</i>	Eastern Indian Ocean	PASSEX exercises
28–29 July 2021	<i>INS Tabar</i>	<i>Zelyony Dol, Odintsovo</i>	Off the Baltic Sea	Anti-aircraft firing, UNREP, helo operations, VBSS.

Note: Short-form 'Vizag' replaces Visakhapatnam in table.

AA: Anti-Aircraft Firing; AD: Air Defence; Sea Riders: Exchange of Personnel for Sailing in Ships of Other Navies; UNREP: Underway Replenishment [of Stores at Sea]

Exercise IBSAMAR: A biennial multilateral maritime exercise between the navies of India, Brazil and South Africa, IBSAMAR highlights the maritime dimension of the IBSA Dialogue Forum. Initiated in 2008, the Exercise has been noted as the most visible manifestation of this convergence of democratic values, economic interests and maritime cooperation between the three countries.

The scope and complexity of the Exercise have increased steadily, and in its fifth edition in 2016, it matured into a complex exercise involving the participation of ships, aircraft and Special Forces from Brazil, India and South Africa.⁵ Naval cooperation among the countries epitomizes the strong long-term strategic relationship between the three nations and their shared ideas of inclusive maritime security.

Duration	Indian Navy	Brazilian Navy & South African Navy	Location	Nature of Exercises
10–26 October 2012	<i>IN Ships Delhi, Deepak</i>	Brazil: BN <i>Barroso</i> South Africa: SAS <i>Amatola</i>	IBSAMAR III Held in South Africa.	Sea phases and harbour phases. Sea phases included Naval exercises, such as GUNEX, CASEX, UNREP, anti-piracy operations and HADR.
20 October–7 November 2014	<i>INS Teg</i>	Brazil: BN <i>Barroso</i>	IBSAMAR-IV Conducted off Simons Town South Africa.	ASW, AA/AD warfare, surface warfare, SAR, VBSS, Naval gunfire support, asymmetric threats, HADR, MDA, interoperability, Naval conventional operations, SOPs, cross-deck helo operations and special operations.
19–29 February 2016	<i>IN Ships Mumbai, Trishul,</i> Submarine <i>INS Shalki</i> Aircraft Sea Harriers, MiG-29K, Dornier 228	Brazil: BN <i>Amazonas</i> South Africa: SAS <i>Spioenkop</i>	IBSAMAR-V Conducted off India's west coast; harbour phase conducted at Goa. Conducted in Indian waters for the first time.	The thrust of this edition of the Exercise was on ASW, surface firing, AD, VBSS, flying operations, special operations and SAR.

Duration	Indian Navy	Brazilian Navy & South African Navy	Location	Nature of Exercises
1–13 October 2018	IN Ships <i>Kolkata</i> , <i>Tarkash</i> Aircraft P-8I	Brazil: BN <i>Barroso</i> South Africa: SA Ships <i>Amatola</i> , <i>Protea</i> . Submarine <i>Mantbathi</i> Aircraft Saab JAS-39 Gripen.	IBSMAR-VI Off Simons Town, Atlantic Ocean	Navigation and seamanship evolutions, surface weapon firings, force protection, exercises, anti-piracy exercises, AA, ASW, flying operations.

Note: IBSAMAR was not conducted in 2020, due to the COVID-19 pandemic. MDA: Maritime Domain Awareness

Indo-Myanmar Coordinated Patrol (IMCOR): The CORPAT initiative between the two navies is meant to address issues of terrorism, illegal fishing, drug and human trafficking, poaching, and other illegal activities inimical to the interest of the two countries.

The two countries have been conducting CORPATs biannually along the maritime

boundary since 2013. Myanmar is among the three countries with which India has signed a formal agreement for maritime-coordinated patrol. During the sea phase, ships patrol the area near the IMBL and progress multiple joint evolutions to enhance mutual understanding and interoperability.

Year	Indian Navy	Myanmar Navy	Location
17–21 March 2013	IN Ships <i>Baratang</i> , <i>Battimalv</i>	UM Ships <i>King Aung Zeya</i> , <i>BayintNaung</i>	Off Great Coco Islands, Myanmar
13–21 February 2014	IN Ships <i>Saryu</i> , <i>Battimalv</i>	UM Ships <i>King Aung Zeya</i> , <i>BayintNaung</i>	Port Blair/Yangon
16–22 March 2015	IN Ships <i>Saryu</i> , <i>Battimalv</i>	UM Ships <i>Mahar Bandoola</i> , 563	Yangon
12–18 February 2016	IN Ships <i>Saryu</i> , <i>Bitra</i>	UM Ships <i>King Aung Zeya</i> , 563	Yangon
12–18 March 2017 15–24 September 2017	IN Ships <i>Karmuk</i> , <i>Bangaram</i> IN Ships <i>Ranjit</i> , LCU L-38, LCU L-39	UMS <i>Kyan Sit Thar</i> UMS <i>Kyan Sit Thar</i>	Port Blair Deployed for surveillance off the IMBL between India and Myanmar in view of the ongoing Rohingya crisis.
13–18 March 2018	IN Ships <i>Saryu</i> , <i>Baratang</i>	UM Ships <i>King Sin Phyu Shin</i> , <i>Inlay</i> and MPA	Port Blair/Yangon. Off Great Coco Islands, Myanmar
31 March–3 April 2018	IN Ships <i>Sabyadri</i> , <i>Kamorta</i> Submarine INS <i>Sindhushastra</i>	UM Ships <i>King Sin Phyu Shin</i> , <i>Inlay</i>	Off Visakhapatnam Maiden IN-MN bilateral exercise
28–29 September 2018	IN Ships <i>Kulish</i> , <i>Battimalv</i> Aircraft Dornier 228	UM Ships <i>BayintNaung</i> , <i>Anawrabta</i>	Yangon and off Great Coco Islands, Myanmar
20–28 May 2019	IN Ships <i>Saryu</i> , <i>Bangaram</i>	UM Ships <i>King Tabin Shwehtee</i> , <i>Inlay</i>	Opening ceremony at Port Blair; Closing ceremony at Yangon

Year	Indian Navy	Myanmar Navy	Location
11–14 November 2019	IN Ships <i>Kesari</i> , <i>Cbetlat</i> Aircraft Dornier 228	UM Ships <i>BayintNaung</i> , 564 Aircraft: ATR-42	Yangon
23–25 November 2020	IN Ships <i>Kulish</i> , <i>Cberiam</i>	UM Ships <i>Tabinshwetti</i> , <i>Kyan Sitttha</i>	Non-contact at sea, Port Blair
10–12 May 2021	IN Ships <i>Kulish</i> , <i>Cora Divb</i> Aircraft Dornier 228	UM Ships <i>Mahar Thiba Thura</i> (F-23), 564	Non-contact at sea, Port Blair



Myanmar Navy Ship Arrives at Port Blair During the 8th Edition of IMCOR

Indo-Thailand Coordinated Patrol: India and Thailand have traditionally enjoyed a close and friendly relationship covering a wide spectrum of activities and interactions that have strengthened over the years. The first CORPAT between the IN and the Royal Thai Navy was held in 2005. The subsequent series of coordinated patrols have

enhanced mutual confidence levels between the two navies and have contributed to the effective implementation of the Law of the Sea to prevent illegal activities.⁶ The aim of the Exercise is to keep the Indo-Thai IMBL part of the IOR safe and secure for commercial shipping and international trade.

Duration	Indian Navy	Royal Thai Navy
25 April–3 May 2011	INS <i>Tarasa</i> Aircraft Dornier 228	HTMS <i>Long Lom</i> Aircraft RTN Dornier 228
9–17 November 2011	INS <i>Battimalv</i> Aircraft Dornier 228	HTMS <i>Khamronsin</i> Aircraft RTN Dornier 228
18–26 April 2012	INS <i>Bangaram</i> Aircraft Dornier 228	HTMS <i>Khamronsin</i> Aircraft RTN Dornier 228
1–9 November 2012	INS <i>Battimalv</i>	HTMS <i>Khamronsin</i>
April 2013	INS <i>Bitra</i> Aircraft Dornier 228	HTM Ships <i>Phuket</i> and <i>Sriracha</i> Aircraft RTN Dornier 228
November 2013	INS <i>Bitra</i> Aircraft Dornier 228	HTM Ships <i>Phuket</i> and <i>Sriracha</i> Aircraft RTN Dornier 228

Duration	Indian Navy	Royal Thai Navy
1–8 April 2014	INS <i>Bangaram</i> Aircraft Dornier 228	HTMS <i>Sriracha</i> Aircraft RTN Dornier 228
18–26 November 2014	INS <i>Baratang</i>	HTMS <i>Tayanchon</i>
3–9 April 2015	INS <i>Bitra</i> Aircraft Dornier 228	HTMS <i>Tayanchon</i> Aircraft RTN Dornier 228
14–24 November 2015	INS <i>Kesari</i> Aircraft Dornier 228	HTMS <i>Tchonburi</i> Aircraft RTN Dornier 228
19 April–27 May 2016	INS <i>Karmuk</i> Aircraft Dornier 228	HTMS <i>Klaeng</i> Aircraft RTN Dornier 228
16–25 November 2016	INS <i>Karmuk</i> Aircraft Dornier 228	HTMS <i>Longlom</i> Aircraft RTN Dornier 228
13–21 April 2017	INS <i>Cheetab</i> Aircraft Dornier 228	HTMS <i>Longlom</i> Aircraft RTN Dornier 228
23–31 January 2018	INS <i>Saryu</i> , Aircraft Dornier 228	HTMS <i>Longlom</i> Aircraft RTN Dornier 228
16–24 June 2018	INS <i>Kulish</i>	HTMS <i>Longlom</i>
8–16 November 2018	INS LCU L-51 Aircraft Dornier 228	HMTS <i>Songkla</i> Aircraft RTN Dornier 228
5–15 September 2019	INS <i>Kesari</i> Aircraft Dornier 228	HTMS <i>Kraburi</i> Aircraft RTN Dornier 228
12–20 February 2020	INS <i>Saryu</i> Aircraft Dornier 228	HTMS <i>Naratiwat</i>
18–20 November 2020	INS <i>Karmuk</i> Aircraft P-8I	HTMS <i>Kraburi</i> Aircraft RTN Dornier 228
9–11 June 2021	INS <i>Saryu</i> Aircraft Dornier 228	HTMS <i>Krabi</i> Aircraft RTN Dornier 228
12–14 November 2021	INS <i>Karmuk</i> Aircraft Dornier 228	HTMS <i>Tayanchon</i> , MPA



28th Indo-Thai Coordinated Patrol (CORPAT)

JIMEX: The Japan–India Maritime Exercises (JIMEX) were first held in 2012 off Uraga Strait, off Yokosuka, Japan. A biennial Naval exercise, JIMEX aims to enhance interoperability, improve understanding and imbibe the best practices of each other’s Navy. It is also indicative of strengthening of Indo-Japanese defence relations and of the continued efforts of both Governments

to work closely to enhance the safety and security of the global commons in keeping with ‘rules-based order’. Naval cooperation between India and Japan has incrementally scaled up in scope and complexity. Post 2013, the next edition of JIMEX took place in 2018, indicating an upswing in Indo-Japanese defence relations after a brief gap.



INS Chennai with JMSDF Kaga at JIMEX 2020

Duration	Indian Navy	Japanese Maritime Self-Defence Force	Location	Nature of Exercises
9 June 2012	IN Ships <i>Rana, Shakti, Shivalik, Karmuk</i>	JMSDF Ships <i>Ōnami, Hatakaze</i>	Off Uraga Strait, Yokosuka, Japan	HADR operations, VBSS and anti-piracy drills.
19–23 December 2013	IN Ships <i>Ranvijay, Satpura, Kuthar</i>	JMSDF Ships <i>Ariake, Setogiri</i>	Chennai	VBSS, gun firing, cross-deck helo operations, ASW, SAG procedures, seamanship evolutions, anti-surface threat scenarios.
7–15 October 2018	IN Ships <i>Satpura, Kadmatt, Shakti, Kirch</i> Submarine INS <i>Sindhushastra</i>	JMSDF Ships <i>Kaga, Inazuma</i>	Visakhapatnam	ASW, VBSS, gun-firing, anti-aircraft threats, cross-deck helo operations.
26–28 September 2020	IN Ships <i>Chennai, Tarkash, Deepak</i> Aircraft P-8I	JMSDF Ships <i>Kaga, Ikazuchi</i>	Arabian Sea (non-contact at sea, due to COVID-19 restriction).	Weapon firing, cross-deck helo operations, surface, ASW, AAW.
6–8 October 2021	IN Ships <i>Kochi, Teg</i> Aircraft P-8I	JMSDF Ships <i>Kaga, Murasame</i>	Kochi	Multifaceted tactical exercises involving weapons firing, cross-deck helo operations, complex surface, ASW, air warfare drills.

Exercise Komodo: A multilateral HADR exercise, Exercise Komodo was conducted for the first time by the Indonesian Navy in 2014 at Batam, Indonesia.⁷ India and Indonesia also share a close defence relationship, especially after the Agreement signed between the Governments of both nations on ‘Cooperative Activities in the Field of Defence’

in 2001. Both India and Indonesia have mutual interest in promoting peace and prosperity in the Indian Ocean and this exercise is a natural progression of the navy-to-navy relationship given our shared maritime security interests.

The details of *IN*'s participation are outlined in the table below.

Duration	Indian Navy	Location	Nature of Exercises
28 March–3 April 2014	INS <i>Sukanya</i>	At Batam	The exercise included Land and Ship Medical Evacuation Exercise (MEDEVAC) and Engineering Civic Action Programme (ENCAP) during the Civic Mission Phase; 22 navies participated.
11–16 April 2016	INS <i>Sumedha</i> Aircraft P-8I	At Padang	The P8I aircraft participated in the Exercise for the first time and operated from Padang. INS <i>Sumedha</i> participated in Indonesian International Fleet Review.



KOMODO 2016

Exercise Konkan: Naval cooperation between India and the United Kingdom (UK) is based on the long-term strategic relationship between both countries. Exercise Bilateral Konkan provides a platform for the two navies to periodically exercise at sea and in harbour, so as to build interoperability and share best practices. The Konkan series of exercises commenced in 2004, and since then it has grown in scale. The regular interaction between the *IN* and the Royal Navy (RN) over the years, has resulted in an increase in the professional content of the bilateral exercise.

Exercise Konkan is aimed at deriving mutual benefit from each others’ experiences and is indicative of the continuing cooperation between the two countries. The inter operability achieved

over the years, as a result of such exercises, has proved to be operationally beneficial to both navies. Naval cooperation is a tangible symbol of the commitment of both nations to ensuring a positive climate at sea for enhancing strategic stability and promoting economic prosperity.⁸ The exercise takes place alternating years (except 2014), in Indian and UK waters.

The first bilateral tri-service exercise—Konkan Shakti 2021—between the India and the UK took place from 21–27 October. Indian Navy Ships *Kolkata*, *Kochi*, *Chennai*, *Talwar*, *Teg*, and *Aditya*, integral helicopters, maritime recce aircraft, submarine; and UK ships—the aircraft carrier HMS *Queen Elizabeth*, HMS *Defender*, HMS *Richmond*, and RFA *Fort Victoria*.



INS *Tabar* and HMS *Westminister* at Konkan 2021:
Consolidating Interoperability

The Royal Netherlands Navy Frigate HNLMS *Evertsen* also participated in the exercises.

In addition to the *IN*, the exercise witnessed participation by IAF aircraft that included Jaguars,

Training Target (EMATT), operated by the Royal Navy, were undertaken through the night.

Exercise Malabar: It first took place as a bilateral exercise between the *IN* and the US Navy (USN) in 1992, and is today one of the oldest exercises with a friendly foreign country. The biennial exercise was halted by USA after India's nuclear tests in 1998. However, it was resumed after USA's attention towards maritime security increased post the 11 September 2001 attacks on the World Trade Centre. Since 2002, the Exercise has transformed into an annual feature between the two countries.

In 2007, several other countries joined the Exercise, including Australia and Singapore, and it was also the first time the venue was the Pacific Ocean instead of the Indian Ocean. It has been alternating every year thereafter. Japan participated in several drills since 2007 as an Observer Member

Duration	Indian Navy	(UK) Royal Navy	Nature of Exercises
7–10 October 2011	INS <i>Betwa</i>	Submarine HMS <i>Turbulent</i>	Off the West Coast of India
15–18 October 2011	Submarine INS <i>Shankush</i>	HMS RFA <i>Diligence</i>	
19–23 November 2012	Konkan 2012 was conducted as a tabletop amphibious operations exercise. Three officers of the <i>IN</i> participated in the exercise.		Portsmouth, UK
14–19 October 2013	INS <i>Delhi</i>	HMS <i>Westminster</i>	Off the West Coast of India
5–11 September 2015	INS <i>Trikand</i>	HM Ships <i>Iron Duke</i> , <i>Wave Ruler</i>	Plymouth, UK
2–6 May 2017	INS <i>Tarkash</i>	HMS <i>St Albans</i> Special Forces	Plymouth and London
28 November–6 December 2018	INS <i>Kolkata</i> Submarine INS <i>Shankush</i> Aircraft Dornier 228	HMS <i>Dragon</i>	Goa
15–16 August 2019	INS <i>Tarkash</i>	HMS <i>Defender</i>	Off Portsmouth, South Coast of UK
2020	Not held due to COVID-19 pandemic		
16 August 2021	INS <i>Tabar</i>	HMS <i>Westminster</i>	English Channel, UK

SU-30 MKI fighters, IL-76 Phalcon AWACS, AEW&C, and IL-78 MKI air-to-air refuelling aircraft.⁹ Sub-surface exercises with an Indian Scorpene-class submarine and underwater remote-controlled vehicle Expendable Mobile ASW

and eventually became a Permanent Member in 2014. Over last thirty years, the Exercise Malabar has grown in scope, and complexity, aims to address the variety of shared threats and challenges to maritime security in the Indo-Pacific.



Australia, India, Japan and the United States Navies at Malabar 2020

In 2015, the JMSDF participated in the exercises for the first time, and have been participating ever since, officially making Exercise Malabar a trilateral maritime exercise. The year 2020 marked the first time when the exercise was conducted in the two-phase-two-coast/seas version, and the same format was followed in 2021. It was also the second occasion where in all the Quad member countries (Australia, Japan, India and USA) exercised jointly after 2007.

Australia rejoined the Exercises in 2020 and has participated in the 2021 edition. Exercise Malabar endeavours to further strengthen India–Japan–Australia–US naval cooperation and enhance interoperability, based on shared values and principles for the betterment of the global maritime community. A brief summary of the growth and evolution of the Exercise over the decade is tabulated here.

Duration	Indian Navy	USN, Japanese MSDF, Australian Navy	Location	Nature of Exercise
April 2011	<i>IN Ships Delhi, Ranvir, Ranvijay, Jyoti</i>	<i>US Ships Sterett, Stethem, Preble, Ronald Reagan, Chancellorsville, Blue Ridge, Carl Brashear</i> Submarine <i>USS Santa Fe</i>	Off Okinawa, Western Pacific Ocean	Communication exercises, SAG operations, formation manoeuvring, helo cross-deck evolutions, UNREP, HADR, gunnery exercises, VBSS, maritime strike, air defence, ASW, screen exercises.

Duration	Indian Navy	USN, Japanese MSDF, Australian Navy	Location	Nature of Exercise
7–16 April 2012	<i>IN</i> Ships <i>Satpura, Ranvijay, Ranvir, Kulish, Shakti</i> Aircraft TU-142M	Carrier Task Force (CTF) 70, 7 th Fleet. US Ships <i>Carl Vinson, Bunkerhill, Halsey</i> USNS <i>Bridge</i> Los Angeles-class nuclear submarine <i>Louiseville</i> Aircraft P-3C Orion	Conducted in Bay of Bengal	Communication exercises, SAG operations, helo cross-deck evolutions and gunnery exercises.
5–11 November 2013	<i>IN</i> Ships <i>Ranvijay, Shivalik</i> Aircraft TU 142M	USS <i>McCampbell</i> Aircraft P-3C Orion	Off the east coast of India	Communication exercises, SAG operations, leapfrogs, helo cross-deck evolutions, gunnery exercises, VBSS and ASW.
23–26 July 2014	<i>IN</i> Ships <i>Shivalik, Ranvijay, Shakti</i>	US Ships <i>George Washington, John S McCain, Shiloh</i> , & a tanker Nuclear submarine: 1 US Aircraft P-3C Orion JMSDF Ships <i>Kurama, Ashigara</i> (participated for the first time)	Off the coast of Japan	Carrier Battle Group (CBG) operations, maritime patrol & reconnaissance operations, anti-piracy operations, VBSS, SAR, helo cross-deck landings, UNREP, gunnery & ASW exercises, officer exchange & embarkation.
12–17 October 2015	<i>IN</i> Ships <i>Shivalik, Shakti, Betwa, Ranvijay</i> Submarine INS <i>Sindhudhvaj</i> Aircraft P-8I	US Ships <i>Theodore Roosevelt, Normandy, Fort Worth</i> Submarine <i>City of Corpus Christi</i> Aircraft P-8A JMSDF JS <i>Fuyuzuki</i>	Bay of Bengal (off Chennai) Officially upgraded to Trilateral Exercise	Maritime patrol & reconnaissance operations, surface & ASW, AD exercises, VBSS.
10–14 June 2016	<i>IN</i> Ships <i>Satpura, Sahyadri, Shakti, Kirch</i>	US Ships <i>John C Stennis, Mobile Bay, Stockdale, William P Lawrence</i> JMSDF <i>Hyuga</i>	Western Pacific, off Japan	Increased interoperability among the three navies; developed common understanding of procedures for Maritime Security Operations.
9–17 July 2017	<i>IN</i> Ships <i>Vikramaditya, Ranvir, Shivalik, Sahyadri, Kamorta, Kora, Kirpan, Jyoti</i> <i>IN</i> Submarine: <i>Sindhudhvaj</i> Aircraft P-8I	US Ships <i>Nimitz (CVN68), Princeton, Kidd, Howard, Shoup</i> Submarine USS Jacksonville Aircraft P-8A JMSDF Ships <i>Izumo, Sazanami</i>	At/off Chennai (Bay of Bengal)	Aircraft carrier operations, AD, ASW, surface warfare, VBSS, SAR, joint & tactical procedures.
7–15 June 2018	<i>IN</i> Ships <i>Sahyadri, Kamorta, Shakti</i> Aircraft P-8I	US Ships <i>Ronald Reagan, Antietam, Chancellorsville, Benfold, Mustin</i> Aircraft: P-8A JMSDF Ships <i>Ise, Suzunami, Fuyuzuki</i> JMSDF Submarine: 1 Aircraft P-1	This was the first time that Malabar was conducted in the Guam operation area.	Aircraft carrier operations, AD, ASW, surface operations, VBSS, manoeuvres.

Duration	Indian Navy	USN, Japanese MSDF, Australian Navy	Location	Nature of Exercise
26 September–4 October 2019	<i>IN Ships Sahyadri, Kiltan</i> Aircraft P-8I MARCOS teams	US Ships <i>McC Campbell, Pecos, Oklahoma</i> Aircraft P-8A JMSDF Ships <i>Samidare, Choukai, Kaga</i> Aircraft P-1	Sasebo, Japan: Japan hosted the Exercise for the first time. <i>IN's</i> P-8I landed at Atsugi Base in Japan, the first time.	Maritime surface, sub-surface & air operations. ASW, AA & anti-surface firings, maritime interdiction operations including VBSS & tactical scenario-based exercises at sea.
Phase I 3–6 November 2020	<i>IN Ships Ranvijay, Shivalik, Sukanya, Shakti</i> Submarine INS <i>Sindhuraj</i> Aircraft P-8I, Hawks, Dornier	USS <i>John S McCain</i> JMSDF JS <i>Onami</i> HMAS <i>Ballarat</i>	Hosted by India in two phases in a 'non-contact at sea only' format.	Surface, ASW, AAW, cross-deck flying, seamanship evolutions, weapons firing.
Phase-II 17–20 November 2020	<i>IN Ships Vikramaditya, Kolkata, Chennai, Talwar, Deepak</i> Submarine INS <i>Khanderi</i> Aircraft P-8I, Mig-29K, IL-38	US Ships <i>Nimitz, Princeton, Sterett</i> Aircraft P-8A, F/A-18, E2C Hawkeye, MH-60R, SH-60 JMSDF JS <i>Murasame</i> HMAS <i>Ballarat</i>	Phase II of MALABAR- 20 was conducted off Goa.	
Phase I 26–29 August 2021	<i>IN Ships Shivalik, Kadmat</i> Aircraft P-8I	US Ships <i>Barry, Rappabannock, Big Horn</i> Aircraft P-8A, C-17 Special Operations Command Indo-Pacific JMSDF Ships <i>Kaga, Murasame, Shiranui</i> Submarine SSN: 1 Aircraft P81 HMAS <i>Warramunga</i>	Off Guam, Sea of the Philippines	Combined maritime operations, ASW, air warfare, live-gunnery events, replenishment at sea, cross-deck flight operations, maritime interdictions.
Phase II 12–15 October 2021	<i>IN Ships Ranvijay, Satpura</i> <i>IN Submarine: 1</i> Aircraft P-8I	US Ships <i>Carl Vinson, Lake Champlain, Stockdale</i> JMSDF Ships <i>Kaga, Murasame</i> HMA Ships <i>Sirius, Ballarat</i>	Bay of Bengal	Advanced surface & ASW exercises, seamanship evolutions & weapon firing.

Exercise Milan: This is a biennial exercise conceived in 1995 at the erstwhile Fortress Command (now Andaman & Nicobar Command), involving the IOR littoral navies.¹⁰ Having been incepted with India's Look East Policy, over the years it also congregated with India's Act East Policy and SAGAR initiative, which brought in the western

Indian Ocean islands and other IOR littorals. The Exercise is focused on enhancing interoperability between navies of the region and exchanging best practices. Over the years, this flagship exercise in the Andaman Sea has grown from a simple tactical exercise to one much more complex, involving weapon firing, SAR operations, air defence

exercises, cross-deck flying, boarding operations and medical evacuation drills.

The exercise aims at culturally cementing friendship and building confidence in seamless operations with each other. It also provides a platform for the senior Naval officers and diplomats of the littorals to interact and exchange

best practices. Having started with only four countries in 1995, the growing participation over the years bears testimony to the success of this multilateral initiative event and encompasses participation by maritime forces from not only the Bay of Bengal and South East Asia, but also the larger IOR.



Exercise Milan 2018

Duration	Participation	Location and Nature of Exercises
3–7 February 2012	Delegates and navies of thirteen countries participated in the exercise.	Port Blair
2–10 February 2014	Delegates and navies of sixteen countries participated in this edition of the exercise.	Port Blair hosted an international seminar and a Table-Top Exercise on HADR.
2016	-	Not conducted due to International Fleet Review
6–13 March 2018	More than 30 delegates from 16 countries & 11 ships from 8 foreign countries participated.	Port Blair Harbour Phase: A Table-Top Exercise focusing on 'Enhancing Regional Cooperation for Combating Unlawful Activities at Sea'. A seminar: 'In Pursuit of Maritime Good Order: Need for Comprehensive Information Sharing Apparatus'. Sea Phase: Participating ships undertook various exercises aimed at harnessing interoperability in a variety of maritime scenarios.
2020	-	Postponed to 2022 due to COVID-19 pandemic.
26 February–4 March 2022	40 countries participated; ships of 13 countries took part in this edition of the Exercise.	Conducted at Visakhapatnam, this was the largest and the most complex edition since inception.

Naseem Al-Bahr: The first *IN* exercise with the Royal Navy of Oman (RNO) was conducted in 1993. Initially named ‘Thammar-Al Tayyib’, meaning the ‘Best Dates’, the name was later changed to ‘Naseem Al-Bahr’, meaning ‘Fresh Breeze’. These exercises were held in 1995 and 1998, and then took a biennial format since 2003. Exercise Naseem-AI-Bahr is aimed at deriving mutual benefit from each other’s experiences and

sharing best practices. The signing of an MoU on defence cooperation in December 2005 and subsequent establishment of the Joint Military Cooperation in March 2006 set the foundation for increased defence cooperation.¹¹ The Exercise is another milestone in strengthening maritime security cooperation between the two navies and serves to reinforce the longstanding bond of friendship between the two countries.



RNOV *Al-Rasikh* Arrives at Goa for the 2020 Edition

Duration	Indian Navy	Royal Navy of Oman	Location	Nature of Exercises
26 December 2011–2 January 2012	<i>IN</i> Ships <i>Beas, Subhadra</i>	RNOV <i>Al-Mua'zzar, Najah</i>	Off the coast of Mumbai	
23–26 September 2013	<i>IN</i> Ships <i>Mysore, Tarkash, Tabar, Aditya</i>	RNOV <i>Al-Mua'zzar, Al-Mussandam, Al-Najah, Tamsab</i>	Off the coast of Oman	Surface warfare, VBSS, AA warfare, Maritime Interdiction Operations (MIO) & advanced helo operations.
22–27 January 2016	<i>IN</i> Ships <i>Trishul, Trikhand,</i> Fast Attack Craft Aircraft P-8I	RNOV [Ships] <i>Al-Shamikh, Al-Seeb</i>	Off the coast of Goa	Navigation & seamanship evolutions, surface firing, force protection, anti-piracy, flying operations.
16–21 December 2017	<i>IN</i> Ships <i>Teg, Trikand</i> Submarine INS <i>Shankush</i> Aircraft P-8I	RNOV <i>Al-Rasikh, Khassab, Al-Mubshir, Al-Bushra</i>	Off the coast of Muscat (Wudam)	
January 2020	<i>IN</i> Ships <i>Beas, Subhadra</i>	RNOV <i>Al-Rasikh, Khassab</i>	Held off the coast of Goa	

RIMPAC: Hosted by the US Navy, RIMPAC is the world's largest multilateral Naval exercise. The exercise commenced in 1971 but *IN's* association with RIMPAC commenced with participation as an Observer in 2006, 2010 and 2012. The *IN's* participation in RIMPAC provides a platform for multilateral operational interaction aimed at increasing interoperability and developing a common understanding of procedures for maintenance of security operations. In 2014, *IN's* participation was enhanced by deploying

INS Sahyadri in the twenty-fourth edition of the Exercise.

Held biennially, RIMPAC is a unique training opportunity that helps participants foster and sustain the cooperative relationships that are critical to ensuring the safety of sea lanes and security on the world's oceans.¹² Participation in the Exercise is also a demonstration of India's commitment to peace and prosperity in the Indo-Pacific region. Since 2014, *IN* continues to be a regular RIMPAC participant.



IN P8I at RIMPAC 2018

Duration	Indian Navy	Other Participating Navies	Remarks
2012	-		Observer status of India
27 June–1 August 2014	<i>INS Sahyadri</i>	More than 40 ships & submarines.	Conducted off the coast of Hawaii; 22 nations participated. For the first time, an Indian warship was in USA's waters for an exercise.
30 June–4 August 2016	<i>INS Satpura</i>	27 navies	Conducted off the coast of Hawaii
26 June–4 August 2018	<i>INS Sahyadri</i> Aircraft P8I	26 navies	Conducted at Hawaii, and in Kakadu at Darwin.

SIMBEX: The Singapore–India Maritime Bilateral Exercise (SIMBEX) has been the cornerstone of India–Singapore Naval relations. Initiated in 1994, SIMBEX is the *IN*'s longest uninterrupted bilateral maritime exercise with any foreign Navy. The scale and complexity of the drills are ample testimony to the interoperability achieved between the two navies. It was initially called 'Lion King', which was later changed to 'Maitri' and was formalized as a bilateral exercise in 1999.

Since then, SIMBEX has transformed into one of the *IN*'s most high-level maritime exercises. SIMBEX has grown in tactical and operational complexity. It has transcended the traditional emphasis on Anti-Submarine Warfare (ASW) to more complex maritime exercises, such as AD, air and surface practice firing, maritime security, and SAR Operations.¹³ Singapore and India share a common outlook towards preserving freedom of the seas following the norms stipulated in the UNCLOS.



SIMBEX 2021

Duration	Indian Navy	Republic of Singapore Navy	Location	Nature of Exercises
21–29 March 2011	<i>IN</i> Ships <i>Delhi</i> , <i>Ranvijay</i> , <i>Ranvir</i> , <i>Kirch</i> , <i>Jyoti</i> Maritime Patrol Aircraft: 1	RS Ships <i>Supreme</i> , <i>Formidable</i> , <i>Stalwart</i> , <i>Valiant</i> , <i>Victory</i> Submarine <i>RSS Conqueror</i> Aircraft Fokker 50 & RSAF fighter aircraft	South China Sea	Gunnery firings, AA, RAS, interaction exercises, seamanship evolutions.

Duration	Indian Navy	Republic of Singapore Navy	Location	Nature of Exercises
21 March–1 April 12	<i>IN Ships Shivalik, Ranvir, Jyoti, Kora</i>	RS Ships <i>Stalwart, Victory</i> Aircraft Fokker 50	Bay of Bengal & Andaman Sea	Surface engagements, VBSS, tactical exercises, anti-submarine exercises.
16–23 May 2013	<i>IN Ships Satpura, Kirch</i>	RS Ships <i>Steadfast, Valiant</i> Submarine <i>RSS Conqueror</i> Aircraft Fokker 50	South China Sea	Surface engagements, VBSS, tactical exercises, anti-submarine exercises.
22–28 May 2014	<i>IN Ships Kutbar, Karmuk</i>	RS Ships <i>Valour, Independence</i>	Andaman Sea	AD, air and surface practice firings, maritime security and SAR.
18–26 May 2015	<i>IN Ships Satpura, Kamorta</i>	RSS <i>Supreme</i> Archer-class Submarine RSS <i>Archer</i> Aircraft Fokker 50	South China Sea	AD, air and surface practice firings, maritime security and SAR.
31 October–5 November 2016	<i>IN Ships Ranvijay, Kamorta</i> Submarine INS <i>Sindhudvaj</i>	RSS <i>Formidable</i>	Bay of Bengal	AD, ASW exercises, gun live firing.
12–24 May 2017	<i>IN Ships Shivalik, Sahyadri, Kamorta, Jyoti</i>	RSN Ships <i>Formidable, Supreme, Victory</i>	Singapore, South China Sea	AD exercise, gun live firing, and tactical exercises.
10–21 November 2018	<i>IN Ships Ranvijay, Satpura, Sahyadri, Kadmatt, Kirch, Sumedha, Sukanya, Shakti</i> Submarine INS <i>Sindbukirti</i> Aircraft P-8I, Dornier 228	RSN Ships <i>Steadfast, Formidable, Unity, Valiant, Vigour, MV Swift Rescue (SSRV)</i> Submarine <i>Swordsman</i> Aircraft Fokker-50 UAV Scan Eagle	The silver-jubilee edition of the annual SIMBEX, was held in the Andaman Sea and Bay of Bengal.	Live weapon drills, torpedo firings, AS rocket firings, ASW, submarine rescue, AAW, UAV operations, cross-deck helo operations. Dr Ng Eng Hen, Defence Minister of the Republic of Singapore, observed the Exercise between the two navies at sea.
16–22 May 2019	<i>IN Ships Kolkata, Shakti</i> Aircraft P-8I	RS Ships <i>Steadfast, Valiant</i> Aircraft Fokker-50	South China Sea	Maritime combat exercises, gun firing, aerial tracking, coordinated targeting exercises.
23–24 November 2020	<i>IN Ships Rana, Karmuk, Kamorta</i> Submarine INS <i>Sindhuraj</i> Aircraft P-8I	RS Ships <i>Intrepid, Steadfast, Endeavour</i>	Conducted in a non-contact format in the Andaman Sea due to COVID restrictions.	War-at-sea exercise, Naval manoeuvres, weapon firing, seamanship evolutions and coordinated navigation operations.
2–4 September 2021	<i>IN Ships Ranvijay, Kiltan, Kora</i> Aircraft P-8I	RS Ships <i>Steadfast, Vigour</i> Submarine: 1 Aircraft Fokker-50	South China Sea	Live weapon firing, advanced naval warfare serials.

SLINEX: Reinforcing the strong neighbourly ties underscored by extensive maritime interaction, the inaugural Sri Lanka–India Exercise (SLINEX) was conducted off Sri Lanka in 2005, and it

takes place every alternate year. However, in view of the security situation in Sri Lanka, SLINEX was not conducted between 2006 and 2010, restarting in September 2011. The

benefits of operational interactions under the aegis of SLINEX are clearly visible, as both the navies today have an improved and steadfast understanding. Exercise SLINEX has also enhanced the capability of the two navies to work together at sea and contribute towards maritime security in the region.¹⁴ It aims to promote mutual understanding and provide exposure to the operating procedures and best practices of both navies and resonates with India's policy of 'Neighbourhood First' and SAGAR.



SLINEX 2017

Duration	Indian Navy	Sri Lankan Navy	Remarks	Nature of Exercise
20–23 September 2011	<i>IN Ships Shivalik, Ranvijay, Gharial, Khanjar, Cora Divb, Cheriam</i> Aircraft Dornier 228	SLN Ships <i>Sagara, Samudura, Nandmithra, Ranajaya, Prathapa</i> The X FAC Sqn also participated.	Off the coast of Trincomalee	Asymmetric warfare exercises, manoeuvres, seamanship evolutions, AA, VBSS, rocket firing.
4–7 November 2013	INS <i>Takwar</i>	SLNS <i>Sagara</i>	Off the coast of Goa	RAS, VBSS, surface firing, asymmetric threat operation.
27 October–1 November 2015	<i>IN Ships Kora Savitri, Kirpan</i>	SLN Ships <i>Sayura, Samudura, Sagara</i> FACs and Gun Boats also participated.	Conducted off the coast of Trincomalee	Anti-piracy exercise anti-surface operation, cross-deck helo operations.
7–14 September 2017	<i>IN Ships Gharial, Kora</i>	SLN Ships <i>Sayura, Sagara</i>	Off the coast of Visakhapatnam	Anti-piracy exercises, cross-deck helo operations, gun firing drills and anti-surface exercises.
7–13 September 2018	<i>IN Ships Kirch, Sumitra, Coradivb</i>	SLN Ships <i>Sayurala, Samudura, Suranimala</i>	Off the coast of Trincomalee	Gun firings, communication procedures, helo ops, seamanship, navigation evolutions.
7–12 September 2019	<i>IN Ships Sumedha, Khukri</i>	SLN Ships <i>Sindurala, Suranimala</i>	Visakhapatnam	Coordinated maritime operations, gun firing, VBSS, underway replenishment.
19–21 October 2020	<i>IN Ships Kamorta, Kiltan</i> Aircraft Dornier 228	SLN Ships <i>Sayura, Gajabahu</i>	Conducted off the coast of Trincomalee	Surface, anti-air, seamanship evolutions, manoeuvres, cross-deck flying operations.
7–10 March 2022	<i>IN Ships Jyoti, Kirch</i> Aircraft Dornier 228 (Helos) ALH-MK II, Sea King, Chetak	SLNS <i>Sayurala</i>	Conducted off the coast of Visakhapatnam	Surface and AA weapon firing exercises, seamanship, evolutions.

Exercise Varuna: Bilateral Naval exercises between the navies of India and France were initiated in 1993. The exercise was christened 'Varuna' in 2001 and has become a vital part of

the India–France strategic bilateral relationship. Having grown in scope and complexity over the years, the Varuna series of exercises continue to provide both navies with opportunities to learn

from each other's best practices. The Exercise has been a principal driver for operational-level interactions between the two and has underscored the shared commitment of both nations to

security, safety and freedom of the global maritime commons.¹⁵ The Exercise is in line with the joint strategic vision of Indo-French cooperation in the IOR.



INS *Mumbai* berthed opposite FNS *Forbin* at Toulon (Varuna 2017)

Duration	Indian Navy	French Navy	Location	Nature of Exercises
11–13 January 2011	IN Ships <i>Viraat</i> , <i>Godavari</i> , <i>Ganga</i> Submarine INS <i>Shalki</i>	FN Ships <i>Charles De Gaulle</i> , <i>Jean Bart</i> , <i>Forbin</i> , <i>Tourville</i> , <i>Meuse</i>	Western seaboard, off the coast of Goa	AA tracking, ASW, maritime interdiction operations, VBSS.
19–22 July 2012	IN Ships <i>Mumbai</i> , <i>Trishul</i> , <i>Gomati</i> , <i>Aditya</i> Helos Sea King & Chetak.	FN Ships <i>Surcouf</i> , <i>Commandant Birot</i> , <i>Meuse</i> , <i>Montcalm</i>	Held in the Mediterranean Sea, off Toulon.	Included various gun engagement, air-defense serials, ASW, UNREP, evolutions at sea.
2013	Not conducted			
2014	Not conducted			
28 April–2 May 2015	IN Ships <i>Viraat</i> , <i>Mumbai</i> , <i>Tarkash</i> , <i>Gomati</i> , <i>Deepak</i> Submarine INS <i>Shankul</i>	FN Ships <i>Charles de Gaulle</i> , <i>Chevalier Paul</i> , <i>Jean De Vienne</i> , <i>Meuse</i>	Held in the Arabian Sea, off the coast of Goa.	Cross-deck flying operations, surface operations, AD, gunnery firing exercises, Air-to-Surface firing, manoeuvres, aircraft carrier operations, ASW exercises, maritime interdiction operations, multi-ship RAS.

Duration	Indian Navy	French Navy	Location	Nature of Exercises
27–29 April 2017	<i>IN Ships Mumbai, Trishul, Aditya</i>	FN Ships <i>Cassard, Auvergne, Aquitaine, Jean Bart</i>	Held off Toulon	Manoeuvres, RAS, passage exercises, electronic warfare exercises, VBSS, surface exercises, exchange of sea riders, INTEREX.
18–24 March 2018	<i>IN Ships Mumbai, Trikand</i> Submarine INS <i>Kalvari</i> Aircraft P-8I, Dornier 228	FNS <i>Jean de Vienne</i> Submarine SSN <i>Perle</i>	Arabian Sea, Bay of Bengal	Anti-Submarine Exercises with SSN, Maritime Reconnaissance, gun firing, VBSS/MIO, and manoeuvres.
2–3 May 2018	<i>IN Ships Mumbai, Trikand</i> Aircraft P-8I	FNS <i>Nivôse</i>	With France off Reunion, Sea Phase II	Cross-deck flying operations, medium-range gun firing.
8–10 May 2019	<i>IN Ships Vikramaditya, Mumbai, Tarkash, Deepak, Chennai</i> Submarine INS <i>Sindhudhvaj</i>	FN Ships <i>Charles De Gaulle, Forbin, Provence, Latouche Tréville, Marne</i> Submarine SSN <i>Amethyste</i>	Off Goa	Air-to-Air combat, AD exercises, ASW exercises and surface shoots.
May 2020	Submarine INS <i>Kalvari</i> Aircraft P-8I	Submarine SSN <i>Émeraude</i>	Full-scale Exercise Varuna was not held due to COVID-19 restrictions in 2020. Non-contact passage exercise was conducted between the two navies.	An advanced ASW exercise was held on 19–21 October 2020 in the Arabian Sea.
25–27 April 2021	<i>IN Ships Kolkata, Tarkash, Talwar, Deepak</i> Submarine INS <i>Kalvari</i> Aircraft P-8I	FN Ships <i>Charles de Gualle, Chevalier Paul, Provence</i>	Arabian Sea	AD, ASW, surface and AA weapon firing, UNREP evolutions.

MIO: Maritime Interdiction Operations, INTEREX: Interaction Exercises

🚢 Overseas Deployments

Overseas deployments or OSDs are undertaken by ships from both the Eastern and Western fleets of the *IN* for purposes of flag showing, fostering better relations with friendly countries and enhancing foreign cooperation. Similarly, the ships from the 1st Training Squadron also participate in OSDs

each year, in addition to intermittent *IN* sailing voyages such as ASEAN sailing voyages and Lokayan by INS *Sudarshani* and INS *Tarangini* as a part of Naval diplomacy. The OSDs since 2011 are appended in the following table. Individual ship visits to foreign ports are also mentioned in the Appendices.



IN Activities During Overseas Deployments

Year	Participating IN Ships	Countries Deployed to and Remarks
2011	Eastern Fleet Deployment	March–May 2011: IN Ships <i>Delhi</i> , <i>Ranvijay</i> , <i>Ranvir</i> , <i>Jyoti</i> and <i>Kirch</i> undertook an OSD to South China Sea and Western Pacific Ocean. They participated in the IN-USN bilateral exercise MALABAR-11 and the IN-RSN bilateral exercise SIMBEX-11 during the OSD, and also visited Singapore the Philippines, Russia, Vietnam, Brunei, Malaysia, and Indonesia.
	1 st Training Squadron	March 2011: INS <i>Tir</i> , <i>Krishna</i> and ICGS <i>Veera</i> were deployed for OSD to Oman, UAE and Saudi Arabia in March. August and September 2011: INS <i>Tir</i> , <i>Krishna</i> and ICGS <i>Veera</i> were deployed for OSD to South East Asia (Singapore, Malaysia, Bangkok and Indonesia) in August and September.
2012	Eastern Fleet Deployment	May–June 2012: IN Ships <i>Rana</i> , <i>Shivalik</i> , <i>Shakti</i> , and <i>Karmuk</i> from the Eastern Fleet were deployed to the South China Sea and Western Pacific and visited ports in: Singapore, Haiphong (Vietnam), Subic Bay (the Philippines), Busan (Republic of Korea), Tokyo (Japan), Shanghai (China), and Port Klang (Malaysia).
	Western Fleet Deployment	July–August 2012: IN Ships <i>Trishul</i> , <i>Aditya</i> , <i>Mumbai</i> and <i>Gomati</i> were deployed to the Red Sea and Mediterranean Sea. During the deployment, the IN ships visited Alexandria (Egypt), Cartagena (Spain), Toulon (France), Haifa (Israel) and Djibouti.
	1 st Training Squadron Deployment	March–April 2012: 1 st Training Squadron Ships were deployed to Jeddah (Saudi Arabia), Port Said (Egypt), Djibouti and Salalah (Oman). September–October 2012: Ships were deployed to Chittagong (Bangladesh), Yangon (Myanmar) and Port Klang (Malaysia).

Year	Participating <i>IN</i> Ships	Countries Deployed to and Remarks
	ASEAN Voyage	14 September 2012–29 March 2013: <i>INS Sudarshini</i> , a sail training vessel, embarked on the ASEAN leg of her voyage on 14 September from Kochi. During the voyage, <i>INS Sudarshini</i> called on at 13 ports in 9 ASEAN countries. The voyage culminated at Kochi on 29 March 2013. The voyage took 192 days to complete, mostly under sail and was widely acclaimed as successful. The countries visited were Indonesia, the Philippines, Cambodia, Vietnam, Thailand, Malaysia, Singapore, Myanmar and Brunei.
2013	Eastern Fleet OSD	May–June 2013: <i>IN</i> Ships <i>Satpura</i> , <i>Ranvijay</i> , <i>Shakti</i> and <i>Kirch</i> were deployed to the South China Sea and the Western Pacific. These ships visited ports in Singapore, Danang (Vietnam), Manila (the Philippines) and Port Klang (Malaysia).
	Western Fleet OSD	September 2013: <i>IN</i> Ships <i>Mysore</i> , <i>Aditya</i> , <i>Tarkash</i> and <i>Tabar</i> were deployed to the Persian Gulf. During the deployment, the ships visited Port Shuwaikh (Kuwait), Port Maiseed (Qatar), Doha (Qatar), Mina Rashid (Dubai) and Port Sultan Qaboos (Muscat).
	1 st Training Squadron OSD	September–October 2013: <i>IN</i> Ships <i>Gharial</i> , <i>Sharda</i> , <i>Tarangini</i> and CGS <i>Varuna</i> were deployed for OSD to Mauritius and the Seychelles.
2014	Eastern Fleet OSD	July–August 2014: <i>IN</i> Ships <i>Shakti</i> , <i>Ranvijay</i> and <i>Shivalik</i> were deployed in the South China Sea, Sea of Japan and the Western Pacific Ocean. The <i>IN</i> ships undertook two major exercises, viz., <i>INDRA '14</i> with the Russian Navy, and <i>Malabar '14</i> with the US Navy.
	Western Fleet OSD	October–November 2014: <i>IN</i> Ships <i>Deepak</i> , <i>Mumbai</i> , <i>Talwar</i> and <i>Teg</i> were deployed in the Southern Indian Ocean and visited Antsiranana, Mombasa, Dar-es-Salaam, Simon's Town, Cape Town, Port Louis, St Denis, Port Victoria and Nacala during the OSD.
	1 st Training Squadron OSD	October 2014: <i>IN</i> ships of 1 st Training Squadron visited Abu Dhabi and Muscat as part of training for sea cadets.
2015	Eastern Fleet Deployment	18 May–27 June 2015: <i>IN</i> Ships <i>Satpura</i> , <i>Kamorta</i> , <i>Ranvir</i> and <i>Shakti</i> from the Eastern Fleet conducted exercises with Singapore, Indonesia, Cambodia, Australia, Malaysia and Thailand.
	Western Fleet Deployment	August–September 2015: <i>IN</i> Ships <i>Delhi</i> , <i>Trishul</i> , <i>Tabar</i> , <i>Deepak</i> , <i>Beas</i> and <i>Betwa</i> of the Western Fleet visited UAE, Bahrain, Saudi Arabia, Kuwait, Qatar Oman and Iran.
	1 st Training Squadron Deployment	March 2015: <i>IN</i> Ships <i>Tir</i> , <i>Kesari</i> , <i>Sujata</i> and <i>Sudarshini</i> were deployed to Indonesia, Singapore, Malaysia, Bangladesh and Sri Lanka, as part of their Spring OSD in March. September–November 2015: <i>INS Tir</i> and <i>Sujata</i> were deployed to Mauritius and the Seychelles.
	LOKAYAN 15	April–December 2015: <i>INS Tarangini</i> , the sail training ship, embarked on the celebrated LOKAYAN 15, visiting 17 ports in Oman, Saudi Arabia, Egypt, Netherlands, Malta, Spain, UK, Norway, Denmark, Germany, France, Portugal, Djibouti and the Netherlands.
2016	Western Fleet Deployment	21 January–18 February: <i>IN</i> Ships <i>Vikramaditya</i> and <i>Mysore</i> of the Western Fleet visited Sri Lanka and the Maldives.
		7–24 May: <i>IN</i> Ships <i>Delhi</i> , <i>Tarkash</i> and <i>Deepak</i> visited UAE, Kuwait, Bahrain and Oman.
		20–30 May: <i>IN</i> Ships <i>Ganga</i> and <i>Trikand</i> visited Iran.
		30 May–4 September: <i>IN</i> Ships <i>Kolkata</i> , <i>Trikand</i> and <i>Aditya</i> visited the Seychelles, Madagascar, Mauritius, Tanzania, Kenya, Mozambique and South Africa.
	Eastern Fleet Deployment: Rajdoot-16	May–July 2016: <i>IN</i> Ships <i>Sahayadri</i> , <i>Satpura</i> , <i>Shakti</i> and <i>Kirch</i> visited Vietnam, the Philippines, Japan, South Korea, Russia and Malaysia.
		August 2016: <i>INS Satpura</i> made the first ever port call by an <i>IN</i> ship at Port Majuro in the Marshall Islands and at Pohnpei in Micronesia.
November 2016: <i>INS Sumitra</i> was deployed to New Zealand, Australia, Fiji, Indonesia.		

Year	Participating <i>IN</i> Ships	Countries Deployed to and Remarks
	1 st Training Squadron Deployment	<p>March–April 2016: <i>IN</i> Ships <i>Tir</i>, <i>Sujata</i>, <i>Sudarshini</i> and <i>Varuna</i> visited Thailand and Sri Lanka.</p> <p>4–19 April 2016: <i>IN</i> Ships <i>Tir</i>, <i>Sujata</i>, <i>Sudarshini</i> and <i>Varuna</i> visited Thailand, Myanmar and Bangladesh.</p> <p>27 October–15 November 2016: <i>IN</i> Ships <i>Tir</i>, <i>Sujata</i>, <i>Sudarshini</i> and <i>Varuna</i> visited Thailand, Myanmar and Bangladesh.</p>
2017	Western Fleet Deployment	<p>17–20 April 2017: <i>IN</i> Ships <i>Mumbai</i>, <i>Trishul</i>, <i>Tarkash</i> and <i>Aditya</i> visited Souda Bay, Greece and exercised with the Hellenic (Greek) Navy.</p> <p>21 April–27 May 2017: The ships thereafter visited Valencia, Spain, Alexandria, Egypt, Haifa, Israel and Jeddah, Saudi Arabia before returning to Mumbai on 27 May.</p>
		<p>02 May–06 July 2017: <i>INS Tarkash</i> visited Plymouth, UK. The ship thereafter visited Lisbon, Portugal, Casablanca, Morocco (18–21 May), Lagos (Nigeria), Luanda (Angola), Port of Wavis Bay (Namibia), Cape Town (South Africa) and Port Louis (Mauritius).</p>
		<p>12 May–24 June 2017: <i>IN</i> Ships <i>Sahayadri</i>, <i>Shivalik</i>, <i>Kamorta</i> and <i>Jyoti</i> visited Singapore, Kuantan, Jakarta, Surabaya, Port Moresby and Freemantle.</p> <p>14 September–30 October 2017: <i>IN</i> Ships <i>Satpura</i> and <i>Kadmatt</i> participated in the ASEAN International Fleet Review and INDRA-17. The ships visited Singapore, Haiphong (Vietnam), Manila (Philippines), Sasebo (Japan) and Vladivostok (Russia).</p> <p>24 November–07 December 2017: They further visited Bandar Seri Bagwan (Brunei), Sihanoukville (Cambodia), Belawan (Indonesia), Laem Chabang (Thailand for the ASEAN IFR) and Port Kelang (Malaysia).</p> <p>3–6 November 2017: <i>IN</i> Ships <i>Satpura</i> and <i>Kadmatt</i> also undertook PASSEX and fuelling with USN <i>Ronald Reagan</i> Carrier Strike Group in Subic Bay.</p>
1 st Training Squadron Deployment	<p>2 March–2 April 2017: Ships comprising the 1st Training Squadron, <i>IN</i> Ships <i>Tir</i>, <i>Sujata</i>, <i>Shardul</i>, ICG <i>Sarathi</i>, and sail training ship <i>INS Sudarshini</i> were sent on OSD to Port Louis, Port Victoria and Male.</p>	
	<p>3 October–8 November 2017: 1TS visited Penang, Malaysia and Jakarta, Indonesia, before visiting Colombo, Sri Lanka.</p>	
	<p>5 March–3 April 2017: Indian Naval Sailing vessel <i>Sudarshini</i>, with 30 trainee officers embarked, was sent on OSD to the Seychelles.</p>	
2018	Western Fleet Deployment	<p>15 April–23 May 2018: <i>IN</i> Ships <i>Mumbai</i> and <i>Trikand</i> were sent on OSD from to visit the Seychelles, Mauritius, Reunion Island, Madagascar and Comoros. During the deployment, the ships, along with a P-8I aircraft, participated in the Phase III of Exercise Varuna off Reunion Island on 1–7 May 2018.</p>
		<p>4 September–29 October 2018: <i>IN</i> Ships <i>Kolkata</i> and <i>Tarkash</i> visited Simons Town (South Africa), Maputo (Mozambique), Mombasa (Kenya) and Toamasina (Madagascar) from, as part of Exercise IBSAMAR.</p>
	Eastern Fleet Deployment	<p>07–15 June 2018: <i>IN</i> Ships <i>Sahyadri</i>, <i>Kamorta</i> and <i>Shakti</i> during their deployment, participated in Exercise Malabar at Guam and various ports in IOR, SCS and Western Pacific.</p> <p>17 September–24 November 2018: <i>INS Rana</i> was sent on Eastern Fleet OSD. The ship participated in International Fleet Review (IFR) in Jeju (South Korea) on 8–15 October 2018.</p>
1 st Training Squadron Deployment	<p>20 September–22 October 2018: <i>IN</i> Ships <i>Tir</i>, <i>Sujata</i>, <i>Shardul</i> and <i>Sudarshini</i> and ICGS <i>Sarathi</i> were deployed to South East Asia as part of the training deployment. The ships visited Lumut (Malaysia), Singapore, and Jakarta (Indonesia). During the deployment, <i>IN</i> Ships <i>Tir</i>, <i>Sujata</i> and <i>Shardul</i> were diverted to Palu (Indonesia), to provide relief assistance to the Tsunami-affected Island of Sulawesi.</p>	

Year	Participating <i>IN</i> Ships	Countries Deployed to and Remarks
2019	Eastern Fleet OSD	April 2019, 05 September to 26 October 2019: <i>IN</i> Ships <i>Kolkata</i> , <i>Shakti</i> , <i>Sahyadri</i> and <i>Kiltan</i> visited Vietnam, China, South Korea, Singapore, Thailand, Malaysia, Cambodia, the Philippines, Japan and Indonesia.
	Western Fleet OSD	28 June 2019: <i>INS Tarkash</i> visited Egypt.
	1 st Training Squadron	April 2019: <i>IN</i> Ships <i>Tarangini</i> , <i>Sujata</i> , <i>Shardul</i> , and <i>ICGS Sarathi</i> visited Port Beira (Mozambique), and Port Victoria (the Seychelles). The 1 st Training Squadron went to Mozambique for HADR activities post Cyclone Idai. October 2019: <i>IN</i> Ships <i>Tir</i> , <i>Sujata</i> , <i>Shardul</i> and <i>ICGS Sarathi</i> visited Madagascar and Tanzania.
2021	Eastern Fleet OSD	August to September 2021: <i>IN</i> Ships <i>Ranvijay</i> , <i>Shivalik</i> , <i>Kadmatt</i> and <i>Kora</i> visited Vietnam, the Philippines, Singapore, Indonesia, Australia, Malaysia.
	Western Fleet OSD	June to September 2021: <i>INS Tabar</i> visited Djibouti, Italy, France, Russia, Sweden, Morocco, Egypt (Port Said), UK and Oman. August 2021: <i>IN</i> Ships <i>Kochi</i> and <i>Trikand</i> visited Dubai, Saudi Arabia and Bahrain, after which <i>INS Trikan</i> was detached for Patrol off Gulf of Aden (POG).
	1 st Training Squadron	24–28 October 2021: <i>IN</i> Ships <i>Sujata</i> , <i>Magar</i> , <i>Shardul</i> , <i>Sudarshini</i> , <i>Tarangini</i> and <i>ICGS Vikram</i> visited Sri Lanka.

⚓ Major Coastal and Island Security Exercises

In addition to the deployment for bilateral and multilateral exercises, the *IN* ships also undertake theatre-level coastal defence and strategic island security exercises along with the other Armed Forces. The aim is to enhance interoperability and operational readiness at all times in the face of traditional and non-traditional security challenges. The major exercises are detailed below.

TROPEX: Theatre-Level Operational Readiness Exercise (TROPEX) is a Tri-Services military exercise involving the participation of the three Services and the CG in an evolution spanning over a month and across the maritime area of responsibility in the IOR. The exercise tests the combat-readiness of the Navy in concert with the Army and Air Force, and strengthens interoperability and joint operations in complex conflict situations. It tests the various joint combat capabilities and the fighting capabilities of the three Services in a war-like situation. The exercise is conducted over a vast geographical expanse in the IOR, including its adjunct waters,

and is aimed at testing the combat readiness of the Navy in a complex multi-dimensional scenario set in the context of the current geo-strategic environment. The Theatre-Level Exercise also aims to validate the Navy's offensive-defence capabilities, safeguard national interests in the maritime domain and promote stability and peace in the IOR.

TROPEX is conducted in alternate years, in the months of January and February. In the interim years, exercises Paschim Lehar of the Western Command and Poorvi Lehar of the Eastern Command are conducted. TROPEX is aimed at preparing the Armed Forces to address maritime-related contingencies as per war plans. Since 2005, the exercises have taken place each year (except in 2016 due to conduct of IFR, 2018 due to heightened security scenario and 2020 when it was cancelled due to the pandemic). TROPEX 2021 took place virtually, where ARNAV war-gaming software was tested. This is explained in detail in the Maritime Warfare Centre sub-section.

Growth and Development of TROPEX

Duration	Location	Nature of Exercises
February 2011	Western Seaboard	During the tactical phase, the exercises conducted were AA/AD, mine-sweeping operations, force protection measures, SLOC protection, missile firing, SAG operations, Maritime Reconnaissance, Over-the-Horizon Targeting (OTHT), anti-surface operations, Electronic Warfare.
End-January to early March 2012	Eastern Seaboard	The exercise included independent work-up phase, amphibious phase, joint work-up phase and a tactical phase, comprising the Western and Eastern Fleets.
End-January to early March 2013	Western Seaboard	The exercise included weapon firing, tactical operations and amphibious operations.
January to end-February 2014	Eastern Seaboard	The exercise involved weapon firings and tactical evaluation. There was participation of over 100 <i>IN</i> assets comprising ships, aircraft and submarines. The exercise also saw the maiden participation of the newly-acquired P-8I Long-Range Maritime Patrol Aircraft, <i>INS Chakra</i> , participation by IAF SU-30 MKI, Jaguars, IL-78 and the IL-76 AWACS aircraft.
29 January–28 February 2015	IOR	The month-long war drill encompassed all dimensions of maritime warfare, and witnessed participation of over 90 ships, aircraft and submarines from the 3 Naval Commands. In addition, this year a large-scale HADR exercise was conducted off the Lakshadweep & Minicoy Islands (Operation Toofan).
24 January–23 February 2017	Western Seaboard	During the Exercise, KH-35 (Anti-ship missile) was successfully fired by IL-38 aircraft. A total of more than 110 <i>IN</i> & CG assets, and teams of Marine Commandos along with troops from the 91 Infantry Brigade and Special Forces of the Indian Army, and over 20 IAF aircraft and Special Forces (Garuds) participated in the month-long exercise.
7 January–14 February 2019	IOR	TROPEX -19 commenced on 7 January 2019 and was planned to be terminated by 10 March. However, the cowardly terrorist attack on the CRPF convoy at Pulwama on 14 February 2019 led to the rapid deployment of <i>IN</i> for operations in the North Arabian Sea. In all more than 130 <i>IN</i> ships, CG ships and aircraft participated in the exercises.
2021	–	Wargamed online through the three MWCs on ARNAV software.

DGX: An annual Exercise, the Defence of Gujarat Exercise (DGX), is conducted in the northern Arabian Sea focused on preventing a seaborne attack either by state or non-state actors similar to the 26 November 2008-type terrorist eventuality. The Exercise is conducted to address various

contingencies arising from both conventional and non-conventional threats against mainly the northern Maharashtra and the Gujarat coasts. The DGX was later converted into Exercise Paschim Lehar conducted in the Western Theatre from 2016 onwards.

Duration	Location	Participating Units/Nature of exercises
1–12 November 2011	Western Seaboard	Missile boat attacks, ASW, UAV, Maritime Reconnaissance, OTHT, Carrier Operations, Crafts of Opportunity (COOP) Deployments. Participation of IAF and CG along with the Navy.
5–14 October 2012	Western Seaboard	Mobile Missile Coastal Battery (MMCB) Operations, Missile firings, ASW, Air operations, UAV Operations, Network-Centric Operations (NCO), MDA, COOP Deployments. Participation of IAF and CG along with the Navy.
18–29 October 2013	Western Seaboard	Air Operations, UAV operations, MMCB, ASW, Mine warfare, NCO—conducted by Western Naval Command. Participation of Indian Army, IAF and CG along with the Navy.
18–28 November 2014	Western Seaboard	Surface operations, Missile firings, MMCB, NCO, ASW, MDA. Participation of IAF and CG along with the Navy.
30 October–8 November 2015	Conducted off the Gujarat and Maharashtra	Air operations, ASW, MMCB, COOP, MDA, MR & OTHT, and Electronic Warfare (EW). A total of 33 ships, 3 submarines and 29 aircraft participated from the <i>IN</i> , IAF and CG.

Exercises Paschim Lehar (XPL) and Poorvi Lehar (XPoL): Keeping the security of India’s Western and Eastern seaboard in mind, a major annual command-level tactical exercise was initiated in 2016. The Western Naval Command commenced Exercise Paschim Lehar (XPL) since January 2016, whereas Exercise Poorvi Lehar (XPoL), earlier known as ENCORE, started in February 2018.

XPL and XPoL are conducted in January and February in alternate years, when TROPEX is not scheduled. During the exercises, cross attachments of fleet units and sister Services and CG take place. The aim is to strengthen the operational capabilities of the Navy with respect to coastal security, offshore defence, HADR and island contingencies.

■ **Exercise Paschim Lehar (XPL):** Conducted by the Western Naval Command on the Western Seaboard, XPL is designed to address contingencies faced by the Western Seaboard, such as a Indo-Pak scenario, defence of Oilfield Development Area/Deep Water Channel and Creek Area, offensive plans off Makran coast, mitigating non-traditional threats and conducting IN-CG deployments. It includes a number of weapon firings.

In November 2016, over 75 *IN*, IAF and CG assets took part. The exercise aims to enhance preparedness and readiness of the Armed Forces, to ensure functional integrity of all three Services and to administer the security of the Island territories in the Arabian Sea. Units from Eastern Naval Command, Indian Army, IAF and the CG are also conjoined to build interoperability among the forces.¹⁶

■ **Exercise Poorvi Lehar (XPoL):** XPoL is conducted to enhance the Eastern Naval Command’s capability of battle space and Maritime Domain Awareness in the Bay of Bengal, to protect the maritime spectrum from asymmetric threats, protection of SLOCs, safeguarding of offshore assets and coastal VAs and VPs.

AMPHEX: A major Tri-Service-plus-CG amphibious exercise, AMPHEX is conducted normally in the Andaman and Nicobar group of islands. This was the first major exercise to be conducted in the operational area of Andaman and Nicobar Command (ANC). AMPHEX was conjoined with XPoL commencing February 2018, and also with TROPEX when conducted on the Eastern Seaboard (including the Lakshadweep and Minicoy Islands), January–February 2019.

Duration	Location	Remarks
27 January–7 February 2011	Eastern Seaboard	Amphibious units of the <i>IN</i> and the Indian Army jointly validated facets of interoperability and concepts of amphibious warfare.
Mid-January–Early February 2013	Western Seaboard	Deployment of Indian Army personnel with associated tanks/troops/ arms and assets of the Infantry Brigade.
21–24 January 2019	Swarajdeep, Radhanagar, Port Blair	Naval operations, Air drops, amphibious landings .
21–25 January 2021	Andaman & Nicobar group of islands	Multi-faceted maritime operations which included operations involving amphibious assault ships, surveillance platforms, execution of maritime air strikes and complex manoeuvres at sea.

Exercise Jal Prahar: Jal Prahar refers to the Tri-Services amphibious training exercise conducted at the Andaman and Nicobar Islands to fine-tune the Forces strategy to take over islands occupied by the enemy via sea. The Exercise’s aim is to foster joint training and validate SOPs for Amphibious Operations.¹⁷ Jal Prahar is a part of Exercise Poorvi Lehar whenever a full-fledged amphibious exercise is not feasible. Jal Prahar exercise was conducted in the Andaman and Nicobar Islands 2014 (27 October–7 November) onwards and last in April 2016.



AMPHEX 2021

Defence of Andaman and Nicobar Islands Exercise (DANX): DANX is a Headquarters Integrated Defence Staff (HQIDS) Tri-Services exercise for the defence of the Andaman and Nicobar islands, and is conducted under the aegis of the ANC since 2017. The Exercise is a joint operation of the three Services from the planning stage, with an integrated approach in execution. It was conducted in 2017, (20–24 November 2017), in which fighter operations, para jumps at sea, amphibious landings, and slithering operations were undertaken; and in 2019 (14–18 October 2019), when Special Forces units from the newly formed Armed Forces Special Operations Division (AFSOD) participated.



Defence of Andaman and Nicobar Islands Exercise 2021

🚢 New Exercises

In consonance with India's 'Act East Policy', 'Neighbourhood First' and SAGAR policies, the section below enumerates the new exercises that were initiated in the decade 2010–20:

ADMM Plus 2016 and 2019: The *IN* has been a regular participant in maritime exercises conducted by the ADMM countries. ADMM Plus Exercise MS & CT is a multinational exercise under the aegis of ADMM Plus consortium.

In keeping with the *IN*'s constant endeavour to enhance maritime security in the Indo-Pacific, INS *Airavat* arrived at Brunei on 1 May 2016 to participate in the ADMM Plus (ASEAN Defence Ministers' Meeting Plus) Exercise on Maritime Security and Counter Terrorism (Exercise MS & CT) from 1 to 9 May 2016. The *IN* Ships *Kolkata* and *Shakti* arrived at Busan (South Korea) on a three-day visit. The visit was a part of the deployment of the Eastern Fleet to the South China Sea on 28 April.

Indian Navy ships participated in ADMM-Plus Maritime Security Field Training Exercise (FTX) at Busan. In 2019, *IN* joined in Phase I (1–3 May 2019) and Phase II (9–12 May 2019) ADMM Plus exercises that were held in the South China Sea.

Al-Mohed Al-Hind (India–Saudi Arabia Bilateral) Exercises 2021: The navies of the two countries were to have held their first-ever joint Naval exercises in March 2020, but these had to be postponed on account of the COVID pandemic. The Naval exercise was rescheduled for the first half of 2021. The first-ever Naval exercise with Saudi Arabia was called 'Al-Mohed Al-Hind'. Guided missile destroyer INS *Kochi*, the flagship of Western Fleet, with its two integral Sea King-42B helicopters, arrived at Port Al-Jubail during its Persian Gulf deployment. Al-Mohed Al-Hind

2021 comprised a number of shore- and sea-based exercises between the two friendly navies. The harbour phase of the Al-Mohed Al-Hind 2021 Exercise commenced on 9 August 2021 and the three day long sea-based drills and maritime exercises started from 12 August 2021.



Exercise Al-Mohed Al-Hind

Cutlass Express: This is a US Africa Command (USAFRICOM) conducted annual multinational maritime exercise by US Naval Forces, Africa, to promote national and regional maritime security in East Africa and the western Indian Ocean. Exercise Cutlass Express aims to assess and improve regional cooperation in support of the Djibouti Code of Conduct (DCoC), create Maritime Domain Awareness (MDA), and facilitate information sharing between maritime operations centres.

The *IN* participated in the Exercise, for the first time in 2019. INS *Trikand* participated in the exercises that were held from 27 January–6 February 2019 at Djibouti. The aim of participating in the Exercise is to increase law enforcement capacity, regional security, and interoperability between Armed Forces for the purpose of interdicting illegal, maritime activity in the western Indian Ocean region.

In 2021, INS *Talwar* participated in the Exercise held from 26 July to 6 August 2021 in Kenya. In the harbour phase, from 26 to 28 July 2021 at Mombasa, a MARCOS team conducted

training of personnel from navies of Kenya, Djibouti, Mozambique, Cameroon and the Coast Guard of Georgia. They shared the best practices in executing visit, board, search, and seizure (VBSS) operations with sailors of the participating foreign navies during the Exercise, which was held at the Bandari Maritime Academy in Mombasa.

Ekatha–India and Maldives: Exercise Ekatha was first conducted in April 2019 and the fourth edition was conducted in 2021. The *IN*'s elite MARCOS unit held joint training exercises, thereby contributing to the capacity building of Maldives National Defence Forces (MNDF) marines.

Bongosagar, India–Bangladesh Bilateral Exercise: Exercise Bongosagar was first held in 2019, and is aimed at developing interoperability and joint operational skills through conduct of a



Closing Ceremony of Exercise *Ekatha* 2021

participation of twenty-three ships including *INS Sahyadri*, twenty-one aircraft, one submarine and over 3,000 personnel from twenty-seven nations in 2018. *INS Sahyadri* received a special mention

Duration	Indian Navy	Bangladesh Navy	Location	Nature of Exercises
25 June–4 July 2018 Indo-Bangladesh CORPAT	<i>IN</i> Ships <i>Satpura</i> , <i>Kadmatt</i> Aircraft Dornier 228	BN Ships <i>Abu Bakr</i> , <i>Dhaleswari</i> Aircraft: Dornier	Bay of Bengal	Surface warfare drills, seamanship evolutions, joint operational SOPs.
2019 1 st Bongosagar	<i>IN</i> Ships <i>Ranvijay</i> , <i>Kuthar</i>	BN Ships <i>Ali Haidar</i> , <i>Shadbinota</i>	Northern Bay of Bengal, Vishakapatnam	Interoperability, joint operational training.
3 October 2020 2 nd Bongosagar	<i>IN</i> Ships <i>Kiltan</i> , <i>Khukri</i> Aircraft P-8I	BN Ships <i>Abu Bakr</i> , <i>Prottoy</i> , MPA	IMBL, Northern Bay of Bengal	Surface warfare, seamanship evolutions.

wide spectrum of maritime exercises and operations. The navies of both the countries participated in surface warfare drills, seamanship evolutions and helicopter operations.

KAKADU Exercise: Exercise Kakadu is an Australia-driven multilateral exercise, in which the *IN* started participating from 2018. The sea phase of the Exercise in 2018 was concluded at sea on 13 September 2018. Ships, submarines and aircraft undertook various surface, sub-surface and air operations during eight days of sea phase. The multilateral exercise hosted by the RAN saw

for its overall performance during the Exercise and for winning the Kakadu-18 Cup.

India–Vietnam Bilateral Exercise: The maiden edition of the India–Vietnam Bilateral Exercise was conducted from 21 to 26 May 2018 at Da Nang, Vietnam. Thereafter, the *IN* undertook the second edition of the bilateral maritime exercise off Cam Ranh Bay, Vietnam from 13 to 16 April 2019. The exercise was undertaken as a part of the ongoing overseas deployment of ships of the Eastern Fleet to South East Asian countries. The *IN* Ships *Kolkata* and *Shakti* participated in the

Exercise, comprising a harbour and a sea phase. On 18 August 2021, *IN* Ships *Ranvijay* and *Kora* and VPN *Ly Thai To* participated in the third edition of the bilateral exercises in the South China Sea.

Samudra Laksamana: As part of the *IN*'s OSD to Southeast Asia and Western Pacific, *INS Sabyadri* and *INS Kiltan* made a port call at Kota Kinabalu, Malaysia, from 12–15 September 2019. During the port call, the *IN* and the Royal Malaysian Navy (RMN) participated in Exercise Samudra Laksamana. The Exercise included a harbour phase, wherein professional interactions, official calls, social engagements, and various sports events were conducted. The sea phase of the Exercise enabled the two navies to further hone their skills in order to enhance interoperability between the navies and ensure peaceful and secure seas for all.

SITMEX–Singapore, India and Thailand: SITMEX is being conducted annually since 2019, with an aim to enhance mutual interoperability and imbibing of best practices between the three navies. The maiden edition of SITMEX was hosted by *IN* off Port Blair in September 2019. The RSN hosted the second edition of the Exercise in November 2020. The 2021 edition of the Exercise was hosted by RTN in the Andaman Sea.

Zair-Al Bahr (India–Qatar Bilateral) Naval Exercise: India and Qatar conducted their maiden joint naval exercise Zair Al-Bahr, Doha (17–19 November 2019), where *INS Trikand* and P-8I MPA took part. The second edition of this exercise was conducted in August 2021 in the Persian Gulf. The 2021 edition included a three-day harbour phase followed by a two-day sea phase. The sea phase comprised tactical maritime exercises including surface action, anti-piracy exercises, air defence, maritime surveillance, boarding operations and SAR exercises. In the sea phase of the Exercise, *INS Trikand* and Qatari Emiri Naval Forces (QENF) missile boats of Barzan- and Damsah-class, Fast Attack Crafts of MRTTP 34-class and Rafale fighter aircraft participated. The second edition contributed to the *IN*'s efforts to consolidate interoperability and forge strong bonds of friendship with the Qatari Navy.



Exercise Zair Al-Bahr 2021

Duration	Indian Navy	Republic of Singapore Navy, and the Royal Thai Navy Ships	Location	Nature of Exercises
16–20 September 2019	<i>IN</i> Ships <i>Ranvijay</i> , <i>Kora</i> , <i>Sumedha</i>	Singapore: RSS <i>Tenacious</i> Thailand: HTMS <i>Kraburi</i>	Andaman Sea	Gunnery exercises, force protection operations, communication drills, tactical manoeuvring, boarding operations.
21–22 November 2020	<i>IN</i> Ships <i>Kamorta</i> , <i>Karmuk</i>	Singapore: RS Ships <i>Intrepid</i> , <i>Endeavour</i> Thailand: HTMS <i>Kraburi</i>	Andaman Sea	Weapon-firing drills, seamanship evolutions, navigational manoeuvres.
15–16 November 2021	<i>IN</i> Ships <i>Karmuk</i> , <i>Ranvir</i> , <i>Kora</i> Aircraft P-8I	Singapore: RSS <i>Tenacious</i> Thailand: HTMS <i>Thayanchon</i>	Andaman Sea	Gunnery exercises, AD, communications.

Zayed Talwar (India–UAE Joint Naval Exercise): The *IN* undertook its maiden bilateral exercise, Exercise Zayed Talwar, with the UAE Navy, on 7 August 2021 off the coast of Abu Dhabi. INS *Kochi*, with two integral Sea King MK-42B helicopters, deployed in the Persian Gulf, participated in the exercise. The UAE participated with UAESAL-Dhafra, a Baynunah-class guided missile corvette and one AS-565B Panther helicopter. As part of the exercise, the ships undertook tactical manoeuvres, OTHT, SAR, and EW exercises to enhance interoperability and synergy between the two navies. Helicopters were extensively used all through the exercise ranging from SAR serial to passing of targeting data to ships for simulated missile engagement drills.

⚓ Participation in International Defence Exhibitions

To showcase the strength of indigenous shipbuilding, *IN* ships have been a regular participant at international defence, naval and maritime security exhibitions. Additionally, as a

part of its Naval Diplomacy initiative and to build bridges of friendship, *IN* ships also organize on-board visits from people of those countries. A few examples are tabulated below.



DIMDEX 2018

⚓ Change in Operational Philosophy: Mission-Based Deployments

India's maritime security drivers have shown increasing complexity in recent years, covering both traditional and non-traditional threats, with continuing and increased challenges across the regional maritime security environment. Further,

Year	Event	Remark
2017	Naval Defence and Maritime Security Exhibition (NAVDEX)	INS <i>Sunayna</i> with ALH embarked, participated in the NAVDEX at Abu Dhabi on 18–24 February 2017.
2018	Doha International Maritime Defence Exhibition (DIMDEX)	INS <i>Kolkata</i> participated In DIMDEX-8 at Doha (Qatar), 12–14 March 2018. During the port visit, the Defence Minister of Qatar, Chief of Staff, Qatar Navy, Ukrainian and Lebanese Naval Chiefs visited the ship.
	DEFEXPO—2018	Operational Demonstration for DEFEXPO-18 was conducted off-Chennai on 12 April 2018 involving participation of <i>IN</i> Ships <i>Sahyadri</i> , <i>Airavat</i> , <i>Sumitra</i> , <i>Kamorta</i> , <i>Kirch</i> and <i>Jyoti</i> .
2019	International Defence Exhibition (IDEX)	INS <i>Prabal</i> participated in IDEX held at Abu Dhabi, 12–21 February 2019.
	International Maritime Defence Exhibition (IMDEX)	<i>IN</i> Ships <i>Kolkata</i> and <i>Shakti</i> participated in IMDEX 2019 held in Singapore.
2021	International Defence Exhibition (IDEX)	The IDEX 2021 once again witnessed the participation of INS <i>Pralaya</i> that was held during 20–25 February 2021.
	Naval Defence and Maritime Security Exhibition (NAVDEX)	INS <i>Pralaya</i> took part in NAVDEX 2021.

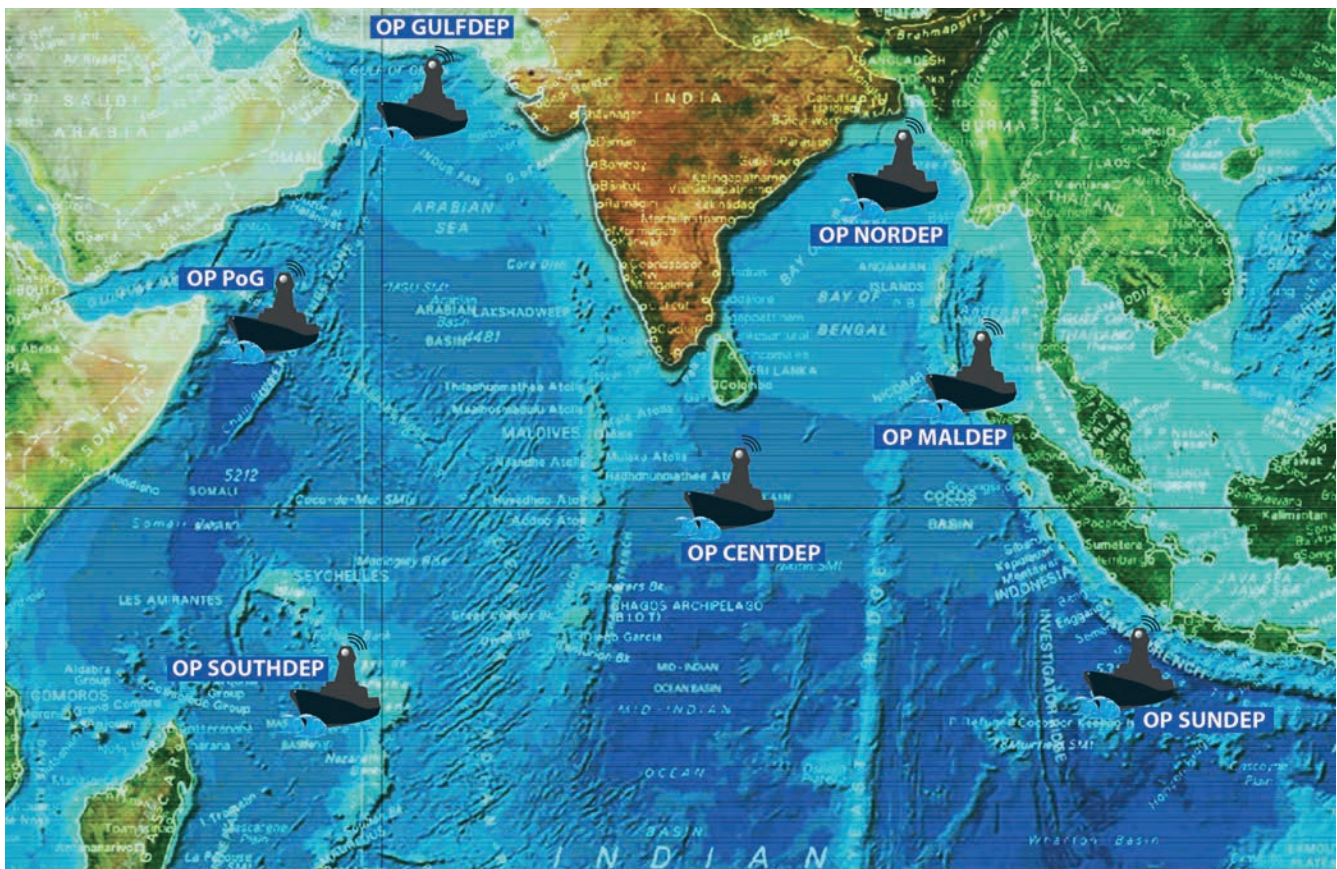
increased incidences of natural disasters and regional instabilities over the past decade, has necessitated enhanced deployment of the *IN* for HADR and other contingencies. Additionally, India's overwhelming reliance on the seas for its external trade and for sustaining its energy needs establishes the need for protecting India's trade in the Sea Lanes of Communication (SLOC) and sea routes. The concept of Mission-Based Deployments (MBDs) aims to empower the *IN* to expeditiously address both traditional and non-traditional threats in the IOR, as well as project and promote our national interests in the maritime domain.

The new MBD concept was unveiled in 2017 and was ratified for incremental implementation. The MBD involves deploying mission-ready ships and aircraft to maintain continuous or near continuous presence, along critical SLOC and choke points in the IOR. These ships are deployed and are ready to face any eventuality across the

spectrum of operations ranging from HADR missions to acts of maritime terrorism and piracy and even full-scale hostilities. In addition, ships deployed in these regions would also undertake bilateral/multilateral exercises and other foreign cooperation requirements, as operationally feasible.

The MBD commenced in July 2017, with ships currently being deployed for Op Gulfdep (Gulf of Oman and Persian Gulf), Op PoG (Gulf of Aden), Op Southdep (South Western IOR), Op Centdep (Central IOR), Op Nordep (Northern Bay of Bengal), Op Maldep (off Malacca Strait) and Op Sundep (off Sunda Strait).

The ships deployed in these regions would undertake SLOC monitoring, enhancing MDA, monitor movement of other forces, anti-piracy patrols, exercises with FFCs, HADR, EEZ surveillance of own and FFCs as per agreements in place among other tasks. Since inception, some



Indian Navy: Mission-Based Deployments

impacts of the deployments have been HADR operations during Cyclone Idai in Mozambique and Cyclone Diane in Madagascar, UN World Food Programme Escort Missions, Operation Rahat, assistance to distressed ships, aid to foreign nations through Samudra Setu, etc. These interventions have been described in detail in other chapters in this volume.

In effect, MBDs have enabled the *IN* to conduct swift operations, constabulary intervention and opportune collaborative engagements with FFCs, while augmenting India's MDA. The concept of MBD has transformed our operational philosophy and has emerged as one of the major conduits of India's Neighbourhood First Policy.

Admiral S Lanba, PVSM, AVSM, Chief of Naval Staff in 2017, has this to say on the conception of MBD during his tenure:

Over the years deployment of ships at sea have been called by different names. Visit to foreign countries were called 'Cruises'. The deployment pattern and activity level at sea increased by leaps and bounds from mid-2000 onwards. From October 2008, a ship was deployed in the Gulf of Aden for anti-piracy patrol and this has continued till date. 'Foreign cruises' started to be called Over Sea Deployments or Long Range Deployments due to the increased reach and period of sustenance at sea. Engagements and bilateral exercises at sea have also increased with close to thirty bilateral exercises and numerous Passex every year.

The globe being in a state of geo-strategic flux, the Indian Ocean SLOCs being a link between the east and the west, the strategic importance of it has grown in the twenty-first century. At any given time there are over 100 multilateral naval ships deployed and since 2008 there has been a permanent presence of PLA Navy in the northern Indian Ocean.

When I took over as the Chief in 2016, the impression I discerned was that deployment at sea had become routine and there was a need to re-align the efforts when they were deployed at sea. There was also a need for us to be present in the area of our interest and improve the overall Maritime Domain Awareness in the Indian Ocean.

We came out with a new concept of Mission-Based Deployments after much deliberation and grasping of the concept. The areas of deployment and periodicity were determined. This brought focus to the ships that they were on a mission to show the flag, presence, and monitor and develop MDA.

Maintenance-Training-Operation-Deployment (MTOD) Cycle: Apart from the introduction of Mission-Based Deployments, in August 2017, the *IN* also introduced the Maintenance-Training-Operation-Deployment cycle. This was a refinement of the preceding ship's operational cum refit cycle and was aimed at achieving smoother and more efficient transition from refit to combat preparedness of ships, as well as for the Mission-Based Deployments.

Operational Deployments in Response to Exigencies

Besides regular deployments and exercises, *IN* ships and aircraft undertake detachments on exigency basis. Some of those deployments are given below.

Operation Sankalp (2019): On 19 June 2019, in the backdrop of the deteriorating security situation in the Gulf region, post attacks on the merchant ships in the Gulf of Oman in June 2019, the *IN* commenced maritime security operations to ensure the safe passage of Indian-flagged vessels transiting the Strait of Hormuz, for protection of the nation's maritime interests. Since then, at least one *IN* ship is required to be deployed for Operation Sankalp in

the region. The *IN* warships and aircraft have been deployed to establish presence, provide a sense of reassurance to the Indian merchantmen, monitor the ongoing situation and respond to any emergent crises.

Indian Naval platforms continue to remain deployed for the Operation for the protection and reassurance of our shipping transiting through the Strait of Hormuz and also in the Gulf of Aden for anti-piracy patrol. By end of 2021, 20 Indian warships have been deployed, and 216 Indian-flagged vessels carrying 21.3 million tonnes of cargo have been provided safe passage.

Pathankot Terrorist Attack: The Indian Navy strongly responded after a group of terrorists attacked an IAF airbase, at Pathankot, Punjab on the night of 1 January and early hours of 2 January 2016. The terrorists were successfully prevented from damaging the strategic assets of IAF and were neutralized by the Indian security forces. Seven defence personnel lost their lives, and another twenty-five were injured.¹⁸ In response to the heightened security situation in the country, the *IN* mobilized by deploying ships of the Western Fleet in preparation of any further escalation. The aggressive maneuvering and posturing of the Western Fleet in the North Arabian Sea kept it ready for strike on adversarial forces upon receiving the directive. The naval assets were kept at peak combat conditions to meet any eventuality.

Uri Terrorist Attack: The Indian Navy mobilized for combat in September 2016 in response to the attack on Indian Army Base Camp at Uri on 18 September 2016. Nineteen Indian soldiers were killed in this attack carried out by four Jaish-e-Mohammed militants. On 29 September 2016 the Indian Army retaliated by executing a surgical strike across the Line of Control (LoC).¹⁹ *IN* was mobilized in response to the heightened security situation in the Northern Arabian Sea as a precautionary measure in case of escalation. Capital combatants of the Indian Navy exercised maritime

superiority and prevented any misadventure by inimical naval forces. Task Forces were primed to respond to any escalation and launch debilitating attacks on adversarial assets at sea and on land.

Pulwama Terrorist Attack: The Indian Navy front-line combatants were sailed out with despatch when on 14 February 2019, a convoy of vehicles carrying Central Reserve Police Force (CRPF) personnel was attacked by a suicide bomber from the Jaish-e-Mohammed on the Jammu-Srinagar National Highway. Lives of forty brave CRPF jawans were lost in this attack. In response to the attack and based on fresh intelligence inputs on the mobilization of fidayeen jihadis, the IAF conducted air strikes inside Pakistan Occupied Kashmir on the biggest training camp of Jaish-e-Mohammed at Balakot.²⁰ Additionally the *IN* executed Operation Zafran and mobilized on the West coast. The *IN* front-line combatants were at enhanced levels of preparedness to forestall adversarial actions, if any, and adopt a deterrent posture. The Indian Navy's assertive intent was significantly signaled quelling the enemy's ideas of raising the ante at sea.

Operation Ajinkya: The standoff across the Line of Actual Control in early May 2020 between the Indian Army and the Chinese PLA in east Ladakh increased tensions between India and China and necessitated a robust Indian response, both militarily and diplomatically. In line with the requirement, ships of the Western Fleet that were operating in the Arabian Sea in mid-May 2020 were tasked to deploy in the Gulf of Aden. Accordingly, *IN* ships established presence in the area. While the patrolling off Gulf of Aden is essentially a constabulary task, the fleet was deployed as a combat force and with a military mission. The Western Fleet assumed a credible deterrent posture through sustained presence and operational readiness to demonstrate the potential of the *IN* to extra-regional forces operating in the region.

🚢 Conclusion

Exercising at sea is the *raison d'être* of warships of navies, in addition to their duties of protecting maritime interests of the nation, and forms the crux of surface operations. It hones the skills of the crew to establish dominance while facing any contingency at sea. Interoperability at sea with like-minded navies—to maintain the established good order and law at sea—becomes an inescapable requirement to police the vast swathes of the oceans. The *IN* has constantly endeavoured to establish good relations with littoral and extra regional forces to understand and form procedures in concert with national policy. The last decade not only witnessed the continuity in the deployments of *IN* ships but also increased intensity and scope of the exercises, and new partner countries.

The nature of exercises at domestic and international levels has evolved over the years, keeping in view the security threats presently facing the region. Bilateral and multilateral interactions are crucial bridges of friendship that increase mutual trust and enhance interoperability among navies of like-minded littoral nations towards the common goal of a peaceful maritime domain. With a renewed vision towards a maritime domain for cooperation, the *IN* is seeking to shape new avenues of collaboration for transforming itself as combat-ready, credible and cohesive force in the IOR and beyond.

Notes

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4

The Indian Naval Submarine Arm A Silent Force

⚓ Introduction

Man's curiosity about the underwater world is not a modern-day phenomenon. It has piqued our interest since time immemorial. The first documented evidence of an attempt at underwater warfare comes from the writing of ancient Greek philosopher and scientist, Aristotle, who records that the Greek emperor Alexander the Great used diving bells to enable men to descend below the surface and destroy barriers that prevent the movement of submerged vessels during the siege of Tyre in 332 BCE. However, the post-World War era witnessed a whole new generation of modern underwater machines, with the advent of the nuclear submarines followed by deployment of Strategic Strike Nuclear Submarines (SSBNs) for strategic deterrence. Submarine weapon technology also metamorphosed from torpedoes and mines to a mix of torpedoes, mines and missiles.

The Indian Navy's (INs) initial plans of 1947 for a balanced force mix included submarines in the arsenal. The idea of establishing an Indian Naval Submarine Arm gathered momentum through the first decade of Indian independence; however, the proposals did not gather much traction due to various constraints. Finally, in 1962, the first batch of Indian Officers commenced its submarine training at HMS *Dolphin* in

Gosport, England. In 1963, post Government approval for the establishment of a Submarine Arm, negotiations commenced with the British Government for the transfer of Porpoise or Oberon class submarines. However, these talks did not reach fruition due to various reasons (for details, refer to *Transition to Triumph* by Vice Admiral GM Hiranandani). Forced to look elsewhere, in 1965, India reached an agreement with the Soviet Union for the transfer of four Foxtrot-class submarines. The IN joined the elite group of countries possessing a submarine on 8 December 1967, when the first submarine, INS *Kalvari*, was commissioned at Riga (erstwhile USSR, present-day Latvia) under the command of Commander (Cdr) KS Subramanian. After a long and arduous journey accentuated by the closure of the Suez Canal, the submarine entered its home port of Visakhapatnam on 6 July 1968. This was followed in quick succession by the commissioning of *Khanderi*, *Karanj* and *Kursura* in the next two years. The submarine base INS *Virbahu* commissioned at Visakhapatnam on 19 May 1971 served as the base depot ship for these submarines of the 8th Submarine Squadron.

Post basing of the four Foxtrot-class submarines in Visakhapatnam, a need was felt for augmentation of submarine force levels. Naval Headquarters decided that four additional submarines were

required to be procured and based in Mumbai, so as to disperse the assets. Accordingly, four more submarines—*IN* Submarines *Vela*, *Vagir*, *Vagli* and *Vagsheer*—were commissioned between August 1973 and December 1974. These submarines under the 9th Submarine Squadron were based at Mumbai, and were modernized versions of the *Kalvari* class with more capable equipment, sensors and weapons. The first submarine training establishment *INS Satavahana* was also commissioned on 21 December 1974 to meet the ever-increasing training requirements of the Navy.

While the Foxtrot-class submarines continued rendering yeoman service, the *IN* realized that these Soviet submarines were essentially late 1950s vintage, and would need to be replaced with newer and more modern submarines. The hunt for successor submarines led the *IN* to look at both Western and Soviet technology. As a result, agreements were reached in the early part of the 1980s, at approximately the same time for the procurement of eight Kilo class (877 EKM) submarines from the USSR and four HDW Type 209-class from Germany.

The period between 1986 and 1994 proved exciting and challenging for the Submarine Arm. It expanded exponentially with the commissioning of eight Kilo-class submarines (11th and 12th Submarine Squadrons at Visakhapatnam and Mumbai, respectively) and four HDW Type 209-class submarines (10th Submarine Squadron at Mumbai) during this period. At one point between April 1986 and December 1989, a period of about forty-four months, the *IN* commissioned as many as nine submarines. The rapid increase in force level along with concurrent absorption of Western as well as Soviet technology was a huge challenge in terms of technology absorption, operational philosophies as well as manpower management. The last two submarines of the German Type 209 submarines, *INS Shalki* and *INS Shankul*,

were significant in that they were constructed at Mazgaon Docks Limited (M/s MDL), Mumbai and catapulted India into a niche league of countries with submarine-construction capability.

Simultaneously, a separate handpicked crew underwent a rigorous training of almost thirty months at Vladivostok for operating a nuclear submarine. With a view to exposing personnel to nuclear propulsion technology, the *IN* leased a Charlie-class nuclear submarine from USSR. On 5 January 1988, with the commissioning of *INS Chakra* under the command of Captain RN Ganesh, India joined an elite club of navies operating nuclear submarines. *INS Chakra* was operated by the *IN* for three years and transferred back to Russia on 5 January 1991, thereby becoming the first vessel under three ensigns—Soviet, Indian and Russian. Interestingly, the Commanding Officer of the submarine, Captain RN Ganesh had the unique distinction of becoming the first Indian Officer to command a nuclear submarine and an aircraft carrier, *INS Vikrant*. The end of the decade also saw the *IN* induct two more Kilo-class submarines from Russia in 1997 and 2000, with the added capability of firing Tube-launched Land Attack Missiles (TLM).

To meet the challenges of operating multiple classes of submarines and absorption of new technology within a short span of time, the appointment of Flag Officer Submarines (FOSM), who would serve as a Class Authority, was introduced in 1987. The Submarine Base Complex at Bombay was also commissioned as a full-fledged base as *INS Vajrabahu* on 1 February 1996.

The decade 2000–10 was a period of consolidation and transition for the *IN* Submarine Arm. The HDW-class submarines were modernized with new sensors, while those of the Kilo class were retrofitted progressively with TLMs for both the anti-ship and land attack roles. The decade also witnessed the decommissioning of the last of the

Foxtrots, INS *Vagli*, on 9 December 2010. The approval and contract for the production of the next generation Project 75-class submarines was also a milestone for the Submarine Arm, since this would be the first submarine project to be constructed entirely in India.

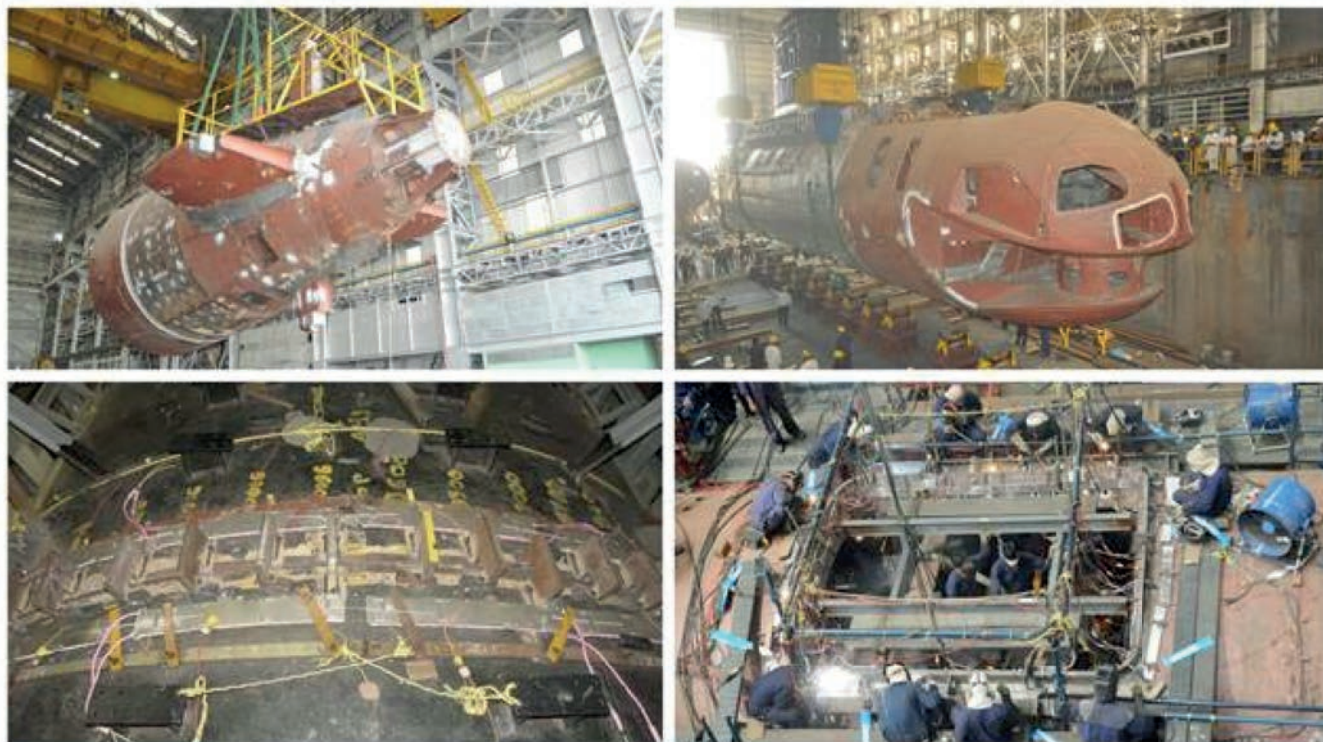
⚓ Submarine Arm Through the Decade *Force Levels*

Project-75—Four *Kalvari*-class Submarines Join the *IN*: The construction of the Project-75 submarines has assisted the *IN* in consolidating its position as a Builder's Navy. It has also provided the necessary boost and confidence building within the Indian shipbuilding yards to understand that the capability to build such complex platforms existed within the country. One of the largest 'Make in India' projects, Project-75 is expected to decrease our dependence on imports, propel indigenization and ensure self-reliance.

The journey towards this achievement can be traced as far back as the commissioning of the last

of the Shishumar-class submarines, in the early 1990s, when, faced with the need for an optimum solution to enhance the submarine capability of the *IN*, a decision was made to proceed with the French Scorpene-class submarines. The Cabinet Committee on Security (CCS) followed this up by giving its approval for the construction of six Scorpene-class submarines at M/s MDL, Mumbai, under Project-75, with M/s DCNS (now M/s Naval Group, France) as the main collaborator and several contracts were signed to ensure seamless execution. In October 2005, a contract was signed between the Government of India and M/s MDL for the construction of six Scorpene-class submarines. This was followed by the signing of a contract between M/s MDL and M/s DCNS in October 2005 for the supply of Combat Systems, transfer of Design & Build Technology, associated services and so on.

In order to procure Exocet SM 39 missiles and associated infrastructure, another contract was signed between the Government of India and MBDA Systems. For the technical arrangement



Project 75: Enabling Make in India and Aatmanirbhar Bharat

of Project-75, a contract was signed between the defence ministries of India and France on 6 October 2005. This contract was significant in facilitating unhindered and uninterrupted grant of export licenses, supply of equipment and transfer of design and technology under Project-75 to M/s MDL. Construction commenced on 14 December 2006, after a year of preparation during which an office was set up to operate the project as an individual directorate at NHQ.

The Project was complex, as other than acquiring the submarines, they had to be constructed in India. This involved multifaceted challenges such as building infrastructure to manufacture submarines, absorb technology and carry out trials and acceptance protocols. The submarines were designed incorporating state-of-the-art technology; advanced stealth features and equipped with both long-range guided torpedoes as well as anti-ship missiles. These modern submarines were to be constructed with advanced Sonar systems and acoustic silencing features which permitted outstanding operational capabilities. An advanced Permanent Magnetic Synchronous motor (PERMASYN) would propel the submarine both on surface and whilst being dived underwater, thus enhancing the submarine's endurance and consequently, the various manoeuvring capabilities.

The selection and training of the crews was another important aspect that was connected to these platforms and the Project-75 office got intricately involved with these aspects. This required instructions on multifaceted disciplines as well as ensuring certain amount of cross-training to progress with smooth knowledge transfer. It involved training of crews, yard personnel and personnel from the M/s MDL, the yard that was actually building the submarine. These submarines were also intended to be retrofitted with an indigenous Air Independent Propulsion (AIP) system. The fitment of the AIP would

further enhance the capability and the stealth of these platforms. In addition, since the system was indigenous, it allowed enough latitude for upgradation and thrust towards self-reliance.

In 2021, the project has four out of the six submarines commissioned into the Navy. The fifth submarine and the sixth submarine have commenced trials and will be commissioned shortly. The decade thus witnessed the consolidation of IN's indigenous submarine construction capability with the commissioning of the first four submarines of the Project-75:

- INS *Kalvari* was commissioned on 14 December 2017 at Mumbai, in the presence of the Hon'ble Prime Minister Shri Narendra Modi.



INS *Kalvari*: The First Project-75 Submarine Is Commissioned

- INS *Khanderi* was commissioned on 28 September 2019 in the presence of Raksha Mantri, Shri Rajnath Singh.



INS *Khanderi*: Ready for Mission

- INS *Karanj* was commissioned on 10 March 2021, in the presence of the former Chief of the Naval Staff, Admiral V.S. Shekhawat, who incidentally was also part of the commissioning crew and later the Commanding Officer (CO) of the old *Karanj* during the 1971 Indo-Pak war.



Commissioning Ceremony of INS *Karanj*

- INS *Vela* was commissioned on 25 November 2021, in the presence of then Chief of Naval Staff, Admiral Karambir Singh.



Commissioning Ceremony of INS *Vela*

Nuclear Submarine INS *Chakra* Joins IN (2012):

Indian and Russia reached an agreement for the lease of an Akula-class SSN. Towards this, a crew headed by Captain Michael T. Moraes was selected, which got together for the first time in INS *Satavahana* in October 2004 for a three-month course to learn the Russian language and the basics

of nuclear engineering. Deputed for further training to Russia in October 2005, the crew completed the rigorous and gruelling SSN course and returned to India in January 2007. Following delays in the construction of the submarine, the crew reassembled at Visakhapatnam under the leadership of Captain P. Ashokan and left for Russia in August 2010, this time to Bolshoi Kamen, for five months of On-the-Job-Training (OJT) and Acceptance Trials.



INS *Chakra*

The OJT commenced with the ubiquitous system-tracing, wherein every individual had to be cleared, system by system, before being finally cleared for sea. The Sea Phase commenced after two months of Harbour Phase, but belying earlier optimism, this phase (planned for forty-eight days over three months), stretched on for a year. The prolonged period was gainfully used to make detailed Acceptance Trial Protocols, formulate SOPs, improve the poor translation of English documentation, streamline spares and take many other preparatory steps towards commissioning. After a tough acceptance process, typical of any new commissioning, the boat was commissioned on 23 January 2012.

INS *Chakra* commenced her return passage to India on 22 February 2012 and entered Visakhapatnam harbour on 31 March 2012. Then Chief of Naval Staff, Admiral Nirmal K. Verma, and the Flag Officer Commanding-in-Chief (FOC-in-C) East, Vice Admiral Anil Chopra,

embarked the submarine at sea, off Visakhapatnam, prior to entering the harbour. On 4 April 2012, INS *Chakra* was formally inducted into the *IN* by then RM, Shri AK Antony. Over the next nine years, the submarine served the Navy with distinction and was the torchbearer of nuclear submarine operations for future indigenous boats.

The experience of INS *Chakra* was a vital catalyst for a massive upgrade to the shore infrastructure and maintenance capability, formulation and practice of new operational concepts, and our designers benefitted immensely from the various technologies used in the boat. It imbibed in us an abiding culture of nuclear and radiation safety. The boat spawned and nurtured a generation of nuclear submariners, who have since shaped the destiny of the *IN*'s Nuclear Arm with the values bequeathed by this boat.

The submarine was returned to Russia in 2021.

INS *Chakra* Commissioning; Commanding Officer Reminiscences

There was no time to celebrate as we had to qualify the Nuclear and Radiation Safety (NRS) Inspection conducted by the Russians before we could operate the reactor independently. Unfortunately, our Russian crew had not warned or prepared us adequately for this very tough examination, which was a first-time experience. Despite our best efforts, we could not qualify, and the NRS Team leader warned me that if our crew was not able to clear it in a reasonable time, the Russian crew would instead operate the reactor on the passage home. All the euphoria of the commissioning vanished, and the crew worked endlessly for the next two weeks and passed the exam with flying colours, even earning reluctant praise from the NRS team. In hindsight, I feel that this first-time failure was the best thing to have happened, as the sting of that failure motivated the crew to do better in the subsequent NRS

inspections by the Russians during the balance period of the lease. Their stringent procedure laid the foundation for a robust inspection process, which was later adapted for our indigenous Indian boats as well.

INS *Arihant*—India Commissions First Indigenous Nuclear Submarine (2016):

India began its nuclear journey with the first nuclear device at Pokhran in 1974. Even prior to this in 1968, Admiral AK Chatterji had laid out plans which would have led to India having its first SSN sail out in the early 1990s. However, finances marred prospects. It was only in 1988 that India leased the first INS *Chakra* from Russia that led to significant learning in terms of submarine operation. According to 1996 Parliamentary records, India had already incurred a large expenditure to develop a nuclear submarine, and DRDO estimated an additional US \$700 million plus in order to complete the project in five years. This decade saw the induction of India's first indigenously-built nuclear powered submarine, INS *Arihant*, a giant achievement for our country. The *Arihant* was built under the Advanced Technology Project and has provided the *IN* with a much-needed platform to showcase its prowess. It was commissioned on 25 August 2016, in the presence of then Chief of Naval Staff, Admiral Sunil Lanba. INS *Arihant* undertook its maiden Deterrence Patrol in October/November 2018 and successfully demonstrated the Sea Leg of India's Nuclear Triad.

An SSBN, INS *Arihant* is a 6,000-tonne submarine, and is capable of firing ballistic missiles. It can travel fast and with great stealth and, barring crew fatigue constraints, can remain submerged for months.

The commissioning of INS *Arihant* and its successful deterrence patrol was a significant strategic milestone in providing Credible Minimum Deterrence and provisioning Assured Second Strike

Capability—as nuclear submarines are supposed to be the best guarantee for a second-strike capability in a possible nuclear exchange scenario.

While the shortage of funds was still being processed, the *IN* continued to work on the existing assets for proving concepts for the SSBN. The sonar capabilities were further refined and indigenization program for submarines was subsequently progressed leading to commissioning of first SSBN in 2016 with 70-75 per cent indigenous equipment.

De-inductions: Two EKM-class submarines were de-inducted during the decade. *INS Sindburakshak*—having suffered extensive damage in an unfortunate incident, achieved similar results but had huge cost differential. Also at Mumbai harbour on 13/14 August 2013—was decommissioned on 13 April 2017, after nineteen years of distinguished service. *INS Sindhuvir* was decommissioned in 2020 and transferred to the Myanmar Navy, where it has been re-commissioned as *UMS Minye Theinkhatu*.

Capability Addition

Submarine Rescue: The success of a rescue operation of a submarine in distress (DISSUB) cannot be assured unless the submarine is technically equipped for receiving such aid, and its crew has practised the same. Accordingly, in 1997 the *IN* had entered into a tie-up with the US Navy for the utilization of the US Navy Submarine Rescue System to facilitate rescue from a DISSUB. All *IN* submarines were inspected and certified for fitness and compatibility with the US Flyaway Kit, infrastructure augmentation at seaport/airport undertaken, and SOPs drawn up for a live submarine rescue. INDIAEX-2012 was a maiden rescue exercise, with the US Navy to develop and demonstrate submarine rescue procedures.

INDIAEX-2012: To check the practicality of the tie up, *IN*-USN rescue exercise INDIAEX-2012 was conducted in 2012. The Exercise provided a

valuable opportunity for validating the procedures for submarine rescue. The aim of INDIAEX 2012 was to exercise common and proven submarine rescue procedures and to build mutual trust on matters pertaining to submarine rescue between India and USA using the US Navy's Submarine Rescue Diving and Recompression System (SRDRS).

The broad objectives of the exercise were to validate cross-deck compatibility of SRDRS with *IN* submarines, calculate Time to First Rescue (TTFR) in a realistic scenario, training and experience for the participants. Dedicated crew training was conducted in harbour. The exercise was conducted from 1-6 November 2012. Indian Navy Submarines *Sindhuvijay*, *Sindhuratna*, *Shankul*, *Shankush* and *Shalki* participated in INDIAEX. Live mating was carried out and personnel were transferred.

Deep Submergence Rescue Vessel (DSRV) Acquisition Programme (2016): As a major submarine operator in the northern Indian Ocean, the *IN* had embarked on an ambitious programme to procure a submarine rescue kit. This would consist of a DSRV and associated equipment, to locate and mark a DISSUB, as also to provide immediate succour and undertake preparatory operations for intervention by the DSRV. Preparation of chambers to decompress survivors (if required) on reaching surface, were also part of the kit.



DSRV: Adding New Capabilities

It was envisaged that the entire kit would be air transportable and capable of being shipped from

base-to-nearest port-to-DISSUB site in quick time, using standard ISO containers by road/rail/air and, thereafter, being mounted on a pre-identified Vessel of Opportunity (VOO) within twelve to twenty-four hours. Time to first intervention, from receipt of the news of DISSUB, was envisaged to be less than seventy-two hours. The *IN* embarked on its quest in mid-1990s, but was not very successful in acquisition due to the requirement of generating competition and deal with diverse technologies, which eventually achieved similar results but had a huge cost differential. Also, the submarine rescue kit was not a core fighting capability and its operation and maintenance aspects were envisaged to be a challenge considering its bespoke nature and low production volumes. Therefore, various models—such as Government Owned-Government Operated, Government Owned-Contractor Operated, Contractor Owned-Contractor Operated etc. were under consideration—each with its pros and cons.

In terms of competing technologies, the dilemma was essentially on whether the submergence vessel was to be a free-swimming vessel (akin to a mini submarine) or tethered submergence chamber; whether the *IN* should acquire rigid metallic compression chambers or flexible foldable metallic/composite chambers—(both these technologies were in use). Additionally, some countries were using the moon-pool concept for DSRV launch and recovery, some were using an A-Frame fitted in stern, and some the side davit concept.

In order to have submarine-rescue capability on both east and west coasts, it was planned to induct two DSRVs for basing on both coasts, viz., Visakhapatnam and Mumbai.

Along with award of contract, the *IN* commenced the: (i) construction of two large DSRV infrastructure facilities at Mumbai and Visakhapatnam; (ii) sought sanction for crew from

the Government of India on an accretion basis; and the process takes on lease two VOOs. The first submarine rescue kit was to be delivered within twenty-four months of award of contract and the infrastructure at Mumbai was to be ready when it arrived—a tall order by any international yardstick. However, *IN* addressed the challenge and a world-class capability was created within contractual timelines. The contract also catered to the training of the first two sets of crew at the OEM's premises (hence at JFD in UK) and of another six sets of crew in India, by 2024.

The first DSRV system was delivered in Mumbai on 10 April 2018 and the second system in Visakhapatnam on 9 January 2019. The Sea Acceptance Trials (SATs) of DSRV 1 were completed in October 2018.

The Submarine Rescue Unit (West) was formally inducted into the *IN* on 11 December 2018 by the Chief of Naval Staff Admiral Sunil Lanba, and its Operational Facility was inaugurated on 11 January 2019 by the FOC-in-C (West) Vice Admiral Girish Luthra. The SATs of DSRV 2 in Visakhapatnam were completed in April 2019, and Submarine Rescue Unit (East) was inducted into the *IN* post completion of SATs in June 2019.



Submarine Rescue Unit, Visakhapatnam

On completion of the process, the *IN's* submarine rescue kit had one of the most capable, deepest diving DSRVs; the largest spread of decompression kits; and multi-aircraft mobility capability, which has been proven in exercises subsequently.

The submarine rescue kit is also being leveraged as a tool by the *IN* to provide submarine rescue capability to regional Navies as a gesture of goodwill/prudent diplomacy. Post-acquisition of the kit, the *IN* ordered two DSVs with M/s Hindustan Shipyard Limited (HSL), which will be shortly delivered, and these ships would act as Mother Ships for the DSRV System.

Operation Lakshya

First Ever Live Transfer of Personnel from a Bottomed Submarine on 18 March 2004

(Excerpt from an article by then Cdr (now VAdm) SN Ghormade, CO, *INS Nireekshak* published in submarine journal *Periscope*)

Indian Naval Ship *Nireekshak* was the only Submarine Rescue Vessel for undertaking Submarine Search and Rescue operations in the *IN* before the arrival of the DSRV. The ship is fitted with CK-59 Submarine Rescue Bell (SRB) capable of undertaking Dry and Wet method of escape from a sunken submarine up to a maximum of eight submariners at one time. The initial wet mating trial of the Bell was conducted in March 1992 and thereafter was just maintained in an operational state. The *Kursk* submarine incident in 2000 was an eye-opener for the necessity of reliable submarine rescue capability. The *Nireekshak* undertook various operations and modifications on the existing rescue bell in order to consolidate the rescue capability of the ship. A number of activities were progressed onboard the ship in 2003 towards proving the ship as a submarine rescue capable platform for the Navy. The ship conducted the deepest saturation dive up to 200m in June 2002. This enhanced the submarine rescue capability to this depth. Deep submergence trials of the SRB were conducted to a depth of 240m

in March 2003 for proving the role worthiness and operational capability of the rescue bell.

Wet mating trial with *INS Sindhuvi Jay* (Operation Sahayata) was successfully conducted in May 2003 where the Rescue Bell was mated with the submarine at a depth of 50m and vacuum was maintained for 48 minutes. **This was the first ever wet mating conducted with a bottomed Sindhughosh class submarine.**

The ship attempted wet mating, including personnel transfer with *INS Vela* off Visakhapatnam (Operation *Samagam*) in May 2003. The trials were not successful due to bad weather, however it was an invaluable learning experience for the ship and her diving team.

The ship worked with a missionary zeal during her refit in 2003 towards achievement of transfer of personnel under pressurized conditions.



Team *INS Nireekshak*: Mission Accomplished

The ship conducted a series of dry mating and submerged hatch mating in harbour with various submarines, which boosted the confidence level of submariners and the ship. The SRB lower hatch had never been opened under pressurized conditions underwater and any mistake or lapse would result in causing grave danger to the crew who would have got exposed to high ambient conditions within no time. Each and every aspect of the rescue operation was discussed threadbare and all emergencies rehearsed. The surface team prepared for all the eventualities and SRB crew was ready for treading into the unknown territory of a live submarine rescue. With close coordination with Commodore Commanding Submarines (COMCOS), West staff we were able

to get two submarines for this real action. *Sindhuraj* bottomed on the morning of 18 March 2004 for the operation. The ship was manoeuvred close to the submarine and the transponder signal from the submarine was picked up on the Ship's dynamic positioning system.

The Submersible Dive Chamber (SDC) was lowered, the diver sighted the submarine and connected the SRB winch wire to the escape hatch. The SRB was then lowered for winching down. At this crucial moment, the internal lighting of the SRB failed and crew was stranded in complete darkness. We continued the operation with the aid of torches available in the SRB. The SRB was mated with the escape hatch of the submarine and vacuum held. After the planned tapping signals were made the SRB crew opened the lower hatch of the SRB for the first time under pressurized conditions. The diver then entered the lower chamber of the SRB and after ascertaining from the submarine regarding draining of coaming, opened the submarine escape hatch for the first time under pressurized conditions.

The operation lasted for over five hours and resulted in the first ever transfer of personnel from a bottomed submarine. This feat was repeated with *Sindhushastra* on 19 March 2004 where in two personnel were transferred from the submarine from a depth of 57m. History had been created and this was a red-letter day for the *IN* and for *Nireekshak*.



INS *Sindhushastra* and INS *Nireekshak*

MR/MLU of Sindhughosh/Shishumar-Class Submarines: The submarines generally have a stipulated service life of twenty-five to thirty years and the Operation-cum-Refit Cycle (OCRC) are worked out in a manner that the submarines are

usually decommissioned when due for the second medium refit (MR). This philosophy holds true for most ships and submarines of the world's navies. However, in practice, the decision to decommission any platform is almost always weighed against the factors of financial/ national security.

Naval Headquarters, in late 2010, had examined the feasibility of a second MR for existing EKM/SSK class submarines. The stakeholders consciously reviewed their past experiences and present nuances with regard to the submarine construction program and future force level requirements. Based upon recommendations by various stakeholders and present and future operational requirements, MoD progressed the case.

Towards the culmination of the process at MoD, it was decided that the term 'Service Life Extension' needed to be renamed. The name 'Medium Refit with Life Certification' (MRLC) was coined and subsequently approved as part of the final version of the proposal. The scope of work was finally prepared and the MRLC was thereafter approved by the Defence Acquisition Council in end-August 2014. The contracts for MRLC were subsequently concluded.

⚓ Equipment Capability Enhancements

L3KEO Periscope for Sindhughosh Class: The Sindhughosh class of submarines were equipped with Russian-type periscopes, part of the original fit. Since these periscopes were rudimentary optical periscopes, the necessity for installing a modern electro-optical periscope was important. A contract was concluded with Kollmorgen Corporation, US in October 2011 for the supply of ten Modern Hull Penetrating Periscopes, along with onboard spares, B&D spares, Documentation, Training, STTE, AMC, installation, HATs and SATs. The periscope provides for binocular vision, still photo capability, HDTV recording and display on remote terminal, powered drive, GPS aerial, IR vision LRF, etc. The

delivery was on time, and all systems have been installed onboard submarines.

Onboard Communication Enhancements:

Communication capabilities improved substantially during the decade. Trailing Wire Antennas enabled submarines to receive communications whilst dived. In October 2013, INS *Sindhudhvaj* became the first submarine to be fitted with an indigenous Ku Band SATCOM. In 2017, the submarine was also fitted with MSS, becoming the first submarine to be fitted with two separate SATCOM systems.

DSMAQ Projects: Some of the acquisitions and upgradation during the period 2011–21 are:

- Procurement of Modern Hull-Penetrating Periscope for Sindhughosh-class submarines in October 2011;
- Dockyard Repair Facility for periscopes fitted onboard Shishumar-class submarines in September 2014;
- Torpedo Simulators for Shishumar-class submarines in September 2015;
- Advanced Distress Sonar System (ADSS) – SUBCON 100 for Sindhughosh-class submarines in May 2018;
- Battery Monitoring System for Shishumar-class submarines in October 2018;
- Submarine Damage Control Fire Fighting and Training Facility (SDCFFTF) in August 2019.

Indigenization

Equipment and System Components: Aiming for self-reliance in the availability of equipment and system components for *IN* submarines, concerted efforts in the last decade have ensured successful indigenization of sixty-seven major items for Shishumar-class submarines and thirty-seven major items for Sindhughosh-class submarines. Impetus for the indigenous development of import substitutes for conventional submarines was commenced by Defence Machinery Design

Establishment (DMDE), Secunderabad and the same was harnessed by Project Naval Interface Group (PNIG) constituted in March 2017. The PNIG also commenced indigenization of equipment for *Kalvari*-class submarines.

Subsequently, the PNIG has been dissolved and the Centre for Indigenization and Self Reliance (CISR) Cell has been set up at Coimbatore, effective from 1 April 2022, to utilize the expertise of the industry. Indigenization activities for conventional submarines will henceforth be undertaken by the CISR Cell.

In addition to continuous indigenization of Sindhughosh- and Shishumar-class submarines, an Indigenization Plan for *Kalvari*-class submarines was prepared and promulgated in February 2022. Additionally, the Government's 'Make in India' initiative is being leveraged for iDEX, Make II and Technology Development Fund (TDF), Schemes to address the import substitution of equipment/items.

Submarine Training

Change in Training Pattern: Submarine training underwent a sea change in the decade 2011–21. During the decade, the *IN* was operating four different types of submarines—EKM, SSK, Arihant and Chakra. Initially, in the 1990s, submariners trained at INS *Satavahana* and the basic class training was provided on the Sindhughosh class. Thereafter, the submariners underwent conversion training as per the class of submarines they were appointed to.

This entailed a lot of time in training before the officers could be fully employed onboard the submarines. A policy decision was taken from 2018 onwards to gradually conduct basic class training in individual submarine-class to cut down time taken on training, and the same is followed to date. Nuclear boat training was independent of this policy, and submariners did their basic training on the nuclear boat class they were appointed to.

The vastly different training requirements and operational philosophies posed a challenge in terms of training. In addition to these challenges, the *IN* also took on the mantle of providing submarine training for foreign navies, and trainees from Myanmar, South Africa, Sri Lanka, Vietnam and Bangladesh have undergone Introductory/Basic submarine training at INS *Satavahana* (see below).

INDIAEX-2012: Based on procedures for submarine rescue, the aim of INDIAEX-2012 was to exercise common and proven submarine rescue procedures. The broad objectives of the Exercise were to validate cross-deck compatibility of SRDRS with *IN* submarines, calculate TTFR in a realistic scenario, and provide training and experience for the participants.

Commissioning of INS *Pallava* (2021): The unit was commissioned as dedicated training establishment on 17 March 2021 and imparts training on Basics of Nuclear and Radiation Safety and pressurized water reactor technology to Naval personnel.



Commissioning of INS *Pallava*

Training Assistance: Foreign Navies

South Africa: A team of two officers was deputed to Simonstown, South Africa in August 2013 to train South African Navy (SAN) submariners on the Type 209/1400 Manthatisi-class submarines. The training mainly covered submarine operations, sonar, watchkeeping, engineering and electrical, maintenance and refits. The officers also undertook revision of SOPs and review of the Operational and Technical documentation.

Vietnam: Vietnam, post acquiring its first Russian-built Kilo-class submarine in January 2014, formally joined the list of submarine-operating nations in South East Asia. Basic Submarine Training for the first and second batches of the Vietnam People's Navy (VPN) was successfully undertaken at Submarine Training School, INS *Satavahana* in 2014 and 2016, respectively, and over 100 officers and sailors underwent training. In addition, an *IN* delegation was also deputed to Hanoi (Vietnam) in 2015, to provide training and consultancy services to the VPN.

Indonesia: Two customized submarine training courses for six officers of the Indonesian Navy was jointly conducted by INS *Satavahana* and the Anti-Submarine Warfare (ASW) School in Kochi in May 2018, for a duration of four weeks.

The Philippines: Influenced by the *IN's* assistance to MN in setting up their Submarine Arm, a request came from the Philippines during a meeting (held at Manila in end-January 2020) for submarine training/consultancy assistance towards raising their Submarine Arm. This is presently being progressed by the Navy.

Singapore: An 'Implementing Agreement' (IA) between *IN* and Royal Singapore Navy (RSN) was signed towards rendering mutual Submarine Search and Rescue Support, to each other's navies.

Operations

Bilateral/Multilateral Exercises: Submarines continued to be at par with the fleets undertaking bilateral and multilateral exercises at sea during the decade. The submarines exercised not only with *IN* ships but also with ships and submarines of friendly navies to build upon interoperability and hone their underwater warfare skills. The submarines that had taken part in individual exercises have been detailed in the 'Surface Operations' chapter.

Operations Undertaken by INS *Sindhudhvaj*:

Some of the unclassified notable operations by INS *Sindhudhvaj* include the maiden OTR at Gangavaram port on 26 April 2011 and Operation Talash, the search for a missing IAF AN 32 aircraft off Chennai during 22 July–4 August 2016.

In June 2015, INS *Sindhudhvaj* undertook SAR operations off Puducherry (Tamil Nadu) for the missing aircraft CG 791. It was deployed for intercepting the 37.5 MHz transmissions from the Sonar Locating Beacon (SLB) of the missing aircraft. Both Periscope Depth (PD) and dived runs were carried out by the submarine for SAR operation. The submarine successfully localized one set of transmissions to a one-mile circle and passed it on to the Senior Officer Search Force (SOSF) for further analysis by MSV *Olympic Canyon*, a specialized undersea commercial operations vessel requisitioned from M/s Reliance Industries. The data recorder and SLB were successfully recovered from the position indicated by the submarine.

Salvage of INS *Sindhurakshak*: In the late hours of 13 August 2013, there was an explosion, which resulted in the sinking of INS *Sindhurakshak* and the loss of life of eighteen personnel. Further details of the accident are given in the chapter on Accidents and Incidents. The salvage of the *Sindhurakshak*, a challenging and dangerous operation, was contracted to M/s Resolve Salvage and Fire India Pvt Ltd on 31 January 2014. The major activities during the execution of the contract included safe removal of ordnance, achieving of watertight integrity, defuelling, lifting of the submarine from the seabed, self-floatation, and docking. The contract culminated on 15 July 2014 after completion of post salvage work. More details on the salvage are given in the Accidents and Incidents chapter.

⚓ Submarine Diplomacy

Myanmar—Project ‘Jalvir’: In pursuance of its vision SAGAR or ‘Security and Growth for All in the Region’ and its commitment to build capacities and self-reliance in all neighbouring countries, India leased out a submarine to Myanmar in October 2020.

INS *Sindhuvir* was in service of the Indian Navy since 1988. The submarine was refitted before being handed over to Myanmar Navy. *IN* also undertook ab-initio training for Myanmar Navy personnel to operate the submarine.

This was the first instance of an *IN* submarine being leased to a friendly foreign country and a significant step towards enhancing bilateral relations with Myanmar. INS *Sindhuvir* was formally handed over to Myanmar Navy on 22 October 2020 and has been named the UMS *Minye Thein Khathu*.



INS *Sindhuvir* Under Two Flags



Project Jalvir

⚓ Golden Jubilee Celebrations and Award of President's Colour

The Golden Jubilee Celebrations of the Submarine Arm, commemorating fifty years of the commissioning of the first submarine, was celebrated in December 2017. A multitude of events were planned through the year to coincide with the celebrations. These included a Submarine Seminar and various social and submarine events. A 'Submarine Song' was also composed especially for the occasion. The lyrics of the song were penned by a submariner Captain Sudeep Sen. The song was set to music by the famous trio of Shankar-Ehsaan-Loy and was released in the presence of the Hon'ble President of India during a performance by the Indian Navy Symphony Orchestra at Siri Fort Auditorium on 10 February 2017. A notable event was the award of the President's Colour being presented by the Hon'ble President Shri Ram Nath Kovind to the Submarine Arm on 8 December 2017 in recognition of the yeoman service rendered by the Arm, both in peace and war.

⚓ Conclusion

The *IN* Submarine Arm has had a glorious history thus far and in the past fifty years, twenty-five submarines of six different classes of Russian, Western and indigenous origins, of conventional and nuclear propulsion, have proudly adorned the Naval Ensign. Their crews have operated these boats, with exceptional professionalism and commitment, in waters near and far, and



Award of President's Colour to Submarine Arm

have significantly contributed to the mandate of safeguarding the maritime interest of India. The Arm has been at the vanguard of the *IN* operational edge ever since the first submarine *INS Kalvari* was commissioned in 1967. The boats have since evolved into an important facet of deterrence in the maritime domain.



5 | Indian Naval Aviation

Fly Navy

⚓ Historical Evolution of Indian Naval Aviation pre-2010¹

Since its inception in 1953, Indian Naval Aviation has evolved into a force to reckon with, by steadily building and enhancing its capabilities. The Directorate of Naval Aviation was set up at Naval Headquarters in 1948. In 1949, the first batch of five pilots and five observers were deputed to undergo training in the United Kingdom (UK). In early 1953, ten Sealand amphibious aircraft were inducted into the Indian Navy (*IN*). On 11 May 1953, *INS Garuda* was commissioned at Kochi, a historic occasion signifying the commencement of the Naval Air Arm. *INS Garuda*, thus, became the ‘alma mater’ of Naval Aviation. The arrival of the armed Firefly aircraft in 1958 added an offensive punch, and Naval Aviation steadily expanded its inventory to become an integral part of a formidable Navy. The year 1959 saw the commissioning of the first Indian Naval Air Squadron (INAS) 550, erstwhile Fleet Requirement Unit, with ten Sealand, ten Firefly and three HT-2 aircraft.

In its early days, however, Naval Aviation was saddled with inventory that was already in the final phase of operational life. The aircraft were at least two generations behind (then) current technology, mostly received or purchased from the UK and France. Nevertheless, aircraft such as the Sea Hawk,² and the Alizé,³ played a very significant role in the 1971 India–Pakistan War in the Eastern sector.

The period from the 1980s to the 2000s saw the induction of Soviet-make helicopters—the Kamovs—Kamov 25 in 1980, Kamov 28 in 1986, and Kamov 31 in 2003—as also the UK’s Sea King 42B and 42C helicopters in the late 1980s. These acquisitions were important milestones in the history of Indian Naval Aviation. The Sea King 42B especially—with its improved sensor fit and capability for Anti-Shipping strike—was superior to the 1971-vintage Sea King MK42 Anti-Submarine Warfare (ASW) helicopters acquired from British Westland Helicopters Ltd. The Tactical Mission System, with ASW/Anti-Surface Vessel (ASV) weapon package, conceptualized by Naval Aviators in the Sea King 42B, was so unique that the helo was christened the ‘Flying Frigate’.

In the early 2000s, a path-breaking move was made by the Indian Armed Forces, with the acquisition of unmanned aerial vehicles (UAVs). The *IN*, which hitherto was content with the well-established Sea Harriers, Sea Kings and old warhorses Chetaks and Dorniers, began operating UAVs in 2002, with the induction of the Heron and the Searcher from Israel. These UAVs were capable of unmanned intelligence, surveillance, reconnaissance, photography, communication and over-the-horizon-targeting. Launched from shore, their control was passed on to a ship at sea specially designated for the purpose. Terms such as ‘Forward Looking Infra-Red (FLIR) payload’, ‘Data Acquisition System’, and ‘Datalink communication’ became common usage.

Consequently, the UAVs added a new technological dimension to aircraft maintenance with the myriad challenges they brought along. Ensuing advancement in technology and improvements in autonomous technologies have helped overcome several operating constraints, and modern UAVs are not only much more autonomous but also armed.⁴

During the 1980s, the *IN* inventory of fighter aircraft had also graduated to Sea Harriers,⁵ and in 2009, with the induction of the twin-engine, multi-role, deck-based MiG-29K the *IN* became the custodian of 4++ generation fighters and associated maintenance equipment. Further, with the induction of the long-range P-8I maritime patrol aircraft in May 2013, to replace the ageing TU-142M fleet, the drive to modernize the Naval Air Arm was well and truly airborne.

Maritime 'Air-power' is the ability of a Navy to use air assets, afloat or ashore, to secure and progress national interests by attaining objectives, achieving missions and executing tasks, as per the *IN*'s stated roles. Maritime air-power is a sub-element of a nation's maritime power and a key enabler in the formulation and implementation of maritime strategies. Maritime air-power, both integral to the fleet and in support of it, possesses the signature characteristics of speed, flexibility, reach and force projection. Operating afloat and ashore, it exponentially complements various facets of maritime operations—such as sea control, battle space dominance and sea denial—while significantly aiding Maritime Domain Awareness (MDA). At sea, an aircraft carrier bolsters the potency of the fleet by deploying aircraft that can apply combat power at great ranges. Aircraft Carriers also provide essential Command, Control, Communications, Computers, Intelligence, Information, Surveillance and Reconnaissance (C⁴I²SR) support functions. A Carrier Battle Group (CBG), as a cohesive operating entity, thus enhances the power projection capability of the fleet manifold.

⚓ Changes in Naval Aviation Force Levels

Before we move on to track the various operational and maintenance aspects of naval aviation, and the widening scope and capabilities of the Naval Aviation branch through the decade 2011–21, it is essential to trace the expansion of air asset holdings in these years. The *IN*'s inventory of aviation assets can be broadly classified based on their primary role:

- Fleet Air Defence
- Maritime Reconnaissance and Surveillance
- Multi-Role aircraft
- Training

⚓ Fleet Air Defence

With the planned induction of the aircraft carrier from Russia (INS *Vikramaditya*), and also a choice for the Indigenous Aircraft Carrier (IAC-1) the *IN* had begun to scan for a replacement for the Sea Harriers by 2002. The search culminated in the signing of a contract for sixteen MiG-29K/KUB Russian aircraft (twelve single-seaters and four two-seaters) in 2004.

Inducted, the MiG-29K/KUB, in 2011: The sixteen aircraft from the initial contract were inducted into the *IN* by 2011. Another contract—for twenty-nine additional aircraft (twelve MiG-29K and one MiG-29 KUB for IAC-1, and the balance for INS *Vikramaditya*)—was also signed by the *IN* in March 2010. The first batch of these aircraft were delivered to the *IN*, along with a flight simulator by May 2011; the last of the forty-five aircraft (cumulative as per 2004 and 2010 contracts) was inducted into the *IN* in 2021.

The aircraft commenced deck operations in February 2014, after INS *Vikramaditya* arrived in India. However, early teething problems affected envisioned timelines for the operationalization of the aircraft. It was observed that during the first trials (July 2012), and the subsequent deck trials, a large



A MiG-29K Aircraft Prepares to Take Off at INS *Hansa*

number of defects were observed in the airframe, and were acknowledged by the original equipment manufacturer (OEM) Substantial efforts (2017–20) by Russian and Indian teams towards modifications resulted in improvements in aircraft serviceability and stability.

De-Induction—the Sea Harrier Bows Out in 2016: Post de-induction of Sea Hawks in 1978, the *IN* had trained its sights on the Short/Vertical Take-off and Landing (S/VTOL) Sea Harrier, then under development by British Aerospace. The Sea Harriers, launched from an aircraft carrier, had been battle-tested by the UK in the Falklands against the Argentinian forces in 1982.

As Lt (later Vice Admiral) S.K. Damle stated:

The Sea Harrier was a quantum jump. The aircraft was more advanced, almost state of the art technology. Secondly the aircraft could carry more all-up weight, more load in terms of weapons, various kinds of weapons and, therefore, many modes of delivery. Thirdly, we had air-to-air radar and, therefore, we could do air-to-air interception. Air-to-air combat was something that had to be developed in our Navy after the Sea Harriers were acquired.⁶

Inducted into the *IN* in 1983, the Sea Harriers were the mainstay of carrier operations onboard both INS *Vikrant* and INS *Viraat*. After thirty-three years of sterling service, the Sea Harriers were de-inducted from the *IN* and undertook the last flight on 11 May 2016. The proud ‘White Tiger’ legacy was continued with the squadron being re-equipped with the new and more capable MiG-29Ks. For the versatile White Tigers, this resurrection also marks a full cycle from commissioning ‘Tail Hooking Sea Hawks’ to the ‘Vectored-Thrust’ Sea Harrier era; and now, the induction of the MiG-29K to this elite squadron, marks the return of the ‘Tail Hookers’.



INS *Viraat* with the Complement of Fighters

Admiral Arun Prakash (Retd), the first Squadron Commander of the Sea Harrier squadron and later Chief of Naval Staff, reminiscences:

With the vintage Sea Hawk being rendered obsolete, and no compatible fighter available for Vikrant's small flight-deck and lightweight catapult, the late-1970s saw the *IN* facing the bleak prospect of losing its carrier-based aviation. Salvation came in the form of two British innovations: the STO/VL Harrier and the ski-jump inclined ramp. The *IN* promptly opted for both.

Induction of the Sea Harrier in 1983, brought with it not just a significant enhancement of defensive and offensive capabilities but also a quantum-jump in technology for the Navy. Its advanced avionics, weapon-aiming computers and complex engine were all representative of 3rd generation state-of-the art technology.

With its multi-mode Blue Fox radar and a weapon suite that included the Magic I (later, replaced by Magic II) air-to-air missile (AAM) and Sea Eagle anti-ship missiles, the Sea Harrier ensured a large 'protective bubble' around the fleet against airborne and surface threats. Its radar and electronic-warfare suite also became the fleet's 'eyes in the sky.' For a Navy that had always worried about the outcome of a Sea Hawk encountering a PAF F-86 Sabre, the presence of the Sea Harrier in the fleet was a great source of reassurance. It served to hugely expand the deployment options available to Fleet Commanders.

In 2005, somewhat belatedly, NHQ implemented a Limited Upgrade of the Sea Harriers (LUSH) which equipped the aircraft with the new, Israeli ELTA radar, the advanced Derby [beyond-visual range] BVR air-to-air missile and an air-air data link. This gave the aircraft a fresh operational edge over most potential adversaries; as proven in exercises with the IAF and foreign navies.

LUSH was to have an unfortunate consequence. Since the upgrade was undertaken by an Israeli firm, in collaboration with HAL, and the aircraft manufacturer was left out, BAE progressively diminished its support to *IN* Sea Harriers. The writing on the wall became clear; the Jump Jet's days were numbered. But our maintainers and logisticians, through ingenuity and hard labour, managed to stretch out its life by another decade.

Adieu Jump Jet

In early 2016, a decision was taken to withdraw the Sea Harrier from service. By now INAS 303, the new MiG-29K squadron was already serving on board INS *Vikramaditya*. To many, it seemed that the withdrawal of the Sea Harrier would also mean the end of the road for INAS 300, the fabled White Tigers of Bangladesh fame.

On 11 May 2016, the CNS, Admiral Rabinder 'Robin' Kumar Dhowan (a White Tiger), presided over a brief ceremony at Dabolim, in which INAS 300 bid adieu to the Sea Harrier and inducted the MiG-29K as replacement. A pair of Sea Harriers, followed by two MiG-29Ks got airborne; one section led by the current [Commanding Officer] CO and the other by the CO Designate. After a brief but impressive display of their respective capabilities, both sections taxied in and a ceremonial change of command took place.

The unique 'Jump Jet', no doubt, made an extraordinary contribution to our maritime capability for 33 years. But even the most proud and misty-eyed old White Tiger would acknowledge that the MiG-29K was a generation ahead in performance. Operating from a big-deck carrier like the *Vikramaditya* the new INAS 300 will enable the *IN* to look every other navy, and many air forces, squarely in the eye. The old order had changed, as we bid adieu to the beloved Jump Jet and welcomed the supersonic MiG-29K.

⚓ Maritime Reconnaissance and Surveillance

In light of the *IN*'s repeated requests for taking over the role of Maritime Reconnaissance after the 1971 India–Pakistan War, the Government approved the procurement of IL-38 MR aircraft from the Soviets for operation by the Navy. The IAF, having undertaken the Maritime Reconnaissance role until then, decided to hand over the existing maintenance-heavy Super Constellations also to the Navy. In November 1976, the *IN* inducted five Super Constellations, and this transition kick-started *IN*'s foray into Maritime Reconnaissance. More details of this transfer are given in the history volume *Transition to Triumph* by Vice Admiral GM Hiranandani.⁷ Considering their vintage, these aircraft were phased out in 1983, but not before they had provided crucial exposure to *IN* on Maritime Reconnaissance. Indeed, the induction of the Super Constellations (MR) was a pioneering effort towards rapid capability building by the *IN* in this domain.

Induction of the Boeing P-8I, the *IN*'s ASW, ASuW, and ISR Aircraft: The *IN* became the first international customer for the Boeing P-8 (Poseidon Eight) aircraft when it signed the nearly US \$2.1 billion deal on 1 January 2009, for a total of eight aircraft. The aircraft is designed for long-range Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASuW), and Intelligence, Surveillance and Reconnaissance (ISR) missions. The first P-8I (I for India) aircraft arrived in India by May 2013, while the eighth was delivered by November 2015.

Exercising the Option Clause, the *IN* placed an order for four additional P-8Is. Delivery of all four P-8Is was completed by March 2022, thereby augmenting the *IN*'s P-8I holding to twelve. The induction of the additional four P-8Is paved the way for the Commissioning of a P-8I squadron, INAS 316, at INS *Hansa*, Goa on 29 March 2022.

These aircraft are equipped with Harpoon Block II air-launched missiles and lightweight torpedoes and sonobuoys. The aircraft successfully undertook Harpoon ATM - 84L telemetry firing (Exercise



IN P-8I

Kesari) on a decommissioned ship in October 2013. The firing of Harpoon (combat version) post induction of aircraft was undertaken on 29 March 2016, which successfully engaged the target.

The P-8I aircraft is also equipped for broad areas, maritime and littoral operations. Its communication and sensor suite includes indigenous equipment developed by Defence Public Sector Units (PSUs) and private manufacturers. With its high speed and high endurance of about ten hours, the aircraft is capable of delivering a punitive response and maintaining a watch over India's immediate and extended areas of interest.⁸

Commander Ravi Kumar, then Ops Officer in the first crew taking over the P-8I aircraft from the US remembers:

The first flight of the P-8I was made in September 2011 followed by the flight test programme in July 2012. The historic first landing of the P-8I in India was on 15 May 2013. Outfitted with two radars, ESM/Radar fingerprinting suite and other latest generation ASW equipment, the P-8I represented a quantum leap in technology over the TU-142M.

As it is based on the commercially viable Boeing 737 platform, the aircraft offers previously unheard of mission readiness for the Indian Navy and provides the eyes and ears over the entire IOR. The aircraft has been termed a 'Game Changer' for the Indian concept of operations.



P-8I: A Force Multiplier for *IN*

Induction of the Dornier DO-228—Meeting the *IN*'s SRMR Needs: In the early '80s, the *IN* was on the lookout for a Short-Range Maritime Reconnaissance (SRMR) aircraft as well. In 1983, HAL bought a production licence for the manufacture of the Dornier 228 aircraft and began production at its Kanpur facility in 1985. The induction of the SRMR Dornier 228 in 1991, gave the *IN*'s MR fleet a further boost. These HAL aircraft continue to steadfastly meet all the *IN*'s air surveillance and reconnaissance requirements, including coastal security missions.

Since late 1980s, a total of thirty-eight Dornier aircraft have been procured by the *IN* under four different contracts. Before the commencement of the decade (2011-21), twenty-six Dornier aircraft were procured through three separate contracts in 1989 (five aircraft), 1999 (ten aircraft) and 2005 (eleven aircraft).



IN Dornier 228

Following the 2008 terror attacks on Mumbai on 26 November, major impetus was given to enhance coastal security. A contract for the supply of twelve Maritime Reconnaissance Information Warfare (MRIW) Dorniers was signed with HAL (Transport Aircraft Division) in December 2016. The induction of these additional Dornier aircraft with latest versions of Maritime Patrol Radar Elta Version 3, AES 212 (ESM), Traffic Alert and Collision Avoidance Systems (TCAS) 100, Electro-Optical/Infra-red (EO/IR), Weather Radar and Communication systems was completed in 2018–20.

The annual inspection of the Dornier 228, hitherto held at HAL, was conducted for the first time at INS *Garuda* in 2020.

De-induction of Tupolev TU-142M in 2017:

The Tupolev TU-142M aircraft (ex-USSR make), inducted into service in April 1988, added to the *IN*'s LRMR, ASW and Electronic Support Measures (ESM)/Electronic Warfare (EW) mission capabilities. Following the induction of the P-8I aircraft from 2013 onwards, the last of the eight TU-142M retired from service in March 2017. One TU-142M, de-inducted by the *IN* after twenty-nine years of service, was handed over to the Government of Andhra Pradesh for conversion into a museum at Visakhapatnam.⁹ The Aircraft Museum was inaugurated in December 2017.

De-induction of Illyushin IL-38/IL-38SD after Over Four Decades of Service: Along with the Super Constellations, the *IN* had inducted the (then) USSR's Illyushin IL-38 (later IL-38SD) in

1977. This aircraft provided the *IN* with airborne LRMR capability. The induction of IL-38s marked the beginning of a period that would see many more Soviet-produced air assets being inducted into the *IN*'s aviation inventory in succeeding years. After completing forty-four years of service, the first IL-38SD aircraft was decommissioned in January 2022.



First IL-38SD Aircraft of Indian Navy Retires After Four Decades of Service



TU Museum at RK Beach, Visakhapatnam
Source: Vizag Tourism

⚓ Maritime Surveillance and Multi-Role Platforms

Induction of Microlight Aircraft Virus SW 80 'GARUD' (2018): A contract for procurement of twelve Microlight aircraft was signed with M/s Pipistrel, Slovenia in October 2015. All aircraft were inducted in 2018. The *Garud* is a two-seater, single-engine aircraft catering for near-field surveillance and bird activity monitoring.



Induction of Chetak Helicopter ex-HAL Bengaluru
Source: HAL

Induction of the Chetak (Alouette III) (2019-20): The HAL-Helicopter Division started manufacturing helicopters in 1962, after entering an agreement with M/s Sud-Aviation (Presently M/s Airbus [Former Eurocopter], France) for the production of Alouette III helicopters (Chetak). The first Chetak (Alouette III) in 'Fly Away' condition was delivered in 1965.¹⁰ Eight of the Chetak helicopters inducted earlier were completing their technical life and were being 'drawn down' in 2019.

Accordingly, the *IN* contracted eight new Chetak helicopters and associated spares/equipment in order to maintain Unit Establishment (UE) of frontline units.

The contract for procurement of eight Chetak Helicopters along with spare Artouste III B engines, necessary Ground Support Equipment (GSE), Ground Handling Equipment (GHE), spares and documentation was concluded with M/s HAL on 18 August 2017. The helicopters procured under this contract were fitted with the latest communication and navigation system developed by HAL. All eight helicopters were inducted between 2019 and 2020.



Lisa Alberts
Admin

The rescue mission in Beira is a real multi-National effort with a MYRIAD of NGO Aid Org's, UN, WFP, UNICEF etc. There are Armies here from several Countries including South Africa, Mozambique, Angola, Portugal, Tanzania, India and others.

There are probably 15 Choppers of all shapes and sizes from NGO's, Privateers and Airforces, from the smallest Robinson they use for spotting to the WFP Mi8, but I must make special mention of the Indian Navy Pilots! These boys are flying an ANCIENT Alouette III and they are flying her to shreds!! They are constantly in the air carrying supplies and airlifting casualties. Their ground crew drills are slick, polished and disciplined and stand out head and shoulders above other Military crews! SALUTE Brothers, keep on throwing that antique at the Cyclone!

A Twitter Post Appreciating *IN* Chetak Operations after Cyclone Idai

Induction of UAV 'Sea Guardian' (2020): The *IN* has been negotiating the purchase of UAV, manufactured by the US firm General Atomics. In 2020, the *IN* inducted two Sea Guardian drones from the US on lease.



IN's New Eye in the Sky: Sea Guardian

Induction of Dhruv Advanced Light Helicopter (ALH) MK3 (2021): Another milestone achieved in this decade was the culmination of the indigenous 5-ton multi-role helicopter programme initiated in 1979. It was the first indigenously designed and manufactured helicopter by HAL, Bangalore. The first Dhruv (ALH) Squadron was commissioned in 2013 at INS *Garuda*, Kochi. The ALH caters to advanced Search and Rescue (SAR) and Night SAR, Special Heli-Borne Operations, Sniper operations, Armed Patrol, and VVIP Carriage.

While the ALH commenced flight-testing at INS *Garuda*, Kochi, in 2003, the trials were conducted over a span of three years, and the subsequent improvements incorporated by HAL resulted in the commissioning of the first INAS 322 (*Guardians*) for ALH at INS *Garuda*, Kochi on 12 November 2013. The ALH programme had faced multiple challenges—different design criteria fielded by the three Services, funding shortfall in the wake of the 1991 economic crisis, sanctions post the Pokhran-II nuclear tests in 1998, design issues, and other developmental issues.

Despite having overcome these challenges, the Dhruv was found sub-optimal for shipborne operations, primarily due to folding blade performance and maintenance issues.

As a consequence of the Coastal Security Framework review post the 26/11 attacks in Mumbai, a need was felt to augment the *IN's* surveillance capabilities. The HAL manufactured the ALH MK3 (wheeled version) capable of operating by day and night and undertaking stage-through operations from Naval ships. It further agreed to upgrade the ALH MK3 as per service requirements. After many improvements, the *IN* placed an order



The Guardians in Action Rig Next to Their Birds

for sixteen ALH Dhruv MK3 in 2017. Three were delivered in 2021 and were based at INS *Hansa*, Goa under INAS 323. HAL incorporated the following modifications in the ALH MK3 helicopter for undertaking the coastal security role:

- Additional sensors viz Surveillance Radar and Electro-Optic Infra-Red;
- NVG Gen III compliant cockpit; and
- 12.7mm Machine Gun for engaging small/medium targets.

In order to achieve self-reliance, the *IN* undertook a comprehensive analysis of the resources at hand and upgraded its maintenance capability by undertaking HAL inspections at INS *Garuda* in 2020.

🚢 Training Aircraft and Aerial Targets

Induction of the Pilotless Target Aircraft (2011):

To facilitate target practice for Fleet Ships, in 2011, ten indigenous Lakshya PTAs were inducted by *IN* through HAL, along with conclusion of life-cycle maintenance and support contracts. Constant liaison with HAL and field units, ensured maximum serviceability of assets for operational exploitation before their decommissioning in the year 2016. The PTAs were replaced by the Expendable Aerial Targets.



Lakshya PTA fired from an *IN* Ship

Induction of AJT Hawk Advanced Jet Trainer MK132 (2013):

The contract for the supply of seventeen AJT Hawk-MK132 was signed between *IN* and HAL, Bengaluru, in July 2010 and formed part of the additional contract for fifty-

seven aircraft (forty for IAF and seventeen for the *IN*). The AJT Hawk were inducted into the *IN* on 6 November 2013 by then CNS, Admiral DK Joshi. All seventeen aircraft, post-delivery, were commissioned under INAS 551, based at INS *Dega*, Visakhapatnam.

The Hawk is embedded with excellent aviation characteristics, reliable navigation systems, along with good stability and response to controls about all three axes. The aircraft is apt for a wide range of aerobatic manoeuvres and exhibits excellent resistance to departure even outside the normal flight envelope. The aircraft is designed to carry a wide array of aerial weapons, including missiles and bombs. The AJT Hawk is primarily used for basic, advanced and weapons training of the pilots.



AJT Hawk-MK132

Expendable Aerial Targets (2014): From 2014 to 2018, a total of 243 Banshee EATs from the UK were inducted by *IN* as a replacement for Lakshya PTAs. The subsequent repair and maintenance contract enabled the recovery/refurbishment of 170 EATs and helped in gaining a huge leap towards savings to the exchequer.

🚢 New Units Commissioned

INAS 343 (2011): Commissioned on 17 January 2011, by Her Excellency Dr Smt. Kamla Beniwal, the Governor of Gujarat, the unit is the second RPA squadron of the *IN* and the first in the Western Naval Command (WNC). INAS 343 was

commissioned at Porbandar and christened the 'Frontier Formidables'.

INS *Baaz* (2012): Commissioned as the eighth air station at Campbell Bay on 31 July 2012, *INS Baaz* presently undertakes stage-through operations of Dorniers and helicopters.



Aerial view of the Runway at *INS Baaz*

INAS 344 (2012): Christened the 'Spirited Shadows', the *IN's* third UAV Squadron was commissioned on 11 April 2012. It marked the beginning of an eventful chapter in the annals of Naval Aviation on the eastern seaboard.

INAS 303 (2013): An Intensive Flying and Trials Unit (IFTU) was formed for the MiG-29K fleet in November 2009, and the first four aircraft were inducted into the *IN* at *INS Hansa* on 19 February 2010. The IFTU (MiG-29K) carried out the task of training and testing of the aircraft till it was formed into the frontline shipborne fighter squadron INAS 303 on 11 May 2013 and christened the 'Black Panthers'.

INAS 322 (2013): The *IN's* first ALH (N) Squadron. The *IN* had inducted eight ALH (N) in a phased manner, with the first ALH (N) accepted by the Indian Naval Delivery Acceptance Team (INDAT) on 28 March 2002. Post extreme flying operations, over more than 5,000 hours and numerous role-enhancement modifications and improvements in serviceability, the first ALH squadron was commissioned as INAS 322 on 12 November 2013 at *INS Garuda*.

Naval Flight Test Squadron INAS 552 (2017): The *IN* had always felt the necessity to set up its own Flight-Testing Unit in order to meet all flight testing and evaluation requirements for fixed and



Naval Flight Test Squadron, Goa

rotary-wing aircraft with specialization in the field of ship-aircraft integration. Consequent to the de-induction of Sea Harriers, the erstwhile INAS 552 training squadron at Goa was revived as the first naval flight-testing Squadron (NFTS) on 1 July 2017. The NFTS is envisioned to be the one-stop solution for all studies, analyses and trials towards expanding the capabilities of the *IN* aviation fleet.

INS *Kohassa* (2019): Commissioned at Diglipur on 24 January 2019 as the ninth air station in the Andaman and Nicobar Islands, *INS Kohassa* presently undertakes stage-through operations of Dorniers and helicopters.

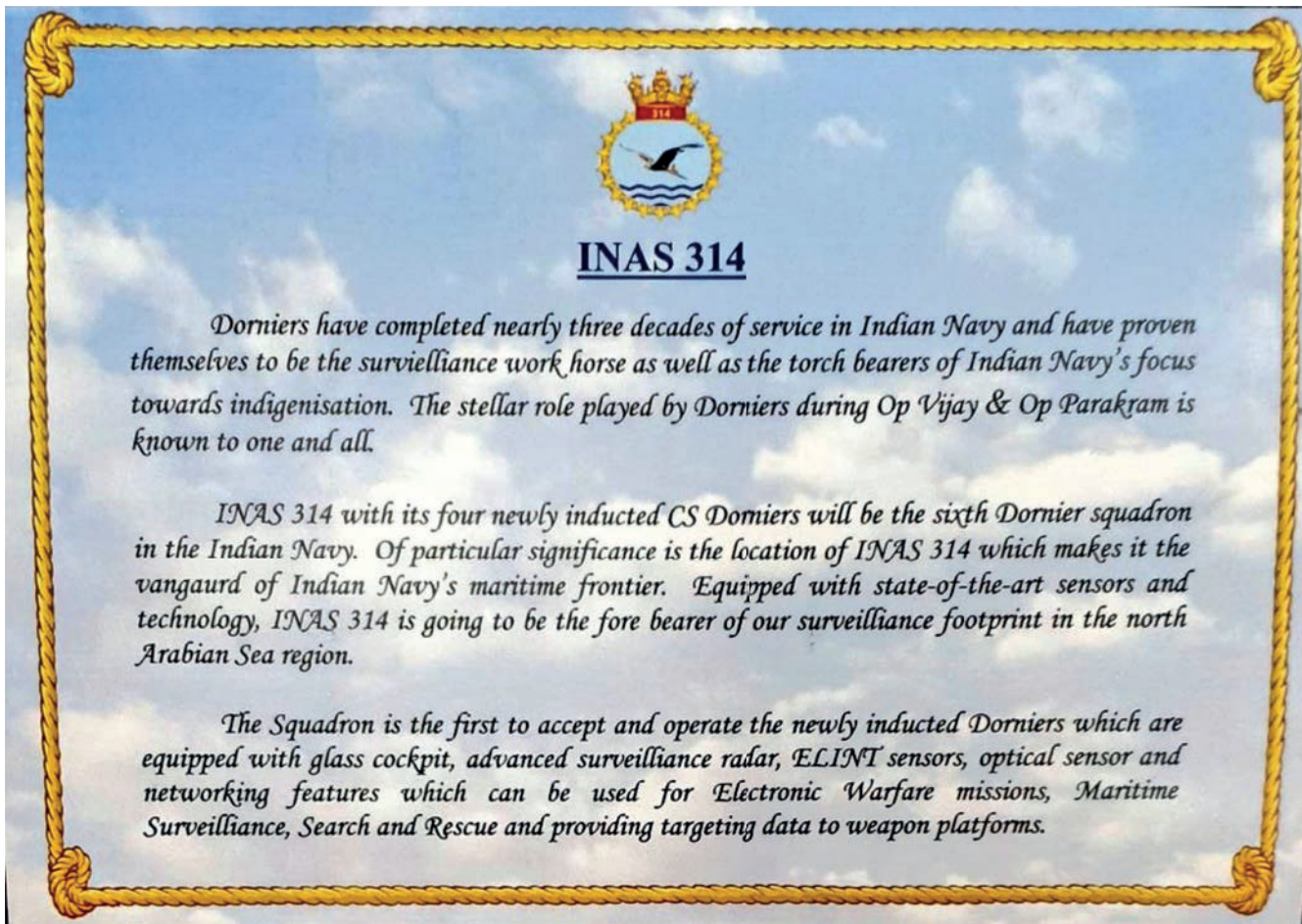
INAS 313 (2019): The fifth Dornier aircraft squadron was commissioned by the CNS at Naval Air Enclave, Meenambakam, on 22 July 2019. The strategic position of the Squadron will give the nation dominance over the north-eastern part of the Indian Ocean, which has the major sea trade routes.

The Squadron will be operating from Chennai International airport. With the commissioning of INAS 313, the state of Tamil Nadu will have three Naval air bases, the highest number for any coastal state. *INS Rajali* at Arakkonam and *INS Parundu* at Ramnad are the other two. INAS 313 derives its name, 'Sea Eagle' from the bird of prey family Accipitridae.

INAS 314 (2019): The sixth Dornier squadron in the *IN* at Porbandar, INAS 314, operates the newly inducted CS Dorniers, and was commissioned on 29 November 2019. The forward location of the squadron makes it the vanguard of the *IN*'s maritime frontier. Equipped with state-of-the-art sensors, INAS 314 is the forebearer of the *IN*'s surveillance footprint in the North Arabian Sea region. The Squadron is the first to accept and operate the newly inducted CS Dorniers which are equipped with a glass cockpit, advanced surveillance radar, electronic intelligence (ELINT) sensors, optical sensor and networking features which can



New Bird's Nest at Andamans



Commissioning of INAS 314, 'Raptors'

be used for electronic warfare missions, maritime surveillance, search and rescue and providing targeting data to weapon platforms. The Squadron is informally called the 'Raptors'.

⚓ Organizational Changes

A revised organizational structure of the air division at NHQ was discussed in 2013. The Directorate of Aviation Projects Management (DAPM) was formulated on 24 February 2014 and is responsible for the execution of all Capital aviation contracts concluded by the Directorate of Aircraft acquisition (DAA). The current major contracts concluded in this decade, being handled by DAPM, have been covered earlier in this section.

Trifurcation of DNAM: With the induction of new aircraft, the expanding aviation fleet-size, and

the growing aviation maintenance infrastructure, a need was felt to reorganize the erstwhile Directorate of Naval Air Materiel (DNAM) at IHQ.

July 2013, witnessed trifurcation of DNAM into the Directorate of Aircraft Systems Engineering (DASE), the Directorate of Air Logistics Support (DALs), and the Directorate of Air Projects & Plans (DAPP). An Air Materiel Division was also created and is headed by a Rear Admiral, the three directorates by officers of the rank of Commodore.

The mandates, of the three directorates are as follows.

- **DASE:** All aviation-related technical issues affecting aviation operations are included under the charter of duties of the DASE.
- **DALS:** This directorate was made responsible for the procurement of aero-engine and aircraft

spares, support equipment, safety and survival equipment, along with Aeronautical Clothing.

Also assigned as the budget centre for procurement of Air Stores, DALs undertakes the formulation of various policies and guidelines required for streamlining and strengthening the Air Logistics Supply Chain. It oversees the function of Materiel Organizations, along with providing policy guidelines to CNAMS for the introduction of various functionalities in the Integrated Logistics Management System (ILMS) (Air).

The DALs is also entrusted with vendor registration for various aircraft being operated by the *IN*. Overall, it is responsible for the effective utilization and forecasting of the Annual Review of Demand (ARD).

- **DAPP:** This organization used to function as the erstwhile Project and Plans Group under DNAM; DAPP came into existence on 31 July 2013. It is mandated to obtain Government sanction for setting up maintenance facilities for aircraft, aero engines and other equipment; undertake indigenization of aircraft and aviation equipment; liaise with Defence PSU's and other R&D organizations for the design and development of new equipment for Naval Aviation; coordinate with professional directorates towards conceptualization and execution of projects related to new inductions/retro mods/upgrades; and represent IHQ MoD (N) on various committees dealing with research, development cataloguing standardization and indigenization of Aircraft and Air Equipment.

Creation of ACNS (AM): Along with the above trifurcation in July 2013, a new billet for an Air Technical Assistant Principal Staff Officer (APSO) was created in Staff Branch II, aimed at providing

the necessary strength to the specialization. The new APSO was designated as Assistant Chief of Naval Staff (Air Materiel), and the three new directorates were placed under his supervision.

Creation of DAWFS and DAPM: Consequent to creation of technical directorates under ACNS (AM), other aspects of Naval Aviation—consisting of a wide spectrum ranging from training to HR Management, Air Operations, Strategy and Plans, Aircraft Weapons/System Trials, Air Traffic Management, Infrastructure, Flight Safety as well as Aircraft Acquisition—were handled by just two Directorates, viz., Directorate of Naval Air Staff (DNAS) and Directorate of Aircraft Acquisition (DAA) under ACNS (Air). Considering the extant charter of duties of the two Directorates, two additional Directorates were created under the delegated powers of IHQ MoD (N) in February 2014, viz., Directorate of Air Warfare and Flight Safety (DAWFS) and Directorate of Aviation Projects Management (DAPM).

Creation of Capt (Tech): In keeping with the vision of creating a 'Single Point Authority', responsible to the CO of the Naval Air Station, for all matters related to 'Aviation Technical Management', approval was accorded in October 2020 for the creation of the post of Capt (Tech) at Major Naval Air Stations. Consequently, officers were appointed to the post of Capt (Tech) at *INS Hansa*, *INS Dega* and *INS Garuda*.

Naval Air Operations

The Fleet Air Arm is capable of supporting naval operations in all three dimensions and is the force enabler for maritime surveillance and HADR in the IOR. Various initiatives in support of Naval

Air Operations and Naval Air Maintenance are discussed in the succeeding paragraphs.


Naval Aviation has contributed immensely during operations such as Op Cactus, Op Jupiter, Op Shield, Op Vijay, and Op Parakram to name a few. It has also spearheaded HADR operations on behalf of the *IN*, providing relief to numerous IOR nations in addition to

operations in our own country, as in Op Castor in 2004, Op Sukoon in 2006, Op Sahayam in 2017, Op Madad in 2018, Op Sahayata in 2019, Op Samudra Setu and the recently conducted rescue operations off Mumbai during Cyclone Tauktae etc.

Some of the major aviation operations of the decade undertaken abroad are tabulated below.

Naval Air Operations in Support of SAR and HADR

Year	Operation/Deployment	Remarks
2012	SAR off Seychelles	In response to a distress call by MV Costa Allegra due to a fire onboard, on 27 February 2012 a Dornier aircraft (<i>IN 234</i>) operating from Seychelles was deployed to provide SAR assistance to the ship that was adrift at sea. The aircraft localized the position of the distressed vessel and maintained the aircraft in position over the area. The aircraft provided much-needed efforts for sanitizing the area by maintaining communication with the ship and merchant traffic in the vicinity.
2014	SAR for MH 370	A total of 80 hours were flown by P-8I aircraft in support of SAR of Malaysian Airlines flight MH 370/Op Searchlight, including from Subang, Malaysia, over a duration of 10 days and from Port Blair over a duration of 12 days respectively.
2014	Cyclone Hudhud	The city of Visakhapatnam witnessed one of the most devastating cyclones in its history on 12 October 2014. Cyclone Hudhud ensured that the entire city was on a standstill with no electricity and water supply for days. The Sea King flight was the first responder to undertake cyclone relief, air-dropping 135 bags of relief material over 6 stranded villages in the vicinity of the city. The flight also undertook underslung cargo operations from INS <i>Dega</i> to atop Simhachalam Hill towards restoration of the 132 KVA transmission tower, which provided electricity to most parts of the city.
2016	Humanitarian Assistance	DO 228 undertook a lifesaving mission during the early hours of 21 February 2016, by ferrying a harvested heart from Aurangabad to Chennai. Despite limited facilities for fuelling and servicing at Aurangabad, the aircraft was turned around within 2 hours on landing and returned to Chennai with the harvested heart. The Mission was a milestone as it was debatably the longest ferry of a harvested heart by an aircraft.
2017	Detachment to Manila, Philippines	One P-8I was detached to Ninoy Aquino International Airport, Manila on 16 October 17 at a short notice to undertake SAR operations for Hong Kong registered merchant vessel <i>Emerald Star</i> , which sank about 284 km northeast of Manila on 13 October 2017.
2017	Op Sahayam	Post the aftermath of Cyclone Okhi that caused destruction of life and property along Kerala Coast, Station aircraft (P-8I) was tasked to carry out SAR operations. On 1 December 2017, it undertook maiden drop of an SAR kit. The P-8I's inherent advantage in terms of range, speed, sensors, equipment fit and operational flexibility made it an ideal Command and Control platform for the Operation. A Sea King helicopter was launched from Trivandrum for an SAR involving adrift fishermen. Flying in extreme weather conditions on a pitch black night and a choppy sea, the crew spotted a lone survivor clutching to a capsized boat. After maintaining a manual hover for nearly 30 minutes, the aircraft recovered the survivor from the rough seas. Capt P Rajkumar was awarded the Shaurya Chakra for the daring night-rescue operations.
2018	Salvage of MV SSL <i>Kolkata</i>	On 16 June 2018 the SC Flight undertook successful salvage operation of MV SSL <i>Kolkata</i> , which was drifting towards IMBL of Bangladesh in hazardous conditions. The SC Flight thereby averted a major ecological disaster in the Sunderbans.

Year	Operation/Deployment	Remarks
2018	Detachment to Mauritius for SAR of SV <i>Thuriya</i>	<p>A P-8I ex-<i>Rajali</i> was detached to Sir Seewoosagar Ramgoolam International Airport, Mauritius from 22 to 26 September 2018, to undertake SAR operation for SV <i>Thuriya</i> skippered by Cdr Abhilash Tomy who had sustained a severe spinal injury during the arduous Golden Globe Race 2018.</p> 
2018	Cyclonic storm Gaja	<p>INS <i>Parundu</i> was first responder to the cyclone-affected areas of Nagapattinam District during the onslaught of the Cyclonic storm Gaja on 18 November 2018. The <i>IN</i>'s first-aid team was deployed after Gaja struck leading to widespread devastation. The <i>IN</i>, on inputs from State Administration, undertook aerial assessment using Chetak helicopters ex INS <i>Parundu</i> and assessed the situation to be catastrophic. Subsequently, Chetak helicopters were launched on 18 November 2018 with a medical officer, medical assistants and emergency medicines as well as additional supplies. A camp was setup at a village near Thoputhurai for three days, wherein civilians were medically treated and necessary supplies were provided.</p>
2019	SAR for AN 32	<p>A P-8I undertook three SAR sorties for locating an IAF AN-32, which went missing on 3 June 2019 en route from Jorhat (Assam) to Mechuka (Arunachal Pradesh). Dense vegetation, terrain greater than 15,000 ft and cloud base less than 8,000 ft hampered search in the area. The remains of the crashed aircraft were spotted by an IAF helicopter on 11 June.</p>

⚓ Air Maintenance

Resolving OEM and Maintenance Challenges:

Very few disciplines demand as stringent compliance of maintenance requirements, as does aviation. Military aviation amplifies these requirements multifold and Naval aviation—with the corrosive maritime environment and the ‘moving airfield’ (ships with helo decks and aircraft carrier)—makes the art of aircraft maintenance even more challenging and demanding.

While the *IN* has garnered flying and maintenance experience of over six decades on all possible types of aircraft—Rotary Wing and Fixed-Wing Transport, Long-Range Maritime Reconnaissance (LRMR), unmanned aerial vehicles

(UAVs), and Deck-Borne Fighters, among others—each of these aircraft have their own set of peculiar modalities as well as challenges of maintenance and sustenance. One of these challenges is having to deal with multiple original equipment manufacturers (OEMs)—western, Russian and indigenous. The disintegration of the Union of Soviet Socialist Republics (USSR) in 1991, posed new challenges in terms of support and maintenance.

The induction of Sea King-MK42B in the late 1980s, and subsequent induction of Kamov 31 and the MiG-29K posed different challenges to the Air Technical branch, as these two were being operated in the *IN* much before their induction into the Navies of host countries. This led to *IN* specialists progressively resolving various design-

related deficiencies—including numerous hardware and software upgrades—in close association with OEMs, through well-captured Reliability and Maintainability data, duly coordinated by Quality Assurance (QA) agencies.

In order to mitigate the severe obsolescence challenges and to reduce dependence on OEMs, the *IN* has actively pursued indigenization efforts in-house as well as with public sector units (PSUs) and the private sector.

The induction and operation of HAL-manufactured aircraft—such as the Chetak, Kiran-MK1 and Kiran-MK2, the ALH, the AJT Hawk, and the induction of technology-intensive retro modifications on the Dornier 228 aircraft—have all greatly enhanced the operational capability of Naval aviation assets. With Defence PSU HAL, Indian Naval Aviation now has an in-country OEM to provide capability enhancements and higher asset availability within tighter timelines.

Today, the *IN*'s Air Arm effectively manages an inventory of twenty-six variants (seventeen by type) of aircraft, from vintage to present-day technology. Whilst modern aircraft, with high-end systems and monitoring mechanisms, contribute towards safer and efficient operations, aircraft with older technology need concerted maintenance efforts to ensure safe flying operations in view of lower reliability associated with vintage technologies, further compounded by the OEM's inability to support all installed systems and provide obsolescence management.

While upgradation of infrastructure and modernization of facilities at Naval Aircraft Yards (NAYs) and Material Organizations (MOs) has been a continuous process, these efforts received greater momentum in the last decade in order to meet the challenges of new inductions, tackling obsolescence and continued sustenance.

Long-term contracts have also been concluded with OEMs, for technical and logistic support,

so as to maintain supply and repair lines. Further, Reliability and Maintainability (R&M) programmes are being implemented for all new inductions, to achieve defined level of performance of aircraft/associated systems.

Maintenance of Aviation Assets: As mentioned earlier, Naval Aviation—with the corrosive maritime environment and the 'moving airfield'—makes the art of aircraft maintenance both challenging and demanding, perhaps more so than for aviation than in other arms and services. Indian naval aviation has been adopting various maintenance options to ensure continued availability of fully fly-worthy and role-worthy platforms.



Keeping Them Airworthy

The focus of this section will be on the Air Technical Arm of Naval Aviation, as this arm is responsible for the maintenance of the *IN*'s airborne assets, as well as some interlinked verticals of air logistics.

Assistant Chief of Naval Staff Air Maintenance, the ACNS (AM), heads the Air Maintenance Organization, and coordinates all Air Maintenance as well as logistic-support activities at IHQ MoD(N). The administrative procedures for accounting, transfer and disposal of aircraft and engines are contained in *Indian Naval Air Publication 2* (INAP 2) and amplified in (Indian) *Naval Technical Instructions*. The Flag Officer Naval

Aviation (FONA) based at Goa, implements these policies to maintain the authorized establishments (AE) and standards of aircraft.

Maintenance Organizations: In the *IN* Aviation Arm, Maintenance Organizations normally service aircraft up to the second- or third-line level. Fourth-line facilities also exist for certain aircraft and systems. The *IN* operates a variety of aircraft of indigenous, Western and Russian origin. Second-line maintenance of indigenous and Western-origin aircraft is carried out at air stations and onboard aircraft carriers, while the Base Support Facility (BSF), Goa, caters for Russian-origin aircraft.



Quality Maintenance for Flight Safety

The NAYs at Kochi and Goa undertake the third- and fourth-line maintenance for aircraft of Indigenous origin, and of Western and Russian origin aircraft, respectively. Fourth-line maintenance of Western/Indigenous aircraft beyond the capability of the *IN*, is undertaken at HAL. In addition, the *IN* also utilizes repair facilities of IAF Base Repair Depots (BRDs), for both Western- and Russian-origin aircraft components common to both Services.

Naval Aeronautical Quality Assurance Service (NAQAS): The NAQAS, based at Kochi, is responsible for the entire aeronautical inspection and quality-assurance requirements of Naval Aviation. It is assisted by regional offices called

Regional Aeronautical Quality Assurance System (RAQAS) offices that are presently sited at Naval Air Stations at Visakhapatnam, Mumbai, Port Blair and Arakkonam.

Flight Testing Group: The FTG, under HQNA, undertakes trials and promulgation of Ship Helicopter Operating Limits (SHOL). A SHOL calendar—promulgated based on inputs received from Commands—is prepared, after which the trials are prioritized, based on operational requirements and availability of test crew. Future plans include expansion of the FTG into a Naval Flight-Testing Unit (NAFTU), which will address the growing requirements of exhaustive testing and evaluation of new acquisitions and upgradation of aircraft and equipment.

Air Logistics: This provides the materiel for meeting operational and aircraft maintenance requirements. The ACNS (AM) heads the organization that ensures regular flow of equipment, parts and ready-to-use materiel to units operating aircraft. Inventories of aeronautical materiel are held in Materiel Organizations located at Goa, Kochi and Visakhapatnam.

Consequent to the vast expansion of Naval aviation, increase in the assigned task and owing to multi-dimensional operations of aircraft in various Commands, the role of air logistics has assumed greater significance. With new acquisitions from diverse sources, additional demand has led to an increase in the range and scale of air logistics.

⚓ Air Maintenance Through the Decade

The 1990s, for the Naval Aviation, were marked by the induction of Russian-origin fighter aircraft, the induction of Western-origin LRMR and ASW platforms, and the induction of various aircraft. In addition, the legacy platforms and systems—inducted in the 1960s and 1970s—were also being maintained and their systems obsolescence was a challenge. This complexity mandated the

restructuring of Naval Technical Aviation at all levels right from IHQ to unit level.

The main elements post restructuring were: Operations, Logistics and Projects (long-gestational in nature). This restructuring was mainly mandated to cope with the large number of inductions, the high tempo of operations and the constant demand for capability upgradation due to new emerging technologies and replacement of systems necessitated by obsolescence of systems.

One major trend hidden in plain sight, was the increasing role the Air Logistics elements played in Aircraft Maintenance and the embedding of Air Technical Officers in Air Logistics—this was unlike other naval disciplines, wherein logistics is handled by Logistics Officers. This new trend was not only embraced but also integrated all aspects of Technical Management of Aviation Assets, including incorporating the Air Logistics element in the Training Institutions.

The last decade therefore was marked by major infrastructure development and maintenance augmentation efforts in Yards, second-line facilities of major Air Stations, Material Organizations and QA institutions. In addition, the maturity of the erstwhile ILMS (Air) culminating into the Centre for Naval Aviation Management System (CNAMS), immensely benefited the Naval Aviation fraternity.

This was indeed a testing time, as organizational restructuring and redefining the role of the major functional elements of the organization had to undergo adaptation and retooling to handle the new roles. The technical fraternity of the Naval Aviation Arm has endured this restructuring and is now poised for further consolidation and enhancement of capabilities in the coming decade.

Key Policy Initiatives

Year of Rotables (2016–17): Though directives for efficient rotatable management had been

issued in September 2002, rotatable management was observed to be below par. Due to multiple challenges, such as obsolescence and delay in planned acquisitions, the *IN* experienced a slump in the availability of rotor platforms. In the face of such constraints the naval aviation technical fraternity had to ensure high availability of existing platforms and faster turnaround during planned maintenance period.

Mitigating actions undertaken to bridge this gap included building capacity at NAYs to undertake Depth D-level maintenance in some cases, thereby obviating the need to dispatch the aircraft/components to the OEM for repairs/maintenance routines. Additionally, in 2016, Headquarters Naval Aviation (HQNA) came out with fresh policy on rotatable management, elaborating on each aspect of the rotatable management chain and covering the contemporary requirements of new assets. In addition, the year 2016–17 was declared as ‘Year of Rotables’ to add extra impetus on this issue.

Year of Rotable Repairs (2017–18): Based on the outcomes of Year of Rotables, 2017–18 was declared as ‘Year of Rotable Repairs’, with the aim of expediting timely and effective repairs, thereby ensuring maximum availability of spares. The major thrust areas under the policy included aircraft transfer, rotatable survey, Annual Maintenance Contract (AMC) of test benches, identification of critical spares, effective liaison between units, review transaction rules on ILMS (Air), among others.

Revitalization of Air Technical Specialization (2018): Air Tech Officers were faced with the dual responsibility of their core specializations (Aviation) and criteria requirement for promotion (Sea Time), which had a direct impact on development of their core competence as also their continued availability in aviation billets.

Accordingly in December 2018, after discussions during the 2018 Commanders Conference, a

decision was taken towards commencing 'Sea Time' for Lieutenant Commanders and Commanders at selected Aviation billets. Subsequently, a policy letter on revitalization of Air Technical Specialization was promulgated in December 2018, wherein Air Engineer/Air Electrical (AE/AL) were converted to a 'non-sea going' vertical within the parent E/L branches. Permanent Commission (PC) officers of the rank of Lieutenant Commander/Commander, appointed to Aviation billets, were considered to be 'equivalent to sea time'.

P-8I Maintenance Support Contract (2017 and 2020): To support the maintenance of P-8I fleet in the post-warranty period, a three-year Interim Support Agreement (ISA) contract was signed with M/s Boeing in June 2017. An ISA Option contract was also subsequently signed for a period of 1.5 years, beginning from December 2020. The maintenance support contract has been instrumental in ensuring high aircraft serviceability.

Memoranda of Understanding with IIT Bombay and IIT Madras (2022): The DAPP concluded separate MoUs with IIT Bombay and IIT Madras for a period of five years in January/February 2022. The objective of these MoUs was to provide a formal basis for promoting academic cooperation and scientific research and development activities through Joint Research Programmes (JRP), with a progress review every three months.

The consequent Intellectual Property Rights (IPR) arising out of any research undertaken through the JRPs, would be shared by the *IN* and the respective IIT, with the feasibility of transferring the IPR to the *IN* on mutually agreeable terms.

The initial focus areas in Aerospace for collaboration identified through these MoUs are:

- Aerospace engineering, including design and education technology;
- Propulsion and propulsion systems;

- Nanotechnology and Micro Electro Mechanical Systems (MEMS);
- Artificial Intelligence, Data Analytics and Machine Learning;
- System controls, instrumentation and sensors;
- Steel technology, metallurgy and material science, and corrosion engineering;
- Management – Technical Logistics;
- Industrial Engineering and Operational Research; and
- Environmental Science and Engineering, Energy Science and Engineering.

Standard Operating Procedure (SOP) for Inter-Services Temporary Loan of Aircraft Spares at ANC: During the course of operations, technical snags result in downtime of aircraft, requiring immediate availability of aircraft spares. At times, these components are not available locally in the air store of the respective service but are available locally with the other services.

In order to promote jointmanship and to ensure maximum availability of aircraft at Andaman and Nicobar Command, the SOP for inter-services temporary loan of aircraft spares was formulated. The spare component available with the sister service is issued on loan immediately, till receipt of the same from mainland. This has aided in significant reduction in downtime of unserviceable aircraft.

⚓ Infrastructure/Capability Upgrades and Additions

Automatic Take-off and Landing (ATOL) Upgrade in RPAs (2011): The introduction of RPAs brought about a paradigm shift in fleet operations. The deployment of RPAs reduced the burden on operators' onboard ships, and enhanced their availability and focus on sensor performance. Notwithstanding this shift, to begin with, RPA operations were also found to be manpower intensive as they required an internal pilot (focused on core mission operations), an external

pilot (focused on take-off and landing), an observer, and an RPA Officer.

Upgradation from manual take-off and landing to ATOL of RPAs, undertaken in 2011, obviated the necessity of external pilots, thus enabling reduction in manpower for flying requirement.

Commissioning of Test Benches (2012–15): NAY (Goa) workshops were installed with Kamov 28, TU-142 and IL-38 test benches around the year 1985, 1990 and 1995 respectively. With induction of MiG-29K aircraft and the decommissioning of the TU-142, a total of thirty-seven avionics test benches of the MiG-29K were commissioned in 2012–15 at NAY (Goa).

Shore-Based Test Facility (SBTF) at INS *Hansa*, Goa (2013): The SBTF was constructed at INS *Hansa*, Goa, by Aeronautical Development Agency (ADA), Bangalore, to provide a flight-testing facility for Light Combat Aircraft (Navy) or LCA(N) and a training facility for both LCA(N) and the MiG-29K aircraft for Ski-Jump and arrested operations ashore.

The design of the entire facility has been carried out by Nevskoye Design Bureau (NDB), St Petersburg, Russia. The foundation stone for the SBTF was laid on 20 August 08 and was completed in end-2013, just prior to the arrival of aircraft carrier *Vikramaditya*.

The take-off area of the SBTF has a Ski-Jump with an angle of 14 degrees for launching the aircraft, while the Landing Area has two arresting gears for recovering the aircraft. Additionally, a telemetry building has been provided for conducting flight test activities.

The SBTF was primarily envisaged as part of the LCA(N) programme towards flight testing of LCA(N) towards carrier compatibility. With the planned induction of the MiG-29K early on in the decade and requirement of a facility for training on deck operations, ADA was requested

by the *IN* to suitably customize the design of SBTF to facilitate MiG-29K operations as well. The facility is being extensively used for Field Carrier Landing Practice (FCLP) for MiG-29K pilots.

H2 Hangar Commissioning at Goa (2013): To accommodate MiG-29K aircraft for servicing operations by NAY (Goa), a new Hangar was commissioned. It can accommodate up to ten MiG-29K aircraft for maintenance and storage. The hangar also houses fully air-conditioned workshops for Radar, Optical locator station and Radar Warning Receiver, which facilitates testing and repairs of Line Replaceable Units (LRUs).

Installation and Commissioning of Hawk Facilities at INS *Dega* (2013–20): The setting up of newly inducted Hawk-fighter trainer aircraft workshop at INS *Dega* dates to 2013, when Hawk operations commenced in the Navy. In addition to positioning of Test Equipment, infrastructure readiness was another important milestone towards the same. Construction of two buildings (Technical Building A and B) at INS *Dega* were sanctioned in September 2013, for Hawk second-line maintenance and were completed in 2015.

As part of installation and commissioning contract, multiple Test Benches were received. The Station took up the task of commissioning the equipment utilizing in-house resources, and these were locally commissioned till 2020. These facilities have proven pivotal in greatly enhancing the serviceability of the Hawk fleet and undertaking maiden Minor Star servicing,¹² of Hawk aircraft by the Station.

CARES Upgrade (2013 and 2019): The Centre for Avionics Repair and Software Development (CARES) facility at NAY (Kochi) was established under Project 'Ashok' in 2001. The facility was equipped with specialized equipment for component-level fault diagnosis and testing.

Subsequently, in June 2013, CARES underwent a major upgrade through M/s Selex, UK, during which, all older equipment was modified and new Test Benches acquired.

During its subsequent upgradation in August 2019, CARES also acquired a 3D Printer for preparing prototypes of aviation spares. The printer was extensively used during the COVID-19 pandemic-induced lockdown for printing of face shields, face masks, prototype of ventilation system and a door-opening claw to support frontline healthcare organizations.

Aviation Fuelling Station (AFS) at Parandu (2014 and 2017): Towards enhancing Operational Logistics, two AFS were commissioned in 2014 and 2017, thereby making Parandu self-sufficient for aviation-fuelling requirements.

The AFS is presently maintained and operated by Air Technical Sailors of the Station, under the supervision of Station Air Engineer Officer. This model differs from other Naval Air Stations, wherein M/s IOCL acts as the custodian and operator for fuelling facilities right up to the concerned aviation asset.

The Parandu facility is of paramount importance, with envisaged civil aircraft operations from the airfield soon to be a reality after UDAN,¹³ Phase III.

New Maintenance Hangar at Arakkonam (2016–20): To enhance the maintenance support for P-8I aircraft, one new aircraft maintenance hangar and two RESS (Ready Event Sunshine Shelter) were constructed at INS *Rajali* in 2016–17. Work to upgrade two old hangars to accommodate workshops and a servicing bay was undertaken in 2019–20. These new infrastructure facilities have enabled simultaneous maintenance activities on two to three P-8I aircraft, reducing downtime and increasing the operational availability.

KM-31 Radar Test Bench Upgrade (2017–18): Version 'A' KM-31 helicopter Radar Test Benches were inducted at NAY (Goa) in the year 2003. Subsequently with upgradation of radar, Version 'A' test benches were dispatched to Russia in year 2017 and were upgraded to Version 'B' and 'C'. These test benches were commissioned at the Yard in October 2018.

Fitment of ELTA V3 on IL-38SD (2018): In order to address the performance gap and enhance MR capabilities of the IL-38SD fleet, the fitment of a proven maritime surveillance system—the ELTA V3 radar (fitted on TU-142M [2010–13], and the Dornier 228 aircraft)—was envisaged. Technology Demonstration trials of the ELTA V3 radar in stand-alone mode were undertaken in January and February 2015 on one IL-38SD through OEM (M/s IAI/ELTA, Israel). The performance of the radar was observed to be satisfactory. Consequently, a contract was concluded with M/s IAI/ELTA Israel for the modification of two aircraft in February 2017 and the same was completed in November 2018.

MO (Goa) Infrastructure Growth (2019): To cater for the increasing demand of inventory management in view of the induction of a large number of platforms over the years, it was necessary that the depot underwent a modernization, encompassing installation of state-of-the-art storage solutions and procurement of Material Handling Equipment.

Accordingly, a first of a kind turnkey contract under Capital Budget for modernization of MO (Goa) was concluded in January 2019 and is currently under implementation in four phases. The project also includes installation of one of the most sophisticated Automatic Storage and Retrieval System (ASRS) in one storehouse, to cater for autonomous and fast storage and retrieval of rapid-moving inventory. A completely in-house developed software by CNAMS, Kochi has been

utilized to bridge the communication between 'Warehouse Management System' (WMS) software of the ASRS system and the existing Air-stores Management Software, i.e., ILMS (Air), to enable seamless store transactions.

Petroleum Oil and Lubricants (POL) Analysis and Calibration Centre (2020): RAQAS (Goa) provides QA support to all aviation units at Goa, as well as to the Aircraft Carrier and shipborne flights at Karwar. Requirements of QA support, calibration and Petroleum Oil and Lubricants (POL) testing increased manifold, with the induction of MiG-29K/KUB aircraft at Goa and the basing of INS *Vikramaditya* at Karwar.



New RAQAS (Vizag) Building

Further, with the induction of P-8I, the Hawk and the ALH-MK3 at Goa, these requirements were expected to rise exponentially. A new POL Analysis and Calibration Centre building was therefore commissioned in January 2020. The civil works for the building were undertaken by the MES through M/s Veejee Enterprises, Goa. The facility comprises a variety of test and calibration equipment to support flying operations at Goa and the Karwar Naval Area.

Formation of AQAS (Porbandar) (2020): The new Air Enclave at Porbandar necessitated appropriate review of the modalities of assuring quality of maintenance, defect analysis and monitoring of quality aspects. Accordingly in August 2020, a new satellite QA unit—the Aeronautical Quality Assurance Service (AQAS), Porbandar—was formed.

New RAQAS Building (2021): The 1990 vintage RAQAS building in Visakhapatnam was found ill-equipped to cater for state-of-the-art lab facilities envisaged. Accordingly, a case for construction of new building (G+2) was sanctioned. Construction commenced in July 2018 and the building was completed on 26 February 2021.

⚓ Major Maintenance/Inspection Activities

Maiden MiG-29K Major Inspections: NAY (Goa), in association with the OEM, completed 200-hour and 400-hour inspections in January 2014 and February 2015 respectively, of the MiG-29K aircraft. In 2018 these inspections were independently undertaken by the IN. Subsequently, Checks and Restoration Works (a 6.5-yearly inspection) was also introduced and NAY (Goa) completed its first CRW in September 2019.

Maiden Phase 32 Inspection of P-8I: The first Phase 32 inspection,¹⁴ of one P-8I aircraft was undertaken by M/s Air Works, Hosur, under contract with M/s Boeing. Successful completion of in-country major inspection of P-8I was a huge step towards self-reliance in the field of aviation maintenance.



A Tweet Appreciating Indigenous P-8I Repair Capabilities

The Kamovs—Kamov 25, Kamov 28 and Kamov 31:

■ **Background:** With the induction of Kashin-Class Destroyers, the USSR-made helicopter Kamov 25 was inducted in 1980, followed by the Kamov 28 in 1986 and the Kamov 31 in 2003. The Kamov 25 was a distinctive ASW helicopter with two contrarotating rotors. It was equipped with a surface search radar, dunking sonar and carried external sonobuoys. For attack, it carried a homing torpedo and depth charges. Progressively, it was replaced by the more capable Kamov 28.

INS *Ranvir* was commissioned in 1986 along with the first Kamov 28 helicopter. The helicopter was very advanced in comparison to the Kamov 25, as it had advanced sensors, data link and Magnetic Anomaly Detector (MAD). In 2001, the Kamov 31 Airborne Early Warning (AEW) helicopters were brought in with the Talwar-class frigates. The Kamov 31 had a unique retractable planar array radar that could be deployed and retracted when not in use.



Post Mission Inspection of Kamov

Some notable capability enhancements were undertaken, in order to reduce downtime in the decade commencing 2011, including the extension of focus on the rotatable management chain, with specific attention on aspects of repair and maintenance.

■ **Maiden Life Extension of Kamov 28:** Life-extension inspections on the Kamov 28 helicopter required 100 per cent replacement of cabling inside the aircraft, as well as assessment of the durability of load-bearing parts of the helicopter. These extension inspections—though conducted at respective air stations with conjoined efforts of ‘Second Line’ maintainers and squadron—necessitated the availability of Russian experts in India.

In April 2018, in pursuit of building self-reliance, an indigenous maiden attempt at the Service-Life Extension of Naval Aircraft was initiated by IHQ MoD (N)/DASE on the Russian-origin helicopter. A joint committee—consisting of Naval and external agencies/authorities, such as the Centre for Military Airworthiness and Certification (CEMILAC)/Regional Centre of Military Airworthiness (RCMA), Defence Metallurgical Research Laboratory (DMRL; Hyderabad), National Aerospace Laboratories (NAL; Bengaluru), and the Director General Aeronautical Quality Assurance (DGAQA)—was constituted to progress the case.

On completion of all critical activities in August 2019, one Kamov 28 successfully received a life-extension. Following ground trials, the maiden test flight was successfully flown on 5 September 2019.

■ **Kamov 28 Mid-Life Upgrade (MLU):** The *IN* had procured thirteen Kamov 28 helicopters in the late 1980s. The contract for an MLU and overhaul of the Kamov 28 was signed between *IN* and Russian Joint Stock Company ‘Rosoboronexport’ [JSC (ROE)] on 29 July 2016. The contract caters for overhaul and an MLU of the helicopters. Consequently, six Kamov 28 helicopters were dispatched to Russia in May 2018, for MLUs. The contract is being executed in two phases as follows:

- **Overhaul phase in Russia:** The overhaul phase includes transportation of helicopters to Russia, refurbishment of airframe, extension of technical life, technical documentation and transportation back to India. This phase also includes upgrade of Russian onboard equipment.

- **Upgrade phase in India:** The upgradation of Mission Onboard Equipment (European Sensors) and Indian Onboard Equipment (BNE and BFE) will be subsequently undertaken in this phase at INS *Dega*, Visakhapatnam, which includes the fitment and integration of sensors and other non-Russian equipment, flight trials and final acceptance of the helicopters. This phase is likely to commence post-overhaul.

Sea King-MK42 Role Conversion (2016–18):

To bolster the *IN*'s ASW capabilities, Sea King-MK42 helicopters were inducted in 1971. The late 1980s also saw the induction of the Sea King-42B/C helicopter, with improved sensor fit and capability for Anti-Shipping strike (over the 1971-vintage Sea King-MK42 ASW helicopters acquired from British Westland Helicopters Ltd). The Sea King-42B anti-ship/anti-submarine helicopter was equipped with surface search radar, panoramic dunking sonar, an ESM and an automatic flight control system. The helicopters were armed with Sea Eagle missiles, homing torpedoes, sonobuoys and depth charges. With issues related to obsolescence of Sea King sensors and requirement to embark additional helicopters onboard *IN* ships, a decision was taken to convert three Sea King-MK42 into utility version (troop-carrier role) with in-house expertise.



Sea King at Hover

Maiden 18K MOD and SDLM on the UH-3H (2020 and 2022): With the induction of the Landing Platform Dock (LPD) INS *Jalashwa* in 2007, six multi-role UH-3H helicopters were also acquired and commissioned. Capable of a wide array of tasks ranging from SAR, CASEVAC, MEDEVAC, special operations, HADR, oil-rig ops, medium-lift and normal utility.



UH-3H Operation Underway

The rotary wing maintenance hub of *IN*, NAY (Kochi), was chosen as the agency for undertaking the maiden 18K Modification and Scheduled Depot Level Maintenance (MOD and SDLM) on the UH-3H aircraft on the basis of the range and scale of resident expertise and facilities available. The helicopters airframe life had been expended after successful exploitation for more than a decade by the Navy. Two helicopters were thereafter inducted for 18,000 MOD and SDLM. Maiden 18K MOD and SDLM evolutions were successfully completed on these helicopters by the joint team of M/s Clayton and the *IN* team.

Jointmanship in Maintenance of IAF Dornier at Andaman and Nicobar Command (ANC): Earlier, the periodic routines of IAF Dornier aircraft based at ANC were undertaken at IAF repair agencies situated on the mainland. This limitation necessitated aircraft to be flown to mainland as and when the routines would fall due. To overcome this constraint, after ascertaining

the technical feasibility at INS *Utkrosh*, periodic routines were undertaken as a maiden effort by a joint inter-service team from IAF and *IN* in June 2021. The successful culmination of these efforts has now been institutionalized and these routines are now being taken up at ANC. This enhanced capability at INS *Utkrosh* has helped in boosting platform availability for operational tasking.

⚓ Digital Initiatives

The advanced defence forces of the world have already begun to harness the power of 'Big Data' to enhance their operational efficiency. In both the military and commercial world, 'data is the new oil'. Naval Aviation today, has a number of Enterprise Resource Planning (ERP)/IT-enabled systems (ITeS), which generate huge amounts of data pertaining to logistics, maintenance, aircraft, engine and systems.

The systems which are large data repositories include ILMS (Air), Quality Assurance Expert System Tool (QuAEST), and the Health & Usage Monitoring Systems (HUMS) of MiG-29K, Kamov 31, the AJT Hawk and the P-8I.

Apart from these systems, there is a vast amount of data at the first to fourth line, on paper. The Naval Aviation Management System (NAMS), is being developed and would capture and exploit the data still being utilized on paper.

Projects underway include:

- Leveraging of the MiG-29K, the AJT Hawk and the P-8I HUMS for predictive maintenance;
- Infusion of Artificial Intelligence in ILMS (Air) and QuAEST; and
- Preparation of Detailed Project Report for NAMS and in-house development of NAMS.

QuAEST Modules Integrated with ILMS (Air) (2012 and 2018): Quality Assurance Expert System Tool (QuAEST)¹⁵ Version 2, expert system QA tool was deployed on Navy Enterprise-Wide Network (NEWN) in November 2012. This application

was hosted towards facilitating data analysis for in-depth defect investigations, trending of critical parameters and to manage voluminous maintenance data generated by all Naval Aviation units.

Since 2018, QuAEST has been integrated with ILMS (Air) and various modules such as Incident Accident Analysis Comprehensive Tool (INACT), Calibration, Authorized Holding Sealed Particulars (CAHSP), Indigenization, Unserviceability Log, Online QA and Engine Defect and Technical Reports.

Migration to Web Application – ILMS (Air) Version 2.0 (2017): ILMS (Air) was formed as a project in June 1998 and the ILMS (Air) Centre established at Kochi. Indigenously developed, ILMS (Air) manages all aspects of air logistics. The application is centrally-managed from Kochi and has Data Recovery (DR) sites at Mumbai and Goa to provide robust fail-safe and recovery process. The ILMS (Air) is also the first Online Transaction Processing (OLTP)¹⁶ application running on NEWN,¹⁷ and is seamlessly integrated with QuAEST and the Financial Information System (FIS).¹⁸

The ILMS (Air) application for management of all aspects of Air Logistics was initially developed and launched in 2002 using ‘Oracle Developer 6i’ as Frontend and Oracle 8i database as Backend. The application was deployed through ‘Citrix’ middleware, which required a dedicated client software agent to be installed on all user machines. Both Oracle and Citrix required huge recurring cost for renewal of licences and were not web based. After a decade of successful exploitation, a need was felt to redesign the application to a web application, using open-source framework, so as to ensure that the application would be available to all users through web browsers only, without any proprietary software agents. This would also eliminate the recurrent licensing cost of the software.

Accordingly, with sustained efforts, the fully indigenously and in-house developed, web-based Enterprise grade ILMS (Air) Ver 2 application was launched in October 2017.

Transformation of INDA (Kochi) to e-INDA (Kochi): INDA (Kochi) handles Air Publications and associated documents of over twenty-four different types of aircraft for distribution to over 190 aviation units/air publication-holding units throughout the IN and CG. At any point of time, INDA (Kochi) holds 40,000 to 45,000 publications in various libraries.

The data which INDA (Kochi) was handling had outgrown the traditional/conventional manual system and was too manpower intensive, time-consuming and slow. Accordingly, from 2017 to 2020, an Aircraft Publication Management System (APMS) was conceptualized and implemented by INDA (Kochi), in association with CNAMS, to enable all units concerned with aircraft publication to carry out their respective functions online.

New NAQAS Website (2020): A new NAQAS website was launched in December 2020. Details pertaining to NAQAS, Defect Investigation (DI) Digest, checklist for Quality Audits, QA calendar, Facilities/Laboratories available for testing various POLs/equipment etc. were made available for information on this platform.

Indigenization Efforts

Naval Aviation, over the last six-and-a-half decades, has been effectively operating and maintaining about seventeen types of aircraft and their associated equipment. The IN's aircraft inventory ranges from the vintage to the modern, with a bulk of it from abroad. ‘Indigenization’ in aviation therefore, is inherently beset with several challenges—limited numbers, impending draw-down of some platforms, stringent specifications, long-winded procedures for flight trials, certification and so on.

On the other hand, the need for self-reliance was obvious, and was further accentuated in the post Pokhran-II era, when several aircraft gear boxes and other components were held captive abroad and new technology denied. Some of the salient indigenization efforts are listed below.

- Dividends yielded by indigenization efforts thus far: indigenous equipment; manufacture of consumables; ground support equipment; fast-moving items such as tyres and batteries; and in-country repairs. The facilities commissioned at NAY (Kochi) for repair, overhaul, testing of Sea Harrier engines, generic Avionics repair and software development, and a host of other workshops are testimony to this.
- The two NAY at Kochi and Goa, along with the Naval Aircraft Servicing and Development Organization (NASDO) at Goa, spearhead aviation's indigenization efforts for respective aircraft holdings. The NAY (Goa) is responsible for Russian-origin spares, NAY (Kochi) for Western-origin spares, and NASDO focuses on common equipment. These organizations are known as the In-house Indigenization Committees (IICs) for indigenization of aviation spares. The Aviation branch's indigenization process is governed by the stringent procedures laid down in *Design Development and Production of Military Airborne Stores*, a CEMILAC document. Naval Aviation has adopted a multi-pronged strategy to enhance self-reliance which involves 'Make' Projects initiatives under the aegis of the DRDO's Technology Development Fund and several indigenization cases taken up by the IICs.
- Self-reliance through in-country repairs was also pursued relentlessly through the DRDO, DPSUs and capable private firms. In October 2017, about 126 Flight Critical

(FC), and 429 Non Flight-Critical (NFC), spares were identified for indigenization and promulgated vide the 'Naval Aviation Indigenization Roadmap (2017–2022)'.¹⁹ After taking into consideration the changing requirements, based on various factors such as user demands, actual consumption, availability, strength/expertise of domestic industries, etc., a revised document titled 'Naval Aviation Indigenization Roadmap (2019–22)' was published in 2019 and encompasses approximately 575 items of flight and non-flight critical nature.²⁰

- Since the indigenization process of aviation spares is governed by stringent procedures, a *Naval Aviation Indigenization Guidebook* was also released in May 2018 to serve as a ready-reference/primer for agencies keen on undertaking indigenization.

Certifications

International Aerospace Standard AS 9100

Certification: NAY (Kochi) was previously accredited with the internationally accepted Aerospace Standard AS 9100 'C'. The parent body of certification, the International Aerospace Quality Group (IAQG) reviewed the certification standards to AS 9100 'D' based on ISO 9001:2015. Subsequently, in October 2016, NAY (Kochi) upgraded its certification to AS 9100 'D' in line with the new revised norms.

OHSAS Certification: The aim of Occupational Health and Safety Assessment Series (OHSAS) Certification is to establish, maintain and continually improve the performance of the Occupational Health and Safety Management System (OHSMS) emphasizing on occupational health safety for NAY (Kochi). The NAY was awarded the OHSAS certification ISO 45001:2018, in March 2021.

⚓ Training

MiG-29K/KUB

Training of Fighter Stream Pilots with USN (2011 to 2018): Envisaging the induction of MiG-29K aircraft, which would operate from the deck of INS *Vikramaditya*, there was a critical requirement to qualify pilots in 'Tail Hooking' from any training establishment in the world. As this was a unique qualification, options were explored from Russia and the US. After careful consideration of all aspects, a case was taken up with the support of US Navy (USN) for training of more than thirty fighter pilots and was approved by the Government of India in 2005.

Officers were trained at Pensacola, Milton and Kingsville for the duration of approximately two years each. These officers attained Carrier Qualification onboard the US Aircraft Carriers. The training was completed in 2011. Based on the planned intake of MiG-29K aircraft, extension of the FMS case was taken up for training of additional fighter pilots was approved in 2009. A case for training of additional fighter pilots with USN was also approved by the Government of India in November 2013.

LSO Training of MiG-29K Pilots at the US through the Decade: *IN* pilots underwent Landing Safety Officer (LSO) training with the US Navy at LSO Ground Training School, Norfolk under Foreign Military Sales (FMS) case in 2013, 2015 and 2016 respectively. The course has been of immense assistance in establishment of 'Standard Operating Procedures' for landing of MiG-29K on the deck of Aircraft Carrier *Vikramaditya*. Another two batches of pilots in 2018 and 2019 completed the LSO Training Course at Norfolk, the US.

MiG-29K/KUB Simulator Training for *IN* Aircrew and *IN* Technical Staff (2015): Full Motion Simulators (one each) were installed and

commissioned at INS *Hansa*, Goa and at INS *Dega*, Visakhapatnam. Another MiG-29K IASO/PT-29K state-of-the-art simulator training facility was commissioned on 2 July 2015 at the Naval Institute of Aeronautical Technology (NIAT); PT-29K indicates Procedure Trainer, and IASO-29K indicates a multimedia-enabled interactive computer-aided classroom environment. The Procedure Trainer has been extensively used by both *IN* technical staff and aircrew towards hands-on practical training on equipment tests and flight simulations, thereby enabling replication of real-time scenarios.

Training HAL Technicians on MiG-29K: Availability of skilled and trained air technicians, especially for the sizeable MiG-29K fleet, was a challenge for the Naval Aviation's technical fraternity. In order to overcome this limitation and also to enhance aircraft production capabilities, an MoU was signed by the *IN* with HAL to augment manpower at NAY (Goa) with HAL employees (ex-HAL, Nasik). After basic training at NIAT (Kochi), on-the-job training and consolidation of HAL employees was undertaken in two batches by NAY (Goa). Since March 2019, the availability of these employees ex-HAL has resulted in successful completion of periodic hourly inspections and the CRW inspection,²¹ of MiG-29K/KUB aircraft. This has not only helped in mitigating manpower shortfall but also aided capability building of *IN* maintenance specialists, and infrastructure to undertake these inspections, which otherwise warranted OEM expertise.

The P-8I

Pilot Conversion Training for P-8I Stream by M/s FSTC (2017): Post induction of P-8I aircraft, there was a requirement to conduct conversion training and refresher training of P-8I pilots till the Simulator was operationalized at INS *Rajali*. A case was taken up for this training at the Boeing Simulator at Flight Simulator Technique Centre

Pvt Ltd, Gurugram in 20 September 2017. A contract was concluded for conversion training of pilots.

P-8I Training Solutions Contract (2018): A contract for procurement of Training Solution for P8I Aircraft from M/s Boeing, along with Training Support and Data Handling Centre (Civil Infrastructure to house the Training Solution Equipment), Comprehensive on-site Annual Maintenance Contract (CAMC) for ten years, technical documentation and training was concluded in January 2018. The Training Solution for P-8I aircraft was set up at INS *Rajali*, Arakkonam, and NIAT, Kochi by October 21.

Setting up the Hawk Simulator at INS Dega

The journey of the Hawk Simulator started with a contract between the MoD and HAL for acquisition of seventeen Hawk-MK132 aircraft. The contract, inter alia, provided for acquisition of Hawk Simulator training aids, comprising of Flight Training Device (FTD), Avionics Part Task Trainer (APTT), Cockpit Procedure Trainer (CPT) and Computer Aided Learning System (CALs). The *IN* inducted these seventeen Hawk aircraft between September 2013 and July 2016, and based them at INS *Dega*. Consequently, a need was felt to induct flight simulators specific to this aircraft. Flight simulators provide a cost-effective avenue for training of pilots in both routine and wargame scenarios, without putting pilot or platform at risk.

The simulator was commissioned in July 2018 at a temporary site and was subsequently shifted to a new simulator complex in 2021. The Hawk Simulator aims to impart training to the air and ground crew. In addition, it provides training to the Hawk pilots in basic flying, emergency procedures, and training in Navigation and Weapon systems of the Hawk aircraft.

⚓ Mitigating Shortfalls in Training Capacity

Basic Pilot Training: The ab-initio training for *IN* pilots is conducted at Air Force Academy (AFA), Dindigul. Due to the reduced serviceability of HPT-32 trainer aircraft in 2012, IAF had reduced the number of vacancies from seventeen to ten for *IN* trainee pilots. There was a critical requirement to increase the number of pilots being trained to cater for gradual expansion of the Naval Air Arm based on the aircraft induction plan.

In order to meet this urgent requirement, a contract was signed between the *IN* and the Indira Gandhi Rashtriya Udaan Academy (IGRUA), Rae Bareilly, for ab-initio flying training of seven *IN* officers with effect from June 2013. The training of seven *IN* officers at IGRUA was completed on 10 December 2013.

In light of pilot shortage and to cater for flight-deck manning requirements of new induction aircraft, a new contract was signed for further training of *IN* officers at IGRUA at the rate of ten officers per batch every six months. A total of eight batches (two per year) were trained in 2014–17. A total of thirty-six pilots were trained in four batches in 2014–17. The availability of trainer aircraft with IAF improved with the induction of Pilatus aircraft and training of pilots with IGRUA was ceased in 2017.

Shortage of Qualified Naval Instructors (QNIs):

With the induction of new aircraft there was a requirement to train adequate number of QNIs every year to sustain workload of Naval Aviation. The IAF training of QNIs every year, was inadequate to meet current requirements. Accordingly, a case was taken up in June 2015 to train QNIs at Observer School. The training of QNIs at Observer School commenced on 9 May 2016.

⚓ Other Training Initiatives

Maiden QAS (Aero) Course (2013): The maiden course on QAS (Aero) for Air Technical officers was conducted at NIAT in April 2013. The course continues to be conducted each year. Officers undergoing this course are imparted training/awareness on quality assurance techniques through guest lectures by subject-matter experts and senior officers from commands, class authorities, QA agencies, aircraft yard and material organization.

Apprentice Training at NAY (Kochi) (2014): NAY (Kochi) commenced a one-year apprentice training course in October 2014, with the first batch comprising of seven apprentices. Since then, it has been the endeavour of the NAY to train a minimum of twenty apprentices each year, on the finer aspects of aircraft maintenance to build a steady pool of technicians with requisite skill and knowledge to take on challenges of aircraft maintenance.

Maiden Course on Indigenization for Officers (2017): The maiden course for 'Indigenization in Naval Aviation' for Air Technical Officers was conducted at NIAT in November 2017. The course aimed at providing more awareness about indigenization within the Service and also in sister Services, thereby creating more synergy, understanding and a conducive atmosphere between the various stakeholders such as in-service agencies, design establishments, certification agencies and potential vendors.

NIAT-Centre of Excellence (2018): An MoU was signed between the Headquarters Southern Naval Command (SNAC) and the Cochin University of Science and Technology in October 2002, which recognized NIAT as a Centre of Excellence and designated it as Centre for Aeronautical Science and Technology. The MoU was further renewed on 1 May 2018.

An MoU with PSG College of Technology (2018):

An MoU was signed between the PSG College of Technology, Coimbatore (PSGCT) and the *IN* on 29 October 2018, coordinated by NIAT, Kochi. The MoU was mutually beneficial with a faculty exchange programme, sharing of research and development labs, joint R&D projects, providing expertise in academics, development of training infrastructure, and Transfer of Technology (ToT) on mutual areas of interest.

Provisioning of four seats to *IN* personnel for pursuing postgraduation, and unlimited seats for research, are the other key highlights of the MoU.

Training Server Sim-NAMS (2019): To facilitate training of personnel on ILMS (Air), a one-of-a-kind training aid called the Simulator-Naval Aircraft Maintenance System (Sim-NAMS) was launched by Centre for Naval Aviation Management Systems (CNAMS), Kochi, in March 2019. The system is also used to host any new functionality developed by CNAMS for evaluation by end-users prior to hosting the same online. Ever since its launch, Sim-NAMS has been extensively used for on-the-job training.

Inauguration of 'KALPANA', a Future Technology Lab (2020):

In order to be abreast with the disruptive/advanced technologies, a Future Technology (FT) incubation lab named 'Kalpana' was commissioned on 18 January 2020 at NIAT, Kochi. The lab was set up with an aim to leverage Augmented, Virtual and Mixed Reality (AR/VR/MR)-based training solutions, as a way ahead and to improve the training effectiveness of existing training methodology.

The lab encompasses various projects and demonstrators which are developed in-house by faculty and trainees, based on emerging technologies such as AI, AR, VR, Internet of Things (IoT), Image Processing, and Embedded Systems Automation. The lab is also being used for conduct

of various courses with VR-based 3D-Walkthrough of *IN*'s air platforms.

Maiden Air Technical Mid-Career and Pre-Commission Training Course (2020):

Post promulgation of the Air Technical Revitalization policy, a dedicated Air Technical Mid-Career Course (ATMCC) and Air Technical Pre-Commission Training Course (ATPCT) was formulated and approved by the IHQ MoD (Navy), for a duration of two weeks. The maiden course was conducted at NIAT on April 2020 (ATMCC) and May 2020 (ATPCT), and would be conducted annually.

- The ATMCC is designed primarily for Air Technical Officers—with one or two years of seniority as Commanders. The course syllabus includes aspects of logistics management, budgeting, procurement, contract handling, etc.
- The ATPCT course is for Air Technical Officers selected to discharge duties of Station Air Engineer Officer, or Station Air Electrical Officer, or Officer in Charge Base Support Facility. These officers undergo formal classroom training for a week, followed by a week-long attachment to INS *Garuda* for consolidation. The ATPCT course was primarily designed to enable effective discharge of supervisory role at the station level, as against the role hitherto of managing operations and technical issues at the unit, i.e., Squadron level.

Maiden Air Logistics Management Course (2020):

In order to familiarize officers tenanted Air Logistics appointments at Material Organizations and Air Stations, a two-week course on Air Logistics Management was formulated and the maiden course was conducted in October 2020 at NIAT.

 **Training Assistance to Friendly Foreign Countries**

Deck Landing Qualification: Helicopter training of one Bangladesh Naval (BN) pilot, was

conducted on Chetak in INAS 561, Arakkonam from June to December 2017. The officer was thereafter deputed to 321 Flight, INS *Garuda*, for attaining Deck Landing Qualification (DLQ) from January to March 2018 and was awarded DLQ on 21 March 2018.

Conversion Training for Dorniers: Conversion on Dornier aircraft of two BN pilots and one Maldives Navy (MN) pilot was carried out in INAS 550, Kochi in 2017 and 2018 respectively.

Underwater Escape Training: Training in underwater escape procedures had been conducted at the Water Survival Training Facility (WSTF), Kochi for four Myanmar and three Indonesian naval helicopter aircrew till November 2019.

Composite Training Plan (CTP) with Vietnam:

To enhance cooperation with Vietnam, in 2012, a Composite Training Plan (CTP) was formulated at IHQ MoD (N) and approved by MoD/MEA. The CTP included conduct of aviation training courses for Vietnam People's Navy (VPN) personnel. Accordingly, *IN* deputed an Aviation Team to Vietnam for conduct of training for VPN aircrew in ASW ops, to be conducted on KV of VPN inventory. The team provided assistance in setting up of the VPN Naval Air Arm.

 **Future and Ongoing Expansion Plans**

Light Combat Aircraft (Navy) Programme: Air Staff Requirements for the LCA's Naval version, the LCA(N)—were first formulated in 1985. Naval Headquarters (now IHQ MoD[N]) had requested Aeronautical Development Agency (ADA) in 1986, to undertake a feasibility study for developing a Naval version of the LCA as a possible replacement for the Sea Harrier aircraft operating from *IN* aircraft carriers. The feasibility study was undertaken by ADA (based on Air Staff Requirements 1985), in 1989–92, and a Study Report was submitted to the *IN*. The preliminary

design study received approval in 1995; Naval Air Staff Requirements (NASR) specific to deck operations, were formulated in 2003; and the CCS accorded approval for development of the aircraft.

The LCA(N) programme was conceived as a 'Limited change derivative' of the Air Force Tejas programme and aimed for a deck-based Short Take-Off But Arrested Recovery (STOBAR) fighter aircraft. At the time of the approval by CCS in 2003 it was envisaged—due to a perceived 80 per cent commonality with the Tejas programme—that building two LCA(N)-MK1 prototypes, with accumulated flying time of 400 hours within six years, would be adequate.

However, the development of niche technologies required for carrier-based flying delayed the programme considerably adding to both time and cost. In 2009, the CCS split the programme into two Full-Scale Engineering Development (FSED) programmes and extended the project validity to 2014.

■ **LCA(N) Phase 1:** Two aircraft, NP1 and NP2 were built in Phase 1, of the LCA(N)-MK1 programme. The two aircraft completed 176:15 hours of flying and undertook a total of eighteen arrested-landings (afloat), twenty-eight arrested-landings (ashore) and sixty-three ski-jump take-offs. On 11 January 2020, both aircraft successfully made a maiden arrested-landing on INS *Vikramaditya*. This was followed by a ski jump take-off from INS *Vikramaditya* the next day. The lessons from the trials of Phase I were assimilated for future phases.



Maiden LCA(N)-MK1 Arrested Landing onboard INS *Vikramaditya*



Maiden LCA(N)-MK1 Ski Jump Takeoff from INS *Vikramaditya*

■ **LCA(N) Phase 2 and progression to TEDBF:**

Phase 2 of the LCA(N) programme had already been approved in November 2009. Two additional aircraft (NP3 and NP4) in LCA(N)-MK2 configuration were to be built. The LCA(N)-MK2 was to achieve better power to weight ratio with incorporation of niche technologies to overcome the shortcomings of LCA(N)-MK1. However, the *IN* put up a proposal to withdraw its commitment from the ongoing LCA(N)-MK2 programme, as capabilities were failing to match operational requirements.

In October 2016, Hon'ble RM approved the *IN's* request to withdraw and directed ADA to progress LCA(N)-MK1 as a Technology Demonstrator, with an aim to utilize it as an intermediate platform in order to develop an indigenous Twin Engine Deck-Based Fighter (TEDBF). Hence, a decision was taken to start afresh on the TEDBF, with enhanced performance characteristics.

TEDBF Timeline for the *IN*: On 9 September 2019, at a General Body Meeting of the ADA, chaired by the Secretary Defence R&D, ADA proposed to develop the TEDBF by 2028. The *IN* wanted the TEDBF to be a 5th generation fighter aircraft to replace the MiG-29K by 2032. After discussions with ADA, it was decided that a 4++ generation TEDBF would be developed by 2028

and subsequently the 5th generation aircraft would be developed. The *IN* wants the first flight to take place by 2026 so that availability of indigenous fighters as a replacement to MiG 29K is confirmed.

The MRCBF—A Multi-Role Carrier-Borne Fighter for IAC-2: By 2015, the *IN* had also started contemplating an altogether new Multi-Role Carrier Borne Fighter (MRCBF) for the Indigenous Aircraft Carrier 2 (IAC-2). Recognizing that the capabilities of the in-service MiG-29Ks were likely to lose relevance in the coming decades, *IN* issued a Request for Information in 2017 for the procurement of fifty-seven MRCBF aircraft.

Naval Utility Helicopters (NUH): Additionally, the *IN* also planned to acquire 111 Naval Utility Helicopters (NUH) through the Strategic Partnership (SP) Model wherein an Indian SP would be selected by the MoD and would build ninety-five indigenously, in collaboration with a foreign OEM. In the interim, in April 2021, the *IN* released a Request For Information to lease

twenty-four new helicopters (less than 5-tonne category) to:

- Undertake SAR operations from ships at sea;
- Conduct MEDEVAC from ships at sea;
- Undertake communication duties to and from ships at sea; and
- Low-intensity maritime operations.

Lockheed Martin Sikorsky MH-60R: The Letter of Offer and Acceptance (LOA) for twenty-four MH-60R multi-role helicopters under Buy (Global) Category through Foreign Military Sales (FMS) was signed on 25 February 2020. The deliveries will begin mid-2022 and end in mid-2025. The first batch of three helicopters in USN configuration were delivered in the US for training. Three helicopters in USN configuration and the first batch of four helicopters in the *IN* configuration, are expected to be delivered in India by end-2023. These inductions will help alleviate the critical capability deficit in the *IN*'s rotary ASuW and ASW capability.



Lockheed Martin Sikorsky MH-60R Deliveries Commence

TAPAS BH–201: A future project of RPAs is the TAPAS BH–201 (Tactical Aerial Platform for Advanced Surveillance Beyond Horizon). It is a MALE (Medium Altitude Long Endurance) RPA being developed by DRDO and ADE, Bengaluru. The Indian Army is the lead Service and the *IN* is closely monitoring the project. The UAVs, now renamed Remotely Piloted Aircraft (RPAs), have multiplied in numbers and been upgraded with greater capabilities over the previous decade.

⚓ Naval Aviation History Cell ‘Udaan’, NAY (Kochi)

The Naval Aviation History Cell ‘Udaan’, established in 2020 depicts milestones achieved by NAY (Kochi) in the past six decades since the Naval Air Arm was established.



Naval Aviation History Cell ‘Udaan’

⚓ Conclusion

Compared to seafaring ships and their inductions into navies centuries ago, Naval Aviation is comparatively nascent in its existence. In our national endeavour to acquire a formidable and sturdy defence capability, the Fleet Air Arm serves as the veritable sharp edge of the Indian Navy. The exponential growth of a fledgling Fleet Requirement Unit with ten amphibian Sealand aircraft in 1953 into a reckonable modern force is testimony to the *IN*'s aspirations and resolve in

developing this Arm. This stems from universal recognition of the aviation component of a Navy as an invaluable tool for power projection.

The *IN* established its Aviation Directorate in 1948, and it has unprecedentedly grown enough in capacity and capability to be considered worthy of the President’s Colour in 2021. The Indian Naval Aviation Arm today has nine Naval Air Stations and three Naval Air Enclaves along the Indian coastline and in the Andaman and Nicobar Islands. Over the past seven decades, it has transformed into a modern, technologically advanced and highly potent force with more than 250 aircraft comprising Carrier-borne Fighters, Maritime Reconnaissance Aircraft, Helicopters and Remotely Piloted Aircraft (RPA).

Indian Naval aviation is supported by specializations such as maintenance, logistics, Air Traffic Control (ATC), meteorology and aviation medicine to make it a robust, reliable and mission ready Arm of the Navy. As seen from the chapter above, the versatility of the Arm extends and supports the *IN* in myriad tasks ranging from military operations, diplomacy, benign operations, constabulary role, to HADR and a plethora of other utilization, both nationally and globally. As one of the few navies in the world to possess and operate an Aviation Arm, it is incumbent that the Arm remains as an integral aid to the multi-dimensional the *IN* in its avatar as the First Responder intrinsically to the nation and extrinsically to the region.

Notes

- 1 Rear Admiral V. Mohan Das, VSM, *Essence of Naval Aircraft Maintenance*, September 2020. This book is available on the *IN*'s intranet.
- 2 Hawker Siddeley Group, UK; inducted into the *IN* in 1962, and phased out in 1978.
- 3 Bréguet Aviation, France; inducted into the *IN* in 1961, and phased out in 1991.
- 4 Singh, A.J. (2021). ‘Giving Wings to Naval Aviation’. *Salute*, November 18. <https://salute.co.in/giving-wings-to-naval-aviation/>

- 5 Hawker Siddeley Group, UK; inducted into the *IN* in 1983, and phased out in 2016.
- 6 Hiranandani, GM (2004). *Transition to Eminence: The Indian Navy 1976–1990*, Volume IV. New Delhi: Integrated Headquarters, Ministry of Defence (Navy), Government of India, in association with Lancer Publishers.
- 7 Hiranandani, GM (1999). *Transition to Triumph: Indian Navy 1965–1975*, Volume III. New Delhi: DPS, Naval Headquarters in association with Lancer Publishers and (Delhi) and Spantech & Lancers (Surrey UK/Hartford, WI, USA).
- 8 Indian Navy website press release (13 November 2015): Navy's Long Range Maritime Patrol Aircraft Boeing P-8I Dedicated to the Nation. <https://www.indiannavy.nic.in/content/navy%E2%80%99s-long-range-maritime-patrol-aircraft-boeing-p-8i-dedicated-nation>. Last accessed on 10 August.
- 9 Link to TU-142 Aircraft Museum Website: <https://visakhapatnam.ap.gov.in/tourist-place/aircraft-museum-tu142-aircraft/>
- 10 The HAL 'Chetak' page: https://hal-india.co.in/Product_Details.aspx?Mkey=54&lKey=&CKey=26
- 11 Link to the Twitter post: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewjkr7azjNf4AhUbwjgGHZg-pBIAQFnoECAcQAQ&url=https%3A%2F%2Ftwitter.com%2Fshivaroor%2Fstatus%2F1109831343997886466&usg=AOvVaw0xHReq18OWY6OzIKy4t2Ag>
- 12 These are 500-hour routines/inspections.
- 13 UDAN (Hindi: *Ude Desh ka Aam Nagrik*; can be translated as 'The common citizen flies'), is a regional airport development programme of the Government of India and part of the Regional Connectivity scheme (RCS) for upgrading underserved air routes.
- 14 One phase is either three-monthly or 150-hourly (and ends with inspection), or is based on stipulated number of landings, whichever is earlier. This is a fourth-line inspection. Fourth-line inspections are usually done at the OEM's premises.
- 15 QuAEST is a tool used by the NAQAS and RAQAS for monitoring Quality Control, inspections and compliance.
- 16 OLTP is a type of automatic data-processing that executes a number of transactions occurring concurrently.
- 17 NEWN serves as the Naval Unified Domain (NUD) where separately managed intra-*IN* networks of ships and shore establishments are integrated and secured with information-security policies applied over the entire domain.
- 18 The Financial Information System (FIS) is an online platform of the *IN*. It is designed for integrating pan-Navy the process of budgetary estimation, allocation, and utilization.
- 19 'Naval Aviation Indigenization Roadmap (2017–2022)'. Version I. Directorate of Air Projects and Plans, IHQ MoD (Navy); https://fcci.in/events/23800/Add_docs/NavalAviation_IndigenizationRoadMap2017-2022.pdf
- 20 'Naval Aviation Indigenization Roadmap (2017–2022)'. Directorate of Air Projects and Plans, IHQ MoD (Navy). Version II; <https://www.indiannavy.nic.in/sites/default/files/Naval%20Indigenization%20Road%20Map%202019-22.pdf>
- 21 The CRW has a fixed component and a variable component of inspection and then based on the condition and thereon, the restoration of the aircraft is undertaken to achieve airworthiness.



6 | Hydrography

Mapping the Indian Ocean Region

⚓ Introduction

Hydrography is a branch of applied science that deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers, for the purpose of safety of navigation and in support of all other marine activities, by mapping the underwater topography (water levels and relief). Hydrography presents an array of benefits for a coastal state. It is a tool for cooperation, which has a universal appeal cutting across geographical boundaries. The study of hydrography, for its accuracy, is crucial for the safety of navigation; support of all other marine activities, including commerce, defence and security, scientific research; and surveying as well as environmental protection, since erroneous data could lead to disastrous results such as marine accidents, loss of life, property and pollution.

The Indian Naval Hydrographic Department (INHD) is the apex and the only national agency authorized to conduct hydrographic surveys and produce navigation charts and publications, including electronic charts as per the SOLAS guidelines. As a part of its international responsibility, INHD provides the entire range of hydrographic information regarding the Indian Ocean, including the Arabian Sea and Bay of Bengal, to the Indian Navy (*IN*) as the region forms its primary Area of Responsibility. The INHD has presented itself as one of the leading

hydrographic organizations in the world and has made a significant contribution to bridging the capacity gap at the international level, particularly in Africa and the Indian Ocean Region (IOR).

The national vision for SAGAR (Strength and Growth of All in the Region) envisages the use of India's capabilities for the benefit of all in our commons, and INHD plays an important role in this vision. In keeping with this vision, the succeeding paragraphs enumerate the structural shifts—such as organizational growth, expansion in its role, activities carried by the organization as well as the milestones achieved in the last decade.



NHO Dehradun

⚓ Evolution of the INHD

Map making, as much as it is an ancient art, has evolved into a science due to the advent of technology. India's own tryst with the maritime tradition goes back to the first century CE.

However, the present INHD derives its origins from the charting activities of the British East India Company. Post-Independence in 1947, the Marine Survey of India was shifted from Calcutta to Bombay. On 1 June 1954, the Office was finally shifted to Dehradun under the appointment of Captain (later Admiral and Chief of Naval Staff) Jal Cursetji as Chief Hydrographer. In 1964, the *IN's* Chief Hydrographer became the Chief Hydrographer to the Government of India.

Initially, Hydrographic training was conducted onboard survey ships. In 1959, the Hydrographic Training Unit was established in Bombay and was eventually shifted to INS *Venduruthy*, Cochin, in 1961. The Hydrographic School was established in Goa in 1978. By 1999, both the officer's courses—Category (Cat) 'A' and 'B' Certification courses conducted by the School—were International Hydrographic Organization (IHO) recognized. Furthermore, the School was awarded an ISO 9001 certification in the year 2000.

The Long Hydrography and Basic Hydrography courses were recognized as Cat 'A' and Cat 'B' courses, respectively, on 25 April 2013 by the FIG-IHO-ICA for a period of six years. The courses have been revalidated and recognized as Cat 'A' and Cat 'B' courses on 27 March 2020 during the forty-third meeting of the International Board for Standards of Competence (IBSC) for a further period of six years. Presently, the Indian Surveys and Charts are used in the development of ports and harbours, offshore energy platforms, refineries, power projects, tourism, integrated coastal zone management and fisheries management.

⚓ 2014: Sixty Years of Service Towards Nation Building

The sixtieth anniversary of the National Hydrographic Office (NHO) was celebrated on 26 August 2014, marking six decades of committed service towards

providing reliable navigational information services and Maritime Safety Services to the global maritime community. The event was organized as a seminar under the theme 'Hydrography for Nation Building'.



60th Anniversary of NHO

⚓ Organizational Growth

Commissioning the Maritime Safety Coordination Centre: The Maritime Safety Coordination Centre (MSCC) was established at NHO, Dehradun and Naval Chart Depot, Mumbai, on 4 December 2019. Earlier, this office had been carrying out Marine safety-related activities utilizing predominantly manual methods and plotting areas on paper charts, prior to promulgating. The MSCC provides a real-time display of maritime activities in the NAVAREA VIII region and is a useful tool for promulgating correct Maritime Safety Information (MSI).

Setting Up New Hydrographic Survey Units: Operational considerations necessitated that Commands carry out hydrographic tasks to meet urgent requirements. Therefore, Hydrographic Survey Units (HSUs) were set up with in-house resources in Mumbai, Kochi and Port Blair. With the ever-increasing need for survey requirements additionally new units were set up at Visakhapatnam and Karwar. Government of India sanction was accorded for all the above ports in 2019, and new HSUs were subsequently established.

Upgradation in Ranks for Chief and Joint Chief Hydrographer: The growing importance of hydrography in India's maritime vision of growth, development and international significance was reflected in the INHD's upgradation of appointments for the position of Chief Hydrographer and Joint Chief Hydrographer. The rank of Chief Hydrographer was upgraded to Vice Admiral on 24 August 2009. The first Joint Chief Hydrographer, in the upgraded rank of Rear Admiral, was appointed in October 2009.

INHD: Expansion in Role and Scope

The role and scope of the INHD has evolved over the years keeping in pace with the national vision and objectives for developing into a Blue Economy in the coming years. Several of the Blue Economy initiatives required the support of hydrographic surveys, some of which are enumerated in the subsequent paragraphs.

Hydrographic Surveys Towards Island Area Development: The Blue Economy Roadmap is an integral component of the Government initiative towards national development. Hydrography being a vertical, the Chief Hydrographer is integral to this initiative and the branch has been contributing under working groups in the Economic Advisory Council (EAC) of NITI Aayog. The INHD has also undertaken hydrographic surveys for the development of water aerodromes managed by the Airports Authority of India limited (AAI) Limited as a part of RCS UDAAN-3 in 2019–20 at Nagarjuna Sagar in Telangana State and Swaraj Dweep Island (Havelock Island), Long Island and Shaheed Dweep (Neil Island) in the Andaman and Nicobar (A&N) Islands.

Hydrographic Surveys Aid Tourism Development: The branch has also contributed towards the development of tourism by

carrying out hydrographic surveys for the Lake Conservation and Management Authority (LCMA) at Dal Lake in April 2019 and survey of Tehri Dam for the Department of Tourism, Government of Uttarakhand in November 2018, to name a few.

Role of INHD in Maritime Dispute Resolution: The INHD has a pivotal role in the resolution of maritime boundaries with our maritime neighbours. For the India–Bangladesh International Maritime Boundary Line (IMBL) Limitation case, the INHD was the key contributor in the preparation of India's case and contributed significantly in all the legal proceedings at the Permanent Court of Arbitration (PCA) at the International Court of Justice, The Hague. The INHD coordinated a successful site visit of the Tribunal to the disputed boundary that had a direct bearing on the positive outcome of the ruling by the PCA. The peaceful resolution of Indo-Bangla Maritime Boundary dispute on 7 July 2014 and the favourable decision demonstrated the INHD's efforts and focused approach on matters with international implications.

Significant Operations and Milestone Surveys in Indian Waters

The INHD extensively deploys survey ships for annual survey commitments, which include Defence, Strategic, Navigation, Project and other critical surveys. These surveys are comprehensively drawn up after receiving inputs from the Integrated Headquarters (IHQ) of the Ministry of Defence, Navy (MoD [N]), sister Services, Commands, Defence Research and Development Organization (DRDO), Ministry of Shipping and other Government Agencies/ Departments etc. During the period from 2011 to 2021, the following important surveys were undertaken:

Survey Season	Important Surveys Undertaken
2010–11	Kalpakkam, Jaigarh, Mundra and Dhamra ports; High Tide Delineation (HTL) of Bitra and Minicoy Islands.
2011–12	Tapi River, Reliance Hazira.
2012–13	Bhangaduni (PCA–Indo–Bangladesh IMBL), Haribanga River (PCA–Indo–Bangladesh IMBL), Katchall, Trinket, Havelock, Cora Divh, Amini and Landfall Islands.
2013–14	Mandvi River, Gulf of Khambhat, Gulf of Kutch, Sundarbans, Dhamra River, Mariners Strait, Duncan Passage.
2014–15	Dahej and Karwar harbours and Kamrajar Port.
2015–16	Pipavav Port, Ambuja Cements (Ulwa channel), Bhogat Port (Cairns India).
2016–17	Palk Bay, Puducherry, Pipavav Port and Murud Janjira to Ratnagiri.
2017–18	Gopalpur Port and Reliance Industries (Goutami Godavari river).
2018–19	Diligent Strait to Kotara Anchorage, Port Meadows, Port Cornwallis; Contract survey for Paringapattai.



INS Sarvekshak: Charting the Oceans

The INHD has demonstrated its presence, whether it be hydrographic surveys or Search and Rescue (SAR), Humanitarian Assistance and

Disaster Relief (HADR) and other operations. Some of the most significant operations apart from hydrographic surveys are tabulated below.

Year	Ship	Operations
2011	<i>Investigator</i>	<ul style="list-style-type: none"> • Location of Wreckage of Ex-INS <i>Prabar</i> and Kamov KV 586 off Goa. • Anti-piracy cover to fleet tanker INS <i>Deepak</i>. • SAR cover to ONGC boat <i>Varad Vinayak</i>.
	<i>Nirdeshak</i>	Wreck location of MV <i>Logos Searcher</i> off Jafarabad.
2012	<i>Sarvekshak</i>	<ul style="list-style-type: none"> • Side-scan sonar operations for locating sunken fishing boat off Manakkodan. • HADR Operations at Agalega Islands. • Anti-piracy escort of INSV <i>Mhadei</i> (Operation Parikrama-II).
	<i>Nirupak</i>	Search operations for Chetak helicopter <i>IN 440</i> off Visakhapatnam.
2014	<i>Sandhayak</i>	SAR operation for Torpedo Recovery Vessel (TRV-72).
	<i>Jamuna</i>	SAR operation for Dornier DO-240 off Goa; the ship utilized its onboard sensors for recovery of the wreckage.
	<i>Makar</i>	SAR & Salvage operations for <i>IN Dornier</i> off Goa.
2015	<i>Makar</i>	SAR operations for crashed Pawan Hans Helicopter off Mumbai High.
2016	<i>Sutlej</i>	<ul style="list-style-type: none"> • SAR operations of UAV 906. • Rescue of distressed fishing vessel <i>Julan Mail</i> off Kanyakumari.
2017	<i>Makar</i>	<ul style="list-style-type: none"> • SAR operations for crashed Pawan Hans helicopter off Mumbai. • Location of ditched MIG-29K aircraft.
	Nirupak	<ul style="list-style-type: none"> • HADR exercise off Chennai. • Assistance to Civil Authorities for SAR operations at Siliguri, to locate missing tourists.
	Jamuna	Operation Madad: SAR Mission during floods in Kerala.
	<i>Sarvekshak</i>	
	<i>Sutlej</i>	
2019	<i>Sandhayak</i>	<ul style="list-style-type: none"> • Part of maiden Indo-US Joint HADR Exercise Tiger Triumph. • Assistance to Civil Authorities for search of downed vehicle in Dikhow River, Assam. • Search Operations for ferry boat at Brahmaputra River, Guwahati.
2020	<i>Makar</i>	• Location and salvage operations for MiG aircraft off Goa.
2021	<i>Sarvekshak</i>	Successfully completed survey action around the site of ill-fated MV X-Press Pearl on 02 July and handed over the survey data to Sri Lankan authorities. The ship undertook a total of 807 miles of Side Scan Sonar survey and identified 54 prominent underwater debris from MV X-Press Pearl and also one additional uncharted wreck.

Decommissioning of INS *Nirdeshak*: INS *Nirdeshak* was the second of the Sandhayak-class ships to join the fleet of survey vessels and was decommissioned on 15 January 2014 after completing thirty years of service.

The ship was commissioned on 4 October 1983 and strived for excellence as per her motto 'One Who Provides Direction'. The first survey by the ship was undertaken in January 1984 off Kavaratti Island and since then carried out hydrographic surveys in the Seychelles, Mauritius and the Maldives. Apart from this, INS *Nirdeshak*

also participated in Operations Pawan, Palksal, Madad and Starfish.



INS *Nirdeshak* Decommissioned

President's Fleet Review/International Fleet Review: The INHD conceptualized and produced a commemorative chart for both fleet reviews, namely the Presidential Fleet Review (PFR 2011) and the International Fleet Review (IFR-16). Five survey ships participated in PFR 2011 (Mumbai), and three survey ships participated in IFR 2016 (Visakhapatnam).

The role of hydrography in a fleet review ranges from carrying out the hydrographic survey in the designated area of anchorage, to the production of the Ceremonial Chart. The area where the fleet review is envisaged is required to be surveyed thoroughly, incorporating the quintessential details pertaining to depth in the area, fixing of a conspicuous objects, type of seabed in the anchorage area, prevailing current, the presence of any underwater hazards/wrecks, etc. In case a fresh survey is required to be undertaken, it is carried out adequately in time so as to produce an updated chart incorporating the latest survey data.

The NHO has been responsible for conceptualizing, designing and printing the Ceremonial Chart for Fleet Reviews ever since the first Fleet Review. The Ceremonial Chart portrays the area of anchorage through which the Review will be conducted. The Chart is printed depicting the units participating—the ships, submarines, yachts, aircraft, etc. All units are demarcated in accordance with their role in the Review, viz., Static Columns, Flag Ships, Reference Ships, Parade of Sails, Submarine Column, and aircraft. The Ceremonial Chart goes through several stages of iteration, wherein suggestions from all stakeholders are sought. Post incorporation of all the inputs and suggestions and the approval of the Chief of Naval Staff (CNS), the same is forwarded for obtaining the signature of the President of India. Thus, this Chart holds significant historical value and is preserved for posterity.

⚓ Outreach Events: Academic

In furtherance of its outreach initiatives, the INHD continued with a range of academic events in the last decade. Activities included organizing international-level seminars and conferences for knowledge generation and dissemination, and participation in regional and international-level capacity-building workshops.

Hydro Ind 2011: INHD organized an International Hydrographic Seminar-cum-exhibition 'Hydro-Ind 2011' with the theme 'Hydrography – An Instrument for Regional Co-operation and Maritime Safety' in New Delhi. The seminar was attended by national and international dignitaries, including then Raksha Mantri (RM) Shri AK Antony, and elicited a response from member states of the IHO, the North Indian Ocean Hydrographic Commission (NIOHC) and the industry. A coffee table book, *Copper to Computer*, was released during this occasion.

32nd INCA International Congress, 2012: Organized by the NHO at Dehradun from 11 to 13 October 2012, the theme of the Indian National Cartographic Association's (INCA's) 32nd International Congress was 'Cartography for Sustainable Earth Resource Management' and the sub-themes covered important topics like GIS and remote-sensing applications, coastal geomorphology, hydrography and digital cartography towards sustainable earth resource management, etc. During the event, an exhibition of maps, charts, globes, models and cartographic and reprographic surveys, and latest remote-sensing related equipment, was organized at the venue.

37th INCA International Congress, 2017: Organized by the NHO in November 2017, the focal theme was 'Geoinformatics for Carto diversity and its Management'. Prominent scientists



37th Indian National Cartographic Association Congress

from ISRO, SERB, IIRS, NRSA, NATMO, and academicians from Shantiniketan University, Jadavpur University, Banaras Hindu University etc., attended the International Congress.

18th North Indian Ocean Hydrographic Commission (NIOHC-18) Meeting, 2018:

The maritime areas of the world are divided into fifteen Regional Hydrographic Commissions (RHC). Each RHC promotes greater navigational safety in its region, based on common standards and procedures followed by all RHCs. India is the leading hydrographic nation in the region

with considerable expertise and was a founding member of the North Indian Ocean Hydrographic Commission (NIOHC) in 2002. The then Chief Hydrographer, Rear Admiral KR Srinivasan, was elected as the Founder Chairman of this Commission. Presently NIOHC is composed of nine Members (Bangladesh, Egypt, India, Indonesia, Myanmar, Pakistan, Saudi Arabia, Sri Lanka, Thailand, and the UK), Associate Members (the US, Australia, France, Oman, Mauritius, and the Seychelles) with Malaysia as the Observer Member. The Commission meets annually to discuss common aspects of hydrography related-issues affecting the maritime safety of the NIOHC region. The 18th North Indian Ocean Hydrographic Commission (NIOHC-18) Meeting, was held in 2018 in Goa.

Capacity Building Sub-Committee (CBSC) Meeting:

The CBSC is one of the constituent forums of the IHO and provides strategic guidance for building hydrographic expertise in maritime states so as to achieve sustainable



10th IRCC Meeting

capability in the fields of hydrography, cartography and maritime safety obligations. The sixteenth meeting of the IHO Capacity Building Sub-Committee was hosted by INHD from 30 May to 1 June 2018 in Goa, India. The meeting was attended by twenty-nine delegates from the eighteen Member States (MS) of the IHO and intergovernmental organizations.

Inter-Regional Coordination Committee (IRCC) Meeting: The Inter-Regional Coordination Committee (IRCC) is the IHO's steering committee for inter-regional coordination and support. The meetings are held in rotation between the member states of the IHO. The tenth meeting of the IHO Inter-Regional Coordination Committee (IRCC-10) was hosted by INHD on 2–4 June 2018 in Goa, India. The meeting was attended by fifty-three delegates from the twenty-three IHO MS and intergovernmental organizations.

NIOHC Phase I Skill Course: INHD conducted a Capacity Building Sub-Committee (CBSC) Skill Development Course Phase I in India from 28 January–1 February 2019. This course was conducted at the National Institute of Hydrography (NIH), Goa. Representatives from seven countries participated in the course which was facilitated by two instructors from the UK and one instructor from India.

Outreach Events: Non-Academic

Training Personnel from Friendly Foreign Countries: As the nodal training institute of INHD, the NIH is equipped with the latest hydrographic equipment and training aids. The NIH has imparted training to 146 Officers, 107 Sailors and 13 Civilians of FFCs during 2011–21. The INHD conducts various courses for officers and sailors from FFCs as a part of the capacity building initiative in the IOR. Courses conducted during 2011–21 are listed below.

- **Long 'H' Course (CAT 'A'):** Eighty officers completed the Long 'H' course certified by FIG/IHO/ICA-IBSC during this period.
- **Basic 'H' Course (CAT 'B'):** Seventy-seven officers completed the Basic 'H' course certified by FIG/IHO/ICA-IBSC during the period.
- **PO 'Q' (HY) Course:** Thirty-seven sailors were trained during the period in the PO 'Q' Course.
- **LS 'Q' (HY) Course:** Twenty-four sailors from various FFCs completed the LS 'Q' Course, during this period.
- **BASIC 'Q' (HY) Course:** Fifty-three sailors were trained during this period through the BASIC 'Q' Course.

The NHO has also been conducting Electronic Navigation Chart production workshops for the international trainees from FFCs since 2016. The importance of these workshops can be gauged by the increasing demand. Since their inception, the workshops have been attended by twenty-six trainees from various neighbouring countries such as Sri Lanka, the Maldives, Myanmar, Mauritius, etc.

Role in International SAR & HADR Assistance: INHD Survey Ships, owing to their capacity, versatility and endurance, have been at the forefront of rendering timely assistance. Two notable instances in the last decade are as follows:

- **Assistance in Fire-Fighting Efforts off Sri Lanka:** During the deployment of INS *Darshak* along the southern coast of Sri Lanka in 2017, INS *Darshak* rendered fire-fighting assistance onboard MV MSC *Daniella* off Colombo on 4 April 2017. INS *Darshak's* integral helicopter was extensively deployed for aerial reconnaissance, and it effectively guided water cannons from ICGS *Shoor* and Colombo Port tugs, at the seat of the fire, utilizing Thermal Imaging Cameras (TIC) to detect hotspots.



INS *Sarvekshak*: Providing Relief Material to Mauritius

- **HADR for Tropical Cyclone Berguitta in Mauritius:** During the survey deployment at Mauritius in January 2018, INS *Sarvekshak* was actively involved in relief operations. The ship handed over relief material to Hon. Marie Roland Alain Wong Yen Cheong, MSK, Minister of Social Integration and Economic Empowerment, Government of Mauritius during a ceremony held on board.

⚓ International Hydrographic Bilateral Cooperation

Hydrography has contributed to the Indian Navy (*IN*) with far-reaching benefits. Towards this, INHD has taken cooperation initiatives with FFCs such as capacity building, training of personnel, signing of memoranda of understanding (MoUs) and conduct of joint hydrographic surveys. Hydrographic ships carried out forty hydrographic surveys for FFCs during the last decade. Hydrographic cooperation activities

carried out in this duration are enumerated in succeeding paragraphs.

Indo-Sri Lanka Cooperation: Hydrographic cooperation dates back to the formation of the NIOHC, with India and Sri Lanka being the founding members. A delegation led by then Chief Hydrographer, visited Sri Lanka from 10 to 12 October 2016. The requirement a joint survey was discussed during the '2nd Bilateral' between INHD and Sri Lanka Navy Hydrographic Service. In addition to the hydrographic survey of Kankasanturai



Indo-Sri Lanka Hydrographic Cooperation

Harbour in 2010, five hydrographic surveys off Weligama Bay, Kosgoda, Colombo and the southern coast of Sri Lanka have also been carried out during this period. Eighty-four personnel from the Sri Lankan Navy have undergone the Long Hydrographic, Basic Hydrography, and the Survey Recorders courses at NIH, Goa. Based on specific request, INHD has also conducted specialized workshops on the production of Electronic Navigation Charts (ENCs) at NHO, Dehradun.

Indo–Mauritius Cooperation: Hydrographic cooperation has been pursued between the nations since 1998, led on India's part by the *IN* and INHD. In October 2005, an MoU on Hydrographic Cooperation for a period of five years, was signed during the visit of the Prime Minister of Mauritius to India. In accordance with the terms of understanding, the MoU was extended for another five years in 2010. Thereafter, acknowledging the efforts of INHD in the field of hydrography over the past ten years, the Government of Mauritius extended the MoU for another five years on 24 October 2015. This MoU was again extended on 22 October 2020 for five years, in recognition of the efforts by the department in providing Hydrographic support and training to the Government of Mauritius.

Since 2013, one officer and two sailors (Hydrographers) have been positioned in Mauritius



Indo–Mauritius Cooperation

to provide infrastructure and training support as part of capacity-building measures. Nine personnel from Mauritius have undergone various courses at NIH, Goa. Based on specific request, INHD also conducted workshops for four personnel on the production of ENCs at NHO, Dehradun. Regular JCMs are held each year in either country to strengthen cooperation.

A total of seventeen hydrographic surveys were undertaken at Mauritius during this period, including those of Saya de Malha Bank–North, Cargados Carajos Shoals, Southern Part, Land-Based Oceanic Industry (LBOI) in 2010, Port Louis Harbour, Nav Channel, Baie Du Cape, Pointe Petite Riviere and Quoin Channel in 2011, off Bambous in 2012, passes off Poudre D'OR, passes off Grand River D south-east in 2013, Continental Shelf Survey off Rodrigues Island in 2015, Deep Sea Block Off Mauritius in 2017, Approaches to Grand Port in 2018, and Point Sud Quest and Souillac in 2019. A total of ten charts and ENCs were published during this period.

Indo–Seychelles Cooperation: The cooperation with the Seychelles commenced with a hydrographic survey in 2005 at Port Victoria. A dedicated MoU on hydrography was signed between the Government of India and the Government of the Seychelles on 11 March 2015. Along with the MoU, a protocol on the sale of navigational charts and ENCs was also signed between the two nations on 11 March 2015. Honouring the MoU, INS *Darshak* was deployed to the Seychelles in November–December 2015 for the survey of Port Victoria. The first Indo–Seychelles hydrography JCM was held on 14 to 15 June 2018 at Port Victoria, Seychelles.

A total of six surveys were undertaken in the Seychelles during this period. Surveys were

conducted off Assumption Island in 2010, Aldabra Island (a World Heritage site) in 2011, Port Victoria and approaches to Port Victoria in 2015, and at La Digue and Port Victoria (Harbour expansion Plan) in 2019. A total of seven charts and ENC's were published during this period.

Two personnel from the Seychelles underwent the Long Hydrography course and the Survey Recorders course at NIH, Goa.

Indo-Maldives Cooperation: Hydrographic cooperation with the Maldives has been pursued by the *IN/INHD* since 2005. An MoU was signed on cooperation in Hydrography between India and the Maldives on 8 June 2019 during the Hon'ble Prime Minister's visit to the Maldives. This was subsequently followed by a JCM, and it was agreed that India would assist the Maldivian authorities in upgrading their infrastructure in the field of hydrography.



Indo-Maldives Cooperation

Based on specific requests, *IN* Survey ships successfully undertook survey deployments. The *INHD* carried out hydrographic surveys off Kaashidhoo to North Male Atoll in 2010, a Continental Shelf Survey in 2011, North Male Atoll and Approaches, Kaashidhoo to North Male Atoll in 2017, Kuthudhuffushi Anchorage and Approaches, North Thiladhunmathee to South Thiladhunmathee Atoll in 2020. Four navigational

charts and ENCs were produced during this period.

Seven personnel from the Maldives underwent the Basic Hydrographic, Long Hydrographic, and Survey Recorders courses at NIH, Goa.

Indo-Myanmar Cooperation: Myanmar is a member of the North Indian Ocean Hydrographic Commission (NIOHC). To extend cooperation, the Governments of both countries have expressed the requirement to formalize emerging hydrographic relations between the two countries. Hydrographic cooperation with Myanmar had been limited to training of Myanmar personnel at NIH (Goa), which was further strengthened with the deployment of *INS Darshak* to undertake the survey of Sittwe Harbour in March-May 2015 and of Thandwe in 2019. An 'Implementing Arrangement' on cooperation in Hydrography between India and Myanmar was signed on 23 December 2020. Cmde Mein Thein Tint, Chief Hydrographer, Myanmar Navy, visited NHO, Dehradun on 11 September 2018 and discussed future hydrographic cooperation. A hydrographic survey was carried out off Thandwe in 2019.



Indo-Myanmar Cooperation

Thirty-nine personnel from Myanmar have undergone Basic Hydrography, Long Hydrography and Survey Recorders courses at NIH, Goa. Since 2016 workshops on ENC production have been conducted on request at NHO Dehradun, as capacity-building measures for Myanmar Navy Officers. Based on specific request, fourteen officers

of the Myanmar Navy were given training during three ENC production workshops conducted over the last four years by INHD at Dehradun.

Indo-Tanzania Cooperation: The first ever deployment of an *IN* Survey Ship for a hydrographic survey to Tanzania took place in 2013 for a survey off Dar es Salaam. An MoU in the field of hydrography was signed on 19 June 2015 between the Government of India and the Government of Tanzania. It was decided that INHD would assist in carrying out hydrographic surveys of important ports and harbours as decided by Tanzania and further assist in the training of Tanzanian personnel. Additionally, a protocol on the sale of navigational charts/ENCs was also signed between Tanzania and India as part of this MoU.

The hydrographic cooperation commenced before the signing of MoU. A total of nine hydrographic surveys have been carried out during this period, commencing with a survey of the Port of Dar es Salaam, Approaches to Dar es Salaam, Dar es Salaam Anchorage in 2014, Port of Zanzibar in 2015, Mkoani Harbour, Approaches to Mkoani Harbour, Tanga Port in 2016, Pemba (Port Kiuyu, Chake Chake Bay) and Pemba Channel in 2017. A total of six charts and ENCs were published during this period. Four personnel from Tanzania underwent the Basic and Long Hydrographic courses at NIH, Goa during this decade.



Indo-Tanzania Cooperation

Indo-Mozambique Cooperation: The *IN* has been engaging Mozambique since the early part of the decade. Hydrographic cooperation with Mozambique began in 2011 when *INS Darshak* was deployed for hydrographic survey of Port Beira. An MoU in the field of hydrography was signed by the Government of India and the Government of Mozambique on 29 July 2019 during the visit of the Hon'ble RM, Shri Rajnath Singh, to Mozambique. The MoU is valid for a period of five years.



Indo-Mozambique Cooperation

Subsequent to the signing of MoU, a 'Protocol on Sales' of Charts and ENCs was also proposed to the Mozambique authorities in order to enhance Hydrographic cooperation. Till date, two surveys at Mozambique were undertaken, viz., off Beira and Approaches to Beira by *INS Darshak* in October 2011. One officer from Mozambique has undergone a Long Hydrographic course at NIH, Goa.

Indo-Vietnam Cooperation: Hydrographic cooperation with Vietnam is being strongly pursued by INHD as part of the country's commitment and engagement with the Vietnamese authorities, thereby enhancing diplomatic relations between both countries. The Implementing Arrangement was discussed in detail and finalized by the Vietnam Peoples Navy (VPN) delegation during their visit on 7-8 November 2020, and signed by the governments of both countries on 8 November

2020. The Implementing Arrangement emphasized Hydrographic cooperation between both countries and the provision of assistance for training Vietnam Naval Personnel in the field of hydrography. Twenty personnel from Vietnam have undergone Basic and Long Hydrographic courses at NIH, Goa.

Indo–France Cooperation: India signed a bilateral agreement on 5 June 2018 in the fields of hydrography, nautical documentation and maritime safety with France, which was represented by Service Hydrographique et Océanographique De La Marine (SHOM). This agreement has formalized the exchange of products, data, materials and services between the two hydrographic organizations.

🚢 Foreign Delegation Visits

United Kingdom: INHD has been actively engaging with UKHO for the past few decades.

- Rear Admiral Nicholas Lambert, the UK’s National Hydrographer, visited New Delhi on:
 - 11 June 2012; and
 - 7 January 2014.

- A Technical Working Group meeting was held at NHO, Dehradun on three occasions: 12–14 June 2012, 8–9 January 2014, and 29–30 January 2019. A two-member delegation from UKHO attended the meeting.

Mauritius: The engagement with Mauritius has been a hallmark of hydrography-based cooperation between the two countries. India signed an MoU with Mauritius in 2005, and this was extended for five years in 2010 and again in 2015. In 2020 the MoU was again extended, this time for a period of ten years.

The eighth Indo-Mauritius JCM was held at NHO, Dehradun, on 5–8 November 2012. Three representatives from Mauritius attended the meeting. During the tenth Joint Hydrographic Committee Meeting held in New Delhi on 21–22 March 2017, the Mauritian delegation led by their Vice Prime Minister Mr Showkutally Soodhun interacted with the Chief Hydrographer, Vice Admiral Vinay Badhwar, in the presence of the *IN*’s Chief of Naval Staff. A six-member delegation from Mauritius visited India for the twelfth JCM on hydrography held in New Delhi on 19–20 August 2019.



Mauritian Delegation in Delhi

Russia: A Russian delegation visited NHO, Dehradun and NIH, Goa on 10–13 April 2017. The visiting delegates expressed their satisfaction with the exposure given to them and opined that they would consolidate their viewpoints and hydrographic cooperation areas. The Chief Hydrographer led a delegation to St. Petersburg, Russia, on 16–19 May 2017 as a Subject Matter Expert (SME) on hydrography for sharing of experience regarding the conduct of surveys in polar regions.



Russian Delegation Visits NHO

UAE: Based on the sixth *IN–UAE* Staff Talks, a two-member UAE delegation visited the *IN*'s hydrographic facilities at NHO, Dehradun and at NIH, Goa on 4–5 June 2018.



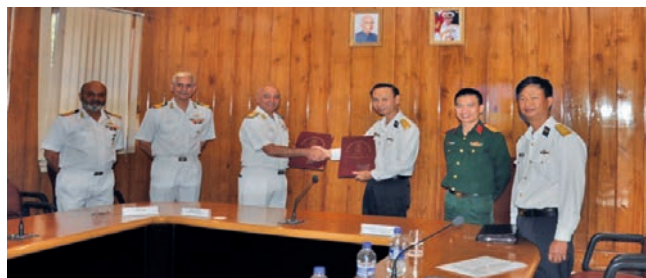
UAE Delegation Visits NHO

Indonesia: A three-member delegation of hydrography experts from the Indonesian Navy visited NHO, Dehradun on 1–2 August 2019, to further cooperation in the field of hydrography. The delegation comprised Rear Admiral Harjo Susmoro, Indonesian Chief Hydrographer, Navy Captain Dyan Primana Sobaruddin and Lt Danar Judas Pratama. The delegation was accompanied by the resident Defence Attaché of Indonesia in India, Capt Asdi Yasin Yanuar Pribadi. The delegation visited various hydrographic and cartographic facilities and discussed the various avenues of cooperation between India and Indonesia.



Indonesian Delegation Visits NHO

Vietnam: A three-member Vietnamese Navy delegation visited NHO, Dehradun on 7–9 November 2019. The delegation comprised Capt. Nguyen Duc Canh, Capt. Nguyen Hong Cuong and Cdr Dao Van Nhiem.



Vietnamese Delegation Visits NHO

Myanmar: An Officer from the Myanmar Navy visited NHO, Dehradun, for technical discussion on the compilation of INT Charts from 11 to 13 September 2019.

⚓ **India's Presence in the Icy Continent of Antarctica**

The INHD has been participating in expeditions to Antarctica every year since 1995. It is a member of the Hydrographic Commission on Antarctica (HCA), the erstwhile Permanent Working Group on Cooperation in Antarctica (PWGCA), an organization established under the aegis of the IHO. The INHD has identified tasks such as data collection for building a Bathymetric database and delineation of the coastline (ice shelf) near India Bay and Larsemann Hills. The data collected is cross-checked against data from earlier expeditions. Data collected over a period of time could be utilized for long-term scientific objectives. The area in the vicinity of the Larsemann Hills has been declared a high-priority charting area in Antarctica. The Hydrographic team continues to survey the Approaches to Larsemann Hills promontory in the interest of mariners.

⚓ **Modernization Programme**

The last decade saw modernization efforts at various levels within the INHD at training, technical and infrastructure levels.



Indian Navy in Antarctica

Hydrographic Production Database: The year 2011 saw the introduction of a state-of-the-art Hydrographic Production Database (HPD) system. Post induction of the HPD, the Chart Branch was reorganized into five production units, each responsible for a specific geographical area. The NHO at Dehradun, too, has suitably modified the techniques of data review, chart and ENC production, with the induction of this system. This office moved to a paperless edition in 2018 by ensuring all publications are available to the *IN* online. Further, ENC updates and base compact discs are also uploaded on the Naval Unified Domain (NUD) instead of forwarding CD's to ships.

Infrastructure Development and Upgradation:

With the advent of new technologies and ever increasing demand of hydrographic needs, INHD has been keeping in pace with modernization and is well equipped to provide products and services for specific use of *IN*, maritime industry towards Blue Economy and fostering cooperation with littoral states aligned in India's overseas interests. To meet the increasing demand and advancement in technology, INHD inducted systems and equipment with contemporary technologies. As a part of infrastructure development in the past decade, the following aspects are highlighted:



- In 2014, INHD procured a Computer to Plate (CTP) image setter for the preparation of four colour separates for the offset press. This enabled the etching of plates with a high degree of accuracy and high resolution (nearly 2400 dpi), thus improving the quality of charts. Further, in 2019, INHD procured a Wide Format LED Printer for Electro-Photography system, which is required to print charts with a resolution of 600 x 600 dpi.
- Being a functional set-up for the production of nautical products and due to the non-availability of training infrastructure, the existing production facilities had been utilized for the conduct of such training till 2021. In 2022, a dedicated and state-of-the-art Marine Cartographic Training Centre was commissioned by the Chief Hydrographer.

Commissioning of INS *Makar*: The first and the only Catamaran Hull Survey Vessel, INS *Makar*, was commissioned on 21 September 2012 by Flag Officer Commanding in Chief (FOC-in-C), Western Naval Command at Naval Base, Karwar. The commissioning of *Makar*, the only Catamaran Hull vessel in the *IN*, has added a new chapter in the Hydrographer's profession. The ship is equipped with Autonomous Underwater Vehicles, Remotely



INS *Makar* Commissioned

Operated Vehicles, Sub-Bottom Profiler and other modern hydrographic equipment. The ship has given the department with a quantum technological fillip with the capability to undertake diverse tasks with precision and further enhancing the spectrum of operations.

Survey Vessel Large: The Government of India has approved the construction of four Survey Vessels Large (SVLs), which are replacements for the existing ocean-going survey ships. The existing ships have been in commission for three decades. The SVLs under construction are based on a contemporary design and will have an advanced hydrographic equipment suite. The primary role envisaged for the SVLs is to undertake hydrographic and oceanographic surveys.

⚓ INHD Awards and Recognitions

INHD's efforts have been recognized internationally over the years. In recognition of the surveying efforts at Mauritius, letters of appreciation by the Government of Mauritius in respect of INS *Sarvekshak* in 2015 and 2018, and INS *Darshak* in 2017, were sent to the Hon. RM.

The field of hydrography is not without operational challenges. Some challenges faced by INHD in the past decade are briefly mentioned below:

- The steady increase in the number of survey requirements, with the inclusion of surveys from other ministries and departments of the Government, placed considerable strain on the ships and resources available with INHD. To meet the challenge of survey requirements by various ministries and agencies, INHD envisaged having a force level of thirteen ships as per MCPP. However, an average of eight ships was maintained during the decade, which placed constraints on meeting optimal requirements.

- The vintage of the existing ships, coupled with enhanced maintenance periods and decommissioning of INS *Sandhyak*, further compounded the problem. The INHD had been seeking Service Life Extension (SLE) for its ageing ships and concurrently progressed with the induction of four new SVLs and Next Generation Survey Vessel (NGSVs). INHD envisages a strength of thirteen Survey Vessels to cater for the growing demand for hydrographic surveys, both nationally and internationally, by the year 2030.

Conclusion

The INHD has expanded its role and scope in the last decades owing to its growing relevance for the country's maritime interests and objectives. In addition to being a knowledge creator with respect to the maritime domain through hydrography survey and research, and an entrusted nodal agency for preparation of navigational charts and data that are used by the *IN*, the INHD has organically grown to become a knowledge repository and dissemination organization.

Additionally, over the years hydrography has emerged as an effective diplomatic tool for furtherance of India's national interests and Security And Growth for All in the Region (SAGAR) initiative. Hydrographic cooperation has been at the forefront of the *IN*'s engagements with countries of the IOR, all with the aim to build comprehensive national maritime capability to address new challenges as opportunities in our waters as well as overseas. The multirole capabilities of our ships have been amply demonstrated during the successful conduct of hydrographic surveys that have been undertaken in the IOR countries such as Kenya, Maldives, Mauritius, Mozambique, Myanmar, Seychelles, Sri Lanka and Tanzania.

The recognition gained by INHD on the international front reflects the professionalism of Indian Naval Hydrographers who have kept pace with advancing technology and methodologies. From paper charts rendered off copper plates, the department now produces Electronic Navigational Charts for global use.

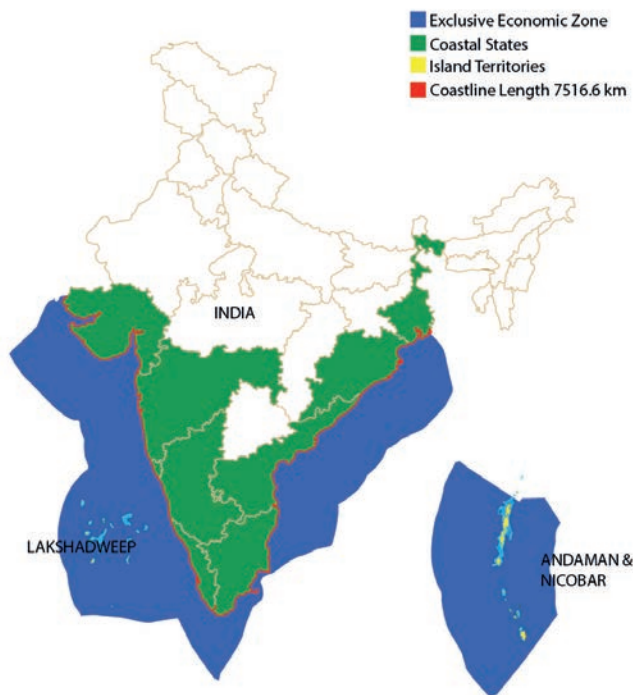


7 Coastal Security

Revamped and Secure Coasts

🚢 Introduction

India has a coastline of 7,516.6 kilometres (km) bordering the mainland and the islands, with the Bay of Bengal in the east, the Indian Ocean in the south and the Arabian Sea in the west. There are nine Indian states (Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha and West Bengal) and four Union Territories (UTs)—Puducherry, Daman and Diu, Lakshadweep, and the Andaman and Nicobar Islands—that border our coastline. Indian coasts have largely been vulnerable to anti-national activities. Numerous cases of smuggling goods,



India's Coastline and EEZ

gold, narcotics, explosives, arms and ammunition, and infiltration of terrorists through the coastal expanse, have been reported over the years.

Post-Independence, in the 1960s and 1970s, smuggling through sea routes gained ascendancy. This resulted in enhanced employment of the Indian Navy (*IN*) in the constabulary role. The Government of India set up Expert Committees to examine the issue, which resulted in the setting up of the Customs Marine Organization in 1974. At about the same time, negotiations for the United Nations Conventions on the Law of the Sea (UNCLOS) were also underway. The Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976—popularly referred to as the Maritime Zones (MZI) Act—came into force, wherein India established its rights over its MZs. This was followed by the setting up of the Coast Guard (CG) in February 1977, for enforcing maritime laws in the MZs. Coastal security thus emerged as one of the primary roles of the CG.

A brief granular history provides a background, since coastal security has been a major and an ongoing issue.

Operation Tasha (1990): In the 1980s, Sri Lanka was embroiled in a civil war, and this had major repercussions on India. The looming possibility—upon the termination of the Indian Peace Keeping (IPKF) operations in

1990—of arms trafficking along the India–Sri Lanka maritime border and illegal immigration (the Sri Lankan Tamil refugee influx) were the main factors that led to the launch of Operation Tasha along the Tamil Nadu coast in June 1990. A little over a year later in May 1991, former Prime Minister Rajiv Gandhi, electioneering at Sriperumbudur, was assassinated with arms and ammunition were purportedly transported through the sea route by cadres of the Liberation Tigers of Tamil Eelam (LTTE).¹

Operation Tasha employed a multi-layered joint surveillance mechanism involving the *IN*, *CG* and the Tamil Nadu Police. The Ministry of Defence (MoD), which was of the view that Operation Tasha fell under the *CG*'s mandate, accorded it operational sanction till 31 March 2015. Prior to the expiry of this sanction—and in line with the evolving coastal security architecture post the November 2008 Mumbai terror attacks—the *IN* submitted a proposal to the MoD in May 2014 suggesting that Operation Tasha detachments be subsumed into the state Coastal Security construct. Pending comments from the Ministry of Home Affairs (MHA) and the Tamil Nadu government, extensions were granted to the Operation on an annual basis.

In February 2016, the Tamil Nadu government agreed to this proposal and out of the seven detachments involved in this Operation, it progressively subsumed five Naval detachments (located at Thoppalur, Kodiyakarai, Mallipattinam, Jagadhappattinam and Thondi), under the state coastal security construct. The remaining two detachments (at Rameswaram and Nagapattinam), however, continue to be operated by the *IN* independently, outside the purview of Operation Tasha.

Operation Swan (1993): The 1993 Mumbai blasts brought to the fore the use of the sea route to smuggle explosives, arms and ammunition through landing points in Raigad District, Maharashtra. In

response to these events, a joint operation involving the *IN*, *CG*, Customs and Police, called Operation Swan, was instituted in April 1993 and launched in Maharashtra and Gujarat under the operational command of the Flag Officer Commanding-in-Chief (FOC-in-C), Western Naval Command.



Securing the Coastline

Operation Swan included a layered protocol for Joint Coastal Patrol (JCP): (i) surveillance of the outer layer by aerial and surface units of the *IN* and *CG*; (ii) the intermediate layer between 25–50 nautical miles (nm) to be patrolled by *IN* and *CG* ships, along with hired ocean-going trawlers; and (iii) an innermost layer, up to 10 nm, to be manned by small, shallow draught vessels and small hired fishing trawlers. The Operation initially started with twelve detachments, which subsequently went up to twenty-two.²



Keeping Vigil

Its aim was to prevent clandestine landings of contraband, and illegal infiltration, along the coasts of Maharashtra and Gujarat. Community participation was introduced to strengthen security along state coastlines through Sagar Rakshak Dals, selected by the police and trained by the Navy. Swan remained a joint *IN*–CG operation till early 2012, and was later subsumed by the CG-led Operation Avaradhan (which commenced in end-2011). The revamp of coastal security architecture in response to the November 2008 Mumbai terror attacks, highlighted the deficiencies in coastal security measures under Operation Swan. Though Operation Swan did not result in a single seizure,³ it nevertheless generated much-required deterrence value.

Kargil Review Committee Recommendations (1999): Post the Kargil conflict, the Kargil Review Committee (KRC) undertook a thorough review of India’s border management, including coastal security in 1999. It recommended raising a specialized Marine Police; strengthening the CG; forming fishermen watch groups; installing of Vessel Traffic Management Systems in major ports; and establishing an apex body for the management of maritime affairs. In 2005, the MHA set up the State Marine Police (SMP) under the Coastal Security Scheme (CSS), with a mandate to police territorial waters. The SMP and the CG were required to work closely using the hub-and-spoke concept, the hub being the CG stations and the spoke being the Coastal Police Stations (CPS).

The concept of coastal security in the national security discourse is relatively nascent, and gained traction after the Mumbai terror attacks on 26 November 2008. Terrorists had hijacked an Indian fishing boat *Kuber* off the Gujarat coast, landed in the heart of Mumbai and carried out attacks at various locations. It was a watershed event that transformed the management of maritime

security, especially coastal and offshore security. Analyses of global events indicate that the scale, scope, and intensity of maritime terrorism have only increased since then. Prabhakaran Paleri,⁴ in his book *Role of the Coast Guard in the Maritime Security of India*, suggests it is essential that the CG be able to ‘dissolve’ into the *IN* in case of any eventuality, and that the *IN* must conduct frequent exercises with the CG and also suitably equip the CG in times of war.⁵

Coastal Security Threat Compass

Today, Indian coasts are prosperous and support a dense population residing in numerous big and small towns and cities that dot the coastline. Access to the sea through the major and non-major ports has facilitated the setting up of Special Economic Zones (SEZs), which, in turn, have resulted in the growth of a number of industrial cities.

Industrialization along the coast has been further boosted by the import of crude oil and liquefied natural gas (LNG). In the case of Gujarat, the Gulf of Kutch and Gulf of Khambhat have emerged as major corridors for importing crude oil for the country. This, in turn, has opened up avenues for the establishment of oil refineries and storage tanks by major oil companies, especially along the Saurashtra coast.

The discovery of oil and gas in the sea has also led to the development of offshore oil-and-gas platforms in the coastal waters of the country. Along the west coast, the Mumbai Offshore Basin has the largest oil-and-gas producing field, which includes the fields of Mumbai High, Heera, Neelam and Bassein. Huge offshore oil-and-gas reserves have been discovered in the Cauvery and Krishna-Godavari basins, on the eastern seaboard.

The primary security threats to all of the above in the decade 2011–21, may be classified under the following categories.

Terror from Sea: India has been facing cross-border terrorism for decades. Over the years, with

the increased deployment of security forces and surveillance equipment along the land borders, as well as the construction of fences, land-border security has been strongly tightened. However, security over the ocean domain with the sea routes has been an area of increasing concern and complexity.

Dry Cargo Ship-owners (INTER-CARGO), International Association of Independent Tank Owners (INTER-TANKO), Oil Companies International Marine Forum (OCIMF), etc.—brought out a document in 2008, the ‘Best Management Practices (BMP), by/of/and for



Secure Seas Secure Shores

Piracy and High-Risk Areas (HRAs) on the West Coast of India:

- Piracy off the coast of Somalia in the Gulf of Aden and in the Horn of Africa (east Africa) surged significantly from 2008 to 2012, when a large number of attacks and hijackings of merchant vessels and their crew were recorded. As part of its counter-piracy measures, the global shipping industry—represented by bodies such as the Baltic and International Maritime Council (BIMCO), International Chamber of Shipping (ICS), International Association of

the shipping industry’. The BMP document provided advisories and guidance for self-protection of merchant ships and their crew from piracy attacks and hijack situations. Vital Areas (VAs), characterized by piracy attacks and/or hijackings, were defined as HRAs.⁶

- In 2008, the HRA coordinates in the Indian Ocean Region (IOR) were extended to longitude 78-degree East, which is quite far from India’s west coast. However, in 2011, in view of increased incidences of piracy, the industry body known as the Round Table (headquartered in London),



Eastward Expansion of High-Risk Area off India's West Coast

extended the HRA geographical coordinate in the IOR to longitude 65-degree East, which came right up to the west coast of India. This stretching of the HRA had the following serious implications for India.

- **Payment of an Additional War-risk Premium (AWRP):** Movement of merchant ships in piracy-prone HRAs were subjected to AWRP by insurance providers on vessels carrying Indian export-import (EXIM) cargo. Around 22,000 vessels call on Indian ports every year. The insurance premiums escalated by about

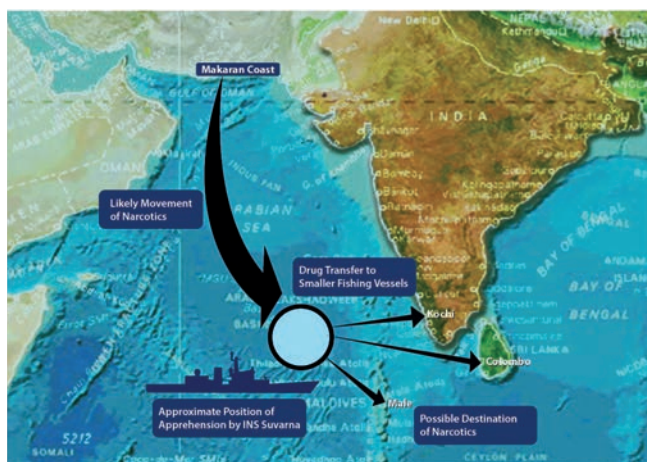
approximately Rs 3,600 crore per year at the peak of the piracy period (2008–12). Following the reduction in piracy incidence mid-2012 onwards, the premiums fell to around Rs 1,500 crore per year. The shipping industry loaded this extra AWRP on the freight and transmitted it to consumers, as a pass-through charge. This was a huge financial burden for Indian EXIM trade and the Indian consumer.

- **Increased Maritime Density:** The extended HRA came up to as close as about 35 nm from the baseline. This was an unwarranted

encroachment into India's EEZ. To avoid HRA-related AWRP charges, international maritime traffic now densely hugged the Indian coastline leading to congestion and jeopardizing maritime safety. Three instances of maritime collisions between merchant ships and fishing vessels were reported, with five Indian fishermen fatalities. The extended HRA also led to an increase in the presence of unregulated foreign-owned and operated floating armouries near India's coastline, potentially jeopardizing Indian maritime security interests.⁷

- **Proliferation of Armed Security Guards:** The period saw the proliferation of armed security guards onboard merchant vessels as a deterrent to piracy attacks/hijackings. There were cases of firing by these security guards on Indian fishing boats. A couple of Indian fishermen lost their lives,⁸ in one such incident.

Smuggling: India's west coast lies close to the Gulf countries. The distance between Gujarat and the United Arab Emirates (UAE) is less than 1,100 nm. This has facilitated seaborne trade between India's west coast and the Gulf as well as with countries in East Africa. However, there have been many instances of dhows plying from these regions to Mumbai and Gujarat, and have been caught smuggling gold and luxury items, heroin, hashish, and precursor chemicals.



Crackdown on Smuggling

Increased drug trafficking from Afghanistan via east African countries to Sri Lanka and the Maldives, and the use of drug money to sponsor terror activities in India, have also been a cause of concern. The seizure of 3,000 kilograms (kg) of heroin worth more than Rs 21,000 crore in September 2021, from two containers ex-Iran at Mundra Port in Kutch, is reflective of the widening scope of this menace.

Illegal, Unreported and Unregulated Fishing: IUU fishing by foreign fishing vessels in the Indian EEZ, especially off the coasts of Gujarat and Tamil Nadu, and poaching in the Andaman and Nicobar Islands have also raised concerns.

Illegal Immigration from the Sea: India's eastern seaboard has been witnessing a steady increase in illegal migration from Bangladesh. Various push-and-pull factors, such as poverty, demographic pressure and other aspects in Bangladesh, and the promise of better opportunities in India, have contributed to this migration. Earlier, almost all such illegal migration took place through a poorly guarded land border in the northeastern states. Now, with the ongoing construction of fences along the land border, sea routes are increasingly being exploited to enter India.

Growth of Critical Infrastructure along the Coastline: Indian coasts are prosperous, and support a dense population residing in numerous big and



Safeguarding India's Energy Security

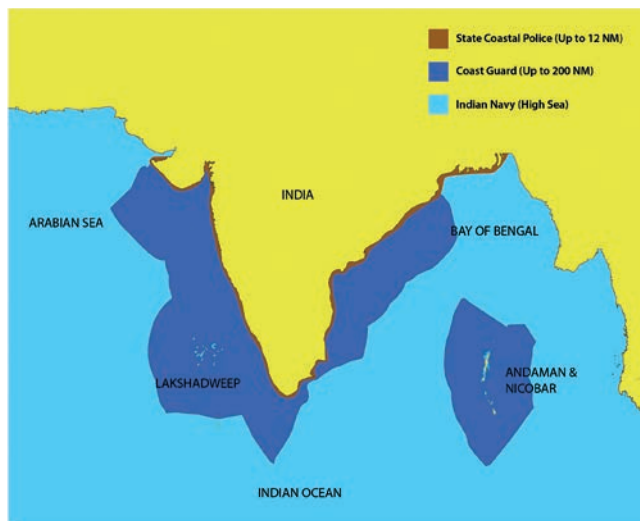
small towns and cities that dot the coastline. Access to the sea through the major and non-major ports has facilitated the setting up of Special Economic Zones (SEZs), which have resulted in the growth of a number of industrial cities. The discovery of oil and addition of critical oil exploration infrastructure along India's coast in the West and East has added another layer to the ever-growing threat compass.

⚓ Actions Taken to Enhance Coastal Security

Cabinet Committee on Security Recommendations (2009): As part of the deliberations to enhance coastal security post the 2008 Mumbai terror attacks, the CCS in its meeting on 16 February 2009 considered a proposal by the MoD for strengthening maritime security. The MoD proposal was formulated after consultation with all concerned ministries, including the MHA.

At the meeting on 16 February, it was decided that:

- The *IN* would be designated as the authority responsible for overall maritime security, including coastal and offshore security.
- The Naval Commanders-in-Chief (C-in-C) would additionally be designated as Cs-in-C Coastal Defence.



Three Tier Coastal Security System

- The *IN* would be assisted by the CG, the SMP and other Central and state agencies for the coastal defence of the nation.
- The CG would be additionally designated as the authority responsible for coastal security in territorial waters, including areas to be patrolled by Coastal Police.

A revised three-tier coastal security ring, as already covered in the Chapter on Geopolitics, was set up included the *IN*, CG and the State Coastal Police.

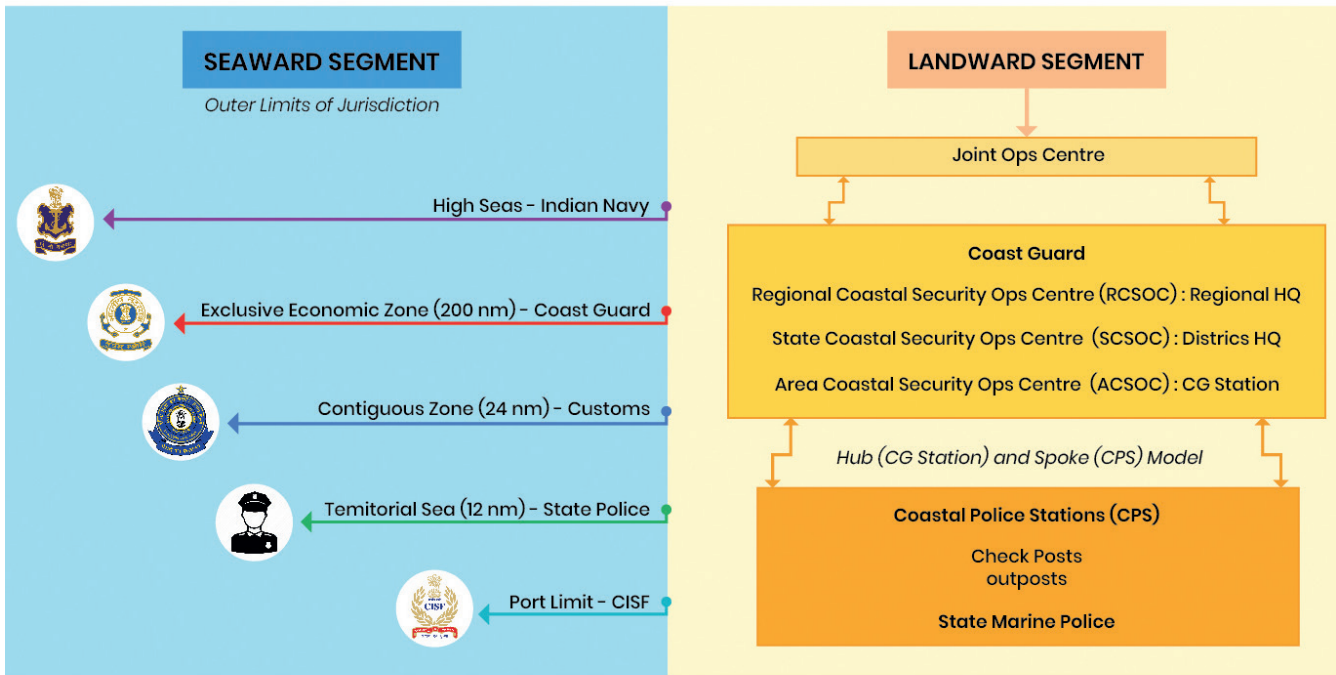
Security of the Offshore Development Areas (ODA) also underwent a paradigm shift. Being a sub-set of the coastal security construct, ODA security oversight now lies with the C-in-C Coastal Defence. The Headquarters Offshore Defence Advisory Group (HQ ODAG) exercises command and control over static and mobile forces when in ODA. The Flag Officer Defence Advisory Group (FODAG) heading the HQ ODAG, is designated as Adviser Offshore Security and Defence to the Government of India.

In this expanded role, the FODAG is required to advise the Government of India, including the MoD and the ministries of Petroleum & Natural Gas, Shipping, and Civil Aviation—through the Chief of the Naval Staff—on all planning and policy aspects of offshore security and defence (covering territorial waters, the Continental Shelf, the EEZ and other MZs as defined in the MZI Act 1976).

Post the August 2003 Mumbai blasts at Gateway of India and Zaveri Bazaar, to further strengthen the ODA security construct, a decision was taken to procure Immediate Support Vessels (ISVs) for ODA security, and the development and induction of a Comprehensive Security Solution. Details of these initiatives are discussed later in the chapter.

In order to execute the mandate of coastal security, the MoD also created:

- Four Joint Operation Centres (JOCs) at Mumbai, Visakhapatnam, Kochi, and Port Blair;



Coastal Security Construct

Source: Das, *Coastal Security Policy Imperatives for India*. p. 105

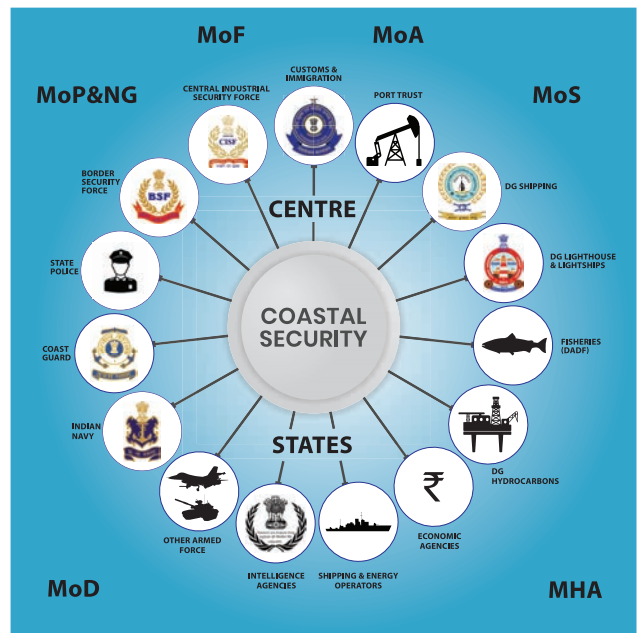
- Regional Coastal Security Operation Centres (RCSOCs; control centres under respective Coast Guard Regional Commander);
- State Coastal Security Operation Centres (SCSOC; control centres under respective Coast Guard District Commander); and
- Area Coastal Security Operation Centres (ACSOCs; under respective Coast Guard District Commander).

National Committee for Strengthening Maritime and Coastal Security (2009): The NCSMCS was constituted in August 2009 under the chairmanship of the Cabinet Secretary. Its members included the Chief of Naval Staff (CNS), the Foreign Secretary, Defence Secretary, Home Secretary,

The SMP was also integrated into this framework.

Additionally, the Director General, CG was designated as Commander Coastal Command, who would be responsible for overall coordination between Central and state agencies in all matters relating to coastal security.

In the last decade, within the IN, besides the Flag Officer Goa Area (FOGA) established in 1987, additional Area Commanders were instituted, and included Flag Officer Karwar (FOK) in 2011, Flag Officer Gujarat Naval Area (FOGNA) in 2015, Flag Officer Tamil Nadu Area (FOTNA) and Flag Officer Maharashtra Area (FOMA)⁹ both in 2016.



Agencies Involved in Coastal Security

Secretary (Border Management), Secretaries of the ministries of Shipping, Petroleum & Natural Gas, Animal Husbandry, Dairying & Fisheries and Revenue; Deputy NSA-cum-Secretary, Director (Intelligence Bureau); Director General CG; Chairman (CBIC) and representatives from the National Security Council Secretariat, and coastal states/UTs

The Steering Committee for Review of Coastal Security (SCRCS), operating under the NCSMCS, is headed by Secretary (Border Management) MHA, as the MHA is the implementing and monitoring agency for all policy decisions taken by the apex body NCSMCS.

Raising of Sagar Prahari Bal (2011): In July 2010, sanction was accorded to the *IN* to raise a special force which would be named Sagar Prahari Bal (SPB). The SPB would comprise 1,000 personnel (98 officers and 902 sailors) for force protection, security of Naval bases and co-located VAs and Vital Points (VPs). This sanction also catered for eighty Fast Interceptor Crafts (FICs) to be based at thirteen Naval ports. However, the base port numbers are periodically reviewed and revised, based on the emergent threat scenario.



Induction Ceremony Sagar Prahari Bal Nagapattinam

Starting 2011, patrolling commenced using hired boats and fifteen FICs ex-Chantier Naval Couach, France, previously contracted for Operation Tasha. Additionally, a contract was also

concluded with M/s Solas Marine, Sri Lanka, for the delivery of eighty FICs in a staggered manner. These FICs were delivered to the *IN* starting March 2013, with the last delivery in March 2017.

The Flag Officer Commanding-in-Chief (C-in-C Coastal Defence) exercises control over the operations of the SPB assets through respective regional operational authorities. Further respective JOCs have been interfaced with the Coastal Defence Headquarters (CDHQ) in each state to ensure streamlined functioning of the coastal security organization. The CDHQs in each state function as the coordination centre for coastal security under the overall control of respective Area Commanders.



Fast Interceptor Craft

The envisaged charter of duties of SPB includes:

- Naval force protection;
- Seaward Security of coastal and offshore Naval assets;
- Security of strategic Naval assets;
- Compliant VBSS operations in coastal waters; and
- Assistance to civil agencies (Customs/ Marine Police) when required.

Apart from the induction of 1,000 personnel to man the eighty FICs as part of SPB, the *IN* took up a proposal in March 2013 for additional manpower as part of Coastal Security Phase II.

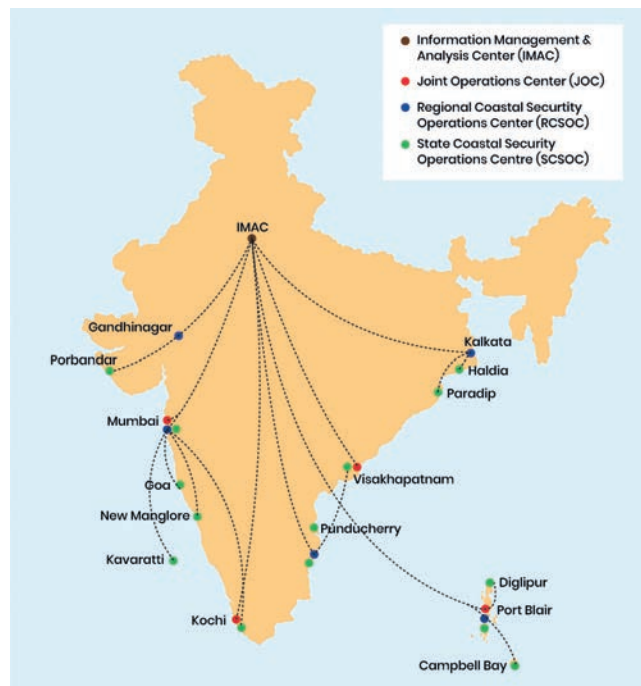
In December 2018, the proposal was amended to project additional manpower (18 officers and 169 sailors) for manning the 15 FICs (ex-France) that had been procured earlier in 2011. The proposal remains under consideration, with the MoD.

Role of CG Augmented (2012): In 2012, the CG was nominated to function as the Lead Intelligence Agency for the coasts to provide functional arrangements for coordination and sharing of intelligence among various agencies operating on the coasts. The *IN*, as one of the primary stakeholders in coastal security, contributed in lock-step to multi-agency initiatives (discussed below in this chapter).

National Command Control Communication and Intelligence Network (2014): The NC³I for developing Maritime Domain Awareness (MDA), was operationalized on 23 November 2014. The NC³I Network, integrating fifty-one nodes of the *IN* and CG, has been established to develop a Common Operational Picture (COP). The network will integrate inputs from the Chain of Static Sensors, seventy-four stations of the National Automatic Identification System (NAIS) Chain, Long Range Identification and Tracking (LRIT), and information from open sources. These inputs are fused and analyzed at the Information Management and Analysis Centre (IMAC) at Gurugram, which disseminates this compiled COP for Coastal Security to all fifty-one nodes of the *IN* and CG.

In addition, the *IN* is pursuing agreements for sharing white shipping and air traffic information with friendly nations, both in the IOR and beyond. The next version of NC³I has been christened the National Maritime Domain Awareness (NDMA) Project, wherein all stakeholders in the maritime security of the country will be brought together by upgrading the existing IMAC to a multi-agency Fusion Centre.

This Whole-of-Government approach in creating an institutionalized mechanism for sharing information in real/near real-time among various ministries and maritime agencies would go a long way in improving the present MDA, since data/information with respect to the maritime domain is also held with many more agencies in India.



National Command Control Communication and Intelligence Network (NC³IN)

General Campose Committee Recommendations (2016): In the wake of the January 2016 attack on the Indian Air Force (IAF) base in Pathankot, the Government of India constituted a committee under the chairmanship of Lt Gen. Philip Campose to examine existing SOPs for the security of all Armed Forces establishments; suggest a model format for their security audit; and recommend corrective measures. The Committee also focused on coastal security from the point of threats to Naval establishments and over 1,300 islands.

The Committee submitted its recommendations in May 2016. One of the recommendations of this report was to align security threat colour codes across all Services in order to achieve uniformity in

times of collective response in multi-agency security architecture. This alignment was also implemented within the Navy.

Coastal Security Scheme (Phase I: 2005–10):

In view of the vulnerability of the coasts to the activities of criminals and anti-national elements, Coastal Security Scheme Phase-I was approved in January 2005 for implementation over the next five years. The scheme had an outlay of Rs 646 crore (Rs 495 crore for non-recurring expenditure and Rs 151 crore recurring expenditure). Its goals:

- Set up coastal police stations, check posts and outposts;
- Equip coastal police stations with manpower trained in maritime activities;
- Procure vehicles and boats for mobility on the coast and close coastal waters;
- Meet recurring expenditure on repairs and maintenance for patrol boats, for six years;
- Meet the training requirements of SMP personnel;
- Provide manpower to states and UTs; and
- Make institutional arrangements at state- and district-level for coordination and sharing of information among various agencies (including CG and *IN*).

During Phase I, coastal states/UTs were provided with seventy-three coastal police stations, ninety-seven check posts, fifty-eight outposts, thirty barracks, 204 interceptor boats, and associated transport vehicles.

Coastal Security Scheme (Phase II: 2011–16): In September 2010, keeping in view the additional requirements of Coastal Police Stations, interceptor boats and other infrastructure by the coastal states and UTs, Coastal Security Scheme Phase-II was approved and was initially to be implemented over a period of five years starting April 2011. It had

a total financial outlay of Rs 1,579.91 crore (Rs 1,154.91 crore for non-recurring expenditure and Rs 425 crore for recurring expenditure) through nine coastal states and four UTs.¹⁰ Thereafter, complete implementation of Phase II was planned for 31 March 2020. However, its completion was delayed due to the COVID-19 pandemic.

Under Phase II, the coastal states and UTs were provided with 131 Marine Police Stations, 60 jetties, 10 Marine Police Operation Centres, 150 boats (12 Tons), 10 boats (5 Tons), 20 boats (19 metres [m]), 35 Rigid Inflatable Boats, 10 large vessels for the Andaman and Nicobar Islands, and associated transport vehicles.

Coastal Surveillance Network Phase I:¹¹

Subsequent to the 26/11 incident, a Coastal Surveillance Network (CSN), comprising forty-six radar stations, was established by the CG, including in the island territories (ten radars), for electronic surveillance.

The CSN aims to monitor the movement of vessels plying along the Indian coast, and prevent intrusion. Surveillance equipment and radar sites include frequency diversity radar, Automatic Identification System (AIS), Electro-Optic (EO) Sensors, Charge Coupled Device (CCD) Cameras, Low Light Television (LLTV), and long-range thermal imagers. Very High Frequency (VHF) communication sets and meteorological equipment have also been fitted at the radar sites. The CSN provides real-time surface surveillance up to 25 nm, using radar and positive identification.

The CSN has a hierarchical network architecture linking the radar with the CG District Headquarters (Remote Operating Stations or ROS), and the CG Headquarters (Control Centre). The networked architecture provides a composite operating picture to the CG and other security agencies.

A State-wise Breakdown of CSN Radar

Coastal States/UTs	Coastline (km)	No. of Radar Stations				Km/Radar
		Phase I	Phase II	Others	Total	
Gujarat	1214.70	6	2	17	25	48.58
Maharashtra	652.60	5	-	-	5	130.52
Goa	101.00	1	1	-	2	50.50
Karnataka	280.00	2	-	-	2	140.0
Kerala	569.70	4	3	-	7	81.38
Tamil Nadu	609.90	6	4	-	10	90.69
Andhra Pradesh	973.70	6	5	-	11	88.51
Odisha	476.40	2	4	-	6	79.40
West Bengal	157.50	1	2	-	3	52.50
Daman & Diu	42.50	2	-	-	2	21.25
Puducherry	47.60	1	-	-	1	47.60
Lakshadweep & Minincoy Islands	132.00	6	3	-	9	14.66
Andaman & Nicobar Islands	1962.00	4	14	-	18	109
Total Static Sensors		46	38	17	101	73.43 Km/ Radar
Mobile Surveillance System		-	8	-	8	
Total Sensors		46	46	17	109	

Source: Das, *Coastal Security Policy Imperatives for India*, p. 317

Coastal Surveillance Network Phase II: On 21 February 2017, the Defence Acquisition Council (DAC) sanctioned Phase II of the CSN project at a cost of Rs 800 crore.

Thirty-eight additional static radar stations and eight Mobile Surveillance Systems (MSS) were sanctioned, and the Vessel Traffic Management Systems of the Gulf of Kutch and Gulf of Khambat would also be integrated. M/s BEL was nominated as the lead integrator for the project.

The CSN has been integrated with the NC³I Network as well. The network aids in developing a Common Operational Picture (COP) among the fifty-one networked stations using electronic surveillance by fusing information from a number of sources.

The Coastal Surveillance Radar System (CSRS)—renamed the Coastal Radar System (CRS) in July 2021—is also being set up in the Maldives, Sri Lanka, Mauritius, and the Seychelles by M/s BEL. Overall thirty-two radars are being set up overseas: ten in the Maldives, six in Sri Lanka, and eight each in Mauritius and the Seychelles. The data received from the CRS is also used to enhance overall regional MDA.

Joint Coastal Patrolling: Keeping in view the vulnerability of the Maharashtra and Gujarat coasts to illegal cross-border activities, Joint Coastal Patrolling was introduced off the coasts of Maharashtra and Gujarat. Under this arrangement, a joint contingent of the *IN*, State Police and Customs are undertaking close

State-wise List of Coastal Security Operations Centres

State/UT	SCSOC Coast Guard	RCSOC Coast Guard	JOC
Gujarat	Porbandar	Gandhinagar	Mumbai
Daman & Diu			
Maharashtra	Mumbai	Mumbai	Kochi
Goa	Goa		
Karnataka	New Mangalore		
Kerala	Kochi		
Lakshadweep & Minicoy Islands	Kavaratti	Chennai	Visakhapatnam
Tamil Nadu	Chennai		
Puducherry	Puducherry		
Andhra Pradesh	Visakhapatnam		
Odisha	Paradip		
West Bengal	Haldia	Kolkata	Port Blair
Andaman & Nicobar Islands	Diglipur		
	Port Blair	Port Blair	Port Blair

Source: Das, *Coastal Security Policy Imperatives for India*, p. 106

coastal-water patrolling. As mentioned earlier, the MoD also created four JOCs (at Mumbai, Visakhapatnam, Kochi and Port Blair) which are jointly manned and operated by the *IN* and CG, with inputs from the concerned Central and state agencies (including the SMP, Customs, IB, the port authorities, and others). The four JOCs operate under the respective Naval Flag Officers Commanding-in-chief (FOC-in-C), one at Port Blair under the Commander-in-Chief–Andaman and Nicobar Command (CINCAN).

The JOCs receive information from multiple sources, including the NC³I Network, and facilitate information flow to other agencies involved in coastal security.

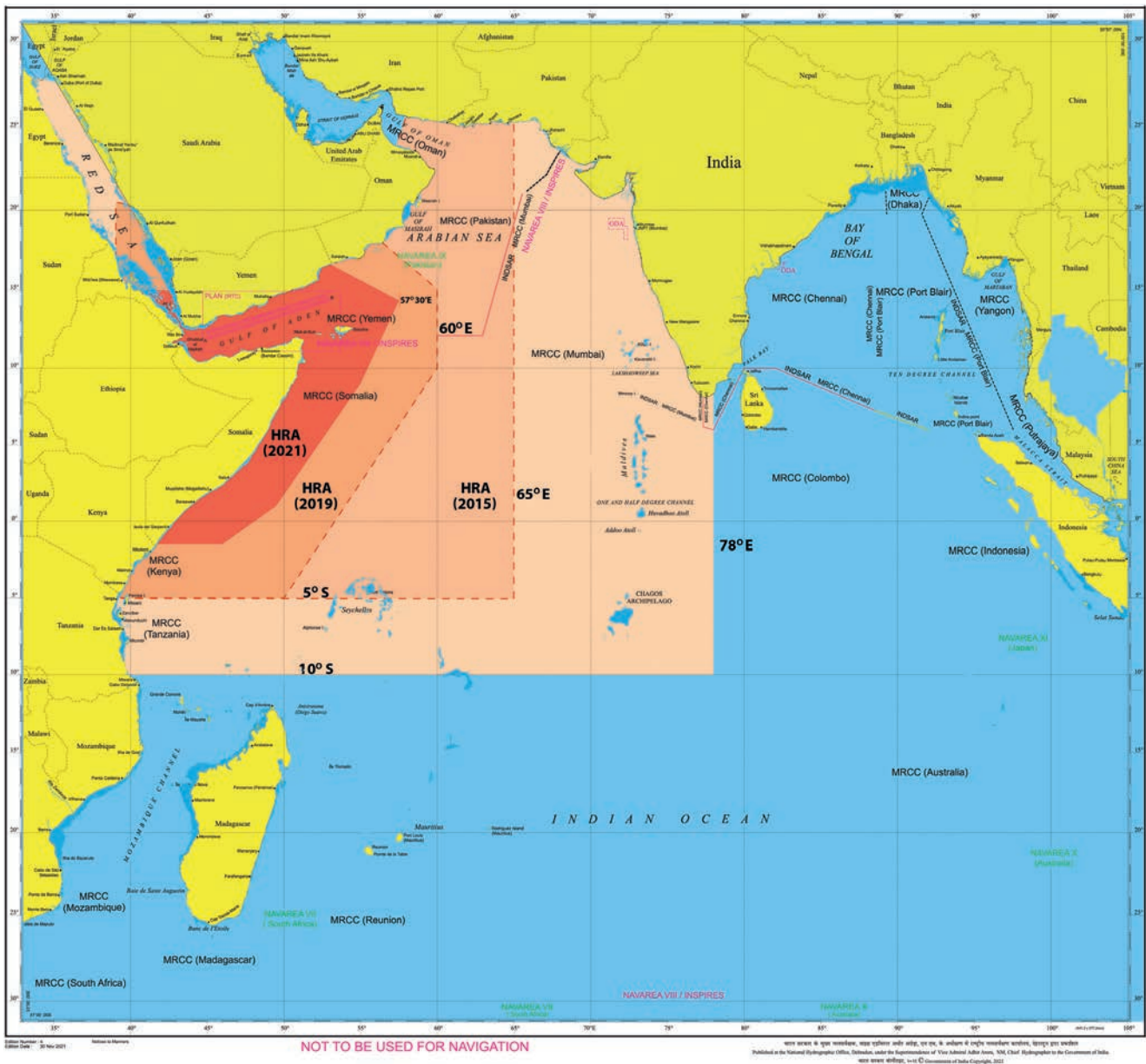
Pushback of HRAs (2015-21): Since 2008, *IN* and CG have provided escort and round-the-clock security to ships in the Arabian Sea to deter and foil any potential pirate attack. As a result, pirate attacks were subdued in the ensuing three-year period.

Since 2011, India has consistently taken up the issue of the restoration of the geographical

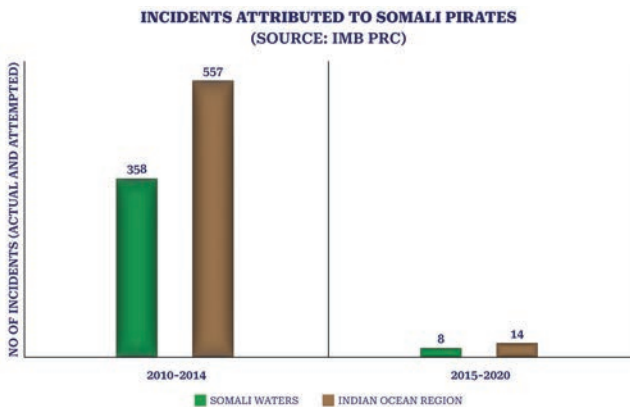
coordinates of the HRAs from its existing position longitude 78-degree East back to longitude 65-degree East at several global fora, such as the International Maritime Organization (IMO) and the Contact Group on Piracy off the Coast of Somalia (CGPCS). Persistent efforts by all stakeholders resulted in international bodies, such as the International Chamber of Shipping and others, agreeing to push back the HRA from longitude 78-degree East to 65-degree East with effect from 1 December 2015.

Since then, due to effective multinational anti-piracy operations, including by the *IN*, the HRA was pushed further westwards to longitude 60-degree East with effect from 1 May 2019,¹² and to 57 degrees 30 minutes East longitude with effect from 1 September 2021.¹³

From 2008 to 31 December 2020, the *IN* deployed eighty-four ships, periodically, for anti-piracy operations in this area,¹⁴ which substantially augmented international efforts to eradicate piracy in the region.



HRA Pushback



Incidents Attributed to Somali Pirates

Source: International Maritime Bureau Piracy Reporting Centre

Setting up Coastal Security Committees (2016): In June 2016, MHA issued orders for the constitution of State and District Coastal Security Committees under the chairmanship of Chief Secretaries and District Magistrates, respectively. A representative from the *IN* was included within the state-/UT-level Coastal Security Committees and subsequently, in December 2018, representation by the *IN* was also extended to District-level Coastal Security Committees.

Multi-Stakeholder Coastal Security Seminar (2016):¹⁵ To facilitate a working interaction of all stakeholders in Maharashtra's coastal security set-up, HQWNC conducted a Coastal Security Seminar on 24 June 2016 at INS *Angra*, Mumbai. It provided all stakeholders with a platform to sensitize others to their perception, understanding and challenges regarding coastal security. The seminar was attended by personnel from the *IN*, *CG*, State Intelligence Department, Marine Police, Maharashtra Maritime Board, Department of Atomic Energy, Department of Animal Husbandry Dairy & Fisheries, Mumbai Port Trust, Jawaharlal Nehru Port Trust, ONGC, coastal police from coastal districts of Maharashtra and representatives from minor ports.

Proposal for Updation of *IN*-*CG* SOP (2017): In order to achieve greater synergy, an *IN*-*CG* Standard Operating Procedure (SOP) was formulated in 2009. In January 2017, at the thirteenth *IN*-*CG* 'Op and Communications Working Group' meeting, a need to further revise the SOP was felt in view of the evolving security architecture, capabilities and environment. Additionally, post the Pulwama incident in 2019, a necessity was felt to explore greater *IN*-*CG* coordination as this could lead to seamless switching over of the *CG*'s security posture from a precautionary defensive state to a response that was more suited to the heightened maritime security threat environment. Primary recommendations then made by the *IN* included:

- **Aligning with MoD Directives:** The MoD promulgated 'Guidelines for Security of Defence Establishments' in November 2016. These include the use of technology for surveillance; positioning of well-trained, armed and equipped Quick Reaction Teams at high threat/high priority military bases; conduct of security audits; and harmonization of security escalation protocols within the coastal security framework.
- **Development of NC³I Capabilities:** Enhancements in technological capabilities of the National Command Control Communication and Intelligence (NC³I) network further necessitated the need to incorporate changes to the SOPs.

Note: The SOP of 2009 is currently in force.

The Coastal Security Doctrine (2017): In June 2017, the *IN* published a Coastal Security Doctrine. This is an operational-level document that aims to provide a shared understanding of the overall framework of coastal security, as also overarching guidance for subordinate doctrines at a tactical level. The document also brings out the differences, and linkages between coastal security and coastal defence as briefly discussed below.

- **Coastal Security:** The doctrine notes that coastal security is a sub-set of maritime security, focused on coastal waters. It entails protection, preservation and promotion of peace, stability and security in coastal waters, against various threats. This enables the pursuit of legitimate activities in coastal waters and also adjacent coastal land. This is ensured through coordinated efforts among multiple stakeholders at the Centre and in the states, towards provision of comprehensive security. Coastal security encompasses a range of interconnected activities in interconnected maritime spaces.
- **Coastal Defence:** This is primarily a military function of defending the nation and its citizens against seaborne conventional and sub-conventional threats. It encompasses measures to prevent, counter and neutralize such threats in coastal waters and further seawards, before the threat can be brought to bear on the coast. Seaborne attacks against our coast and offshore assets could include the use of missiles, mines, guns and explosives, by ships, submarines, aircraft and marine/Special Forces, and even

by intentional collision or scuttling of vessels. Coastal defence entails protection from such seaborne attacks against the coast and coastal assets, including populace, ports, harbours, infrastructure, VAs and VPs.

Dorniers and Advanced Light Helicopters (ALH) for Coastal Security (2017-21): Post the 26 November 2008 attacks on Mumbai, major impetus was given to enhancing coastal security. In order to augment the existing fleet of Dorniers for undertaking surveillance, in December 2017, the *IN* concluded a contract with Hindustan Aeronautics Limited (HAL) for the procurement of twelve coastal surveillance Dorniers 228. These began to be inducted by the *IN* from January 2019 onward. As compared to the earlier models, the newer aircraft were upgraded with a digital console, and many improvements in avionics and electronic hardware.

Additionally, HAL-manufactured ALH-MK III are capable of operating by day and night, as also undertaking stage-through operations from Naval ships. The HAL has agreed to further modify the ALH-MK III to meet specific requirements for coastal security. Subsequently, a contract for sixteen ALH-MK III was signed with HAL in

MPs/MLAs Gain Insight on Coastal Security Through ‘Day at Sea’ (2017-21): In pursuance of Prime Minister Modi’s directives—and to assist the senior leadership of our coastal states to: (i) appreciate the threats and challenges that can come from the sea; and (ii) to provide them with an overview of the coastal security architecture of India—the *IN* instituted the ‘Day at Sea’. Since 2017, a Day at Sea has been held in many port cities, and has seen the participation of MPs/MLAs, including those of Kerala, Tamil Nadu, Maharashtra and Odisha.

In addition, the *IN* also conducted familiarization sorties for the states of West Bengal and Andhra Pradesh.

Island Security System (2018): In June 2015, the MHA formed five sub-groups to address the holistic development of islands. Sub-Group V was assigned the task of examining security-related aspects of islands and was headed by Joint Secretary (Border Management) MHA. In May 2016, MHA forwarded the recommendations of Sub-Group V to all coastal states/UTs and all stakeholders for compliance. Sub-Group V recommended that responsibility for the internal security of



Patrolling the Coastline

March 2017. The induction of these helicopters commenced in January 2021.

the islands should primarily rest with state/UT administration. Therefore, the states were asked

to prepare and implement comprehensive security plans in consonance with state-CG SOPs.

Based on the inputs received from the coastal states and UTs, the MHA in March 2018 formulated the Island Security Scheme (ISS)—a detailed security plan for 1,382 islands. The ISS mandated the CG with the overall responsibility of patrolling areas near the islands with augmentation by the *IN* as required by the CG. Subsequently in August 2018, MHA issued directives for joint teams of *IN*, CG and SMP to be constituted, to periodically visit and inspect each island territory. The CG was nominated as the overall coordinating agency for these joint patrols with support from *IN*, SMP and the state administration.

It was the *IN*'s view that joint patrolling of the islands fell under the ambit of internal security, and was essentially an issue for state/UT administrations. It further viewed the participation by internal intelligence agencies, forest, fishing and revenue departments in the joint patrol teams, as essential to effective joint patrols and cross-agency domain awareness.

The *IN* recommended that the model adopted by Andaman and Nicobar Islands—where issues pertaining to island security are monitored by the Lt Governor and Chief Secretary, with the CG coordinating with all agencies involved—could be adopted by all states and UTs. In October 2018, the MoD informed MHA that it agreed with the *IN*'s suggestions on: (i) adoption of the model implemented in the Andaman and Nicobar islands; (ii) the inclusion of representatives from other departments.

Subsequently, the *IN* now provides necessary assistance for the conduct of joint patrols.

National Academy of Coastal Policing (2018): The Government of India has approved, in principle, the setting up of the National Academy of Coastal

Policing (NACP) under the administrative control of the Border Security Force (BSF). A temporary NACP campus started functioning from 29 October 2018 in Dev Bhoomi District of Dwarka, Gujarat.¹⁶ Land (100 hectares) has been identified in Mojap Village in Devbhoomi District,¹⁷ for setting up of the full-fledged NACP.

The *IN* assisted the BSF with the formulation of the training curriculum and also provided access to jetties and boats for the conduct of the maiden Marine Police Foundation Course that commenced in October 2018.¹⁸ Earlier, in July 2018, the *IN* had forwarded a list of thirty-six ex-servicemen to NACP for consideration of employment as instructors.

Indian Navy Training for BSF, CISF, Marine Task Force (Gujarat) Personnel (2019): The *IN* has been actively involved in the marine orientation training of personnel from the BSF, the Central Industrial Security Force (CISF), and the Marine Task Force (Gujarat). This training is conducted at INS *Chilka*, which is the premier training establishment for sailors who are newly inducted. In 2019, sixty BSF personnel successfully underwent a Marine Orientation Course at INS *Chilka* from 22 July to 3 August.¹⁹



IN conducted Marine Orientation Course for BSF

Approximately 240 CISF personnel are trained in batches of sixty every year and deployed by the CISF for the protection of ports and installations near the coast. Apart from training for BSF and CISF, the *IN* also undertakes a comprehensive 3.5-week training for Marine Task Force (Gujarat).²⁰

Tracking and Registration of Fishing and Non-Fishing Boats (2012-19):

- **Registration of Boats:** The Government mandated that all fishing/non-fishing boats plying in Indian waters have to be registered under a uniform system. By 2012, a common online registration system was developed by the National Informatics Center (NIC) for pan-India registration of boats. Since its inception, more than 2,60,000 vessels have been registered on the portal.
- **Installation of Transponders on Boats:** It was also decided that all types of boats would be fitted/provided with navigational and communication equipment to facilitate vessel identification and tracking. This required all types of vessels, including fishing vessels of less than 20m categories to install AIS type B transponders for identification and tracking.

The National Committee on Strengthening Maritime and Coastal Security (NCSMCS) reviewed the issue in its fourteenth meeting held on 24 November 2016, wherein the Committee recommended satellite-based technology for the fitment of transponders in Sub-20m boats. To begin with, Indian Space Research Organization (ISRO) was requested to provide 500 transponders each, to the sensitive coastal states of Gujarat and Tamil Nadu. Post successful Proof-of-Concept testing by *IN*, more than 950 such transponders have been fitted onboard small vessels.

- **Issuance of ID Cards to Fishermen:** The Government also announced that all fishermen would be issued biometric ID cards, which would be relatable to a single centralized database. There were two types of cards issued: (i) the National Population Register (NPR) ID Cards issued by the Registrar General of India (RGI) for coastal village populations; and, (ii) Fishermen Cards issued to fishermen by the Department of Animal Husbandry Dairying & Fisheries, Government of India.

In March 2019, it was decided that all marine fishermen going to sea (territorial waters, EEZ, and high seas) should carry a QR-enabled Aadhaar Card with a good-quality picture printed on or after 13 March 2019. More than twenty-lakh ID cards have been issued to fisherfolk since the launch of this initiative.

Coastal Security Exercises (2011-21): Since 2008, the *IN* and *CG* have conducted more than 300 coastal security exercises with state authorities. Some of the major exercises, with specific focus on coastal security, are listed below.

- **Exercise Sagar Kavach:** Post the 2008 Mumbai attacks, the *IN* and *CG* have been conducting joint state-focused exercises called Sagar Kavach. Exercise Sagar Kavach is conducted every six months to check the coastal security mechanism and validate the SOPs. Multiple stakeholder agencies involved participate in this Exercise and its regularity has helped improve interagency coordination on matters of coastal security. Since its inception, more than thirty Sagar Kavach exercises have been conducted to date, in various coastal states and island territories.



Exercise Sagar Kavach

In a first, in November 2015, Exercise Sagar Kavach off Gujarat was conjoined with the major maritime 'Defence of Gujarat' (DGX) Exercise',²¹ thereby providing substantial

impetus to the Coastal Security matrix—a first, in that coastal security was linked to coastal defence.

■ **Exercise Sea Vigil-19 and Sea Vigil-21:** Exercise Sea Vigil was undertaken in continuation of the *IN*'s effort towards creating greater synergy between the various stakeholders involved in coastal security. It was essentially the creation of a linkage between coastal defence and coastal security.

● **Sea Vigil-19:** The maiden large-scale, pan-India Coastal Defence Exercise Sea Vigil-19 was conducted along the entire coastline and India's EEZ on 22–23 January, 2019.²² It focused on activating all agencies involved in the coastal-security construct, and in identifying gaps and institutionalizing mitigating measures. More than 200 ships, aircraft and patrol boats participated, manned and operated by various security agencies.²³ Feedback from the Exercise was shared with the NCSMCS.

● **Sea Vigil-21:** The second edition of the biennial pan-India coastal defence exercise was conducted on 12–13 January 2021.²⁴ The Exercise was conducted as a build-up to the major theatre-level exercise TROPEX (Theatre-level Readiness Operational Exercise), which the *IN* conducts every two years. While smaller scale exercises are conducted in coastal states regularly, including combined exercises among adjoining states, the conduct of a national-level security exercise provides an opportunity at the apex level, to assess our preparedness in the domain of maritime security and coastal defence.

Sea Vigil-21 involved the deployment of the entire coastal security apparatus—more than 110 surface assets of the *IN* and the CG,²⁵ along with a large number

of Marine Police and Customs assets. The entire coastline was kept under surveillance by *IN* and CG aircraft. Helicopters linked up with Special Operations personnel operating onboard offshore platforms.



Exercise Sea Vigil-21

As ports form the nerve centre of seaborne trade, Sea Vigil-21 also validated the security mechanism of ports during the Exercise. Crisis management plans of all ports were assessed for effectiveness in tackling emergencies. State Police teams, *IN* Marine Commandos (MARCOS) and Commandos from the National Security Guard (NSG) were assessed for effectiveness in the face of maritime terrorism. This Exercise also validated the technical surveillance infrastructure, i.e., the NC³I Network. The IMAC at Gurugram and its various nodes across *IN* and CG stations were assessed for effectiveness in coordinating the surveillance and information dissemination mechanism

⚓ Offshore Development Area Security

Closely linked to coastal security is offshore security. Offshore security relates to the safety and protection of offshore infrastructure and vessels, including artificial islands, offshore terminals,

installations and other structures that lie within a country's EEZ. The protection of all natural resources, assets and people engaged in maritime activities within this area, also constitutes offshore security.

Essentially, actions in the military role (defence) are undertaken against state actors; and actions in the constabulary role (security) are undertaken against a host of non-state actors (terrorists, pirates, robbers, criminals, etc.). However, when viewed from a conflict perspective, such actions are part of the same continuum.

Increased exploration and production activity for oil and gas in the Indian EEZ, to meet the country's growing energy requirements, has resulted in significant increase in the size of ODA as well as maritime activities off the ODA in recent years. Presently, about 11 per cent of India's crude oil demand is sourced from offshore fields (this accounts for half of domestic production). Offshore gas fields contribute to 80 per cent of India's gas production. The succeeding paragraphs discuss some actions taken to enhance ODA security.

Induction of Immediate Support Vessels (2012-15): The proposal for procurement of twenty-three ISVs through ONGC was mooted in 2010, with the envisaged transfer of ownership and subsequent manning, operational exploitation and maintenance to the Navy. In 2012, an order for fourteen ISVs was placed with M/s SHM Shipcare, Mumbai and the balance nine ISVs with M/s Abu Dhabi Shipbuilding, Abu Dhabi. By 2015, the *IN* had commissioned all twenty-three ISVs, and they are since being used for ODA security. Post-induction, the ISVs were split into two groups. A fleet of fifteen ISVs was allocated to Western Naval Command (WNC), and the remaining eight were transferred to Eastern Naval Command (ENC). By February 2015, the rebasing of all ISVs was completed.



Immediate Support Vessels

Upgradation of Vessel and Air Traffic Management System (VATMS) (2018-19): An Integrated Radar-Automatic Identification System (AIS)-based VATMS was set up by ONGC in both the Western and Eastern ODAs, to provide real time, round-the-clock monitoring of the ODAs. The VATMS also assist in search and rescue (SAR) operations, and in tracking any drifting or intruding vessels, so that timely interception can be ensured. Major functions of the VATMS include detection, tracking, and assignment of identity and Naval Security Clearance information to vessels operating in the ODA.

The VATMS (West) was set up in 2007 and upgraded in 2018, while VATMS (East) was made operational in January 2019.

- **VATMS (West):** The Command and Control Centre (CCC) for VATMS (West) is at HQ ODAG. Data from all sensors is integrated at Data Integration Centre (DIC), Mumbai. The integrated data is routed from ONGC/DIC to CCC at HQ ODAG, while the server for remote display sites for *IN* and CG are set up at JOC (Mumbai). Data is also shared with the IAF component on the Western Front.
- **VATMS (East):** The Main Control Centre (MCC) for VATMS (East) is at JOC (Visakhapatnam). In addition, the integrated

Radar-AIS VATMS picture of the Eastern ODA is also provided to CG at RHQ, Chennai.

Comprehensive Security System for ODA (2021): A proposal for the installation of a CSS was mooted at the nineteenth Offshore Security Coordination Committee (OSCC) meeting in 2013, which envisaged a platform-centric system of sensors, deterrents and a central station. The final contract was awarded by ONGC to M/s BEL, and work on the CSS project commenced in July 2021.

⚓ Legal Empowerment of IN and CG Officers

Considering the large role played by the IN in the overall coastal security construct, a need exists to empower IN officers through a review of the existing legal and regulatory framework. Officers from the IN have limited powers, and that too only under the MZI Act, 1976 (revised in 1981) to arrest/detain offenders. The relevant laws and degree of legal empowerment of IN and CG officers are tabulated below.

Legislation/Act	Empowerment	
	IN	CG
Customs Act, 1962	Partially	Yes
Code of Criminal Procedure, 1973	No	Yes
Emigration Act, 1983	No	No
Merchant Shipping Act, 1958	Yes	Yes
The Territorial Waters, Continental Shelf, Exclusive Economic Zones and other Maritime Zones of India Act, 1976 (MZI Act, 1976)	No	No
Maritime Zones of India (MZI) Act (Regulation of Fishing by Foreign Vessels Act), 1981	Yes	Yes
Offshore Areas Mineral (Development and Regulation) Act, 2002	No	Yes
Narcotic Drugs and Psychotropic Drugs Act, 1985	No	Yes

Legislation/Act	Empowerment	
	IN	CG
Passport Act (Entry into India), 1920; Registration of Foreigners Act, 1939; Foreigners Act, 1946	No	No
Suppression of Unlawful Acts against Safety of Maritime Navigation and Fixed Platforms on Continental Shelf Act, 2002	No	Yes

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8 | Anti-Piracy Operations

⚓ Introduction

Piracy and armed robbery at sea constitute some of the oldest forms of maritime security threats. They have a detrimental effect on the maritime interests of a large number of countries as they threaten maritime trade and place the lives of people onboard ships at extreme risk. Further, they impinge upon the freedom to use the seas for livelihood and economic growth. Therefore, combating the menace of piracy has been a major task of navies over centuries, and remains so in the twenty-first century.

The closing years of the earlier decade (2000–10) and the initial years of the decade just past (2011–21) witnessed a rise in incidents of piracy in areas of maritime interest to India. From the Gulf of Aden and the Somali Basin, piracy spread across the Arabian Sea and reached within 500 nautical miles (nm) of the Indian mainland by 2011, threatening global maritime trade passing through the region. A large percentage of India's trade passes through the Gulf of Aden, and according to estimates of the Ministry of Shipping (MoS), Indian imports through the Gulf of Aden can be valued in the order of US \$50 billion and exports at US \$60 billion.¹ The safety and unhindered continuity of maritime trade, through ships that use this route, is therefore a significant issue. While this route accounts for about 13 per cent of India's trade, members of India's large seafaring communities also traverse these waters onboard

the numerous foreign-flagged vessels operating on this route.

To counter the threat of piracy emanating from these regions, robust steps were taken by the Indian Navy (*IN*) and the Coast Guard (CG). The past decade also saw the *IN* cooperate with numerous navies and organizations to combat piracy, not only in the Gulf of Aden, but also along the Somalian coast, the Omani coast and in the seas between the African coastline and the Maldives. The *IN* began anti-piracy patrols in the Gulf of Aden in 2008 and has successfully overseen the safe passage of numerous vessels, both Indian and foreign-flagged.

Sustained anti-piracy operations by the *IN*, among other navies, have significantly contributed to the reduction in piracy and improved the security and safety of mercantile shipping. The role of Naval Forces, including *IN*, in countering piracy off Somalia/in the Gulf of Aden has been widely acknowledged. More details are given in the succeeding paragraphs.

⚓ Anti-Piracy Operations in the Gulf of Aden

The modern-day menace of piracy in the Gulf of Aden, helmed primarily by some actors from Somalia, finds its roots at the turn of the century. The initial Somali pirates were merely small groups of armed fishermen who 'took on' the merchant vessels in retaliation to what they perceived as the dumping of illegal waste by



Anti-Piracy Operation by Indian Navy

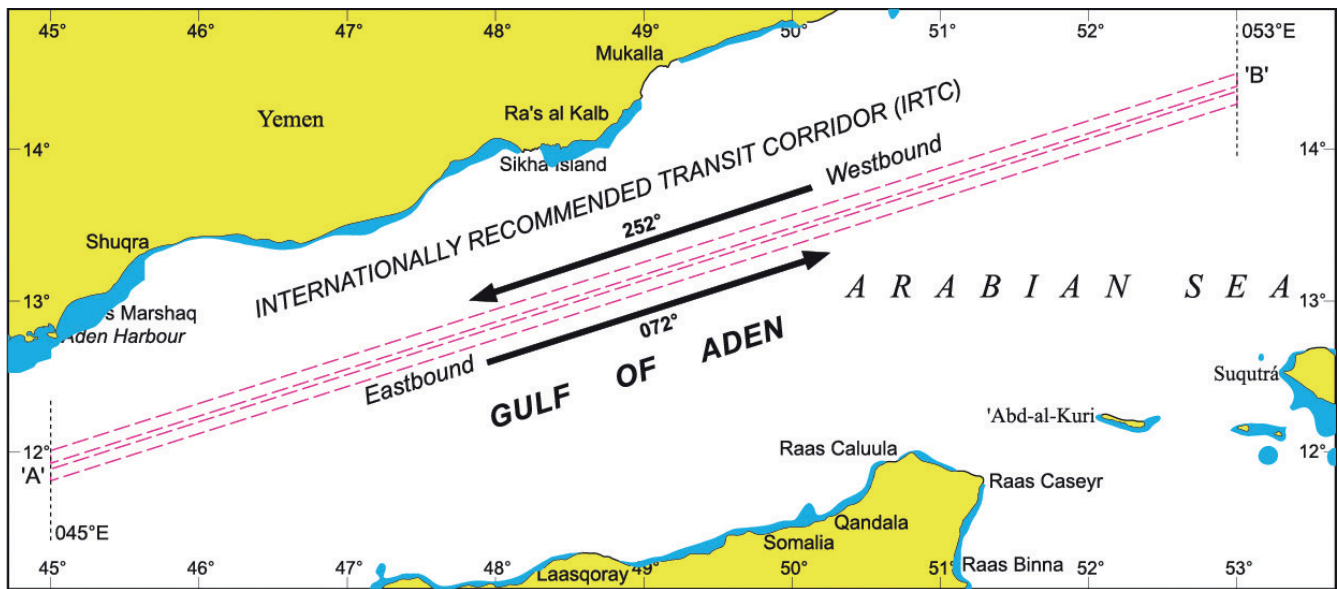
international ships in their waters.² According to them, dumping of waste adversely affected the catch in their waters. Fuelled by large payoffs, however, these hijackings turned into a lucrative business. The state of Somali pirates can be attributed to a number of socio-economic factors. There was extreme poverty, aggravated by: (i) Illegal, Unregulated and Unreported (IUU) fishing in Somali waters; and (ii) the lack of a credible law-enforcement mechanism both on land as well as offshore. The situation was further compounded by the rise of the terrorist organization Al-Shabab, which facilitated the easy availability of arms in Somalia.

The Indian establishment saw the issue of piracy being brought into sharp focus with the hijacking of MT *Stolt Valor*, a Hong Kong-flagged tanker, by Somali pirates in September 2008. Of the twenty-two crew on board, eighteen were Indian, including the captain of the ship. The crew was finally released after intense two-month-long negotiations.

October 2008 witnessed the *IN* commencing its anti-piracy patrols in the Gulf of Aden, with INS *Godavari* becoming the first Indian

warship to be deployed for anti-piracy patrols in the region. Since that deployment, the *IN* has been on station without a gap and has been escorting not only Indian-flagged vessels but also international shipping.

Internationally Recommended Transit Corridor (IRTC): To ensure the safety of traffic in a piracy-prone region, the International Community created a route corridor for the safe transit of ships. The idea was to optimally utilize warships to escort merchantmen, which would ply along a promulgated route in case they wished to avail of the escort facility. This corridor—called the Internationally Recommended Transit Corridor (IRTC)—was promulgated on 1 February 2009, and was amended based on a revised analysis of pirate activity in the region. The IRTC is a 490-nm corridor with separate westbound and eastbound legs, each 5-nm wide and separated by a 2-nm buffer zone. The IRTC facilitates safe navigation and the conduct of dissuasive and deterrent operations. Indian Naval ships escorted merchant vessels along the IRTC till 2018.³



IRTC

United Nations Security Council Resolutions: On 2 June 2008, the United Nations Security Council (UNSC) adopted UN Security Council Resolution (UNSCR) 1816 (2008), authorizing action against piracy in Somalia. Acting under the United Nations Charter, the UNSC authorized, for a period of six months, all states and regional organizations cooperating with the Somali Transitional Federal Government (TFG), to enter Somalia's territorial waters to combat piracy. During this six-month window, they were permitted to use all necessary means to repress acts of piracy and armed robbery at sea off the Somali coast, consistent with relevant provisions of international law. The resolution was renewed via UNSCR 1846 (2008) in December 2008 and UNSCR 1897 (2009) in November 2009, each time for a further period of twelve months and similar extensions (UNSCR 1950, 2020, 2077, 2125, 2383, 2500) with the last extension being granted for three months in December 2021 by UNSC Resolution 2608.

The *IN*'s Anti-Piracy Deployments: As brought out earlier, in order to ensure the security of Sea Lines of Communication (SLOCs) from piracy attacks, the *IN* has deployed one warship

continuously in the Gulf of Aden starting October 2008. The presence of the Indian warship proved to be a deterrent for pirates and provided much-needed security to Indian-flagged merchant ships. Since then, Indian warships have carried out patrols in the Gulf of Aden along the IRTC till 2018, after which the deployment philosophy changed into one of establishing a free patrol in the region rather than transiting between Points Alpha and Bravo of the IRTC. This change enabled the ship in station to be available to respond to any contingency occurring in the western Arabian Sea, including piracy. Additionally, the regular deployment of P-8I aircraft relaying real-time information has been a force multiplier for the *IN*'s anti-piracy operations.

By 2011, incidents of piracy extended to new areas in the eastern Arabian Sea. In order to counter this trend, anti-piracy deployment in the eastern Arabian Sea was substantially increased by the *IN* and the CG. The deployments led to four pirate mother ships and 120 pirates being apprehended in the eastern Arabian Sea in 2011; seventy-three fishermen and crew were also rescued by the *IN* in these operations.



IN P-8I deployed for Anti-Piracy Patrol Sorties from Salalah in the Gulf of Aden

Sustained anti-piracy operations by the *IN* and CG significantly contributed to the reduction in piracy and improved security and safety of mercantile shipping in the eastern Arabian Sea. These operations brought piratical attacks east of longitude 65-degree East to a halt since April 2012, with the last successful piracy incident in the eastern Arabian Sea being that of the Iranian-owned cargo ship MV *Eglantine* on 26 March 2012. The incident was reported, with MV *Eglantine* being at a distance of 430 nm from the Indian mainland (210 nm from the Lakshadweep and Minicoy Islands). The table on the other side provides a snapshot of the number of ships (all flags/nationalities) that the *IN* provided cover to, as they traversed these troubled waters from 2011 to 2018. In order to optimize its escort operations, the *IN* coordinated the patrol of its warships with that of other navies present in the Gulf of Aden.

■ **2013–14:** The year 2014 saw a major decline in the levels of piracy, with no incident being reported in the eastern Arabian Sea. This decline

was largely attributed to Naval deployments, and self-protection measures undertaken by the merchantmen, including employment of private security.

■ **2017:** The *IN* played far more active role this year. Piracy activities in the Gulf of Aden and off the Somali Coast increased in 2017, as compared to the previous four years. The *IN* ships played an instrumental role in thwarting numerous piracy attempts in the Gulf of Aden. A few notable ones during this decade are recounted subsequently.

Year	<i>IN</i> Ships Deployed	Total Merchant Vessels Escorted
2011	05	442
2012	05	429
2013	05	369
2014	06	319
2015	06	173
2016	07	118
2017	05	280
2018	05	324

- **Indian Dhow *Al-Kausar*:** The *Al-Kausar* was hijacked on 1 April 2017. INS *Sharda*, deployed on an anti-piracy patrol in the Gulf of Aden since 6 April 2017, was diverted off Hobyo, Somalia, to monitor the situation and render necessary assistance to the dhow. After negotiations, *Al-Kausar* was released and safely escorted by INS *Sharda* to Kismayo, Somalia. During the passage to Kismayo, the dhow was again approached by two skiffs; however, INS *Sharda* prevented any further incident.



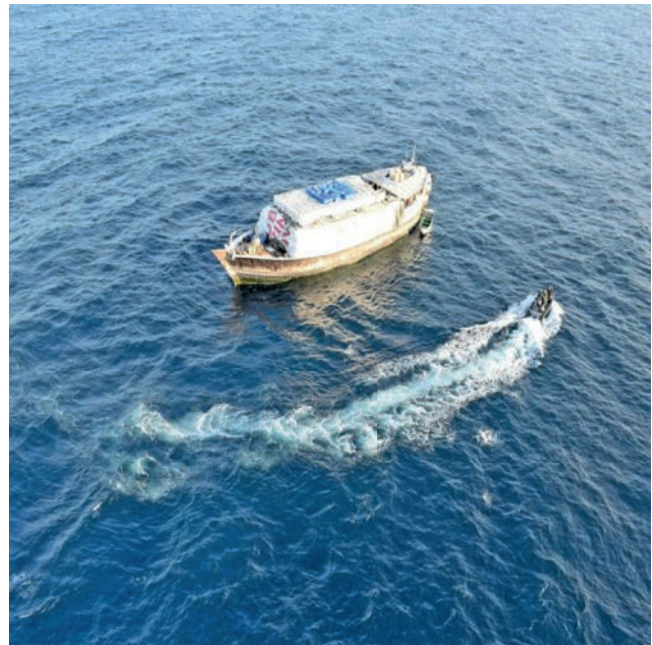
Al-Kausar Being Escorted by INS *Sharda*

- **Bulk Carrier OS35:** In another incident, a Bulk carrier, OS35 (with nineteen Filipino crew onboard), reported a pirate attack on 8 April 2017. Indian Navy Ships *Mumbai*, *Tarkash*, *Trishul* and *Aditya* operating in the area were diverted to provide assistance. A PLA (N) ship was also in the area. The *IN* undertook continuous aerial surveillance to sanitize the upper decks of the Bulk carrier, and one Prahar (Marine Commando) was kept on standby. Under the aerial surveillance of the *IN* and on receiving ‘all clear signal’ from the *IN* that no pirates were visible on the upper decks, PLA (N) personnel boarded the ship. It was ascertained that pirates had abandoned/fled the ship.
- **Suspicious Skiffs:** On 16 May 2017, based on an alarm raised by MV *Lord Mountbatten*, INS

Sharda apprehended two mother boats along with seven to eight skiffs. INS *Sharda* undertook boarding and search operations, during which arms and ammunition were recovered and thereafter the boats were disarmed in absence of any other piracy triggers and released.

- **MV *Jag Amar*:** While escorting the Indian-flagged vessel MV *Jag Amar* (twenty-six Indian crew on board) in the Gulf of Aden on 6 October 2017, INS *Trishul* detected a boat carrying out manoeuvres in the vicinity of the merchant vessel. INS *Trishul* closed on to the boat for further investigation and immediately launched the integral helicopter (with sniper embarked) towards the boat. Under the surveillance of the helicopter, the ship’s boat with Prahar team members boarded the boat. All piracy triggers—including the AK 56 assault rifles with rounds—were recovered by the ship’s boarding team, to prevent any piratical action by the boat’s crew. All Indian crew onboard MV *Jag Amar* were safe, and the merchant vessel safely proceeded to its next port of call, Al-Jubail in Saudi Arabia.

Piracy triggers and attacks have been on the decline during the decade with only few successful hijackings reported by 2020. INS *Sumedha*, on anti-piracy patrol in the Gulf of Aden, went to the rescue of the crew of the dhow *Al-Hamid* on 6 January 2020. The dhow was detected by the helicopter of INS *Sumedha*, which confirmed that the vessel was in distress and drifting near the coast of Somalia. A boarding team, along with a Naval technical team, embarked on the *Al-Hamid* for routine checks and to render assistance. The crew of the dhow comprised thirteen Indian citizens. The technical team assessment revealed that the dhow had suffered a broken main engine shaft, which was not repairable at sea. It was then towed to safety away from the Somali coast.



Assistance to the Dhow *Al-Hamid*

Between 2011 and 2018, a total of 413 Indian-flagged ships and 2041 foreign bottoms were escorted by the Indian Navy. Since 2019, *IN* ships have been deployed as per the Mission-Based Deployment philosophy in a free patrol in the area and did not transit along with the merchantmen.

⚓ International Efforts to Combat Piracy in the Gulf of Aden and off Somalia

In addition to the deployment of ships, India is also part of major international efforts to combat piracy in the region. Some of these initiatives are outlined in the succeeding paragraphs.

Contact Group on Piracy Off the Coast of Somalia (CGPCS): The CGPCS was created in January 2009, pursuant to UNSCR 1851. It is a multistakeholder-community open to any country or organization that contributes to anti-piracy efforts, or is directly affected by it, including non-government organizations (NGOs) and the private sector. The mission of the CGPCS is to bring together all stakeholders affected by Somali piracy and to foster close international cooperation to address the menace of piracy off

the coast of Somalia.

By 2014, the following four working groups were established in the CGPCS:

- **Capacity Building:** Ensuring effective Naval operation coordination and supporting the building of the judicial, penal and maritime capacity of Regional States.
- **Maritime Counter-Piracy and Mitigation Operations:** Naval, shipping industry and seafarers in one Working Group.
- **Disrupting Pirates' Networks Ashore:** Tracing the financial networks of pirates and working towards the prosecution of pirate leaders (kingpins).
- **A fourth Working Group:** The CGPCS later established its Legal Forum, which focuses on judicial mechanisms for deterring piracy.

The chairmanship of CGPCS is rotational. India took over the Chairmanship of CGPCS in September 2012, and the thirteenth Plenary Session of CGPCS was conducted under India's Chairmanship on 11 December 2012 at UN Headquarters, New York.

The half-yearly meetings of the CGPCS forum provided *IN* the opportunity to present India's case—how sustained counter-piracy operations

by the *IN* and *CG* resulted in shrinking piracy-affected areas to primarily off the coast of Somalia. In 2016, the Seychelles assumed the Presidency of CGPCS and on the request of the Seychelles, India hosted a strategy meeting of the CGPCS at Mumbai on 1 February 2016. The meeting aimed at doing ‘a stocktaking of all activities done by the working groups, to discuss the way forward for 2016 and beyond, and to formulate recommendations which could then be formalized at the next CGPCS plenary’.

Counter-Piracy Shared Awareness and De-Confliction (SHADE): The SHADE initiative was taken by the Combined Maritime Forces (CMF), a multinational maritime partnership, aimed at upholding the Rules-Based International Order (RBIO). The role of the CMF has been elaborated in detail below.

In order to ‘bring together’ Naval forces operating in support of anti-piracy operations in the Gulf of Aden, the SHADE initiative was formulated. Its prime objective was to ensure effective coordination and de-confliction of military resources and operations in combating piracy. As part of the de-conflicting charter, convoy coordination among deployers is undertaken during the quarterly SHADE meetings. Indian Navy officers participate in SHADE meetings held at Manama, Bahrain.

Combined Maritime Forces: As mentioned, the CMF is a multinational maritime partnership. It is led by the US, the North Atlantic Treaty Organization (NATO) and the European Union Naval Force (EUNAVFOR). The CMF exists to uphold the RBIO by countering illicit non-state actors on the high seas and by promoting security, stability and prosperity across approximately 3.2 million square miles (sq. m) of international waters that encompass some of the world’s most important shipping lanes.⁴ The CMF’s main focus areas are counter-narcotics, counter-smuggling, suppressing piracy, encouraging regional cooperation, engaging with regional and other partners to strengthen relevant capabilities in order to improve overall security and stability, and promoting a safe maritime

environment free from illicit non-state actors. The CMF has four Combined Task Forces (CTFs) and the relevant three are detailed below:

■ **Combined Task Force 150 (CTF 150)**

Maritime Security: CTF 150 conducts Maritime Security Operations (MSO) outside the Arabian Gulf to ensure that legitimate commercial shipping can transit the region, free from non-state threats. CTF 150’s mission is to disrupt criminal and terrorist organizations and their mandated illicit activities by restricting their freedom of manoeuvring in the maritime domain. Its activities deny criminal and terrorist organizations a risk-free method of conducting operations or moving personnel, weapons or income-generating narcotics and charcoal. CTF 150’s Area of Responsibility (AOR) includes some of the world’s busiest shipping lanes and spans over two million sq m, covering the Red Sea, Gulf of Aden, Indian Ocean and Gulf of Oman.

■ **Combined Task Force 151 (CTF 151) Counter**

Piracy: CTF 151 was established in January 2009 with a specific counter-piracy mission-based mandate.⁵ It is currently endorsed under United Nations Security Council Resolution (UNSCR) 2500 (2019). CTF 151’s mission is to deter, disrupt and suppress piracy and armed robbery at sea and to engage with regional partners in order to protect global maritime commerce and secure freedom of navigation. CTF 151 is a multinational force, with command being rotated between participating nations on a three- to six-month basis. Over the years, navies of Japan, Kuwait, Pakistan, Republic of Korea, Singapore, Turkey, USA and Brazil have led CTF 151.

■ **Combined Task Force 152 (CTF 152) Gulf**

Maritime Security: Established in March 2004, CTF 152 aims at enhancing regional maritime cooperation focusing on illicit non-state actors in the Arabian Gulf, especially between Gulf Cooperation Council (GCC) nations. CTF 152 operates inside the Arabian Gulf where it coordinates Theatre Security Cooperation (TSC) activities with regional partners, conducts

Maritime Security Operations (MSO), and remains prepared to respond to any crisis involving non-state actors, which may develop.

Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP): The first regional government-to-government agreement to promote and enhance cooperation against piracy and armed robbery against ships in Asia, ReCAAP was launched in November 2006, with fourteen Asian Contracting Parties including North, Southeast and South Asian countries. At present, it has twenty-one Contracting Parties: Australia, India, Philippines, Bangladesh, Japan, Singapore, Brunei Darussalam, Republic of Korea, Sri Lanka, Cambodia, China, Myanmar, Lao People's Democratic Republic, Thailand, Vietnam, Denmark, Netherlands, Germany, Norway, United Kingdom and the USA.

The ReCAAP Information Sharing Centre (ReCAAP ISC) was established in Singapore on 29 November 2006. It serves as a platform for information exchange between ReCAAP focal points and facilitation of capacity building efforts. The Maritime Rescue Coordinating Centre, Mumbai (MRCC Mumbai) is one of the focal points for ReCAAP.

At the twelfth Governing Council Meeting in 2018, the Council announced that ReCAAP ISC had met the criteria to be declared a Centre of Excellence for information-sharing in combating piracy and armed robbery against ships at sea.

Information Fusion Centre (IFC) Singapore: A multinational maritime security centre, IFC has a special focus on Southeast Asia and is based at Changi Naval Base, Singapore. The *IN* has been associated with the IFC since its inception. The Republic of Singapore Navy (RSN) inaugurated the Centre on 27 April 2009. The IFC aims to achieve early warning on maritime security threats through information-sharing with maritime stakeholders, and consequently be able to cue regional responses against those threats. The stakeholders include Navies, CGs, and Marine Police Forces.

EUNAVFOR: In late 2008, the European Union (EU) Council adopted Joint Action 2008/851/CFSP, based on various UN resolutions, to establish the executive EU military maritime operation for Somalia (Operation Atlanta) and contribute to the deterrence, prevention and repression of acts of piracy and armed robbery off the Somali coast. Over time, the mandate of EUNAVFOR has been adapted to reflect the evolving situation at sea and the increased presence of the international community in Somalia in order to support initiatives and enable a long-lasting solution to the Somali piracy problem.

The EUNAVFOR operates in an Area of Operations covering the southern Red Sea, the Gulf of Aden and a large part of the Indian Ocean, including the Seychelles, Mauritius and Comoros. The Area of Operations also includes the Somali coastal territory, as well as its territorial and internal waters. This represents an area of about 4,700,000 sq. nm. EUNAVFOR warships also conduct patrols in the IRTC in the Gulf of Aden and the Indian Ocean. Further, warships and Maritime Patrol and Reconnaissance Aircraft (MRPA) conduct reconnaissance and surveillance operations. Warships and their boarding teams routinely conduct visual or physical checks of vessels transiting the High-Risk Area (HRA).

In combination with CTF 151 and EUNAVFOR Somalia, the *IN* has deployed Naval ships to patrol the Maritime Security Transit Corridor (MSTC) and undertake passage exercises with other participating navies. These exercises include joint manoeuvres, transfer of personnel by boat, and flying operations by Naval helicopters.

In 2021, *IN* conducted its first Naval exercise with the EUNAVFOR in the Gulf of Aden. The *INS Trikand*, which was mission-deployed for anti-piracy operations, participated in the Joint Naval Exercise on 18 and 19 June 2021. It was joined by the Italian Naval Ship ITS *Carabinere*, Spanish Naval Ship ESPS *Navarra*, and two French Naval Ships FS *Tonnerre* and FS *Surcouf*.

Standing NATO Maritime Group 2: The SNMG2 is a part of NATO's Standing Naval Forces (SNF) that provide the alliance with a continuous naval presence. The SNMG2 undertakes operations to deter, defend and protect vessels contracted by the World Food Programme (WFP) against piracy and armed robbery. It carries out a programme of scheduled exercises, manoeuvres and port visits and can be deployed in times of crises and tensions.

The SNMG2 acts as a multinational, integrated maritime force comprising vessels of allied countries. These vessels are available permanently to NATO to perform various tasks ranging from exercises to operational missions. They also help to establish Alliance presence, demonstrate solidarity, and conduct routine diplomatic visits to different countries.

The SNMG2 falls under the authority of Allied Maritime Command (MARCOM), Northwood the (UK), following MARCOM's December 2012 inauguration as the operational hub for all Alliance maritime operations.⁶

⚓ **India's Cooperation with Other Counter-Piracy Initiatives and Task Forces**

India has not been a part of various combined forces involved in counter-piracy initiatives at sea owing to its reluctance to be seen as part of any grouping or cohort, in line with its foreign policy

outlook. However, this has not precluded informal cooperation that often happens at sea between maritime forces or regular information exchange with navies patrolling in the IRTC. This is apart from its participation in SHADE meetings and information exchange on the internet-based Mercury Net. Mercury Net is a tool of communication between various organizations and navies operating in the region wherein information is exchanged and actions coordinated among the various users.

In addition, in order to interdict illegal maritime activity in the western Indian Ocean, INS *Trikand* participated in Exercise CUTLASS EXPRESS-19, a multi-national training exercise, held from 27 January to 6 February 2019. The exercises aimed at improving law-enforcement capacity, promoting regional security and improving the progress of interoperability between the Armed Forces of participating nations. During the exercise, Naval Coast Guard and Marine Police personnel from a number of East African countries were jointly trained by mentors from India, the USA and the Netherlands, along with support from international organizations such as International Maritime Organization (IMO), the CMF and EUNAVFOR. The Indian Naval Ship *Trikand* provided a platform for live Visit Board Search Seizure (VBSS) drills during this Exercise, which proved to be of immense training value to the participating nations.



Indian Navy Participates in Multinational Training Exercise CUTLASS EXPRESS-19

⚓ Information Fusion Centre–Indian Ocean Region (IFC-IOR)

The constant increase in vessels transiting the IOR, and the porous nature of maritime areas of IOR countries, necessitates international collaboration for effective monitoring of the seas. Towards this, while there were a number of regional constructs such as IFC, Singapore, ReMiX and ReCAAP, a pan-IOR construct was conspicuous by its absence. The *IN*, therefore, proposed the setting up of the Information Fusion Centre–Indian Ocean Region. The IFC-IOR was launched by the *IN* in December 2018 at Gurugram and keeps a close watch on the movement of white shipping in the Gulf Region. The IFC-IOR functions as an information hub for the maritime domain and as an effective check on piracy.

Towards promoting IFC-IOR as the nodal hub for information-sharing, a proposal to invite International Liaison Officers (ILOs) from select countries was taken up with the Ministry of Defence (MoD). Subsequently, MoD approvals for inviting ILOs from Australia, France, Japan, Singapore, Italy and the US, were accorded. In consonance with the PM's vision of 'Neighbourhood First', a subsequent proposal to Invite ILOs from immediate neighbouring countries was taken up in March 2020. The MoD accorded approval for inviting ILOs from Bangladesh, the Maldives,

Mauritius, Myanmar, the Seychelles and Sri Lanka. The ILOs, who would join the Centre in the near future, would be organized into clusters looking into specific maritime security threats, such as piracy, IUU fishing, maritime terrorism, HADR, contraband, and smuggling.

Activities of IFC-IOR: Since its launch, IFC-IOR has actively pursued the vision of 'Promoting collaborative Maritime Safety and Security towards a peaceful, stable and prosperous Indian Ocean Region'. The IFC-IOR has established linkages with partner countries and MARSECs and contributes to information-sharing exercises, seminars and workshops. The functioning of the IFC-IOR is given in detail in a separate chapter on the subject. Noteworthy workshops and some activities conducted by IFC-IOR are elaborated on in the succeeding paragraphs.

■ BIMSTEC Coastal Security Workshop:

The IFC-IOR organized the maiden Coastal Security Workshop for BIMSTEC countries on 20–22 November 2019.⁷ It covered issues related to security, non-traditional threats in the region and other challenges in the maritime domain. The workshop was attended by nineteen delegates from the seven BIMSTEC countries and the BIMSTEC Secretariat. Thematic sessions conducted during the workshop included Maritime and Coastal Security,



Maiden Coastal Security Workshop for BIMSTEC countries

Challenges in Fisheries Management, Port and Shipping Security, Non-traditional Threats to Maritime Security, Challenges in Tracking Sub-20m Boats, and Technical Requirements for Setting-up a Coastal Surveillance Radar System.

- **IFC-IOR and SHADE:** The IFC-IOR has been invited to all iterations of SHADE, commencing from the forty-fourth to the forty-eighth meeting in April 2019 and September 2021 respectively, thus consolidating the linkages between the two.
- **Interaction with Other Regional Fusion Centres:** The *IN* is a member of the Mercury Net for coordination of the anti-piracy effort off the coast of Somalia and the Gulf of Aden. The IFC-IOR also constantly monitors the Mercury Anti-Piracy Coordination in the Gulf of Aden to keep abreast of the recent events in the region. Further, *IN* officers undertake duties as ILOs at the International Fusion Centre (IFC) Singapore. The IFC is a regional maritime hub, to enhance Maritime Situational Awareness and provides early warning and actionable information for timely response.



Indian Navy at IFC Singapore

- **An Information Hub in the Maritime Domain:** The IFC-IOR maintains a database which acts as an information repository of all maritime security incidents in the IOR, and aims to become the *IN*'s information hub in the maritime domain. The information collected in the IFC database is categorized under prominent maritime security divisions, including piracy,

IUU fishing, contraband, trafficking, irregular human migration and maritime terrorism.

- **Interaction with Experts:** The IFC-IOR has also started finding mention in the reports and publications of various centres/organizations. Stable Seas,⁸ in their reportage on piracy, predominantly mention IFC-IOR among other established centres like IFC Singapore, RMIFC Madagascar and ReCAAP.

⚓ Piracy: High-Risk Areas

The Best Management Practices (BMP) for Protection against Somalia-Based Piracy, promulgated by a consortium of stakeholders operating in the Gulf of Aden, defined the high-risk areas (HRAs) as those where pirate activity and/or attacks have taken place. The HRA, since 2010, had been defined as an area bound by Suez and the Strait of Hormuz to the North, 10 degrees South and 78 degrees East. The eastern limit of the piracy HRA was extended to longitude 78-degree East in June 2010, and promulgated in BMP Version 3. This expansion was undertaken, considering the extended reach of pirates in the central and eastern Arabian Sea, using mother ships, and converted the existing 'Reporting Areas' east of 65 degrees East Longitude also into 'Piracy High-Risk Area'. This resulted in the re-routing of merchant ships, higher costs in insurance, and proliferation of private security forces with arms and ammunition, among other issues. Detailed information on the High Risk Area and the pushback from the West coast of India has been covered in the Coastal Security chapter.

Piracy and Island Security: By around 2010, there was a slight decline in piracy in the Gulf of Aden and Somali extensions. However, incidents of piracy started extending to new areas in the east Arabian Sea. In order to counter this trend, Operation Island Watch was initiated. Further, the *IN* continues to maintain one ship on anti-piracy patrol at all times in

the Gulf of Aden. Sustained anti-piracy operations by the *IN* and *CG* have significantly reduced piracy and improved the safety and security of mercantile shipping in formerly piracy-infested areas.

Domestic Legislation on Piracy: In January 2010, a decision was taken that the MEA would steer a separate domestic legislation on piracy at sea. Consequently, a Piracy Bill was introduced in the Lok Sabha in April 2012. The 2012 Bill lapsed with the dissolution of the fifteenth Lok Sabha. In December 2019, the Anti-Maritime Piracy Bill was introduced in Lok Sabha and was referred to the Standing Committee on External Affairs for detailed examination. This Bill provides for the prevention of maritime piracy and prosecution of persons for piracy-related crimes. It will apply to all parts of the sea adjacent to and beyond the limits of India's EEZ, i.e., beyond 200 nm from the coastline. The Bill defines piracy as any illegal act of violence, detention, or destruction committed against a ship, aircraft, person or property, for private purposes, by the crew or passengers of a private ship or aircraft. Such acts may be carried out on the high seas (beyond India's EEZ) or any place outside the jurisdiction of India. Inciting or intentionally facilitating such acts would also qualify as piracy. It includes any other act that is considered as piracy under international law.

Offences and Penalties: The Bill provides that:

- An act of piracy will be punishable with: (i) imprisonment for life; or (ii) death, if the act of piracy causes or attempts to cause death. An attempt to commit, aid, support, or counsel an act of piracy will be punishable with up to fourteen years of imprisonment, and a fine. Participating, organizing, or directing others to participate in an act of piracy will also be punishable with up to fourteen years of imprisonment, and a fine.
- Offences will be considered extraditable. This means that the accused can be transferred to

any country for prosecution with which India has signed an extradition treaty. In the absence of such treaties, offences will be extraditable on the basis of reciprocity between the countries.

Private Maritime Security Companies; Privately Contracted Armed Security Personnel; and Floating Armouries: The threat of piracy in the Gulf of Aden spawned the rise of Private Maritime Security Companies (PMSC), Privately Contracted Armed Security Personnel (PCASP), and floating armouries. The IMO has issued circulars stipulating 'guidelines', and ISO standards have also been promulgated for PCASP/PMSC.

In addition to the *MV Enrica Lexie* incident, involving the shooting of Indian fishermen in 2012, two incidents in the past include those of the *MV Imara* and *MV Seaman Guard Ohio*. The PCASP onboard *MV Imara* reportedly dropped arms/ammunition at sea off the west coast in July 2013. *MV Seaman Guard Ohio*, a floating armoury, was operating in the Indian EEZ since July 2013 till her detention whilst operating in Indian territorial waters on 12 October 2013 under the Arms Act. The crew of the vessel were subsequently convicted under Indian laws.

Floating Armouries/PCASPs are potential maritime security threats, operating in a regulatory void, necessitating both a domestic and international response. The issue is particularly complex as it needs to balance traditional freedom of seas and the security concerns of Coastal States/Flag States.

During the ninetieth session of the Maritime Security Committee (MSC) of the IMO, in 2012, India raised the issue of 'reporting the details of armed security personnel on board ships, which sail through the high seas, close to the coastline of a State, to the concerned state'. However, at that time, the proposal did not gain favour. Subsequently, India raised the issue of the need for regulating floating armouries at the ninety-fourth session of the MSC (2014). India, during the strategy meeting of the CGPCS held on 1 February 2016, made an

intervention to highlight the following:

- Need to develop interim guidelines for regulating the operation of floating armouries and, in the meantime, encourage all states whose merchant vessels operate as ‘floating armouries’, to inform the concerned coastal state about the whereabouts and details of such vessels.
- Need for the International Standards Organization (ISO) to develop Publicly Accepted Standards for floating armouries along similar lines as developed for PCASP/PMSC.

The Working Group on Maritime Security and the Maritime Security Committee of IMO met in 2015 and considered issuing an amendment to existing guidance to Flag States regarding the use of PCASP in HRAs. The guidance has since been revised and, inter alia, includes establishing minimum criteria for compliance by PCASP, accreditation of PMSC through ISO standards or established national requirements, establishing a process of authorization by the Flag State as also requirements for record-keeping and information sharing with IMO for circulation to member states.

Other Measures to Deal with Piracy at Sea: The Government of India set up an Inter-Ministerial Group (IMGO) under the MoS on 27 April 2011, to deal with the hostage situation resulting from hijacking at sea of merchant vessels with Indian crew. The Government also approved the Contingency Plan for dealing with piracy and hijacking of merchant ships. A Committee of Secretaries on Anti-Piracy and Hijacking at Sea (COSAPH), under the Chairmanship of the Cabinet Secretary, was constituted. Other additional measures for combating piracy included:

- Guidelines for anti-piracy measures to be implemented on Indian ships were issued through Merchant Shipping Notice No. 1 of 2011, dated 14 January 2011. These guidelines provided for elaborate anti-piracy measures (Best Management Practices), including safe

house/citadel for vessels.

- Maritime security advisory to mechanized sailing vessels, registered in India, to desist from operating in waters south or west of the line joining Salalah and Male, vide merchant shipping Notice 03/010 dated 31 March 2010.
- On account of a piracy incident, the DGS issued an advisory vide DGS Circular 01/2017 dated 6 April 2017, for all Indian ships to keep at least 200 nm away from the Somali coast.
- Naval escort provided by *IN* ships in the Gulf of Aden was instructed to be continued.
- The *IN*'s vigil in the Indian EEZ and westward up to longitude 65-degree East was further enhanced.
- Active participation of India in the security meetings of the IMO, CGPCS and other international forums to continue.

Conclusion

A significant development of the anti-piracy role played by the *IN* as part of its stated constabulary role has been the growing recognition of India's maritime outlook, capabilities and actions in the national and international narrative. The *IN* has seen a steady increase in its operational footprint across India's maritime interests, with a growing cooperative framework and contributions, especially in anti-piracy missions. The growth of piracy in the IOR has seen the establishment of various cooperative anti-piracy mechanisms such as SHADE, ReCAAP, CGPCS etc., and the *IN* continues to support these mechanisms.

India's maritime forces will continue to counter piracy, as required, in consonance with domestic and international law, to ensure security for shipping and fishing in the region. The HRA pushback has been one of the most significant achievements for India in the maritime domain affecting the entire global maritime supply chains in the Indian Ocean region during this decade. India remains committed to

ensuring maritime security in the region, especially in the eastern Arabian Sea, by deploying *IN* ships and aircraft to continue to escort merchant ships of all nations in the Gulf of Aden.

Notes

- 1 Figures cited in response to 'Q.11' on the Department of Defence website: FAQ (n.d.); <https://www.mod.gov.in/dod/faq?page=1>
- 2 Singh, A. (2018). *Blue Waters Abov! The Indian Navy 2001–2010*.

- 3 New Delhi: Ministry of Defence, Government of India; p.109
- 4 Ibid., p.110.
- 5 CMF website: <https://combinedmaritimeforces.com>
- 6 See CMF website: <https://combinedmaritimeforces.com/ctf-151-counter-piracy/>
- 7 NATO webpage (last updated 30 May 2022): NATO's maritime activities. <https://www.nato.int/cps/en/natohq/70759>
- 8 Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) has seven Member States: Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand.
- 9 www.stableseas.org



9 | NEO, HADR and SAR

The Indian Navy in a Benign Role

⚓ Introduction

The Indian Navy's (*IN*'s) capstone publications, viz., *Indian Maritime Doctrine* (INBR 8)¹ and *India's Maritime Military Strategy* (IMMS-2007)² of the last decade, stress the imperative for the *IN* to prepare for Humanitarian Assistance and Disaster Relief (HADR) exigencies and 'build capabilities to undertake such operations with alacrity'. Among the three Services, the *IN* has proximate presence in India's coastal geographies (both mainland and island territories) that are increasingly prone to frequent occurrences of natural disasters. Additionally, the *IN* has significantly farther reach, longer sustenance on task and greater capability in responding to disasters beyond domestic calls into the larger Indian Ocean Region (IOR). These features of the *IN*, backed by a clear and genuine intent towards the development of collective maritime security capabilities developed on India's maritime vision of Security and Growth for All in the Region (SAGAR), has been instrumental in the *IN* being able to deliver on its commitment as a 'First Responder' to many disasters and crisis witnessed in the last decade.

India's Maritime Security Strategy, released by the *IN* in 2015, identifies challenges to its envisaged role of 'First Responder' and the mitigating frameworks for overcoming such challenges despite capital constraints. Some of these include:

- Climate change-exacerbated natural disasters that are likely to place increased demands on the *IN*'s HADR capability;
- Participation in HADR exercises with foreign navies would be one of the ways to enhance maritime engagement with other navies;
- The *IN* maintaining credible HADR capability and also promoting capability development and coordination between regional navies for combined HADR operations; and
- Enhancing sealift capability, which would be essential for HADR and NEO operations in future.

The *IN* has undertaken innumerable relief operations in India and other countries post many a natural disaster. As promulgated in the IMSS 2015, the *IN* undertakes HADR operations as a part of its benign role that includes Search and Rescue (SAR), Non-Combatant Evacuation Operations (NEO)³ and Hydrographic assistance. While assistance rendered for Hydrography is covered in a separate chapter in this volume, the operations conducted by the *IN* in support of NEO, HADR and SAR are outlined in the succeeding paragraphs.

⚓ Non-Combatant Evacuation Operations

The safety and security of Indian citizens in other countries is an important consideration. India

has the largest diaspora spread in the world—nearly 32 million.⁴ Significantly, 94 per cent of Non-Resident Indians (NRIs) and 99.7 per cent of People of Indian Origin (PIOs) reside in coastal states, adding to our maritime links and overseas interests. The large numbers and spread of Indian citizens, many in regions that have been afflicted with instabilities, add to our maritime challenges.

In recent years, the *IN* has been deployed for several NEOs in crisis-affected areas, both in precautionary support and for the actual evacuation of Indian nationals. In the last decade, there has been a rise in regional tensions and instabilities in some areas of maritime interest to India, particularly the Persian Gulf and Gulf of Aden littoral. These have already had a spillover effect from land to sea, giving rise to non-traditional threats and maritime security challenges, such as piracy, terrorism, and humanitarian crises necessitating NEO. Consequently, the *IN* has undertaken several NEOs in recent years, in coordination with other national agencies, providing succour to both Indian and foreign nationals. The *IN* also played a key role in the expatriation of Indian nationals during COVID-19 through Operation Samudra Setu I.



Operation Blossom (2011): The *IN* deployed *IN* Ships *Jalashwa*, *Aditya* and *Mysore* on NEO to rescue stranded Indians in violence-hit Libya on 26 February 2011. The ships were thereafter deployed off Tripoli in March 2011 and evacuated 150 Indian nationals to Malta.

Operation Rahat (2015): The Indian diaspora in Yemen (approximately 4,000 people) are primarily employed in various professions/service sectors. The civil war in Yemen left thousands homeless and stranded. Military intervention by other nations further complicated the situation, with aerial bombardments across the country. Yemen's airports and seaports, except for AL Hodeidah, became non-operational, making it difficult for people to leave the country. With the situation deteriorating rapidly, the Government of India directed the evacuation of Indian nationals from Yemen on 30 March 2015. The *IN* undertook evacuation operations from Yemen with ships sailing into various Yemeni ports in the midst of the ongoing civil war.

Three *IN* warships—*Mumbai*, *Tarkash* and *Sumitra*—were deployed for nearly three weeks (30 March–19 April 2015). *INS Sumitra*, the newest Offshore Patrol Vessel, was the first to respond. Deploying immediately to enter the port of Aden, she evacuated 349 Indians on 31 March and transported them to Djibouti, from where they were airlifted to India by IAF C-17 aircraft. Meanwhile, two Indian passenger ships, *MV Kavaratti* and *MV Corals*, which normally ply between Kochi and the Lakshadweep islands, were sailed from Kochi towards Yemen.

The civil war in Yemen had reached the port of Aden, which was engulfed in shelling and firing. Permission for entry of ships into Aden harbour was denied by the local authorities. Since more than 300 Indians were known to be awaiting

evacuation from Aden, INS *Mumbai* was relieved of anti-piracy escort duties and dispatched to reach off Aden, where she arrived in the early hours of 4 April. INS *Tarkash* continued to escort the passenger ships, which reached Djibouti on 5 April.

During the Operation, 441 people, including foreign nationals, women, the elderly and children were evacuated using boats from Aden harbour to INS *Mumbai*, which stayed close to the shore to shorten the travel time of evacuees. The evacuees were transported to safety, to Djibouti, by the morning of 5 April. This evacuation was particularly critical, as the harbour was shelled the next day, killing a large number of people.

On 5 April, INS *Sumitra* undertook her third evacuation, this time from Ash Shi'hr, near Al Mukalla. The ship evacuated 203 personnel and proceeded to Djibouti to disembark the evacuees. Meanwhile, INS *Mumbai* sailed from Djibouti on the evening of 5 April and arrived off the Port of Hodeidah the next day, where she evacuated a large group of Indian citizens.

The *IN* crews involved in the operations prioritized the comfort and ease of the evacuees, vacating their accommodation for them, providing them hot meals and medical aid, assisting the elderly, and ensuring their comfort during the passage to Djibouti. Ladies and children were accommodated in mess decks, whilst men were provided sheltered areas on the upper decks. Additionally, personnel were provided medical attention and essential medicines. Requisite assistance was also provided to pregnant ladies.

Operation Rahat was the biggest and most successful NEO undertaken by the *IN* from a conflict zone, during which 3,074 people (including 1,291 foreigners) were evacuated from war-torn Yemen by *IN* warships.



Bringing Them Home Safely

**First-Person Account of Op Rahat:
Capt Milind Mokashi, SC, then Commanding
Officer of INS *Sumitra***

When we sailed out from Chennai on 4 March 2015 for the ship's maiden Anti-Piracy deployment in the Gulf of Aden, little did we know that unprecedented and historic action awaited us in the ensuing thirty days! Yemen was already burning by then, but no one had foreseen the civil war turning ugly so alarmingly. I still distinctly remember it was the bright, sunny afternoon on 23 March 2015 that INS *Sumitra* (which was peacefully chugging along the Internationally Recognized Transit Corridor in the Gulf of Aden) got the news of the President of Yemen having escaped the country via sea, and the action suddenly seemed to be happening right around us. With the situation turning desperate, the Government of India was exploring various avenues for evacuation of our diaspora, with the sea route being one of them. Within no time, the ship and its crew were given the mission, and we switched into top gear in planning for what seemed like a herculean operation that involved a Non-Combatant Evacuation from various sea-ports of Yemen.

Whilst we prepared for the impending action with what we had (which was not much, as we had already been deployed for over three weeks by then!), we realized that there was much that we lacked. For starters, it was scanty resources—limited amount of accommodation and wash spaces, provisions, linen, medicines, manpower (to simultaneously handle the needs of manning the ship, ensuring her security from asymmetric and conventional threats, the safety of evacuees, looking after their needs, cooking and serve food, maintaining hygiene and habitability etc.), information (about expected threats, ports of evacuation for which we did not have proper charts for navigation, numbers to be evacuated and their identities, unforeseen contingencies, etc.) the list was endless. So that's when we fell back on the superior training imparted by the Service,

and every man onboard rose to the occasion and how! We put down the details on paper, made our strategy, divided ourselves into teams to look after various tasks, and worked out our security details for the ship, the crew and the potential evacuees both ashore and onboard.

Once we were ready, we indicated our preparedness to the Headquarters, which placing unwavering trust in us, a motley crew of a ship only six months old, put us right into action. Off we went to Aden, and entered it in pitch darkness with our navigation lights switched off amidst all the flames and noise due to the incessant bombing, shelling on the hills surrounding the city and the continuous rattle of machine-gun firing. We were disconcerted, to discover around 350 scared people waiting for us, hiding in containers to save themselves from getting hurt. We were given only forty-five minutes to undertake the Operation, and we did it as swiftly as we could and evacuated all of them safely to Djibouti. For the next six days and two other evacuations from Hodeidah and Ash Shihr, we were alone out there until INS *Mumbai* followed by INS *Tarkash* joined the operation. The ship ended up undertaking a total of five evacuation Operations, wherein we evacuated 1,621 Indian and foreign nationals. We were the 'First In, Last Out' of Yemen, until the last person waiting was evacuated. Every man onboard worked tirelessly for those seventeen restless days and sleepless nights, and displayed the best in them.

**⚓ Humanitarian Assistance and
Disaster Relief**

The tsunami of December 2004 was a watershed moment for India and the *IN*, in more ways than one. The *IN* distinguished itself by its prompt response in providing relief not only to our own coastal regions but also to other nations such as Sri Lanka, the Maldives and Indonesia—thus winning accolades from the global community and being

Indian Navy Continues Rescue and Rehabilitation Efforts in Puri



IN HADR Efforts in the Wake of Cyclone Fani

reckoned as a force that could render HADR in the region.

After the initial crisis management actions, the Government of India institutionalized the functioning of disaster relief with the National Disaster Management Authority (NDMA) at the apex and formed the National Disaster Response Force (NDRF) at the ground level. The tsunami also led to the *IN*'s acquisition of the Landing Platform Dock (LPD; *INS Jalashwa*) (ex-USS *Trenton*). While primarily an amphibious assault platform, the LPD, with its inherent flexibility and unique payload, could very quickly and effectively take on the HADR role. The tsunami was followed in recent years by Out of Area Contingency (OOAC) operations in Lebanon, Libya and Yemen. While most of these related to NEOs, they also highlighted the *IN*'s continual need for capability infrastructure and personnel skills to undertake humanitarian and benign missions.

Given the 'oceanic' character of our country, with its peninsular geography, vast coastline and many islands, it would be axiomatic to infer that the nation depends on the Navy for HADR operations in island territories and coastal areas. This gains even more salience considering the increasing frequency of 'extreme climatic events' in the region in recent times. While the *IN* is prepared to meet all such eventualities, and factoring in the truism that ships are completely self-contained, it may still be useful to list the *IN*'s current capabilities. We can, therefore, broadly summarize that the *IN* is expected to have the capability to undertake the following:

- Coordinate HADR operations in remote islands/locations even without the availability of preloaded additional HADR material.
- Live streaming of data, video and photographs using only Naval assets, where required. This is particularly useful for information dissemination in HADR

situations where normal communication channels may not be available.

- Capability to establish water and fuel sumps ashore/in a disaster-struck area remotely, either from safe anchorage or manoeuvring in the vicinity of the coast. This is again significant because fuel/water sources in disaster-affected areas are likely to be unavailable or contaminated.

The *IN* has maintained a credible HADR capability and coordinated with regional navies for combined HADR operations due to the transnational nature of the calamities. Whilst unique capabilities such as flexibility, reach, sustained presence and speed of operational response enable this multi-tasking, the training and manpower in the *IN* make it suited to undertake these tasks. The improved capacities of the *IN* enabled it to carry out challenging operations and establish it as a ‘Credible⁵ First Responder’⁶ in the wake of any humanitarian emergency or natural disaster both within the country as well as in the region. Considering the vast expanse of maritime geography that the *IN* serves in its benign role, HADR operations have been segregated into instances of domestic and foreign assistance.

Domestic Assistance

Uttarakhand Relief Operations (2013): Consequent to the natural calamity in Uttarakhand in June 2013, personnel of the Indian Naval Marine Commando Force (MARCOS) and divers were deployed for SAR and diving assistance. One officer and eleven sailors were deployed at Haridwar, whilst another officer and twelve sailors were deployed at Rudraprayag. The teams were deployed along with NDRF/local authorities.

Operation Phailin (2013): Cyclone Phailin crossed Odisha and north coastal Andhra Pradesh near Gopalpur on the night of 12 October 2013. Winds gusting to 220 km/hr were experienced along and

off coastal districts in north coastal Andhra Pradesh and South Odisha. Indian Naval Ships *Jalashwa* and *Ranvijay* were put on short notice for sailing, with relief material for 5,000 personnel, while *INS Investigator*, with relief material, rations and medical supplies for 1,000 personnel embarked, sailed from Port Blair on 13 October 2013. The ship carried two medical units and three diving units. Together, *IN* Ships *Jalashwa*, *Ranvijay* and *Investigator* provided relief material, rations and supplies to over 8,000 people.

Operation Madad in Andhra Pradesh (2013):

The southern state experienced heavy rainfall from 25 October 2013 onward, resulting in flooding in approximately sixteen districts. Based on the request from the civil authorities, Eastern Naval Command commenced rescue/relief operations on 27 October 2013. A total of seventeen rescue/relief teams with inflatable craft and diving equipment were mobilized. The teams rescued 440 personnel, and distributed food provided by the civil administration. Operation Madad was terminated on 28 October 2013 in consultation with civil administration, post improvement in weather conditions.

Operation Megh Rahat (2014): The erstwhile state of Jammu and Kashmir experienced heavy rainfall in early September 2014, resulting in flooding in Srinagar and adjoining areas. An *IN* diving team comprising ten divers led by an officer along with two inflatable craft, diving and rescue equipment were deployed for relief operations on 11–19 September 2014. Additionally, a medical team were deputed to 92 Base Hospital, Srinagar. The *IN* Diving Team evacuated approximately 1,300 personnel to safer areas and distributed relief material to about 3,650 people in nine submerged villages.

Operation Lehar (2014): On 12 October 2014, the city of Visakhapatnam and adjoining areas of Andhra Pradesh were hit by Cyclone Hudhud,

leading to widespread damage of property. Cyclone Hudhud was one of the rarest, as it struck a coastal city directly. On 13 October, the *IN* was made the nodal agency to carry out relief and rescue works under Operation Lehar—a massive HADR and SAR operation that accessed and mitigated the devastating impacts of the cyclone.

The *IN* readied thirty diving teams with inflatable craft and associated equipment, twenty rescue teams, four ships with medical bricks⁷ and medical stores, two medical teams, six helicopters, two aircraft and two medical teams, at Visakhapatnam. All were deployed as soon as weather conditions permitted.

As the lead agency, the *IN* also actively coordinated with various agencies towards the restoration of basic essential services and normalcy. Operationalization of the airfield was essential for expeditious movement of relief stores. After making the airfield operational for round-the-clock day and night operations on 16 October 2014, the *IN* along with NDRF personnel shifted focus to assisting the Airports Authority of India (AAI) in getting the Visakhapatnam Airport terminal ready for civil flight operations. The complete terminal and Entry/Exits were cleared of debris, and baggage conveyer belts cleared of water. The X-ray screening machines were made operational, and Foreign Object Damage (FOD) clearance of the airfield was completed to facilitate the resumption of flight operations on 17 October 2014. Naval communication personnel also assisted the telecom authorities and civil administration in restoring communication and connectivity in the city. Six tonnes of material were flown in to operationalize the 132 KV transmission power station.

An aerial recce of the affected areas by Naval helicopters was undertaken to survey and access the damage. Airdrop of relief material was undertaken at Rambilli by Chetak helicopters, as the area had been isolated post the cyclone. Debris

was cleared from Vital Areas (VAs). A survey of the Visakhapatnam harbour channel was also undertaken. This included surveying the fishing jetty as well, to restore port operations.

Based on interaction with the local administration, community kitchens were set up at various locations and distribution of food was done in coordination with the local MLAs and representatives, to ensure that all the affected got food.



Community Kitchen

The *IN*'s multipronged approach resulted in improving conditions significantly. An International Fleet Review (IFR-16), an event of magnificent proportions and importance, was scheduled at Visakhapatnam in February 2016, and it was crucial to get the city in shape for it. The *IN* made this possible by pooling-in resources with the civilian administration and putting up an impressive show.

Naval Assistance and Aid at SEZ Duvvada Fire (2016): On 26 April 2016, a major fire was reported at Duvvada Special Economic Zone (SEZ), Visakhapatnam, resulting in the burning of twelve biodiesel tanks. Nine Naval fire tenders, two medical teams with ambulances and Naval Quick Reaction Teams (QRTs) were immediately dispatched to the site. Additionally, an *IN* Dornier carried out an aerial recce of the fire-affected area, and Chetak helicopters dropped Dry Chemical Powder Fire Extinguishing Balls to assist in extinguishing the fire.

Relief Operations in Gujarat (2017): Gujarat received incessant and torrential rains commencing the night of 14/15 July 2017, which led to a flood-like situation and breakdown of road connectivity, communications and electric supplies. To provide flood-relief assistance, the *IN* shore establishment base *Valsura* immediately deployed two teams of divers in the districts of Jamnagar, Dhrol, and Morbi.

The relief and rescue effort was augmented by nine diving teams (Ex-Mumbai), which were deployed in the affected areas of Ahmedabad, Porbandar, Banas Kantha, Patan Deesa, Gochnad, Baragpur and Santhalpur from 26 July to 2 August 2017. The teams successfully evacuated more than 600 villagers from these affected areas.

An *IN* Sea King helicopter operating from Ahmedabad airport undertook SAR operations and conducted an aerial recce along Banas River to assess the extent of damage from 26 July to 1 August 2017. In addition, *INS Gomati* and *INS Kochi* were deployed with HADR bricks to Porbandar.

Relief Operations in Odisha (2017): Incessant rains resulted in flash floods and inundation of low-lying areas in south Odisha on 16 July 2017. An *IN* Sea King and UH3H helicopters were deployed from Visakhapatnam to undertake relief assistance in the affected areas of the Rayagada district. The helicopters undertook an airdrop of 3,500 kg of relief material on 17–19 July 2017.

Mumbai Flood-Relief Operations (2017): Mumbai received incessant and torrential rains on 29 August, which led to a flood-like situation and a breakdown of road connectivity, communications and electric supplies. A crisis management team under Flag Officer Maharashtra Area (Area Commander), assembled on the same day to assess the situation. Areas were allocated to various units with instructions for distribution of food, medical aid (as required) and provision for night shelters (at Colaba, Ghatkopar, Malad and Worli) for the stranded individuals.



Extending a Helping Hand

Publicity on electronic and social media was undertaken regarding the shelters, including locations and phone numbers, so that stranded individuals could be guided to the shelters. Additionally, seven diving teams, nine rescue teams, one Sea King helicopter and one ship were kept on standby to provide assistance if required. An aerial recce of the affected low-lying areas was also undertaken on the morning of 30 August to determine the extent of flooding with a view to augmenting relief efforts.

Operation Madad, Kerala Floods (2018): Southern Naval Command conducted a fourteen-day-long rescue operation in flood-hit Kerala. The state Government sought the *IN*'s assistance in carrying out SAR operations in the low-lying flooded areas of Ernakulam and Idukki districts, due to the opening of Cheruthoni dam's shutters, and in Wayanad District following unprecedented heavy rains.

Operation Madad was launched on 9 August 2018 to assist the state administration and undertake disaster-relief operations. Besides the *IN*, the Indian Army, the IAF and CG personnel were also involved in the rescue and relief operations along with the Civil Administration. Naval Air Station *INS Garuda* facilitated civil aircraft operations in addition to the military flying

requirements. This was because the international airport at nearby Nedumbassery had shut down in the wake of floods.

A total of twenty naval aircraft—consisting of Dornier, Sea King, ALH and Chetak—were involved in Op Madad. A total of ten IAF aircraft, six CG aircraft, two civil aircraft and two helicopters of the Oil and Natural Gas Corporation (ONGC), operated from INS *Garuda*. In addition to the above, several AN-32, as well as C-130 and C-17 heavy-lift aircraft, landed at INS *Garuda* on a daily basis with relief material, inflatable craft and medical teams. A total of forty aircraft operated from INS *Garuda*, which coordinated more than sixty sorties a day.

Along with the rescue of the marooned, ten air sorties amounting to fifteen hours of flying were undertaken by various naval aircraft, mainly for air-dropping of relief supplies, especially food and medicines. On request from the District Collector, relief material such as food, candles and some essential items were air dropped to help approximately 1,500 patients stranded

at the Narayana Institute of Medical Sciences, North Paravur.

Based on a request from the Civil Administration, some of the rescue teams at Wayanad were diverted to set up Medical Camps in remote areas not accessible by road. A makeshift relief camp was also set up at the T2 Hangar inside Naval Base, Kochi, and people rescued through air effort were provided food, bedding and other necessities there. Two Kendriya Vidyalaya schools near the Naval Base, administered by the Southern Naval Command, were also kept on standby as additional relief camps to house more displaced persons if needed. A community kitchen set up by INS *Venduruthy* at Cochin University of Science and Technology was catering for 7,000 people till the end of the crisis.

All the boats and divers at the disposal of Southern Naval Command were committed to this Operation, and more boats and divers were requisitioned from other Naval Commands. The Western Fleet tanker INS *Deepak* and Destroyer INS *Mysore* arrived at Kochi with fresh water, rations and 70 tonnes of



Operation Madad 2018

relief material to augment the disaster-relief efforts. The INS *Mysore* also carried one Chetak helicopter for augmenting the Southern Naval Command's air effort. INS *Sharda*, with 15 tonnes of fresh rations, departed Karwar and INS *Mumbai* was also loaded with relief material to Kochi.

The diving teams, rescue teams of personnel fully kitted-up, and medical and community kitchen bricks were on standby for any assistance sought by civil authorities. The *IN*'s Sea King helicopter was also extensively used to ferry diving teams, portable generators and other rescue equipment to Wayanad. The *IN* also provided technical repair assistance to the Amrita Institute of Medical Sciences, repairing its defective water pumps that had caused disruption in water supply. A team from the Naval Ship Repair Yard, Kochi got the system operational in a matter of ten hours.

On 22 August 2018, the Southern Naval Command called off its fourteen-day-long rescue operations in flood-hit Kerala, as waters receded in affected areas and normalcy was slowly restored. The *IN* had rescued a total of 16,005 people, including 1,131 survivors who were airlifted by helicopters from inaccessible areas. The *IN* also contributed Rs 8.92 crore towards the Kerala Chief Minister's Relief Fund. Two Indian naval Officers, Captain P Raj Kumar and Commander Vijay Verma, were bestowed the *Straits Times*' 'Asian of the Year 2018' award for their extreme courage during the Kerala floods.

Assistance to Civil Authority During Cyclone Titli (2018): On 11 October 2018, information was received at Eastern Naval Command, Visakhapatnam, regarding the landfall of Very Severe Cyclone Titli at Srikakulam. Based on assistance sought by the state Governments of Andhra Pradesh and Odisha, the *IN* provided HADR and SAR assistance, including air-dropping of 3,000 food packets and 5,500 kg of

relief material at various locations, in coordination with state administrations. The *IN* teams were de-inducted on 15 October 2018.

Cyclone Tauktae (2021): In May 2021, the *IN* undertook one of the largest maritime SAR operations during Cyclone Tauktae. The joint ops between the *IN*, CG, ONGC, and other agencies saved over 500 lives. Cyclone Tauktae—the most powerful storm to hit the region in more than two decades—sustained winds of up to 210 km (130 miles) per hour when it crossed the coastline of Gujarat state late on 17 May 2021. Tauktae left more than fifty dead in the coastal areas of the states of Gujarat and Maharashtra.

In a swift response to an SOS by an Indian vessel adrift in the Arabian Sea, a Naval helicopter was dispatched early morning on 17 May to rescue the stranded crew of Indian flagged Tug 'Coromondel Supporter IX', which was adrift northwest of Mangalore, Karnataka. Rough seas, due to Cyclone Tauktae, had resulted in flooding of the vessel's machinery compartments rendering it without propulsion and power supply, and the crew without any support. The *IN* Helo was dispatched early morning on 17 May 2021, after failed rescue attempts by boat. Four crew members were winched up safely by the Helo.



Coromondel Supporter IX

In the offshore area of Maharashtra, three vessels and an oil rig with 707 personnel on board had gone adrift the same day. These included accommodation barge P-305 with 273 persons, cargo barge GAL Constructor with 137 personnel on board, support station barge SS-3 with 196 personnel on board, and Sagar Bhushan oil rig with 101 personnel on board. The vessels were working for ONGC, the largest crude oil and natural gas company in India.



Getting the Survivors to Safety

Indian Navy ships were deployed on 17 May onwards till 25 May 2021. The *IN* was informed that barge P-305 had sunk on 18 May 2021 off the Heera oil fields in Bombay High area with 273

personnel on board. The oil fields are around 38 nautical miles (nm) southwest of Mumbai. Indian Navy Ships *Kochi*, *Kolkata*, *Beas*, *Betwa*, *Teg* as well as the P-8I maritime surveillance aircraft, Chetak, ALH and Sea King helicopters were involved in the SAR operations. On completion of its operations off the coast of Gujarat, *INS Talwar* was diverted to assist Support Station 3 (SS-3) and Drill Ship *Sagar Bhushan*, both of which were being safely towed back to Mumbai by ONGC support vessels.

Naval Ships (*INS Kochi* and *INS Talwar*) and their crew battling extreme weather conditions, rescued 188 of the 273 people who were on board barge P-305. The *IN* recovered seventy bodies on board barge P-305, and another sixteen bodies were recovered ashore. The International Maritime Organisation awarded Certificates of Commendation to the crews of *IN* Ships *Kochi* and *Kolkata* for the rescue of personnel onboard P305.

Various ships along the western seaboard were kept on standby with aid and relief material for immediate assistance to affected areas as required, and to provide assistance to fishing boats/small boats



IN: In Service of the Common Man

stranded due to rough weather. The *IN's* Maritime Reconnaissance Aircraft on surveillance continuously broadcasted cyclone warnings to fishermen.

Other Rainfall and Flooding-related Assistance:

Heavy rainfalls and consequent flooding are among frequent recurring natural disaster challenges for the country. As any flood situation worsens, it adversely affects the civil administration due to submerged transportation infrastructure and power lines, damaged telephone and internet connectivity, in addition to endangering lives.

In such situations, the *IN* joins the efforts of the sister Services to provide assistance and relief supplies to the flood-affected areas throughout the country. These operations include Operation Megh Rahat during flooding in Uttarakhand (2013); Jammu and Kashmir (2014); and flood-relief operations in Bihar and Mumbai (2017). The *IN* assisted the overall HADR operations in these locations by providing manpower, medical assistance and equipment to safely evacuate the civilians to safer destinations and to distribute the relief material.

Operation Samudra Setu I in Support of Mission Vande Bharat: In May/June 2020, *IN* launched Operation ‘Samudra Setu’, meaning ‘Sea Bridge’, as part of a national effort to repatriate Indian citizens from overseas during the COVID-19 pandemic. Indian Navy Ships *Jalashwa*, *Shardul*, *Airavat*, and *Magar* traversed 12,500 nm over fifty-eight days as part of one of the largest repatriation missions undertaken by



Operation Samudra Setu I: Supporting Vande Bharat Mission

the Government of India—Vande Bharat Mission, wherein they evacuated 3,992 Indian citizens from the Maldives, Sri Lanka and Iran. This Operation progressed in close coordination with the ministries of Defence, External Affairs, Home Affairs, Health and various other agencies of the Government of India and State Governments.

Operation Samudra Setu II in Support of COVID Relief Assistance: In end-April 2021, when the extraordinary surge of the pandemic put tremendous pressure on the country’s health infrastructure and capacity, the *IN* launched Operation Samudra Setu II to augment the national mission for meeting medical oxygen requirements. Indian Navy warships (*Airavat*, *Kochi*, *Kolkata*, *Trikand*, *Tarkash*, *Tabar*, *Jalashwa*, and *Shardul*) from all three Naval Commands in Mumbai, Visakhapatnam and Kochi deployed for the of Liquid Medical Oxygen and associated

Ship	Embarkation Date and Port	No. of Citizens Evacuated	Disembarkation Date and Port
<i>Jalashwa</i>	8 May, Male	698	10 May, Kochi
<i>Magar</i>	10 May, Male	202	12 May, Kochi
<i>Jalashwa</i>	15 May, Male	588	17 May, Kochi
<i>Jalashwa</i>	1 June, Colombo	686	2 June, Tuticorin
<i>Jalashwa</i>	5 June, Male	700	7 June, Tuticorin
<i>Shardul</i>	8 June, Bandar Abbas	233	11 June, Porbandar
<i>Airavat</i>	20 May, Male	198	11 June, Tuticorin
<i>Jalashwa</i>	25 June, Bandar Abbas	687	1 July, Tuticorin



INS *Shardul*: Augmenting Oxygen Supply Chains

medical equipment from FFCs across the expanse of the IOR. As on date, Indian Naval ships have ferried nearly 1050 million tonnes (MT) of Liquid Medical Oxygen and medical supplies from Bahrain, Brunei, Kuwait, Qatar, Vietnam, the UAE and Singapore.

⚓ Assistance to Friendly Foreign Countries

Operation Neer (2014): In early December 2014, an acute shortage of water was reported in the city of Male. This was due to a fire in the control panel and cabling of the generator supplying power to the island's main distillation plant. The Government of the Maldives requested assistance from India. The city had to be sustained with over 100 tonnes of drinking water per day till the plant was made operational. Based on a request by the Government of the Maldives, the *IN*, along with the IAF, responded with alacrity. While the *IN* deployed INS *Sukanya*, already deployed at sea, INS *Deepak* sailed from Mumbai carrying about 3,000 tonnes of water. Additionally, the two ships deployed at Male on 7–15 December generated 2,086 tonnes

of fresh water through the ship's RO Plants, which was also supplied to the island nation. Additionally, the IAF also deployed three C-17 and three IL-76 aircraft to airlift packaged water from Delhi to Arakkonam, and thereon to Male, delivering 374 tonnes of drinking water to Male.⁸

First-Person Account of Op Neer: Capt M Doraibabu, NM, author of this volume, and (then) Commanding Officer of INS *Sukanya*



INS *Sukanya* Deployed for Op Neer

INS *Sukanya* had already been out at sea for about sixty days out of base port. The ship was on her way home and somewhere in the south Indian

Ocean region when I got a call from Headquarters giving me a very brief directive—‘head to Maldives immediately’. Though I had a multitude of queries, I held counsel and got on to charting my detour to the Maldives. From my present position, it would take twelve hours of steaming at the best speed and I would reach Male, the Maldives in the wee hours the next morning. Sometime, en route, I was briefed that there had been a fire in the control panel of the main desalination plant rendering it non-operational and the city in a crisis without any fresh water supply. The inhabitants of the city of Male were completely dependent on the water supplied by the desalination plant, which was now defunct. The Government of the Maldives had requested technical repairs and provision of water assistance from two or three countries, including India. Knowing the criticality of time, I pushed the ship to her limits to reach early, and though I was not carrying additional water onboard, I decided to supply the water stored in my tanks for my crew to the city of Male. The crew’s support was unanimous in this decision and they curtailed their usage of water to a bare minimum so as to save maximum water to be given to Male. At about 0200 hrs, I was able to establish contact with Port Control of Male harbour and the resident Indian Defence Attaché. In the absence of a harbour pilot to conduct my ship into harbour, I decided to enter on my own escorted by an MNDF Patrol Craft in the dark of the night. Having been to the port just a week prior had helped me familiarize myself with the harbour. As soon as I berthed the ship alongside, I issued orders to rig up a pipe supply of water from my tanks to the jetty where the Maldivian officials already had lined up water tankers. The Operation went on the whole night, and in the morning after I had emptied my fresh water tanks, I moved away from the jetty to anchor the ship at an appropriate depth to again start making water using my own Reverse Osmosis (RO) plants. The cycle continued for three days by when INS *Deepak* fetched up from Mumbai with about 2000 tonnes of water.

INS *Sukanya* was the first to arrive at the Maldives within twenty-four hours of assistance being sought and the only one providing water till INS *Deepak* arrived shortly. The Indian Air Force had also airlifted about 60 tonnes of packaged water using five C-17 aircraft during this period. Though this detour had changed the ship’s plans of heading home after more than sixty days of being away, the crew rose to the occasion with their spirit and selflessness in this HADR venture named Operation Neer, which translates to water, in assisting a neighbouring country during their dire times.



IN with High-Level Maldivian Crisis Management Team

Aiding Sri Lanka During Cyclone Roanu

(2016): The Sri Lankan Government requested flood relief-related HADR stores post Cyclone ‘Roanu’ in May. In response to the request, INS *Sutlej* and INS *Sunayna* were deployed for flood-relief operations at Colombo, on 21–23 May 2016. In addition to the transfer of relief material and medical stores, the ships conducted a medical camp for the affected populace.



IN Medical Camp at Sri Lanka

Naval Assistance at Antsiranana, Madagascar (2016): On 1 September, a major fire broke out at Ambilobe, 140 km south of Antsiranana, Madagascar, affecting more than 5,000 people. The Malagasy Civil Administration approached the Indian Ambassador for assistance. Indian Naval Ship *Trikand* was then on a port visit to Antsiranana (31 August–3 September 2016), and was able to render timely assistance by donating victualling stores, medical and surgical material to Antsiranana Civil Authorities.

Assistance to Merchant Vessel (MV) MSG *Daniela* (2017): A coordinated mission between the *IN* and CG extended assistance to a merchant vessel that reported fire on board. The fire broke out on board MSG *Daniela* (a Panama-flagged container vessel) on 6 April 2017, at a location 120 nm off the coast of Sri Lanka. The Sri Lankan Navy received a distress call from the vessel's agent and dispatched the SLNS *Sagara* to assist, which began its attempts to curb the smouldering fire. The High Commissioner of India at Colombo, requested the *IN's* assistance to salvage MV MSG *Daniela*. Indian Navy Ships *Darshak* and *Gharial*, along with the CG ship *Shoor*, were deployed to undertake firefighting operations. Whilst ICGS *Shoor* undertook extensive firefighting operations, INS *Darshak's* helicopter was utilized for locating the seat of the fire and directing firefighting efforts. The fire was brought under control on 6 April 2017, and all crew were reported to be safe.

Flood-Relief Operations in Sri Lanka (2017): In May 2017, Indian Navy Ships *Kirch*, *Shardul* and *Jalashwa*—with HADR supplies, medical and diving teams embarked—were deployed to Colombo for flood-relief operations; INS *Kirch* was deployed to Colombo within twelve hours of the request for assistance from the Government of Sri Lanka. The ship was in Colombo on 27–28 May. Subsequently, INS *Shardul* and INS *Jalashwa*

arrived at Colombo on 28 and 29 May, respectively. Post completion of relief operations, the ships returned to Visakhapatnam.

Bangladesh Relief Operations (2017): On 30 May 2017, Cyclone Mora, a Category 1 storm with peak winds of 75 mph, struck the low-lying nation of Bangladesh. It was formed after heavy rains in Sri Lanka that caused floods and landslides, killing at least 180 people. In Bangladesh, more than 100 people were reported missing, leading to grave concerns for the densely packed coastal communities.

In a swift action by Eastern Naval Command INS *Sumitra*, operating in the Northern Bay of Bengal, was deployed and rescued twenty-seven survivors, including children and elderly people found adrift at sea approximately 100 nm south of Chittagong. All survivors were Bangladeshi nationals washed away by the severe cyclone. Search and rescue efforts to find more survivors were undertaken despite the prevailing rough weather in the area. A P-8I aircraft was launched to augment the search effort to locate more survivors.

The Government of Bangladesh conveyed its gratitude to the Government of India and the crew members of INS *Sumitra* for rescuing Bangladeshi nationals at sea under difficult circumstances, and for the relief supplies.

Relief Operations in Myanmar (2017): In the aftermath of Cyclone Mora, INS *Sumitra* visited Yangon in Myanmar to hand over relief material as



INS *Sumitra* at Yangon

a token of solidarity of the people of India with the people of Myanmar. After sailing from Chittagong, INS *Sumitra* proceeded to provide relief assistance to Myanmar. The ship visited Yangon from 6 to 8 June, during which the *IN* personnel onboard, provided the necessary assistance.

Shipment of Relief Aid, Bangladesh Rohingya Crisis (2017): INS *Gharial* was deployed to deliver relief aid to Bangladesh for Rohingya refugees. The ship departed Kakinada, post embarkation of relief aid on 25 September 2017, and arrived in Chittagong on the morning of 28 September. It departed on 30 September. Items totalling 777 tonnes were handed over to Bangladesh authorities.

Aid to Mauritius During Cyclone Berguita, (2018): A tropical depression, Berguita, crossed Mauritius on 18 January 2018. Based on a request from the Indian High Commission in Mauritius and MoD directives, INS *Sarvekshak* handed over HADR material comprising provisions, clothing items and medicines to the Government of Mauritius on 27 January 2018.

Transshipment of Humanitarian Aid to Bangladesh (2018): INS *Airavat* was deployed for transshipment of humanitarian aid to Chittagong on 5–14 May 2018. A total of 345 tonnes of relief material was handed over to the Government of Bangladesh.

Cyclone Idai Hits Mozambique (2019): Cyclone Idai made landfall near Beira city, Mozambique, on 14 March 2019 as a Category 2 storm. The heavy rains and strong winds led to flash-flooding, hundreds of deaths, and massive destruction of property and crops. In response to the catastrophe, the ships of the *IN*'s First Training Squadron (INS *Sujata*, ICGS *Sarathi*, and INS *Shardul*) at sea were diverted to Beira to provide HADR assistance on 15–30 March. They undertook HADR operations at Port Beira from 18 March 2019 onward. The *IN* Ships rescued more than 150 survivors from the

Buzi area near Port Beira, which was cut off from the mainland. In addition, two medical camps were set up at Port Beira and Gaura-Gaurathe Island, and medical assistance was provided to over 800 affected people from the local population.

The *IN*'s Chetak helicopter undertook several sorties in difficult conditions, for the evacuation of local personnel, in coordination with local authorities and the UN Mission. The Helo also undertook the evacuation of three pregnant ladies and airdropped relief material including 500 kg provided by the World Food Programme (WFP). The Chetak flew damage assessment/aerial reconnaissance sorties with General Secretary International Red Cross Society and Portuguese Marines onboard.



Indian Navy: First Responder in Mozambique

Indian Naval Ship *Shardul* transferred 10 tonnes of fresh water to a water bowser on a jetty using submersible pumps. About 2 tonnes of drinking water was also provided by INS *Sujata* in jerry cans to the port authorities for relief camps. The ships also set up community kitchens that they kept open 24x7 for all local populace, including workers at the port. A total of about 450 people were provided hot meals from the rations carried onboard the ships meant for the crew. The *IN* ships were committed to assisting the local populace till the return of normalcy.

The *IN* ships were the first to arrive at Beira and were the only naval units on-site providing relief and communications.



INS *Trikand* Escorting UNWFP Chartered Vessel

UN World Food Programme (UNWFP) Escort Missions (2018–20): Indian Navy ships provided security to the merchantmen carrying WFP supplies to the affected countries. In December 2018, INS *Sukanya* escorted the *Al-Dahab* from Bossaso to Berbera. Similarly, in December 2019, INS *Trikand* escorted MV *Annika N* carrying food cargo from Berbera to Mombasa. Assistance of US \$8 million was also extended by the Government of India to drought-impacted countries in the Horn of Africa, Somalia, Kenya and Djibouti.

At the height of the COVID-19 pandemic, INS *Airavat* escorted UNWFP-chartered vessel MV *Juist*, which carried 3030 tonnes of humanitarian aid from Berbera to Mogadishu in Southern Somalia in June 2020. The Mission covered a distance of over 1,600 nm, through piracy-risk areas and extreme sea conditions. Incidentally, the UNWFP was also awarded Nobel Peace Prize 2020 in October 2020.

Operation Vanilla (2020): On 26 January, INS *Airavat*, which was deployed in South Western IOR, was diverted to Antsiranana, Madagascar to provide succour and relief assistance to the affected population in the aftermath of Cyclone Diane. The relief material—comprising disaster-relief stores, clothing, food, and medicines—was handed over to the Government of Madagascar on 1 February 2020.

Mission Sagar (2020–22): Mission Sagar was India's initiative to assist countries in the Indian Ocean Littoral states during the COVID-19 pandemic. Under Mission Sagar, the Indian Navy deployed INS *Airavat*, INS *Kiltan*, INS *Jalashwa*, and INS *Kesari* to fifteen FFCs. These deployments spanned over 215 days at sea and delivered cumulative assistance of more than 3,000 MT of food aid, over 300 MT of Liquid Medical Oxygen, 900 Oxygen Concentrators

and 20 ISO containers. Whilst undertaking these missions, *IN* Ships traversed a cumulative

distance of close to 40,000 nm. The details are tabulated below.

Ship	Month	Countries	Remarks
<i>Kesari</i>	May 2020	The Maldives, Mauritius, Madagascar, Comoros and the Seychelles	Medical teams, medicines and 580 tons of food aid
<i>Airavat</i>	October 2020	Djibouti, Eritrea, Sudan and South Sudan	270 tons of food aid
<i>Kiltan</i>	December 2020	Vietnam and Cambodia	HADR aid, amounting to 15 tons each
<i>Jalashwa</i>	March 2021	Comoros and Madagascar	1000 tons of rice each
<i>Airavat</i>	August 2021	Indonesia, Thailand and Vietnam	Indonesia – 100 MT Liquid Medical Oxygen (LMO), 300 Oxygen concentrator Thailand – 300 Oxygen Cylinders Vietnam – 100 MT LMO, 5 ISO containers & 300 Oxygen concentrators.
<i>Shakti</i>	August 2021	Sri Lanka	100 MT LMO & 0 ISO containers
<i>Savitri</i>	September 2021	Bangladesh	2 Mobile Oxygen Plants
<i>Kesari</i>	December 2021	Mozambique	500 tons of Food Aid
<i>Gharial</i>	April 2022	Sri Lanka	760 kg of 107 types of critical lifesaving medicines



INS Kesari: On Mission Sagar at Port Victoria, the Seychelles

⚓ Search and Rescue

The Indian CG is the National Maritime Search and Rescue Coordinating Authority for SAR missions in the Indian Search and Rescue Region (ISRR). It has established Maritime Search and Rescue Coordination Centres (MRCCs) in Mumbai, Chennai and Port Blair, and the Indian Maritime Search and Rescue computerized ship reporting system called INDSAR, for ships transiting through the ISRR. M-SAR efforts are supported by the *IN* and the IAF, in addition to all other maritime agencies in the ISRR.

Domestic Assistance

Assistance to ONGC Rig *Sagar Uday* (2013): In July 2013 an emergency gas leak was reported on ONGC platform *Sagar Uday* located 90 nm west of Mumbai. Two Support Vessels *SCI Yamuna* and *Samudra Prabha* were deployed to spray water to prevent fire, and *INS Teg* was deployed along with two Sea Kings from Naval Air Station *Shikra*, to undertake evacuation of personnel at short notice.

Operation Lighthouse—MH-370 SAR (2014): On 8 March 2014, Malaysian Airlines flight MH-370 went missing over the Gulf of Thailand in the South China Sea. The Malaysian authorities requested for a search in the Bay of Bengal, in an area of approximately 2600 sq nm and about 500 nm due west of Port Blair. The *IN* was nominated as the lead service for the coordination of the Operation. The joint Indian effort included *IN*, IAF, and CG assets and was coordinated from the *IN*'s Maritime Operations Centre at New Delhi. Additionally, a Joint Operations Room was activated at Port Blair to monitor the progress of the search operations. The Commander-in-Chief Andaman and Nicobar Command was nominated as the Overall Force Commander of the Indian Forces. The *IN* joined the massive SAR effort and deployed Indian Navy Ships *Satpura*, *Sahyadri*,

Saryu, *Kumbhir*, *Kesari*, *Bangaram*, and *Battimalo* in the Bay of Bengal, Andaman Sea and west of the Andaman Islands. Additionally, one P-8I, one IAF C-130J, and *IN* and CG Dornier aircraft were deployed for SAR ops.



Indian Navy: Joining a Multinational Effort

Indian Navy Dornier (CG 240) (2015): At about 2200 hrs on 24 March 2015, an *IN* Dornier on a routine surveillance mission ditched at sea in a position approximately 25 nm southwest of Goa. The crew comprised Commander Nikhil Joshi, Lieutenant Kiran Shekhawat and Lieutenant Abhinav Nagori. At about 2335 hrs Commander Nikhil Joshi was recovered by a fishing trawler with severe injuries.

Eight Indian Navy Ships—*Mumbai*, *Jamuna*, *Subhadra*, *Kondul*, *Karuva*, *Betwa*, *Makar* (with Side Scan Sonar) and *Matanga*—along with ICGS *Amal*, a P-8I, Dornier, and Chetak aircraft, and ALH Kamov, and Sea King C helicopters were deployed for SAR. On 26 March 2015, based on an underwater contact detected by *INS Makar*, diving operations were undertaken and the aircraft positively identified. Subsequent diving operations resulted in recovery of mortal remains of the missing aircrew, viz., Lieutenant Kiran Shekhawat and Lieutenant Abhinav Nagori.

Operation Talash for Missing Coast Guard Dornier (CG 791) (2015): At about 2100 hrs on 8 June 2015, a CG Dornier on a routine Operation Tasha sortie ditched at sea approximately 110 nm

south of Chennai. The aircrew comprised Deputy Commandant Vaidya Sagar, Deputy Commandant Subhash Suresh and Deputy Commandant MK Soni.

Surface search in excess of 690 hours, and 196 hours of air search for the missing CG DO-791 were undertaken by various air and surface units. Indian Navy Ships *Khukri*, *Kulish*, *Chetlat*, *Savitri*, *Car Nicobar*, *Cora Divh*, *Sandhayak* and Submarine *Sindhudhvaj* were actively involved in the SAR operations, in addition to *IN* aircraft and ICG ships and aircraft.

The search was augmented by deployment of *Sagar Nidhi* (NIOT vessel) and MSV *Olympic Canyon* (M/s Reliance). Based on inputs from *INS Sindhudhvaj*, debris of the aircraft, Flight Data Recorder (FDR), Cockpit Voice Recorder (CVR) and few human remains were recovered by MSV *Olympic Canyon* on 11 July. Operation Talash for search for the missing Coast Guard Dornier was terminated on 14 July 2015.

Assistance to MV Jindal Kamakshi (2015): At about 2300 hrs on 21 June 2015, MRCC Mumbai reported receipt of a distress message from MV *Jindal Kamakshi*, anchored approximately 40 nm northwest of Mumbai. The ship reported heavy list (approximately 20 degrees), due to ingress of water.

On receipt of the information, a Sea King helicopter ex *Shikra*, was launched for visual assessment, and *INS Mumbai* was sailed for SAR assistance to the ship. On 22 June 2015, a total of nineteen crew members were winched up from the vessel and safely evacuated to Mumbai by the *IN* Sea King helicopter.

SAR of Pawan Hans Helicopter Off Mumbai (2015): Following the crash of a Pawan Hans helicopter on 4 November 2015, *INS Mumbai* (with Sea King helicopter embarked), ISVs T48 and T50, and a Sea King helicopter from *Shikra* were immediately deployed to provide assistance in

locating the crashed helicopter. Subsequently, on 6 November, two specialized ships, viz., hydrography ship *INS Makar* and minesweeper *INS Karwar* were deployed for side-scan sonar operations. Based on positions reported by *Makar* and *Karwar*, diving operations were undertaken by vessels deployed by ONGC.

Diving in vicinity of the position reported by *Makar* led to recovery of debris of the helicopter, the Black Box and mortal remains of one of the pilots, Col TK Guha (Retd). On 13 November, the *IN* made a further attempt to locate the second pilot and other parts of the wreckage. Indian Naval Ship *Trikand* (with a Chetak helicopter embarked), two ISVs, and one *IN* Dornier aircraft were deployed for the task, however the second pilot could not be traced.

AN-32 Crash (2016): On 22 July 2016, an AN-32 aircraft belonging to the IAF's 33 Squadron undertook a scheduled courier sortie from Tambaram (Chennai) to Port Blair. The aircraft departed Tambaram at 0830 hrs with six crew and twenty-three passengers on board and was scheduled to arrive at Port Blair at 1145 hrs. When the aircraft failed to contact the Port Blair Air Traffic Control, an overdue action was initiated. The last radar contact recorded by Chennai Air Traffic Radar was 151 nm east of Chennai. The aircraft was reportedly flying at 23,000 feet (ft).



IAF AN 32 Search Air Coordination from *INS Rajali*

A massive search Operation was conducted, braving the monsoon weather conditions and poor visibility. The IAF, *IN* and CG pooled in resources to look for any sign of the aircraft in the vast swath of the Bay of Bengal between Chennai and Port Blair. However, no aircraft debris was sighted, highlighting the predicaments of losing assets at sea.

Of the twenty-nine souls on board, six were crew members, eleven were IAF personnel, two were from the Indian Army, one from the CG, eight were civilians working with the *IN*, and one was an *IN* sailor.

Evacuation of Tourists from Havelock and Neil Islands (2016): Starting 5 December 2016, heavy rains developing into a flood-like situation, led to more than 2,000 people being stranded for over three days on these islands with no mobile or internet connectivity. A coordinated multi-agency effort that included the *IN*, IAF, CG and local administration was undertaken for evacuation of 2,321 tourists from Havelock and Neil Islands (of the Andaman and Nicobar Islands chain). Indian Navy Ships *Kumbhir*, *Bitra*, *Bangaram*, LCU 38 and LCU 37 were deployed to undertake the evacuation operations. Evacuation of all trapped tourists was completed by 10 December 2016.

SAR Operations for *Kavya Darshini* (2017): A motorized dinghy *Kavya Darshini* with two crew members on board, carrying food material was reported missing while transiting from Port Blair to



Evacuation of Tourists

Neil Island on 13 July 2017. An *IN* helicopter along with CG assets undertook SAR operations for the missing dinghy on 14–16 July 2017. One crew member was rescued but the other crew member could not be located.

SAR for Missing Pawan Hans Helo (2017): Based on information of a Pawan Hans helicopter going missing on 13 January 2018, the *IN* launched SAR operations in coordination with the CG and ONGC. Five *IN* Ships (*Makar*, *Tarasa*, *Teg*, ISV T11 and ISV T45), one Dornier aircraft, one P-8I aircraft and two Sea King helicopters were deployed for the SAR operations. Indian Naval Ship *Makar*, undertook search using her side-scan sonar (SSS) and helped in location of sunken wreckage and also recovered the mortal remains of two missing personnel. On recovery of all seven bodies, SAR operations were terminated on 18 January 2018.

SAR Post Cyclone Ockhi (2017): In December 2017, the *IN* launched an SAR operation in the Southeast Arabian Sea and Lakshadweep and Minicoy islands in the aftermath of Very Severe Cyclonic Storm ‘Ockhi’. The ships deployed by the *IN* included INS *Sagardhwani*, INS *Jamuna*, INS *Nireekshak*, INS *Kabra* and INS *Kalpeni* off the Kerala coast, and INS *Sharda* and INS *Shardul* towards Lakshadweep islands. Besides this, three aircraft, viz., Dornier fixed-wing aircraft, Sea King helicopter and the ALH were also deployed. A total of eighty-four personnel were rescued over the two days—sixty-two by aircraft and twenty-two by ship.



Indian Navy Relief Camp



Indian Navy HADR/NEO/SAR Operations 2011–2021



Assistance to FV *Miriam* (2018): A fishing vessel *Miriam* reported to be stranded approximately 100 nm off the coast of Ratnagiri on 4 February 2018 and had run out of fuel. An *IN* Dornier located the vessel and subsequently *INS Chennai* provided fuel along with fresh water, food and other provisions to the vessel.

Medical Evacuation (MEDEVAC) from MV *Nu Shi Nalaini* (2018): On 13 June 2018, *INS Kalpeni* and an ALH undertook MEDEVAC of one crew member of *MV Nu S Nalaini*, off Kochi had suffered severe burn injuries due to fire on board.

Assistance to ONGC (2018): On 20 July 2018, ONGC HQ reported an incident of gas leak on board an oil rig approximately 82 nm off Mumbai. Accordingly, on 22 July 2018, Sea King C helicopter *ex-Shikra* successfully winched down an ONGC Repair Team in inclement weather.

Rescue Operations for Stranded Miners in Meghalaya (2018–19): A mining accident in Meghalaya on 13 December 2018 occurred due to drilling into an adjacent mine filled with water. Ten miners were trapped in the mine at Ksan due to the resultant flooding. An *IN* team comprising nineteen divers and two technical staff from the Naval Dockyard, Visakhapatnam assisted in the rescue effort that began on 28 December 2018. Under Water Remotely Operated Vehicles (UWROVs) from the *IN* were operated continuously for systematically searching and sanitizing the mines/rat holes from 30 December 2018.

On 24 January 2019, the body of one of the missing miners was recovered by the *IN* and was handed over to police in the presence of District Collector. On 26 January, a second dead body was located by an ROV at 260 feet inside a rat hole. Efforts to recover the body were adversely affected due to the high turbidity of water and underwater objects such as polythene bags, loose ropes etc.

Assistance to Friendly Foreign Countries

SAR Operations at the Maldives (2017): The *IN* was intimated by the India Defence Attache' at Male about an SAR request from the Government of the Maldives on 19 May 2017, regarding a civilian Landing Craft *Maria 3* with six crew (including a lady) missing.

An *IN* ALH deployed at the Maldives, was launched and *INS Kirch*, deployed for EEZ surveillance off the Maldives, was diverted to the search area. Subsequently, on 20 May 2017 an *IN* Dornier aircraft was deployed to augment the SAR operations.

The Dornier detected the *Maria 3* and directed *Kirch* to the Landing Craft. Despite inclement weather and rough seas, *Kirch* rescued all the crew members of *Maria 3* and safely handed them over to the Government of the Maldives.



Uniting Families and Countries

SAR Operations for Missing Crew of Mexican ship *Cuauhtemoc* (2017): On 11 June 2017, a lady Cadet fell overboard from the Mexican Sail Training Ship *Cuauhtemoc*, 560 nm west of Goa. Four P-8I aircraft sorties were undertaken on 11–13 June for SAR and *INS Teg* and *Mysore* (with one Chetak and one Sea King 428) were also deployed to undertake SAR operations.

Unfortunately, the body of the lady Cadet was not sighted and the search was called off by the Mexican

authorities on 16 June 2017. The Mexican Embassy conveyed its deep gratitude for the prompt and significant search effort mounted by the Indian Navy.

SAR Operations at Port Moresby (2017): As part of the Eastern Fleet Overseas Deployment (OSD), INS *Sahyadri* entered Port Moresby, Papua New Guinea (PNG) on 12 June 2017. The Embassy of India, PNG, requested the ship to undertake SAR operations to locate a PNG fishing vessel with four crew on board, suspected to have sunk approximately 7 nm from the coast off Port Moresby.

A Chetak helicopter (ex *Sahyadri*) was launched and the capsized fishing vessel detected. The ship informed the exact position of the vessel to the PNG authorities. Whereas one crew member swam ashore earlier, the other three remaining crew members were not sighted.

Assistance to MV *Wakashio* (2020): The *IN* reached out to provide assistance to mitigate a marine disaster in Mauritius. The Japanese freighter *MV Wakashio* ran aground on the coral reefs off Mauritius on 25 July 2020. It remained stuck and started breaking apart on 6 August (thirteen days later), releasing 1000 tons of its estimated 4000 tons of heavy bunker fuel into the pristine waters of the Indian Ocean.

The *IN* provided assistance by sending INS *Nireekshak*, a specialized Diving Support Vessel, which provided diving assistance, seaward security and medical cover.

Assistance to MT *Diamond* (2020): In early September 2020, Panama-flagged crude-oil tanker *New Diamond* was incapacitated and drifting off the east coast of Sri Lanka, posing a grave threat to the environment and maritime ecosystem of the region. On request of the Sri Lanka Navy the *IN* initiated a multisectoral response, led by INS *Sahyadri*, to rescue the stranded crew and coordinate firefighting and salvage efforts.

🚢 Conclusion

The NEO, HADR and SAR are tasks included in the 'Benign' role as one of the stated roles of the Indian Navy. The role is so named since violence has no part to play in its execution, though operating in hostile zones for NEOs does. Naval assets, because of their rapid mobilization capability, are very utilitarian in their usefulness in the early stages of a crisis for provision of relief material, first aid and succour. Much of the capacity to perform these functions derives from the mobility, reach, reliable communications and endurance inherent in Naval ships, coupled with their lift capability. While civilian organizations can take over control at a later stage, it is the maritime forces that provide the first helping hand. Populations living along either Indian or foreign coasts are most vulnerable to natural disasters owing to extreme weather phenomena and environmental changes. As stated in the IMSS 2015, the *IN* will maintain credible HADR capability and also promote capability development and coordination between regional navies. The *IN* has been the preferred instrument of the state for delivering relief and services via sea during the hour of need. This also helps to project the nation's soft power, in improving relationships and the regional maritime environment.

Notes

- 1 Indian Maritime Doctrine, INBR 8 (2009), Indian Navy.
- 2 IHQ MoD (Navy) (2007) Freedom to Use the Seas: India's Maritime Military Strategy. New Delhi: IHQ MoD (Navy), Government of India.
- 3 Non-combatant Evacuation Operations (NEO). NEO are operations undertaken, on directions from the Government of India, for the evacuation of non-combatant Indian citizens from foreign nations, when their lives are endangered by conflict, civil unrest or natural disaster, to designated safe havens. The NEO are undertaken by the Armed Forces and other state agencies, essentially maritime and aviation, operating in close coordination with the Ministry of External Affairs (MEA). In case of a large-scale NEO, or where safety and security of the embarkation point is not available, and force may have to be used to protect the civilians, the Indian Army may also be involved.

- 4 Countrywise listing (n.d.) of the number of NRIs and PIOs across 210 countries. http://mea.gov.in/images/attach/NRIs-and-PIOs_1.pdf
- 5 Indian Navy banner 'Har Kaam Desh ke Naam'. <https://indiannavy.nic.in/content/indian-navy-0>
- 6 Mod/PIB press release (8 November 2021): Goa Maritime Conclave – 2021. <https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1770089>
- 7 A 'brick' is a portable container that carries all the requi-

site material needed for its specific role. For example, an HADR brick will have all the utilities that may be needed by a unit operating in the disaster area; similarly, a medical brick or a community-kitchen brick will be completely equipped to carry out its role. All bricks are used for HADR purposes.

- 8 Operation Neer: Indian assistance to Maldives during Males Water Crisis, High Commission of India Male, Maldives, Press Release available at <https://hci.gov.in/male/?3840?003>



10 | Diving

⚓ Introduction

As with any professional Navy, the Indian Navy (*IN*) carries out four distinct roles, viz., Military, Diplomatic, Constabulary and Benign. While *IN* divers have contributed immensely to all of these roles over the years, they have made the strongest impact in the Benign role.

At the beginning of the 1960s, the *IN* recognized the need for Clearance Diving Teams. Accordingly, between 1964 and 1966, Government sanction was accorded for setting up a Clearance Diving Cadre comprising five officers and forty-four sailors. The major roles of the Clearance Diving Team include underwater search and clearance of mines/bombs/improvised explosive devices (IEDs) from warships, dock installations and harbour areas during hostilities; conducting clandestine operations against soft hostile targets; providing diving assistance for submarine rescue operations, and to civil authorities for Search and Rescue (SAR) operations including during natural calamities and disasters.



Indian Navy Divers in Action

Thereafter, approval was accorded for the formation of two Clearance Diving Teams, one each at Bombay and Visakhapatnam. The fifth Defence Plan of 1966–71, accorded the provision for the acquisition of ocean-going platforms for diving, the first being *INS Gaj*. These platforms were equipped with an eight-man Recompression Chamber (RCC) and a portable one-man RCC (an essential capability required for conducting deep-sea diving).

In 1971, the deep-diving capabilities of the *IN* were further enhanced with the induction of the Submarine Rescue Vessel (SRV) *Nistar*. Further, the diving cadre was also reorganized into categories for both officers and sailors, namely Clearance Diving, Saturation Diving and Ships Divers.

⚓ Naval Divers

Indian Naval divers undertake a multitude of tasks such as underwater inspection of a ship's hull, underwater cutting and welding, recovery of sunken objects, mine clearance, disposal of bombs, Explosive Ordnance Disposal (EOD), clandestine attacks, etc.

Ever since their inception, the divers have been regularly used for assistance to civil authorities. It was primarily for retrieval of mortal remains of victims of drowning, and gradually as a part of diving capability in National and State Disaster Response agencies, enabling them to be the first responders during heavy rains, floods, riverine and coastal accidents. Over the years, the divers have



An Indian Navy Diver Training for Underwater Repairs

undertaken various types of operations, including Non-combatant Evacuation Operations (NEO), and Humanitarian Assistance and Disaster Relief (HADR), consisting of flood relief, SAR operations, and retrieval of victims of drowning. Some of the activities undertaken by *IN* Divers in the past decade are listed below.

Salvage Operation of INS *Vindhyagiri* (2011):

In January 2011, INS *Vindhyagiri* capsized when berthed alongside ND after a collision with a Cyprus flag merchant ship, MV *Nordlake*, near Sunk Rock lighthouse off Mumbai harbour. A Marine Commandos (MARCOS) team from INS *Abhimanyu* undertook intense diving during the salvage of ex-INS *Vindhyagiri*. The salvage operation was conducted from 4 February to 10 April 2011. During the operation, the MARCOS team undertook various tasks related to marking various compartments, clearing the passages, positioning salvage bags and entry into numerous compartments in nil visibility conditions.

Recovery of Cannons by the MARCOS (2011):

From 2 to 6 March 2011, a MARCOS team undertook an operation to salvage three British-era cannons from Cross Island. One of the salvaged cannons is now placed at the entrance of the new Western Naval Command, Headquarters building,

while another is ornamentally placed at the entrance of the Naval Officers Residential Area (NOFRA) Mumbai.

HADR and SAR During Cyclones and Floods:

The diving teams were also deployed in rescue operations in all the major cyclones and incidents of heavy rainfall in the past decade:

■ **Cyclone Nilofar (2015):** This cyclone hit Gujarat in September, and a team from the Command Clearance Diving Team (CCDT) was deployed immediately to rescue people from the flood-hit areas.

■ **Sri Lanka Flood Relief (2017):** INS *Jalashwa* and INS *Kirch* from Visakhapatnam, and INS *Shardul* from Kochi were tasked to embark medical disaster bricks and HADR stores,¹ and to deploy medical and diving teams to flood-affected areas of the southern and southwestern region of Sri Lanka.

■ **SAR at Curchorem Bridge over Zuari River in Goa (2017):**

On 18 May, part of the Curchorem Bridge over Zuari River, collapsed into the water, taking with it around thirty civilians. The civilian authorities requested the *IN*'s assistance in searching for missing persons. Subsequently, Naval Teams were deployed with rescue equipment and commenced diving operations. Divers from 321 Flight of INS *Hansa* were deployed to carry out rescue operations.

■ **Operation Madad (2018):**

In August, severe floods affected Kerala as a result of unusually high rainfall during the monsoon season. As a response to this disaster, the *IN* launched Operation Madad, which included the deployment of divers on a vast scale. The Operation was undertaken on 9–22 August 2018. Diving teams were deployed in the districts of Ernakulam, Alappuzha, Pattanamtitta, and Kannur.

- **Search Operation in Imphal River (2019):** On the request of the Government of Manipur, a team of twelve Naval divers and two hydrographers were deputed to Imphal. The team joined an ongoing search operation along with a National Disaster Response Force (NDRF) team and the civil authorities, for three missing personnel after their boat capsized during a storm in the reservoir of Mapithel Dam in Kamjong District of Manipur on 28 April 2019.



IN Divers Assisting Search Operations in Imphal River

- **Assistance by INS *Nireekshak* (2020):** In August/September 2020, the *IN's* only Diving Support Vessel, INS *Nireekshak* was deployed to Port Louis, Mauritius, in order to provide assistance for the grounded merchant vessel MV *Wakashio*. The diving team further undertook a wreck investigation of Tug *Sir Gaeten* on 4–5 September 2020 off Mauritius. In December 2019, INS *Nireekshak* had been deployed for mix-gas diving training of Sri Lankan Navy Divers and wreck diving on HMS *Hermes*, the first aircraft carrier of the world, sunk by the Japanese in The Second World War off Trincomalee in Sri Lanka. In February 2020, the ship had also undertaken a protracted salvage operation of a Mig-29K aircraft, which had crashed off Karwar, from a depth of 62 metres.

Operation Starship—Salvage of Sea King Aircraft

While going through the archives of various accidents, the authors chanced to see this particular account of a salvage operation of an entire Sea King helicopter which had ditched into the sea. Though the incident predates the period under cover by the book, we had not come across any reference of this unique operation in which for the first time an entire Sea King was lifted off the bottom of the sea. The incident took place in April 2003. The authors connected with the then Commanding Officer of INS *Nireekshak*, a Submarine Rescue Vessel and Diving Support ship, Cdr (now Vice Admiral) SN Ghormade and he recounted the following.

I had to take over Command of the ship in rather unique circumstances with no pomp and ceremony since the predecessor had to relinquish his Command in a hurry. The ship had already been tasked to undertake the salvage of a Sea King helicopter that had crashed into the sea off Goa. So immediately, on taking over Command, we sailed out to accomplish the directive. I had no prior experience nor did the divers on the ship to salvage a full Sea King helicopter from the sea bed and above that, at the time we sailed out, the position of the crashed aircraft itself was not known other than an approximate datum established by INS *Viraat*.

The immediate task was to reassure the crew that irrespective of the challenges that we faced in the task, the mission had to be accomplished and that we would leave no stone unturned in retrieving the ditched aircraft. Some of the challenges I immediately faced was that the ship had been at sea for some prolonged period and the men needed a break with their families. I addressed that first by ordering that we would sail with exactly the number of personnel required for the mission and the rest could get the first round break at the base station. The next challenge was the equipment of the ship crucial for the mission, which was performing sub-optimally—efforts were made at Mumbai dockyard and the OEM. The most important equipment, the Dynamic Positioning System, was rectified by the crew enroute to the site of the incident. The final and biggest challenge was an action plan of lifting

the debris from the sea bed after we located the aircraft. I personally visited various establishments, with my Diving Officer, basing active Sea King aircraft and studying the structure to work out the lifting arrangements. The divers and I needed to have a visualized plan to undertake the task since no prior documentation or experience was available. All this was done in time-critical circumstances.

We then set sail on 4 April and reached the marked location of the crash on 5 April 2003. The ship had, in an earlier attempt, located the broken tail section of the aircraft on 29 Mar 2003, but the fuselage was still unlocated. The sea conditions were not conducive—bad sea state, depth in area was about 70 metres, visibility was near negligible so search had to be done mostly by touch and feel of the sea bed mostly. The first day, even though we carried out about 9.5 hours of saturated diving and covered an area of about 3900 square metres, we did not find the aircraft body. On 6 April, during the initial diving, we were able to locate a few pieces of the aircraft spread on the sea bottom. But no fuselage. There were additional issues like poisonous sea snakes in the vicinity and the underwater camera cable getting damaged, but nothing deterred the spirit of the divers and they continued diving for 11.5 hours that day. Based on a hunch and instinct after applying the sea characteristics and the search so far, I ordered a search pattern a little away from the tail in a direction that normally wouldn't have been in the calculation. My hunch paid off and the fuselage was located, in early evening, 110 metres away from the tail section. We were euphoric on the ship. The entire team was raring to get the aircraft up.

Based on our study of active aircraft at Mumbai, lots of underwater video coverage of the sunken aircraft and detailed discussions, we commenced the salvage of the aircraft on 7 April. The challenges we faced were innumerable and we improvised and innovated on the fly. To cut it short, after almost nine hours of underwater salvage operations, we managed to lift the fuselage from the bottom and got it onboard. The ship successfully achieved the first full-fledged salvage operation of Indian Navy (*IN*), recovering

up to 99 per cent of the aircraft from a depth of 70 meters. This was a major achievement for the *IN* as the salvage capability was proved beyond doubt.



Lifting the Bird from the Seabed

■ Flood-Relief Operations in Gujarat (2021):

Based on a request for assistance from the civil administration, a Naval HADR team, comprising Naval divers with support gear was dispatched at short notice from *INS Sardar Patel* to Rajkot on 13 September 2021.

The diving assistance detailed above is only indicative of the sort of aid provided to civil authorities, in addition to tasking by the Service. Most of the relief measures provided during HADR, as detailed in the HADR chapter, would have a component of divers in the actions taken in rendering assistance and succour to the affected populace. Divers, over the years, have specialized in SAR, both inland and at sea due to their rigorous training and expertise working in desperate conditions. This has led the diving teams at various Commands and Units to be placed on standby for immediate deployment as an SOP, even before a catastrophe has occurred.

Divers remain some of the hardest personnel of the *IN* and also one of its most decorated cadres. HADR remains one of the subsidiary roles of the Diving Cadre while their operational requirement



Ready to Dive

is tested on almost an everyday basis. The next step for the toughest ship's divers is to qualify of Clearance Diving and try to achieve the coveted status of a Marine Commando (MARCOS), which is by no means an easy task. The next chapter gives a gist of the functioning of the MARCOS in the past decade.

Note

- 1 A 'brick' is a portable container that carries all the requisite material needed for its specific role. For example, an HADR brick will have all the utilities that may be needed by a unit operating in the disaster area; similarly, a medical brick or a community-kitchen brick will be completely equipped to carry out its role. All bricks are used for HADR purposes.



11

MARCOS

Indian Navy Marine Commandos

⚓ Introduction

The Indian Navy (*IN*) Marine Commandos (MARCOS) are a part of the *IN* Special Operations Forces. The idea for the MARCOS was conceptualized, in 1987, as the Indian Marine Special Forces with the objective of defence of offshore assets in the Bombay High against clandestine attacks.¹ The exclusivity of MARCOS lies in their capability of operating in all three dimensions—sea, air and land.² Some MARCOS personnel are also attached to Army Special Forces units conducting counter-terrorism operations.



The Special Ones

The chapter provides a brief overview of developments within the MARCOS organization in the last decade and the evolution of their role and scope, keeping the current geopolitical trends and threats in mind.

⚓ Background

In April 1986, the *IN* started to plan for a Special Force which would be able to conduct amphibious reconnaissance, raids and terrorism operations in a maritime environment. The MARCOS were raised to fulfil the need for an elite force for special maritime operations. Specially trained and equipped for the conduct of special operations in a maritime environment, today the MARCOS are divided into two units, one each for the Eastern and Western coasts.

Initially raised as the Indian Marine Special Force (IMSF) in 1987 and co-located with INS *Abhimanyu*, Mumbai,³ the acronym was changed to Marine Commandos Force (MCF) in 1989, to give an element of individuality, before settling on the general term MARCOS.



Eye on Target

The MARCOS are tasked to conduct combined assault operations including both airborne and amphibious forces. Just a few months after the unit's formation, the MARCOS were called into action in Sri Lanka against the Liberation Tigers of Tamil Eelam (LTTE). They saw action in Operation Pawan in Sri Lanka and Operation Cactus in the Maldives in 1987–88. The unit proved its mettle during these operations and, to date, is the recipient of the highest number of gallantry awards in the Navy.

⚓ Infrastructure and Training Development

The past decade witnessed infrastructural shifts, upgradations and development of new training courses for the MARCOS. The Naval Special Warfare Technical Training Centre (NSWTTC) was set up on 1 June 2002 and was co-located with INS *Abhimanyu* at Naval Station Karanja. However, the unit was relocated to INS *Mandovi*, Goa on 1 April 2011, where several training projects could be initiated, such as the construction of Close Quarter Battle Complex, Battle Obstacle course, Rappelling and Slithering tower, Explosive store, Armoury and sports facilities to meet the training and administrative support requirement through works infrastructure buildup. The NSWTTC has been providing yeoman service as an ab-initio and vertical training centre for the MARCOS to date.

In July 2016, the MARCOS (East) was commissioned as INS *Karna*, becoming the first independent MARCOS base. Admiral Sunil Lanba, then Chief of the Naval Staff, commissioned the Marine Commandos Unit INS *Karna* in a solemn ceremony held at the Naval Base at Bheemunipatnam, Visakhapatnam.

In the past decade, the MARCOS have been participating in Tri-Services Special Forces training camps. During the camp, strategic and operational synergy and interoperability was practised among the Services Special Forces elements.^{4,5}



INS *Karna* Commissioning Ceremony

Functions/Role: Personnel from the unit are deployed round-the-clock from Kashmir in counter- insurgency/counter—terrorism (CI/CT) operations to the Gulf of Aden & Off-Somalia for anti-piracy operations. The role and scope of the MARCOS have widened in the past years due to their unique skill sets:

- **Counter-Terrorism Deployment at Jammu and Kashmir:** Since 1995, the MARCOS have been deployed for CT operations at Wular Lake (North Kashmir) Jammu and Kashmir. They are tasked to check the infiltration of terrorists from Pakistan through water ways in Srinagar.



MARCOS: An All-Domain Fighting Force

- **Anti-Piracy Operations:** The MARCOS have been at the forefront of the *IN's* Anti-Piracy Operations since September 2008. Under the aegis of the sustained *IN* efforts, the MARCOS have thwarted numerous piracy attempts that have resulted in apprehending pirates and arms recovery in the period 2011–21.

- **Salvage Operations:** The MARCOS also participate in the salvage operations of submerged ships. During operations, they are tasked with marking various compartments, clearing passages, positioning salvage bags, and gaining entry into numerous compartments even in nil visibility conditions.
- **Non-Combatant Evacuation Operations (NEO):** NEO's are often conducted in extremely demanding conditions with volatile and aggressive armed men or militia in close proximity, juxtaposed with continuous shelling/ bombardments of the cities and ports. During these conditions for NEOs, the MARCOS provide the first line of defence, critical for the success of the operations.
- An Indian Diving and Marine Commando team has been posted in Mauritius since 2008 for raising the NCG Commando Unit, and training commandos and divers of the Mauritius Police Force.⁶

Other Milestones: In the memory of a brave heart, Chandra Shekhar, a MARCO fallen in the line of duty to terrorist bullets and to promote solidarity



Air Insertion of MARCOS

and respect for soldiers, the MARCOS constructed a memorial gate and installed a statue atop 'Shaheed Chandrashekhar Dwar' built in his memory on 20 August 2017, in the presence of unit representatives at Alipur Aterna village, Muzaffarnagar, UP. He was leading a MARCOS team deployed in North Kashmir. He sustained fatal injuries from a terrorist's firing whilst he was rescuing his team mate who had received fatal gunshot wounds. Chandra Shekhar was awarded the Shaurya Chakra (Posthumous) for his gallant action and selfless courage.

The past decades saw the MARCOS performing various roles in the Indian security context. Details are tabulated below.

List of Operations/Activities conducted by IN MARCOS

Date	Category of Action	Detail
July 2011	Anti-Piracy	A piracy attempt on a Greek ship MV <i>Elinakos</i> in the Gulf of Aden was successfully foiled by INS <i>Godavari</i> by the MARCOS, who were launched to board the pirate boat.
12 August 2011	Anti-Piracy	The <i>IN</i> foiled a piracy attack after it rescued merchant vessel MV <i>Nafis-1</i> , approximately 170 nautical miles west of Mumbai.
June 2013	HADR and SAR	Uttarakhand Relief Operations: In June 2013, consequent to the floods in Uttarakhand, the MARCOS and naval divers were deployed for diving assistance and SAR. Two teams were positioned at Haridwar and Rudraprayag, respectively. The teams were deployed along with National Disaster Relief Force (NDRF)/local authorities for SAR operations. ⁷
12 August 2013	Anti-Piracy	The <i>IN</i> foiled a piracy attack after it rescued merchant vessel MV <i>Nafis-1</i> , drifting approximately 170 nautical miles west of Mumbai.
September 2014	HADR and SAR	The MARCOS deployed in J&K and an additional team from Indian Naval Diving Team, Delhi was positioned for SAR and HADR operations in Kashmir under Operation Megh Rahat. ⁸

Date	Category of Action	Detail
March 2015	HADR	Diving Assistance in J&K: The MARCOS frequently participated in waterborne activities being organized by the Army under the aegis of 'Op Sadbhavana' aimed at Winning the Hearts and Minds of the local population. Four major diving operations, apart from numerous small-scale operations, were carried out by MARCOS in 2015. ⁹
30 March–16 April 2015	NEO: Op Rahat	The MARCOS embarked in <i>IN Ships Tarkash</i> and <i>Mumbai</i> to evacuate Indian citizens from Yemen, The team was instrumental in evacuation of approximately 1,500 Indian and foreign nationals from the Port of Aden and Al-Hudeidah, under hostile conditions. The Operation was the largest evacuation in foreign waters conducted by the <i>IN</i> till then.
April 2017	HADR and SAR	Flood Relief at J&K: 2 teams of the MARCOS were deployed for flood relief-cum-rescue operation in Behrampora and Ningli, respectively, in April 2017. The team was able to rescue 25 women and children stranded in flooded houses and provide relief with respect to ration and supplies in conjunction with 22 Rashtriya Rifles (RR). ¹⁰
May 2017	Anti-Piracy	INS <i>Sharda</i> , deployed for anti-piracy operations in the Gulf of Aden, came to the rescue of Liberian merchant vessel <i>Lord Mountbatten</i> facing a pirate attack. The MARCOS, with support from the helicopter onboard the ship, carried out a 'board and search' operation on 2 dhows and 5 skiffs found suspicious. ¹¹
October 2017	Anti-Piracy	Whilst escorting Indian-flagged vessel MV <i>Jag Amar</i> (with 26 Indian crew onboard) in the Gulf of Aden on 6 October 2017, INS <i>Trishul</i> detected a pirate boat carrying out manoeuvres in the vicinity of the merchant vessel. The MARCOS boarded the pirate vessel and confiscated all piracy triggers. ¹²
December 2020	Deployment	Amid the ongoing stand-off between India and China, the MARCOS have been deployed in the Pangong Tso lake area in eastern Ladakh. ¹³

Notes

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12 | Accidents and Incidents

⚓ Introduction

The adoption of safe working practices is essential for any organization. This is particularly relevant in the Navy, where men and women operate in potentially hazardous and demanding environments in all three domains of operation—sea, sub-sea and air. The Indian Navy (IN) is a capital-intensive force with cutting-edge platforms, manned and operated by skilled and trained professionals. Non-adherence to established safety protocols not only puts at risk the life of trained and highly skilled personnel, but may also impact the availability and capability of capital assets that have been created over decades despite the *IN* operating in a constrained fiscal envelope. Adherence to safety protocols is thus imperative. Established Standard Operating Procedures (SOPs) by themselves are not static in nature and, therefore, evolve in step with the evolving nature of technology, equipment, threat environment and many other factors.

The *IN*, by its inherent nature of operating in hazardous environments, had a safety culture ingrained across various verticals, such as training, operations at sea, and shore-support functions. However, instances of unforeseen accidents and incidents in the last decade, despite the then prevalent stringent safety structure, have occurred in all three domains—sea, sub-surface and air. While introspection and evolution of the *IN* safety culture have been an ongoing process, serious discussions

on the need for a thorough revamp of the safety architecture have been underway for at least the last two decades. The accidents—especially those early in the last decade that eventually led to the resignation of then Chief of Naval Staff, Admiral DK Joshi, on 26 February 2014, taking ‘moral responsibility’ for the spate of accidents—provided an institutional drive to accelerate reforms and the operationalization of a new *IN* safety architecture.

The collage features several news snippets:

- Business Standard:** Navy chief D.K. Joshi resigns. IANS | New Delhi. Last Updated at February 26, 2014 19:52 IST.
- The Indian EXPRESS:** Admiral DK Joshi was disturbed, requested me to accept resignation: AK Antony. "I consulted everybody. I met the PM also. Ultimately, we took a decision to accept the resignation." February 27, 2014 11:47:26 am.
- Press Information Bureau Government of India Ministry of Defence:** Chief of Naval Staff Admiral DK Joshi Resigns. Taking moral responsibility for the accidents and incidents which have taken place during the past few months, the Chief of Naval Staff Admiral DK Joshi today resigned from the post of CNS. The Government has accepted the resignation of Admiral Joshi with immediate effect. The Vice Chief of Naval Staff Vice Admiral RK Dhowan will be discharging the duties of officiating CNS, pending appointment of regular CNS. 26-February-2014 19:06 IST.
- THE TIMES OF INDIA:** Navy chief Admiral DK Joshi quits, retired officers express surprise. Feb 26, 2014, 22:41 IST.
- DECCAN Chronicle:** Ex-Admiral says Navy chief did the right thing. BY CHANDRASEKHAR VENKATACHANDRAN. PUNE: Feb 27, 2014, 1:28 am IST.
- THE HINDU:** I was firm on taking responsibility, says Admiral Joshi. NEW DELHI: FEBRUARY 27, 2014 12:20 IST.
- Hindustan Times:** Twitter salute for Indian Navy chief for quitting with dignity. India News. Updated on Feb 26, 2014 10:40 PM IST. Indian Navy chief admiral DK Joshi resigned on Wednesday, taking moral responsibility for a series of recent accidents. As news of this made headlines, Twitter was abuzz with people commending his decision to quit.

CNS Resigns (February 2014)

With an aim to improve on learning from past mistakes and imbibe best safety practices as part of organizational DNA, the *IN* constituted the Indian Naval Safety Team (INST) in December 2017 at Kochi. The role of the INST includes empowerment of all personnel, both uniformed and civilian, with requisite training, tools and understanding of safety concepts, to collectively adopt a proactive safety culture that identifies risks, implements mitigating strategies and manages hazards without compromising mission accomplishment. The INST exercises cover all safety aspects across all arms and branches of the *IN*, with the exception of nuclear safety. While time will be the best judge of the effectiveness of these changes, over the last four years since the inception of INST, there is a general institutional view—backed by a statistical drop in the number of serious accidents—that the safety organization put in place has been effective, but will need to continuously adapt going ahead.



Indian Naval Safety Team

From a historical point of view, it is pertinent to put on record some of the major accidents witnessed during the last decade, which must serve as a stark reminder to all naval planners, strategists and *IN* personnel at large, that safety must continue to remain a vital aspect at all levels of planning and operations.

The list of accidents and incidents tabulated at the end of this chapter is a compilation of notable

accidents cutting across the three domains in which the *IN* operates. A detailed cataloguing of accidents of a more serious or catastrophic nature is covered chronologically in the subsequent paragraphs.

⚓ Major Accidents of the Decade

Fire at Naval Dockyard Mumbai (3 November 2011): A major fire broke out at the Admiral Superintendent Dockyard (ASD) Office Administrative building on 3 November 2011. The building, a heritage structure, was constructed in 1807 and was more than 200 years old at the time of this accident. While the fire completely gutted the entire first floor and caused damage to other floors, there were no casualties due to timely adherence to evacuation protocols. The fire was brought under control by late evening on the same day. The Board of Inquiry attributed the fire to a short-circuit, and also ruled out sabotage, mischief or arson as a probable cause. Some of the major recommendations of the inquiry (subsequently implemented) included: upgradation of equipment and capacity held with Defence Fire Services (DFS) at Naval Dockyard (ND) Mumbai, and the use of technology to improve surveillance of important offices and installations.

Explosion Onboard INS *Sindhurakshak* (12–13 August 2013): INS *Sindhurakshak*, a Russian-made EKM-class submarine, was scheduled to go on deployment from Mumbai on 14 August 2013. This necessitated intensive preparations by the submarine crew, including loading of armament, stores, fuel oil and critical spares. The loading of armaments for the said deployment was carried out on 12 and 13 August 2013. Just before midnight on 13 August, a number of explosions occurred onboard the submarine. The explosions were accompanied by a major fire with very high temperatures within the submarine. Although concerted efforts were made to fight

the fire and save personnel, the explosion caused distortion of the submarine hatches, making any attempt to access difficult. The submarine, primarily due to a breach of the hull, took in water and eventually submerged alongside the jetty at ND, Mumbai.

A total of eighteen personnel (three officers and fifteen sailors) lost their lives during the accident.¹ Making a statement about the incident on the floor of Parliament, (then) Raksha Mantri (RM), Shri AK Antony, stated that extensive checks on weapon-related safety systems and an audit of the SOPs onboard all operational *IN* submarines had been ordered.² A Board of Inquiry was instituted to investigate the circumstances leading to the accident and subsequent sinking, with loss of lives, and recommend remedial measures. The Board of Inquiry submitted an interim report within a month of its constitution, and further investigation was withheld for lack of access to the internal compartments of the submarine.

In February 2014, the Board of Inquiry reconvened after undertaking scientific analysis and inferred leakage of oxygen from a torpedo as a primary initiator of the incident. The oxygen leak was attributed to material failure of the oxygen flask or its associated pipelines, as was also later noted in the audit report of the Comptroller and Auditor General (CAG) in 2017.³ The CAG's audit report also noted that: (i) 'complete "Work Up" of the submarine was not conducted when the submarine was prepared for operational deployment, as it was completed within one week instead of the prescribed two weeks; and (ii) that the submarine was holding ammunition nearing life expiry.'

The recommendations of the inquiry (implemented subsequently), included: (i) revision of SOPs; and (ii) provisioning of a submarine data recorder (SDR), akin to a cockpit voice recorder (CVR) and flight data recorder (FDR) used in the aircraft. The submarine was brought to surface

in June 2014 through salvage operations, and decommissioned on 13 April 2017.

Fire Onboard INS *Viraat* (22–23 September 2013): Around midnight of 22 September, a fire broke out onboard INS *Viraat* while the ship was undergoing a refit in Mumbai. Two hours later, the fire was brought under control by the ship's designated firefighting teams. The Board of Inquiry attributed fire to an internal short-circuit inside one of the split air conditioners (ACs). Recommendations of the inquiry (implemented subsequently), included: (i) audit of all split ACs; and (ii) fitment of fire/smoke detectors in living spaces.

As a consequence of this fire, Headquarters Western Fleet promulgated an advisory on the safe operation of split ACs, which brought out common problem areas and remedial measures to be instituted forthwith. Additionally, the Work-Up Teams under the Flag Officer Sea Training (FOST) also undertook audits onboard *IN* Ships during their work-up (inspection), and provided design feedback reviews with regard to the fitment of fire/smoke detectors in various compartments, including living spaces, in accordance with international specifications and standards.

Fire Onboard INS *Sindhuratna* (25–26 February 2014): As part of training and mandatory work-up, INS *Sindhuratna*, a Russian EKM-class submarine had sailed on 25 February 2014 from Mumbai with a strength of ninety-four personnel—seventy-eight crew and sixteen personnel from the Squadron Staff. On the night of 25 February and early hours of 26 February, during ongoing inspections, while the submarine was operating at a depth of 40 metres, smoke was observed in one of the compartments near the control room. While this was brought under control, within a span of two hours, a secondary fire broke out in the same compartment, and within minutes, it developed

into a major fire. The submarine's Deputy Electrical Officer Lt Cdr Kapish Muwal and Compartment Officer Lt Cdr Manoranjan Kumar lost their lives while fighting the fire.

The submarine requested assistance for the evacuation of seven casualties. One Sea King-C, T-80, INS *Tarasa*, INS *Subhadra* and INS *Mumbai* were pressed into service to assist in the safe passage of the submarine to Mumbai. The submarine eventually reached Mumbai at about 1015 hrs on 27 February 2014.

The Board of Inquiry report attributed the fire to inadvertent exposure of seawater to oxygen regeneration cartridges due to malfunction of seawater valve.

As a consequence of this incident, and the INS *Sindhurakshak* incident of 2013, the *IN* accelerated a major revamp in the safety organization and also created a dedicated Submarine Work-up Team at Visakhapatnam in July 2014, initially placed under the operational control of Flag Officer Submarine (FOSM) and subsequently shifted to Flag Officer Sea Training (FOST) in August 2019.

Death of Cdr Kuntal Wadhwa (7 March 2014): Yard 12701 (Kolkata Cell) was under construction at M/s Mazagon Dock Limited, Mumbai as the first P-15A class of ship. As part of pre-commissioning checks, testing and trials of various equipment were undertaken. The major machinery compartments of the ship were installed with a fixed carbon-dioxide (CO₂) firefighting system with microprocessor-based control panels. Gas Discharge Test (GDT), for the first ship of a class of ships, is mandated.

As part of these tests, GDT of the Forward and Aft Gas Turbine Rooms was planned on 7 March 2014. Engineer Officer (Desig.) Cdr Kuntal Wadhwa was actively involved in overseeing the trials and associated preparatory activities, required to be conducted by the ship's staff. Cdr Kuntal Wadhwa positioned himself in the Aft CO₂ compartment to monitor the operation of pilot

cylinder and subsequent events. Having established that the system was ready for operation, the trials commenced, but after about a minute, the CO₂ gas was accidentally released into the Aft CO₂ compartment. This accident led to the death of Cdr Kuntal Wadhwa.

The Board of Inquiry instituted by the *IN* ruled out foul play and attributed the cause of the accident to the malfunction/failure of Direction Control and Non-Return Valves fitted in the Aft CO₂ compartment that resulted in the accidental discharge of the gas. Some of the major recommendations of the inquiry with a specific impetus on enhancing safety during such trials included: (i) installation of load cells for monitoring weight of bottles during the conduct of GDT, with digital readout outside the compartment; and (ii) installation of portable cameras inside the CO₂ compartments with remote display.

Collision of MV *Madeleine Rickmers* with INS *Kora* (31 October 2014): INS *Kora* became operational on 30 April 2014, after completing a long refit. The ship had undertaken various operational and training exercises since the completion of refit. On 25 October 2014, about six months after becoming operational and having regained sea legs through these exercises, INS *Kora* sailed from Visakhapatnam for another training and revalidation exercise. Post completion of this exercise, on 29 October 2014, INS *Kora* was assigned to escort INS *Gaj* to Port Blair. During the passage to Port Blair, on 31 October 2014, at about 0400hrs MV *Madeleine Rickmers* and INS *Kora* collided. This collision did not cause major damage and INS *Kora* was able to proceed under own power.

After the incident, INS *Kora* undertook fuelling of INS *Gaj*, both on the evening of 31 October 2014 as well as the early hours of 1 November 2014. Post the fuelling, INS *Kulish* relieved INS *Kora* from escort duties, and INS

Kora returned to Visakhapatnam on 2 November 2014 under own power.

The inquiry report brought to fore certain shortcomings with regard to situational awareness and Bridgeman ship, both onboard INS *Kora* and MV *Madeleine Rickmers*. Recommendations of the inquiry (implemented subsequently) included: (i) priority scheduling of Work-Up of ships post long refits; (ii) inclusion of refresher capsule on Rules of Road (ROR) and Bridgeman ship for all long courses, except long Navigation and Direction officers (as already part of their syllabus); and (iii) fitment of Voyage Data Recorder (VDR) as part of the standard fit for all ships irrespective of vintage.

Sinking of TRV 72 (6 November 2014): *IN*TRV A-72, a torpedo-recovery vessel, was commissioned on 23 February 1983. The design life of the ship at the time of commissioning was twenty years. The service life of the ship was progressively extended till 2017, through a range of refits and upgrades. The replacement for TRV-72, though originally expected by 2010–11, was delayed as INS *Astradharini* was commissioned in October 2015; requiring the continued availability of TRV-72.

On 6 November 2014, TRV-72 was deployed off Visakhapatnam for operational duties. On completion of the tasking and while returning to harbour on the same evening, this more than thirty-year-old ship encountered uncontrolled flooding in the Aft Steering Position compartment. Valiant efforts were made to arrest the flooding by the ship's crew. However, the rate of flooding resulted in its eventual sinking.

Indian Navy Ships *Ranjit*, *Shivalik* and *Sahyadri* were pressed into service to render rescue assistance. Out of the total twenty-nine personnel onboard, twenty-four were rescued; POME Jacob was brought in dead, and four personnel—Cdr Shishir K Yadavannavar, LS RC II V Krishna Raju, LME Sangam Sharma, and ME I Gurjeet Singh—were missing and have since been presumed dead.

Additional SAR effort using ships and aircraft was mounted from 6 to 14 November 2014. MV *Olympic Canyon* was deployed on 17–18 November 2014, to localize the position of the wreck. While the position of the ship was localized, photographed and videographed, no bodies were sighted in the vicinity of the wreckage or within the compartments that could be photographed using the Remote Operating Vehicle ex-MV *Olympic Canyon*.

A Board of Inquiry was instituted to assess the cause of the incident and recommend institutional remedial measures to avoid recurrence. The inquiry concluded that the vessel, during her extended service life (155 per cent of designed life), could have suffered fatigue failure due to weakening of the hull.

Recommendations of the inquiry (implemented subsequently) included: (i) revision of the Comprehensive Nuclear Biological Chemical and Damage Control (NBCD) Allowance List (CNAL) for smaller ships; and (ii) provision of additional flood sensors, especially in older design ships, in accordance with extant international specifications and standards. Additionally, Work-Up Teams under the FOST undertook audits onboard *IN* Ships during their work-up, and provided design feedback reviews with regard to the fitment of flood sensors in various compartments in accordance with extant international specifications and standards. Further, remedial measures were also instituted by the *IN* to periodically assess the fatigue strength of the hull.

Loss of *IN* Dornier 240 at Sea (24 March 2015): An *IN* Dornier (DO 228-201, registration IN240), ex-INAS 310 Goa, planned an operational and low-flying training sortie on 24 March 2015. The aircraft took off at 1951 hrs from Dabolim, INS *Hansa*. Cdr Nikhil Joshi, Captain of the aircraft, was flying as Co-pilot; Lt Abhinav Nagori was flying as first pilot; and Lt Kiran Shekhawat was the Tactical Coordinator (TACCO).

The last 'Ops Normal' call was received from the aircraft at 2202 hrs. Twenty minutes later, at 2222 hrs, when the air traffic controller (ATC) at INS *Hansa* hailed the aircraft, no reply was received. Efforts were made to contact it on various communication channels, including relay through airborne civil aircraft. When no communication could be established, the aircraft was declared 'Overdue'.

At about 2330 hrs Captain (Air), INS *Hansa* received a message from a fisherman who had rescued Cdr Nikhil Joshi. On establishing communication, Cdr Joshi reported that the aircraft had crashed into the sea and other aircrew members were missing. INS *Karuvva* and INS *Kondul* were dispatched on a SAR mission. Additionally, INS *Kondul* and INS *Makar* (with its side-scan sonar capabilities) were able to locate the wreckage of the aircraft. Divers were sent in to retrieve the mortal remains of Lt Abhinav Nagori and Lt Kiran Sherawat. The wreckage of the aircraft was salvaged with the assistance of ONGC vessel MSV *Samudra Sevak* on 28 March 2015.

A Board of Inquiry was instituted to investigate the accident. The inquiry identified the crash to have occurred during the low-level flying sorties. Recommendations of the inquiry included: (i) audit of prevalent operating procedures for low-level flying; (ii) inclusion of role clearances for certain profiles/missions; (iii) promulgation of unified SOPs across an aircraft fleet; (iv) certain design modifications with regard to the safety of aircrew members; and (iv) upgradation of flight engine controls and displays. Incidentally, Lt Kiran Shekhawat was the first Indian Navy woman officer to die in harness in an operational event.

Fire and Subsequent Sinking of *INISVT-13* and *T-14* (19 July 2016): An electric fire broke out on the Immediate Support Vessels (ISVs) *T-13* and *T-14* while they were berthed alongside in Mumbai on 19 July 2016. Despite efforts to bring the fire

under control on these fibre-reinforced polymer (FRP)-hulled vessels, both ships suffered irreparable damage and were submerged in the shallow waters of the harbour berth. These *IN* ISVs had been designed to RINA standards (classification standards for ships) by SHM Shipbuilders.

Following the fire, a Board of Inquiry ordered to investigate the incident attributed the cause of the fire to design and construction deficiencies, and also found operational limitations with the then existing firefighting organization onboard these thinly manned platforms, especially during off-work hours. Major recommendations, with a specific impetus on enhancing the safety of FRP-hulled vessels, included: (i) augmentation of firefighting and damage control equipment; and (ii) a thorough audit of the design deficiencies, especially with regard to watertight integrity and the major firefighting system. Local Work-Up teams conducted audits of all ISVs in a progressive manner and formulated a consolidated list of design deficiencies as well as carried out material and operational safety audits of these vessels.

IAF AN-32 Missing at Sea (22 July 2016): A team of eight naval defence civilian personnel from Naval Armament Depot (NAD; Visakhapatnam) and Controllerate of Naval Armament Inspection, CNAI (East) were deputed to Port Blair for undertaking defect rectification onboard *IN* ship at Andaman and Nicobar islands. The team used an IAF aircraft (AN-32) for their passage from Chennai to Port Blair. The aircraft took off from Chennai at 0830 hrs on 22 July 2016 for Port Blair, where it was expected to arrive at 1130 hrs. When it failed to arrive, and ATC Port Blair was unable to establish any contact whatsoever, the flight was declared 'overdue'.

Coordinated SAR operations were launched by both IAF and *IN*, but were unable to locate the aircraft and its passengers. The eight missing defence civilian personnel were presumed dead,

as were the twenty-one other defence personnel on board. A Board of Inquiry was instituted by the *IN* to investigate the ‘missing naval civilian personnel onboard AN-32 flight of 22 July 2016’, while another inquiry was ordered by the IAF to investigate the cause of the accident.

The *IN* inquiry brought to the fore the need for: (i) creation of a dedicated team at Port Blair to obviate the need for prolonged deputation of teams from Visakhapatnam; and (ii) to provide timely support to operational assets of both the *IN* as well as the Coast Guard (CG) at Port Blair. Eventually, an NAI unit was established at Dollygunj, Port Blair in 2021. Details of *IN* personnel presumed dead, included:

Name
Sanjeev Kumar, PO LOG (OC)
B Sambamurthy, CM (F)
Bhupendra Singh, Examiner
P Nagendra Rao, HSK I
RV Prasad Babu, HSK II
Purna Chandra Senapati, AF(SK)
Charan Maharana, SK
N Chinna Rao, TMM
G Srinivasa Rao, TMM

Capsizing of INS *Betwa* in CG Dock (5 December 2016): INS *Betwa*, a Brahmaputra-class guided missile frigate, was commissioned as the second of this class on 7 July 2004. The Major Refit of INS *Betwa* commenced at Naval Dockyard, Mumbai on 15 April 2016, with a planned refit completion of April 2018. The ship had docked at CG Dock on 20 October 2016, and whilst undertaking undocking operations, on 5 December 2016, the ship keeled over to the port side. This incident resulted in the death of two sailors, Chief Electrical Artificer (CHEAR) NK Rai, and Leading Mechanic (LME) Ashutosh Pandey, while thirty-six personnel were injured.

A Board of Inquiry attributed the accident to loss of stability arising due to erroneous weight

management. As a consequence of this accident, the *IN* took disciplinary action against three officers for negligence. Salvage operations were undertaken by the *IN* through M/s Resolve Salvage & Fire (India) through a contract that was concluded under the emergency financial power clause. The dewatering of the dock was ceased post this accident to avoid further keeling of the ship.

The firm M/s Resolve Salvage & Fire (India) undertook an immediate dive survey and subsequently progressed with stabilization docking of the warship at CG Dock to permit full dewatering. The stabilization job, an essential prerequisite for subsequent undocking and re-docking was completed by 29 December 2017. The operations for uprighting and for relocation of dock commenced on 16 January 2017. After undertaking extensive repairs, a preliminary leak test was conducted on 18 February 2017, and subsequently on 19 February 2017 too. Uprighting operations commenced on 20 February 2017 and were completed on 23 February 2017. The ship was once again docked at Duncan Dock on 27 February 2017 to undertake a refit-and-restoration work package.

While many experts across the globe believed that the warship had suffered irreparable damage, the *IN* declared its intent to get the ship operational and combat-worthy. The scope of planned—and now also unplanned work—had expanded significantly due to damage to the propulsion shaft-line, boilers, turbines, switchboard, and quite a lot of other major equipment and the hull. Notwithstanding, ND (Mumbai), took up this unprecedented challenge of restoration, which was akin to the scope of a ship builder and not that of a repair yard.

On 18 February 2020, the ship was put to sea for the first time after the accident, followed by Full Power Trials in March 2020. Through dedicated action teams, the refit, despite many logistical and technical challenges, was completed on 21

September 2020. While the salvage and restoration were major achievements, the *IN*, as a consequence of this incident instituted multiple measures—especially with regard to the training of personnel with regard to stability and promulgation of SOPs for weight management of ships during life-cycle and refit.

Ditching of Chetak at Sea (10 April 2019): An *IN* Chetak had embarked *INS Trikand* on 10 January 2019 for the mission of Patrolling off Gulf (PoG). On 10 April, whilst deployed, the helicopter ditched in the sea while undertaking routine flying operations. The aircraft crew comprised first pilot, co-pilot and a diver.

The helicopter had become airborne at 1530 hrs and continued to undertake assigned operations till 1646 hrs. On completion of these operations on its return profile to the ship, the aircraft also undertook SAR circuit runs. While undertaking SAR circuits, at about 200 to 300 feet, an uncontrollable yaw to left was experienced with a loss of rudder control. After turning one to one-and-a-half circles the helicopter ditched in water at about 1719 hrs.

Despite limited response time, prompt actions by the aircrew, adherence to SOPs and exemplary courage and presence of mind—especially by the

diver, Praveen Kumar, LA (FD)—resulted in the entire aircrew surviving the accident by executing underwater egress from the helicopter. Efforts made by the ship to search for the sunken helicopter were unsuccessful owing to the depth in area.

Fire Onboard *INS Vikramaditya* (26 April 2019): Whilst undergoing operational sea training, a fire broke out in the Aft Boiler Room onboard *INS Vikramaditya* on 26 April 2019, due to spillage of fuel from the discharge line of a fuel pump, when the ship was about to enter Karwar port. The fire was brought under control by the ship’s crew through swift actions preventing any serious damage affecting the ship’s combat capability.

Lt Cdr DS Chauhan, the ship’s Nuclear Biological Chemical Defence Officer (NBCDO-II), led the firefighting efforts in the affected compartment. Whilst the fire was brought under control, the officer suffered the loss of consciousness owing to the smoke and fumes. Though the officer was immediately evacuated to *INHS Patanjali*, the naval hospital at Karwar, for medical attention; sadly he could not be revived.

Major Accidents and Incidents of the decade 2011–21 are tabulated below, and Visakhapatnam has been shortened throughout as Vizag.

Date	Location	Accident/Incident	Brief Remarks on Accident/Incident
30 January 2011	Mumbai	Collision between MV <i>Nordlake</i> and <i>INS Vindhyagiri</i>	Collision occurred off Mumbai harbour. Subsequently a fire started and the ship capsized alongside during damage control operations.
18 May 2011	ND (Vizag)	Collapse of Lambda Gate of Matsya Dock	Accident during structural integrity tests.
12 December 2011	Kochi	Accident of Sea King C, SC 556 ex- <i>INS Garuda</i>	Fire in main gear box during scheduled stopover at Mangalore due to damage to brake piston resulting in oil spray.
7 March 2012	Air Force Academy	Accident of Kiran MK 1A, U-835	Accident during training sortie.
16 February 2012	Vizag	Accident of RPA Searcher, US 901 of <i>INS Dega</i>	Accident during recovery phase.
2 April 2012	Vizag	Accident of Dornier aircraft, DO 243 of <i>INS Dega</i>	Accident during landing at <i>INS Dega</i> .

Date	Location	Accident/Incident	Brief Remarks on Accident/Incident
5 March 2013	Off Vizag	Ditching of Chetak, CH 440	Aircraft ditched at sea due to engine failure.
14 February 2013	Goa	Ground Accident of MIG-29K, MK 802 at H2 Hangar, NAY (Goa)	Accident during parking of aircraft leading damage to starboard tail-fin.
14 July 2013	Mumbai	Fire onboard INS <i>Tarasa</i>	Fire during hot work (welding/cutting) whilst the ship was undergoing refit. Fire was brought under control by ship's staff and dockyard firefighting team.
21 August 2013	Goa	Accident of Kiran, KR 071 of INS <i>Hansa</i>	Damage to aircraft while on training sortie due to defect in brakes.
7 October 2013	Vizag	Aircraft accident of CH 462 while taxiing at INS <i>Dega</i>	Accident during training sortie.
15 October 2013	Goa	Accident of Chetak, CH 405 of INS <i>Shikra</i>	Accident occurred due to mechanical failure during landing at Dabolim for a planned stopover, while the aircraft was being ferried from Mumbai to Bengaluru for routine inspections.
16 October 2013	Ramanathapuram	Accident of Chetak, CH481 of INS <i>Parundu</i>	Accident due to mechanical failure whilst deployed.
19 October 2013	At sea	Accident of Lakshya pilotless aerial target, LH -020	Crashed at sea after take-off due to mechanical failure.
4 November 2013	Porbandar	Accident of RPA <i>Searcher</i> , SV 904	Accident during recovery stage due to mechanical failure.
4 December 2013	Vizag	Fire onboard INS <i>Konkan</i>	Fire during hot work whilst the ship was undergoing refit. Fire was brought under control by ship's staff.
8 January 2014	Mumbai	Crack on Sonar Dome of INS <i>Betwa</i>	Accident during outbound passage from harbour.
30 January 2014	Vizag	Damage to port propeller of INS <i>Airavat</i>	Accident during inbound passage to harbour.
28 June 2014	Port Blair	Damage to port propeller of INS <i>Kuthar</i>	Accident during inbound passage to harbour.
10 August 2014	Vizag	Accident of Chetak, CH-413	Accident during recovery stage onboard INS <i>Sabyadri</i> .
8 December 2014	INS <i>Hansa</i> , Goa	Accident of MIG-29K, MK 803	Accident during landing due to mechanical failure.
15 January 2015	At sea	Loss of Lakshya pilotless aerial target, LH 009	Crashed at sea after take-off due to mechanical failure.
5 May 2015	At sea, off Kochi	Accident of RPA <i>Searcher</i> 908	Crashed post take-off due to engine failure.
28 December 2015	At sea	Loss of Lakshya pilotless aerial target, LH021	Crashed at sea after take-off due to mechanical failure.
21 January 2016	Off Chennai	Fire and subsequently sinking of Fast Interceptor Craft, FIC 304	A fire occurred when the ship was deployed at sea. The fire resulted in loss of structural integrity to the FRP-hulled vessel leading to its eventual sinking. All crew members were rescued.
18 March 2016	Off Kochi	Accident of RPA <i>Heron</i> , HV 923	Crashed at sea during routine sortie due to engine failure.

Date	Location	Accident/Incident	Brief Remarks on Accident/Incident
18 May 2016	Vizag	Loss of stern gate of INS <i>Jalashwa</i>	Accident due to mechanical failure whilst undertaking operations for Landing Craft Mechanized (LCM) embarkation.
1 January 2017	The Maldives	Accident of ALH 750 at the Maldives	Accident during take-off for medical evacuation operation.
10 January 2017	ND, Mumbai	Fire in machinery control room and galley of INS <i>Pralaya</i>	Fire was brought under control by ship's staff and dockyard firefighting team.
23 February 2017	Mumbai	Damage sustained by INS <i>Sindhuratna</i>	Submarine collided with merchant vessel.
26 September 2017	Off Kochi	Fire in Aft Engine Room (AER) onboard INS <i>Nishank</i>	Fire in AER due to fuel leakage from damaged fuel line. Fire was brought under control by ship's staff.
21 November 2017	Kochi	Accident of RPA <i>Searcher</i> , 908	Accident during recovery phase due to mechanical failure.
23 December 2017	Mumbai	Accident of Chetak, CH 411	Accident during landing, resulting in structural damage.
3 January 2018	INS <i>Hansa</i> , Goa	MIG-29K, MK-812 went off runway and caught fire	Accident during training sortie.
10 January 2018	Vizag	Fire onboard INS <i>Shivalik</i>	Fire due to short-circuit whilst ship was undergoing refit. Fire was brought under control by ship's staff and dockyard firefighting team.
17 March 2018	Kochi	Accident of Chetak, CH 413	Accident during emergency landing due to loss of engine oil pressure.
1 October 2018	Arakkonnam	Accident of Chetak, CH 442 while at hover	Structural damage during landing during training sortie due to mechanical failure.
6 March 2019	Mumbai	Incident of fire onboard INS <i>Sindhukesari</i>	Fire started while hotwork was being undertaken. Fire was brought under control by ship's staff.
12 May 2019	Mumbai	Incident of fire onboard INS <i>Teg</i>	Fire in ship's galley. Fire was brought under control by ship's staff.
24 September 2019	Vizag	Flooding onboard INS <i>Jalashwa</i>	Flooding in Aft Steering Position. The ship entered harbour on manual steering and the flooding was controlled by the ship's staff.
15 October 2019	Kochi	Incident of flooding onboard INS <i>Nishank</i>	Flooding occurred due to failure of fire-main pump suction line whilst in operation. Flooding was controlled by ship's staff.
14 November 2019	Kochi	Accident of Chetak, CH427	Structural damage to aircraft while carrying out vertical replenishments with ship at sea.
16 November 2019	Goa	Loss of MIG-29K, MB 676	Accident due to bird-hit and subsequent engine failure. Pilot ejected after veering the aircraft away from populated areas.
26 February 2020	At sea	Loss of MIG-29K, MB 835 ex-INS <i>Vikramaditya</i>	The aircraft ditched at sea due to engine fire shortly after take-off. The pilot ejected safely.
27 November 2020	At sea	Loss of MIG-29K, MB 677 ex-INS <i>Vikramaditya</i>	The aircraft crashed at sea with the pilot due to uncontrolled Fly-By-Wire episode.

🚢 Conclusion

The *IN* is the only military service that operates in all domains (sea, sub-sea, air and land). The operational risks to its men and assets are therefore much higher and even more dynamic. While institutionalization of safety measures has also been a dynamic process based on new induction (both at equipment and technology level), evolving operational environment, maintenance philosophies and heightened tempo of deployments, the last decade did witness some major accidents. While the then Chief of Naval Staff, Admiral DK Joshi, resigned taking ‘moral responsibility’, it also made the *IN* take a hard look at its safety architecture and identify systemic lacunae, if any.

The aim was not only to sustain a safe working and operating environment, but also to create robust mechanisms towards incident reporting, analysis, recording of lessons learnt and subsequent dissemination. The lessons learnt have helped policy makers, managers and operators in recalibrating design, policy and procedural frameworks, as well as promoting safety as a culture at the grassroots level.

While the accidents of this decade (2011–21) have not been forgotten and serve as a stark

reminder to officers, men and civilians of the *IN*, they must also be seen from the perspective of the success of uniformed and Naval Civilian personnel who repeatedly put personal safety at risk in the line of duty to preserve precious capital assets. This relative success emblemizes the quality of workforce and the training imparted to them in preparation of such unforeseen emergencies. While the rate and severity of the accidents have seen a significant downfall, the *IN* is committed to reaching higher safety standards in the coming decade.

Notes

- 1 Indian Navy website: Fire Accident onboard INS *Sindburakshak*: Status Report as on 18 Aug 13 (15:00 Hrs) <https://www.indiannavy.nic.in/content/fire-accident-onboard-ins-sindburakshak>
- 2 ‘The Minister of Defence made a statement regarding incident of major fire onboard Indian Navy submarine INS *Sindburakshak*.’ Article in Parliament Library. <https://eparlib.nic.in/bitstream/123456789/732954/1/10142.pdf>
- 3 Comptroller and Auditor General of India (2016). *Report of the Comptroller and Auditor General of India for the Year Ended March 2016: Union Government (Defence Services) Navy and Coast Guard Report No. 20 of 2017*. New Delhi: Government of India. Last accessed on 20 July 2022; https://cag.gov.in/cag_old/sites/default/files/audit_report_files/Report_No.20_of_2017_Compliance_audit_Union_Government_Defence_Services_Navy_and_Coast_Guard.pdf



13

Indian Navy

Fostering Maritime Diplomacy

⚓ Introduction

Maritime relations are an important facet of India's broader politico-economic relations, and the Indian Navy (*IN*) plays a pivotal role in this regard. It is a key instrument in furthering India's interests through the instruments of maritime (Naval) and military diplomacy. It has played a vital role in several of India's politico-diplomatic initiatives. Some of these are India's 'Act East' Policy to expand engagement and relations to its east, across the Indo-Pacific region, with an emphasis on economic and security cooperation; Project 'Mausam' in 2014 and 'Security and Growth for All in the Region (SAGAR)' in 2015. These initiatives are part of India's endeavours to strengthen cultural links and economic relations and development in a mutually supportive cooperative manner among many other, constructs regionally. The *IN* being the principal manifestation of India's maritime power, is therefore also one of the vital enablers of India's maritime diplomacy. The *IN*'s firm belief in democratic principles and institutions has helped it emerge as the 'Preferred Security Partner' in the Indian Ocean Region.

Identifying maritime diplomacy as a crucial role of the *IN*, the Indian Maritime Security Strategy (2015) noted:

Shaping a broader maritime environment to counter the flow of threats and challenges

from one area to another requires inclusive and cooperative efforts between the nations concerned and their maritime forces. These efforts are facilitated by maritime engagements, as a principal means of conducting maritime diplomacy. Interaction with maritime forces of different nations will be pursued to mitigate traditional concerns and address non-traditional threats for mutual benefit. These will also serve to enhance mutual understanding, cooperation, and interoperability between the maritime forces.¹

The *IN* pursues maritime engagements in multiple ways, each of which is covered below:

- Port Visits;
- Personnel Exchanges;
- Staff Talks and Interactions;
- Exercises with Foreign Navies;
- Maritime Assistance;
- Operational Interactions;
- High-Level Maritime Strategic Interactions.

⚓ Port Visits

Ships of the *IN* and Coast Guard (CG) regularly undertake port visits to other nations, to promote goodwill and professional interactions. Similarly, port visits to India by warships of friendly nations are welcomed. Details of such visits by Indian ships to foreign ports and visits by foreign warships to Indian ports, are available in the Appendices at the end of this volume. In the last decade (2011–21).

⚓ Personnel Exchanges

The *IN* undertakes attachments and exchanges of personnel with other maritime forces, for training interaction, gaining operational experience, sharing and developing skill sets, building interoperability and strengthening maritime diplomacy. These include reciprocal positioning of Naval personnel in diplomatic billets, training and positioning of technical support teams. Since these efforts are spread across various professional verticals of the *IN*, such initiatives undertaken in the decade gone by have been covered in various chapters of this volume.

⚓ Staff Talks and Interactions

Staff talks provide the mechanism for Naval staff of friendly navies to deliberate on various issues of mutual interest. The *IN* conducts bilateral staff talks with around twenty foreign navies, on an annual/biennial basis. These enable structured growth of ideas and interactions, including plans for further maritime engagements and cooperation. The majority of these twenty countries are in the IOR—reflective of the priority accorded by the *IN* to regional stability and security.



IN-RAN Staff Talks 2022

⚓ Exercises with Foreign Navies

The Indian Navy regularly exercises with various foreign navies, at bilateral and multilateral levels. These exercises are used to project Indian capabilities, hone operational skills, imbibe best practices and procedures, and enable doctrinal learning. Exercises also provide a benign means for benchmarking our capabilities against international standards, and develop mutual friendship and respect. As of 2022, the *IN* hosts and participates in bilateral Naval exercises with seventeen IOR countries,² and participates in eighteen annual/biennial multilateral exercises,³ with others (details provided in the chapter on Surface Operations). Details of *IN*'s participation in various occasional and institutionalized exercises conducted at bilateral and multilateral level have been covered extensively in the chapter on Surface Operations earlier. Details of Fleet Reviews, which form one of the major proponents of maritime diplomacy, are covered in the succeeding paragraphs.

Fleet Reviews: Naval diplomacy entails the use of Naval forces in support of foreign policy objectives to build 'bridges of friendship' and strengthen international cooperation. Shaping a benign maritime environment to counter the flow of global and regional threats and challenges requires inclusive and cooperative efforts between the nations concerned and their maritime forces. With an objective to strengthen political and navy-to-navy relations, build greater goodwill and promote regional stability, the *IN* undertakes constructive maritime engagements (discussed above), participates in Fleet Reviews and hosts India's own International Fleet Review (IFR).

This chapter focuses on Fleet Reviews conducted since 2011 and also traces the evolution of Exercise Milan, a flagship initiative of the *IN* aimed at fostering collective maritime cooperation among member participants.

The earliest recorded Fleet Review in India was in the eighteenth century by the powerful Maratha Fleet consisting of two types ships—Ghurab⁴ and Gallivat⁵—under the renowned Sarkhel (Grand Admiral) Kanhoji Angre at the coastal fortress of Ratnagiri. In the United Kingdom, then known as England, a Fleet Review was a precursor to setting sail for war or was conducted on special occasions such as the coronation of a new monarch. In the United States of America, the ‘Great White Fleet’ meant to project American power overseas was reviewed by President Theodore Roosevelt in 1907 prior to departure, and once again in 1909, on its return to the US.

Today, a Fleet Review is an assembly of ships at a pre-designated anchorage for the purpose of paying respects to the Head of State (in our country, the President of India, as the Supreme Commander of the Armed Forces, reviews the fleet) and to display their commitment to him/her. In turn, the Head of State, by reviewing the ships, reaffirms his/her faith in the fleet and its ability to defend the nation’s maritime interests. Over a period of time, Fleet Reviews in India have seen participation by ships, submarines and aircraft to emphasize the *IN*’s three-dimensional nature. Ships of the CG, Government research vessels, and Indian-flagged merchant ships have also joined in fleet reviews. The *IN* participates and hosts the IFR as well as the President’s Fleet Reviews (PFR).

The *IN* holds a Fleet Review usually once in five years, i.e., once in the tenure of each President. Some of the Fleet Reviews are expanded in scope to involve the participation of foreign ships or delegations and thus become IFRs, usually conducted once in fifteen years. Events like IFRs act as catalysts, where the navies of different nations meet and cooperate to celebrate each other’s maritime traditions and work towards mutual benefit.

International Fleet Review

India’s approach to the increase in regional and global issues has been to build bridges of friendship with all nations, with the *IN* as the principal instrument to support foreign policy efforts in the maritime and security domains.

The *IN*’s first IFR was hosted in January 2001, off Mumbai, with participation from twenty-nine countries. More than eighty ships participated, including twenty-four foreign ships. The *IN* hosted the IFR for the second time on 4–8 February 2016, off Visakhapatnam. International Fleet Review-16 was thus aimed at further broadening maritime engagement between India and other foreign navies, while providing renewed impetus and momentum to our global maritime partnerships. In the run up to the event, the objectives were aptly enunciated by Chief of Naval Staff Admiral RK Dhowan, who said:

‘The hosting of the International Fleet Review (IFR) by the Indian Navy in February 2016 can be seen as a significant event in the nation’s maritime history. While showcasing our navy to the nation and to the Honourable President of India we also celebrate the time-honoured principles of friendship across the oceans, which are intrinsic to the seafaring community. The IFR serves to provide a platform for participating navies to interact with each other, strengthen bridges of friendship, towards developing a common appreciation of maritime challenges and the potential for addressing them through a united approach. This is in line with India’s overall policy of strengthening cooperation amongst nations to meet common maritime security challenges and to render the global commons’ safe and secure.’

The coming together of many navies was accompanied by several events and functions in a week filled with action and interaction aimed at

maximizing the time spent together to fulfil the aims and goals of the IFR. Thus, we sought to move ahead on the concept of the global maritime family with our theme 'United through Oceans'. Some details of this event are outlined in succeeding paragraphs.

(Then) President of India Pranab Mukherjee, Prime Minister Narendra Modi, (then) Raksha Mantri Manohar Parikkar, (then) Governor of Andhra Pradesh ESL Narasimhan, (then) Chief Minister of Andhra Pradesh Chandrababu Naidu and other high Indian dignitaries, along with the Naval heads of the participating nations attended the Fleet Review on 6 February 2016, with collateral activities conducted on 4–8 February.

Planning IFR-16: As compared to the IFR in 2001, (then) Chief of Naval Staff Admiral RK Dhowan envisioned IFR to be held in 2016 (IFR-16) at a much larger and grander scale commensurate with the *IN*'s growth and stature in the IOR and beyond. Eventually, the event witnessed the participation of fifty countries, including twenty-two Naval Chiefs, a hundred ships (including twenty-eight foreign ships from twenty-four nations), ninety-one aircraft, twenty-six foreign delegations, over a hundred senior foreign delegations and 25,000 personnel from different countries.

The *IN* itself fielded seventy-one frontline ships and submarines and sixty aircraft. Learning from the experience of hosting the first IFR in Mumbai in 2001, a need was felt to devise a working model with several subcommittees looking after specific planning, coordination and execution of activities. This would increase efficiency and assign roles and responsibilities through a whole-of-organization approach. A collaborative Command and Control Organization was established. This Nodal Control Centre operated from the Swarnajyoti Complex in Visakhapatnam Naval Base and had representatives from all the coordinating committees. An Operations Centre was also set up at the District

Collectorate for quick liaison between civil and military agencies. Multiple committees were formed to coordinate activities related to these events, such as berthing, shore-support security, international city parade, accommodation, sightseeing, hospitality, media and outreach, among other facets.

Amidst all the preparations for this mega event, the major challenge that emerged was Cyclone Hudhud, which wreaked havoc on the city of Visakhapatnam and the Naval establishments there, in October 2014. With less than sixteen months for the IFR, the *IN*, along with the local administration, worked relentlessly to transform the cyclone-ravaged city into a modern host city for the event. The changes brought in during that period have stood the test of time and continue to attract tourists to Visakhapatnam till date.

One of the highlights of IFR-16 was the designing of an IFR Website and a mobile app 'IFR 2016 Indian Navy' that was launched to facilitate the dissemination of information about various IFR activities to all participating navies. The website also had modules to manage the workflow for various committees. This website comprised the Indian Naval Communication Interoperability System for International Fleet Review (INCIS-IFR), a web-based tactical communication system between Indian ships, foreign ships and IFR Committees during IFR-16.



IFR 2016 Logo

An IFR Tablet was provided to all participating ships, as a primary mode of tactical communication among the Closed User Group (CUG) of all participating foreign and Indian Naval warships. The web application provided multi-lingual web access for messaging, Exercise orders, discussion forum, announcements, and document sharing and chat facility for interactive communication among ships of different countries as well as between various IFR Committees.

The ships were connected from anchorage over a 4G customized network, while the shore-based units managed the data-flow through apps on the internet with adequate security overlay. The device also allowed one to access the website using onboard satellite connections of respective navies (e.g., INMARSAT, Iridium, MILSATS, etc.).

Major Events at IFR-16:

- **Fleet Review and Flypast:** Shri Pranab Mukherjee, President of India, reviewed the fleet on 6 February 2016. INS *Sumitra*, an indigenously built Naval Offshore Patrol Vessel (NOPV), was the Presidential Yacht.
- **International Maritime Conference:** A two-day international Maritime Conference was inaugurated on 7 February 2016, on the theme 'Partnering Together for a Secure, Maritime Future'.
- **Op Demo and International City Parade:** The evening on 7 February, witnessed the Operational Demonstration, followed by the International City Parade (ICP), which included marching contingents and bands from the CG and the Army, Navy and Air Force.



Fleet Review by Supreme Commander

■ **IFR Band Concert and Presidential Banquet:**

The *IN*-band concert was held on 6 February evening at Samudrika Naval Auditorium. A commemorative stamp for the occasion was released by the Hon'ble President, followed by the Presidential banquet at the ENC Officers Mess.

■ **Joint International Band Concert:** The activities of IFR-16 concluded on the evening of 8 February 2016, with a joint international Band Concert at the Naval Officer's Institute, followed by a closing ceremony.

■ **Maritime Exhibition and IFR Village:** The Chief Minister of Andhra Pradesh inaugurated the Maritime Exhibition (MAREX) on 4 February 2016. The exhibition was aimed at promoting 'Innovation, Youth and Indigenization'. The MAREX displayed maritime orientation of Indian industries, Public Sector Undertakings (PSU) and entrepreneurs in the maritime domain. An IFR Village was also set up at the same venue and featured an

Indian cultural *mélange* showcasing various traditional arts and handicrafts.

■ **Outstation Visits:** Various tours were organized for foreign visitors between 4–8 February 2016 to New Delhi, Agra and Bodh Gaya.

IFR-16—Facts and Figures: The IFR was just a four-day event for the world, but even today, it is remembered and cherished by many who experienced this maritime commemoration. A few facts about IFR-16 are shared below:

- Over 5,000 additional sanitary workers, 2,000 labourers, 1,000 skilled workers, 300 gardeners and many others were pressed into service to spruce up Visakhapatnam city.
- 600,000 people attended the event on 7 February, as against the expected 150,000 people.
- The IFR Village proved to be a huge attraction, with 102 stalls from different states of the country. The Village showcased a range of Indian handicrafts, art, dance forms and food.



International Maritime Conference

- The Maritime Exhibition acted as the perfect platform for seventy-four stalls which showcased the *IN*'s self-reliance. Indian industries like BHEL, BDL, and HAL were part of this event.

Fleet Reviews are an age-old tradition that help us harness our maritime heritage and history in a practical way to cater to the complexities of a new era. Shaping a benign and conducive maritime environment, to counter global and regional threats and challenges, requires inclusive and cooperative efforts, between the nations concerned and their maritime forces. These efforts are facilitated by maritime events like IFR, as a means of conducting maritime diplomacy. The navies of the world shared and bonded at IFR-16 and displayed great esprit de corps.

An endeavour by the Government of India and the *IN*, the IFRs promote peaceful engagement, information exchange and maritime domain awareness. Exhibiting a benign and harmonious character, the IFR is a social, fraternal and inclusive form of Naval diplomacy. In addition, the general public is also given a chance to get acquainted with our maritime history and heritage.

President's Fleet Review

The *IN* participates in the annual Republic Day parade, where India's military might, cultural diversity, social and economic progress are on display. However, with its assets operating in sea, sub-sea and air domains, it is the President's Fleet Review (PFR) that provides the *IN* a unique opportunity to showcase its military hardware and capabilities to the President and the country. While the PFRs are largely domestic in nature, they also send signals of strength to potential adversaries and showcase capabilities to friendly foreign countries (FFCs) and thus act as an agent of maritime diplomacy.

The first Presidential Fleet Review (PFR) was conducted in 1953 and was reviewed by then President of India, Dr Rajendra Prasad. Till date, twelve PFRs have been conducted since Independence, of which two have been IFRs (in 2001 and 2016). The *IN* conducted two PFRs during the decade 2011–21—the first in 2011 (Mumbai) and IFR 2016 (Visakhapatnam)—and most recently a PFR in 2022 (Visakhapatnam). These were reviewed by Presidents Pratibha Patil (2011), Pranab Mukherjee (2016) and Ram Nath Kovind



Lining Them Up for PFR 2011

(2022), respectively. The historic details of the PFRs conducted in 2011 and 2022 are outlined in the subsequent paragraphs.

PFR 2011: The 2011 edition was the tenth PFR and was conducted off Mumbai on 19–20 December 2011. Sixty-six *IN* warships, including one aircraft carrier, forty-seven aircraft, ten CG ships, and four merchant-marine vessels participated. *INS Subhadra* was the Presidential yacht, with *INS Savitri* as standby. Apart from the customary review by the President, a symphony orchestra performed on 19 December 2011 at Mulla Auditorium, followed by the release of a commemorative stamp and a photo essay book. A Presidential Banquet was held at the Western Naval Command Officers' Mess. To increase awareness, a maritime exhibition was open to public for forty days from 20 December 2011 at the Coomarswamy Hall, Chatrapati Shivaji Vastu Sanghralaya, Mumbai.

PFR 2022: The 2022 edition was the twelfth PFR and was conducted off Visakhapatnam on 21 February 2022. A PFR Cell was set up and functioned from DGNP (Vizag) complex. With the theme '75 years in Service of the Nation', the *IN* showcased its state-of-the-art indigenously built combat platforms. The PFR was also conducted as part of 'Azadi Ka Amrit Mahotsav', the seventy-fifth anniversary celebrations of India's Independence.



PFR 2022

As many as fifty-four ships from the *IN*, two from CG, two from the Shipping Corporation of India (SCI), one Oceanographic Research vessel from the National Institute of Ocean Technology (NIOT), and fifty-five aircraft participated in the event. Indian Naval Ship *Sumitra* was the Presidential yacht, with *INS Sumedha* as standby. Several enthralling waterfront activities in the form of Parade of Sails, Search and Rescue (SAR) Demonstration at Sea, Aerobatics by Hawk aircraft and Water Para Jumps by the elite Marine Commandos (MARCOS) were conducted and open to the public.

Apart from the customary review by the President, a Presidential Banquet lunch was held, a Commemorative Stamp released and a First Day Cover (FDC) unveiling. The Stamp was digitally released on a data wall, along with the release of the album by the Hon'ble President in the form of a short video prepared by India Post.

⚓ Maritime Assistance

The *IN* has provided maritime assistance to friendly nations, on their request to the Government of India, to address specific requirements. Assistance provided includes hydrographic surveys, diving assistance, ordnance disposal, salvage (removal of wrecks), sealift of critical stores, SAR, and overseeing ship construction. Such assistance has been instrumental in reassuring the beneficiary communities, and has been a catalyst for enhancing relations and goodwill in those nations. Maritime assistance of this nature is also indicative of the trust and confidence reposed by requesting nations in India's capabilities and readiness to address contingency issues.

Coastal Radar System (CRS): The *IN* is facilitating capability enhancement of littoral countries of the IOR by setting up a CRS chain comprising radar, Automatic Identification System (AIS) and electro-

optic sensors through M/s BEL. The CRS has been set up in the Seychelles, Sri Lanka, the Maldives and Mauritius. Work on CRS in Myanmar is in progress by M/s BEL, and a memorandum of understanding (MoU) was signed with Bangladesh in October 2019.

While details of hydrographical surveys, diving assistance, SAR, and warship construction are covered in different sections of this volume, details of assistance of other nature to the FFCs in the decade 2011–21 is tabulated below.

Ser	Asset	Numbers	Year	Remarks
The Maldives				
1.	Landing Craft Assault (LCA)	1	2014	
2.	CGS <i>Huravee</i>	1	2015	Refit funded by Ministry of External Affairs (MEA).
3.	Advanced Light Helicopter (ALH)	1	2016	(i) From <i>IN</i> inventory. (ii) Maintenance by <i>IN</i> .
4.	CGS <i>Kaamiyaab</i>	1	2019	(i) Gifted. (ii) Refits funded by MEA.
5.	<i>IN</i> -DO	1	2020	(i) From <i>IN</i> inventory; (ii) Maintenance by <i>IN</i> .
6.	Coastal Radar System (CRS)	10 sites + 1 Combat Centre	2021	Setting up of CRS and one-year warranty borne by India.
Mauritius				
1.	Coastal Radar System (CRS)	8 sites + 1 Control centre	2011	Maintained under annual maintenance contract (AMC) paid by Mauritius.
2.	Survey Motor Boat (SMB)	1	2013	Presented by the Chief of Naval Staff (CNS) at Port Louis.
3.	CGS <i>Barracuda</i>	1	2015	Purchased by Mauritius.
4.	Fast Interceptor Boats (FIBs)	10	2016	Purchased by Mauritius .
5.	Dornier MPCG 4	1	2016	Purchased by Mauritius.
6.	Waterjet Fast Patrol (WFPs) Vessels (<i>Victory</i> and <i>Valiant</i>)	2	2016 2017	(i) Constructed at M/s GSL. (ii) Purchased by Mauritius.
7.	Passenger Variant Dornier	1	2021	On lease till new Dornier aircraft is provided by India against Defence Line of Credit.
Myanmar				
1.	Submarine	1	2020	Myanmar, renamed UMS <i>Minye Thein Khatbu</i> .
Seychelles				
1.	Ex-INS <i>Tarasa</i> (PS <i>Constant</i>)	1	2014	Refitted and gifted.
2.	Dornier DO-228	2	2013 2018	Undergone routine overhaul in India.
3.	PB Hermes/Ex-ICGS C 405	1	2016	Nil
4.	Coastal Radar System (CRS)	6	2018	Gifted under Government of India Aid.
5.	Fast Patrol Vessel (FPVs) <i>Zoroaster</i>	1	2021	Newly constructed vessel at M/s GRSE.
Sri Lanka				
1.	Ex-ICG OPV <i>Varaha</i> (SLNS <i>Sagara</i>)	1	2011	Gifted.

Ser	Asset	Numbers	Year	Remarks
2.	Advanced Offshore Patrol Vessel	2	2017 2018	(i) Purchased by Government of Sri Lanka. (ii) Spares/assistance being provided on case to case basis, post Ministry of Defence (MoD) approval.
Mozambique				
1.	ICG FIBs	2	2019	Gifted.
2.	IN FICs	2	2021	Gifted.
Vietnam				
1.	Ex-Petya/Minesweeper Class Spares	638/48 tons	2011/2020	Spares provided gratis.

⚓ Operational Interactions

The *IN* also interacts with friendly maritime forces in specific professional mechanisms, to enhance mutual understanding, operational coordination and maritime security cooperation. These include Milan, International Maritime Boundary Line (IMBL) Meetings, and Anti-Piracy cooperative mechanisms. The mechanism of holding regular meetings at the IMBL between maritime forces of neighbouring states, facilitates mutual understanding and communication between local Commanders, for clarification of issues, coordination and cooperation, so as to maintain stability. Sharing and building of MDA is fast emerging as a vital addition to such operational interactions. While details on Anti-Piracy are covered in a separate section in this volume, the details of Exercise Milan conducted in the last decade and the growth of cooperation in information sharing and building of MDA are covered below.

Exercise Milan: Milan is a multilateral exercise hosted by the Indian Navy. It is conducted biennially and first began in 1995 with the navies of Indonesia, Singapore, Sri Lanka and Thailand as participants. Since 1995, the *IN* has held eleven editions of Exercise Milan, ten at Port Blair and one at Visakhapatnam. The event was not held in 2005, due to the 2004 Indian Ocean earthquake and tsunami, and was subsequently rescheduled to 2006. The 2001 and 2016 editions of Milan were not held in view of the planned IFRs in those years.

Exercise Milan aim to foster cooperation between participating friendly foreign navies and learn best practices from each other. Originally conceived in consonance with India's Look East Policy, Exercise Milan, over the years, has increased both in size (in terms of participating members) and in scope (with the evolving foreign policy initiatives such as the Act East Policy and SAGAR). Taking this growth into account, a decision was taken to host the eleventh Exercise at Visakhapatnam on 18–28 March 2020. This edition was, however postponed, due to COVID-19 pandemic and was eventually held from 25 February to 4 March 2022 in Visakhapatnam. Milan 2022 was also conjoined with PFR 2022. Since 2011, the Exercise was held in 2012, 2014, 2018 and 2022. Further details are provided in the Surface Operations chapter.



Milan 2014

Milan 2022

The eleventh edition was conducted at Visakhapatnam from 25 February to 4 March 2022. This edition of the Exercise saw the largest representation, with over forty countries participating. Under the aegis of Milan 2022, an international seminar, 'Harnessing Collective Maritime Competence through Collaboration', a Deep Submergence Rescue Vehicle (DSRV) demonstration, sports fixtures, cultural visits to Agra and Bodh Gaya, an Op Demo and an International City Parade were conducted.

Learning from the experience of IFR 2016, also held at Visakhapatnam, as well as the significant scaling-up in the participation of foreign navies, a decision was taken to set up various committees akin to IFR 2016 for smooth coordination and conduct of activities related to Milan 2022. Some of the major coordinating committees included:

- **PFR and Milan Cell (PMC 2022):** PFR and Milan Cell (PMC 2022) was established to coordinate all activities associated with the events.
- **Guest, Reception, Invitation and Protocol (GRIP) Cell:** The GRIP Control Cell (GCC)

was set up at INS *Virbahu's* Conference Room and was manned round the clock. The GCC, exercised Command and Control over all Reception Cells and coordinated all aspects of reception of all invitees.

- **Other Units and Coordination Committees:** Committees were also set up at Headquarters Eastern Fleet for Hospitality; Commodore Commanding Submarines (COMCOS) for the International Maritime Seminar; Eksila for cultural visits; Naval Dockyard (Vizag) for Maritime Defence Expo; INS *Kalinga* and INS *Karna* for City Parade, and others.

⚓ High-Level Maritime Strategic Interactions

High-level maritime strategic interactions are periodically held with other nations to improve strategic communication, share maritime strategic perspectives, and review measures for maritime cooperation. These also serve to shape maritime policy in a cooperative, balanced and mutually beneficial manner, and facilitate persuasion or dissuasion, where necessary.⁶ The interactions are



Milan 2022

conducted by way of high-level visits, delegations and dialogues between India and other countries, in bilateral and multilateral mechanisms. Some key IOR mechanisms in this regard are:

Maritime Security Focus in IORA: The IORA was formed in 1997, with India as a founding member. Since the 2011 meeting in Bengaluru, IORA has highlighted the key linkage of maritime security with regional economic growth and development.⁷ It has also endorsed the role of the Indian Ocean Naval Symposium, and called for IORA's work on maritime security to align with and complement IONS initiatives.⁸

Indian Ocean Naval Symposium: IONS was conceptualized and activated by the *IN* in 2008, as a regional forum for navies of the Indian Ocean. It provides a platform wherein the Naval Chiefs can regularly meet, as a mechanism for constructive engagement, to review and enhance common maritime security. The IONS has gained momentum since inception, with a steady growth in activities that address the range of maritime security challenges. The chairmanship of IONS has been held by India (2008–10), the UAE (2010–12), South Africa (2012–14), Australia (2014–16), Bangladesh (2016–18) and the Islamic Republic of Iran (2018–21). France assumed the Chairmanship on 29 June 2021 for a two-year tenure. Details of IONS conducted in the last decade are tabulated below.

IONS Edition	Host	Date
3rd	South Africa	10–14 April 2012
4th	Australia	26 March 2014
5th	Bangladesh	11–13 January 2016
6th	Iran	22–25 April 2018
7th	La Réunion	28 June–1 July 21

UN Mission in Somalia (UNSOM): In a bid to revive the UN Mission in Somalia after a gap of nearly two decades, and keeping with the Navy's outreach to the IOR littoral states, in October

2013, the *IN* appointed Cdr Raghu R Nair to the UNSOM at Mogadishu. The representation by *IN* continues to date.

🚢 Conclusion

The two PFRs of 2011 and 2022, the IFR of 2016, and the other editions of Milan (2012, 2018 and 2022) need to be viewed in totality and as a continuum to discuss their significance and deduce the takeaways.

First, assembly of ships for events like these underscore India's increasing combat power. These are akin to the Republic Day Parade, where the Army and the IAF are able to showcase their hardware but the Navy faces constraints, given that our combatants and combat power are best seen at sea. The assemblage of ships in this decade would fill anyone with pride, indicating the transformation from a very tiny Navy to one of the biggest in the world.

Second, such events showcase our growing indigenization efforts. Every passing year sees greater Indian content among Indian ships, aircraft and submarines on display. While there is much work still to be done, events such as these are the best advertisement for our necessary prowess in shipbuilding and our skills at integration.

Third, these events bring to fore the professionalism of the *IN* and its men and women. Apart from the main event itself, several sidelights such as Op demo, air show, etc., give an opportunity for display of professional skills. That apart, the precision, efficiency and hospitality ultimately reflect the ethos and conduct of the Service and earn several equities for it. These are essentially intangible attributes, but can be discussed in the long run.

Fourth, events like this also help to act as 'tourism magnets' for India. Men and women of foreign ships and delegations number in thousands and visit the port of call and other places nearby. Apart from boost to local economy, good synergy

between Naval and civil authorities ensures that several soft power aspects such as culture, cuisine, crafts etc., are embedded in the event itinerary, thus aiding in enhancing India's image globally.

Fifth, these events also enable a better and deeper connect between Indian citizens and the Navy. While the locals in the city where the events are held get to directly experience or be part of these events, the effective use of media and social media enable greater numbers of fellow Indians to watch and witness the events and get to understand the Navy. This is important in a country like India where maritime awareness is still a 'work in progress'.

As Ambassador Yogendra Kumar (Retd) noted in October 2019, during his address at Indian Institute of Information Technology (Dharwad):

The maritime dimension of India's regional and global diplomacy has assumed even greater salience with the onset of globalisation, since the end of the Cold War in 1991, as the seaborne commerce has become a critical component of this process. This has meant attention not only to the general state of the oceans but also the freedom of navigation and overflight across narrow oceanic chokepoints, safety and security of sealines of communications, illegal exploitation of the resources of maritime zones, security threats from the seas, naval rivalry between powers big and small, and the efficacy of governance mechanisms for the seas to meet wider challenges such as the negative impact of climate change, sustainable use of marine resources and the overall health of the oceans.

The *IN's* ability to simultaneously engage and bring together foreign countries on a common platform, despite background complexities and competition in their individual bilateral relations, is a sign of India's acceptance as a rational and legitimate actor.

Maritime diplomacy domain events like IFRs and Milan are force-multipliers. It is possible to see

an organic connect between the theme of IFR-01 ('Building Bridges of Friendship'; in other words meet, greet, and get to know), to the theme of IFR-16 ('United through Oceans', i.e., acknowledging the commonality of opportunity and threats on the ocean), to the theme of Milan 2022 ('Harnessing Collective Maritime competence'; in other words, let's do something about this together).

Of the huge bouquet of maritime diplomatic activities that the *IN* is involved in, IFR and Milan—apart from other multilateral constructs like IONS, Goa Maritime Conclave, etc.—do much to put India in a pole position as the initiator/pioneer of collaborative ventures seeking 'common good'. Along with our bilateral Naval engagements, it strengthens our relationship with other nations and contributes to India's diplomatic standing. It may be foreseen that in future such events will not only be larger in scope and magnified, but also have greater depth and width in terms of maritime engagements and interactions.

Notes

- 1 Indian Navy (2015). *Ensuring Secure Seas: Indian Maritime Security Strategy*. Indian Navy Naval Strategic Publication (NSP). 1.2 New Delhi: Ministry of Defence (Navy), Government of India. https://www.indiannavy.nic.in/sites/default/files/Indian_Maritime_Security_Strategy_Document_25Jan16.pdf
- 2 Australia, Bangladesh, France, Indonesia, Japan, Malaysia, Myanmar, Oman, Qatar, Russia, Saudi Arabia, Singapore, Sri Lanka, United Arab Emirates, United Kingdom, United States of America, and Vietnam. Details available at PIB/MoD press release (21 March 2022): Maritime Cooperation with Regional Partners. <https://pib.gov.in/PressReleaseDetail.aspx?PRID=1807607>
- 3 Kakadu, Milan, Komodo, IONS Exercise, Mighty Shield, EOD Exercise 2-JA, CUTLASS Express, IMX, WPNS, RIMPAC, Sea Dragon, Black Carillion, SITMEX, IBSAMAR, MARISX, SEACAT. Details available at PIB/MoD press release (21 March 2022): Maritime Cooperation with Regional Partners. <https://pib.gov.in/PressReleaseDetail.aspx?PRID=1807607>
- 4 A medium to large trading vessel.
- 5 An armed vessel with sails and oars, formerly used in Asian waters.
- 6 Indian Maritime Doctrine, INBR 8 (2004). The document states on page 30: Persuasion is convincing another state, by diplomatic means and without the threat or use of force, to carry out certain actions

that are in its own interests, by emphasising the benefits of the actions to that state. Dissuasion is convincing another state, by diplomatic means and without the threat or use of force, to desist from carrying out certain actions that are inimical to our interests, by emphasising the disadvantages of the actions to that state.

7 Bengaluru Communiqué, 11th Meeting of the Council of

8

Ministers of the IORA, 15 November 2011. www.iora.net/documents/communique.aspx, last accessed on 17 July 2015
Perth Communiqué, 13th Meeting of the Council of Ministers of the IORA, 1 November 2013, and 14th Meeting on 9 October 2014. Last accessed on 17 July 2015. www.iora.net/documents/communique.aspx.



14 | Coast Guard

⚓ Historical Background

Ever since the 1960s, the Indian Navy (*IN*) had been requesting the Government of India to set up an auxiliary service for Maritime Law Enforcement and undertaking ‘Safety and Protection’ tasks in Indian waters. Deployment of sophisticated and high-value naval warships and assets was clearly not an optimal alternative for these tasks. In due course, this logic of the *IN* was accepted by the Government, especially because by the early 1970s, two other important factors had contributed to the rationale for the early institution of a ‘Coast Guard’ service.

First, the rampant seaborne smuggling across the seas that threatened the nation’s economy. Existing maritime agencies such as the Customs and the Fisheries Department did not have the capability to contain this large-scale smuggling activity, and intercept illegal vessels even within territorial waters. The Government set up the Nag Committee in 1970 to examine the growing menace of smuggling. The Committee recommended the need for a separate marine force to deal with smuggling activities.¹

Second, in 1973 during a discussion at the United Nations (UN’s) Third Conference on the Laws of the Seas, the need to enforce national jurisdiction in the maritime zones was recognized by the Government of India. It was also felt that such law enforcement should not be undertaken by the *IN*, as that could detract from the *IN*

essaying its operational role. Also, the deployment of sophisticated warships and manpower trained for specialized roles on law-enforcement tasks in peacetime was neither considered prudent, nor cost-effective.

Accordingly, in September 1974, a committee was constituted under the Chairmanship of KF Rustamji, an acclaimed police officer, to study the problem of seaborne smuggling and the question of setting up a Coast Guard. In 1977, Union Cabinet approved the setting up of a Coast Guard (CG) and the organization came into being on 1 February 1977. The Coast Guard Act was enacted in Parliament on 18 August 1978.

The major objective for the establishment of the CG was to undertake peacetime tasks of ensuring the security of the maritime zones of India (MZI). Thirdly, apart from this primary role, since its inception, the CG has been assigned multiple roles. Some of these include:

- Enforcement of Maritime Zones of India Act of 1976;
- Ensuring safety of artificial islands, offshore terminals, installations and other structures in any maritime zone;
- Protection and assistance to fishermen during times of distress at sea;
- Preservation and protection of maritime environment, and control of marine pollution;
- Assisting Customs and other authorities in anti-smuggling operations;

- Undertaking precautionary measures for the safety of life and property at sea and collection of scientific data; and
- Assistance to civil administration for disaster relief.

Since its inception, additional duties have further been assigned to the CG as follows:²

- National Maritime Search and Rescue (SAR) Coordination Authority;
- Coordinating Authority for National Oil-Spill Disasters;
- Coordination for security in offshore oil-fields;
- Focal point in India for coordinating Anti-Piracy Operations; and
- Lead Intelligence Agency for maritime borders.

At its inception in 1977, the CG consisted of two frigates (INS *Kirpan* and INS *Kuthar*) seconded from the IN, and five patrol boats (*Pamban*, *Puri*, *Pulicat*, *Panaji* and *Panvel*). From 1983 onwards, in successive Five Year Plans, the CG built up its

resources using indigenously constructed offshore, inshore and fast patrol vessels, interceptor boats, interceptor craft and hovercraft. It also inducted Seaward Defence Boats, Offshore Patrol Vessels (OPVs) with Chetak helicopters embarked.

A Helicopter Squadron was commissioned in 1982 and a maritime Surveillance Squadron was commissioned in 1983. From its inception in 1977, primarily to counter seaborne smuggling activities, the organization has grown both in response to its growing role, as well as the rising threat dimensions. The Mumbai 2008 terror attacks, wherein terrorists infiltrated the country through the sea route, led to the reimagining of national security architecture largely shadowed by terrestrial concerns to the new threats emerging from the maritime domain.

Among the many major organizational changes brought about post the Mumbai blasts of 2008, the IN, in 2009, was designated as the authority responsible for overall maritime security (including coastal security and offshore security), while the CG was designated as the authority responsible for coastal security in territorial waters, including



Mumbai Terror Attacks (2008)

areas to be patrolled by the Coastal Police. In order to bring about greater coordination and cohesion among various agencies involved in Coastal Security, the CG was directed to prepare a Standard Operating Procedure (SOP) in consultation with the Ministry of Home Affairs (MHA) and State Governments, and submit the same to the Ministry of Defence (MoD) for approval. Final SOPs in respect of all the coastal states were promulgated between June 2010 and September 2010.³

⚓ Journey Through the Decade

Increase of Maritime and Aviation Assets: At the end of the previous decade (2001–10) the CG had a force level of forty-three ships, forty-five aircraft and helicopters, twenty-four boats/craft and twenty-three non-commissioned boats/craft in its fleet to carry out regular surveillance of the MZI and the areas of interest.⁴ By the end of 2021, these force levels had increased to 156 ships and 62 aircraft in its inventory and is further likely to expand to achieve targeted force levels of 200 surface platforms and 80 aircraft by 2025.⁵



CG Ships in Action

The number of CG stations also increased from twenty-two in 2008 to more than seventy as on date. With a need to provide capacity to the CG for maritime surveillance, between 2010 and 2014, twelve Dornier surveillance aircraft were added

to its fleet. In order to take the modernization plans of the CG on a further trajectory of growth and capability, in 2017, the MoD approved a Definitive Action Programme (2017–22) worth Rs 36,068 crore.

The CG has also got a nod from the MoD for the procurement of fourteen Twin Engine Heavy Helicopters (TEHH), which would allow the CG to undertake missions to prevent maritime



CG Dornier

terrorism, infiltration of terrorists by sea routes, and carry our SAR operations. As per present timelines, the contract for procurement of fourteen TEHH is likely to be signed in 2022. The aircraft are likely to be delivered to the CG by 2025–26.

In 2012, Vice Admiral (Retired) GM Hiranandani, noted:⁶

The evolution of the Coast Guard has been remarkably cost effective. Most of its ships and aircraft are indigenous. With the Navy's help, its manning and training have been extremely economical. Its anti-poaching operations, its anti-smuggling assistance to the Customs, its pollution-control operations, its protection to endangered marine species like the Olive Ridley turtles on the Orissa coast, its Search and Rescue Operations, its sustained round-the-clock surveillance in the shallow waters of the Palk Bay between Tamil Nadu and Sri Lanka, all have been invaluable.

The subsequent paragraphs broadly elucidate the CG's events and actions that were undertaken or had a joint effort with the Indian Navy. The events are not exhaustive but more indicative of the growing stature and capability of the CG in the maritime security scenario in the performance of the organizational stated roles and responsibilities.

Coastal Security: While many of the actions taken post the 2008 Mumbai attacks, with regard to Coastal Security have been covered in a separate section in this volume, some of the salient actions taken by the CG in concert with the *IN* include the following:

- **Coastal Security Exercises:** Since 2009, more than 300 Coastal Security exercises have been conducted by the CG in close coordination with coastal State Governments and state Maritime Police for enhancing the effectiveness of coordinated patrolling and validation of the SOPs as well.



Coastal Security Exercise

- **Coastal Security Operations:** The deployment of CG ships and aircraft for Coastal Security, in addition to patrolling in the Exclusive Economic Zone (EEZ), has seen a substantial rise. More

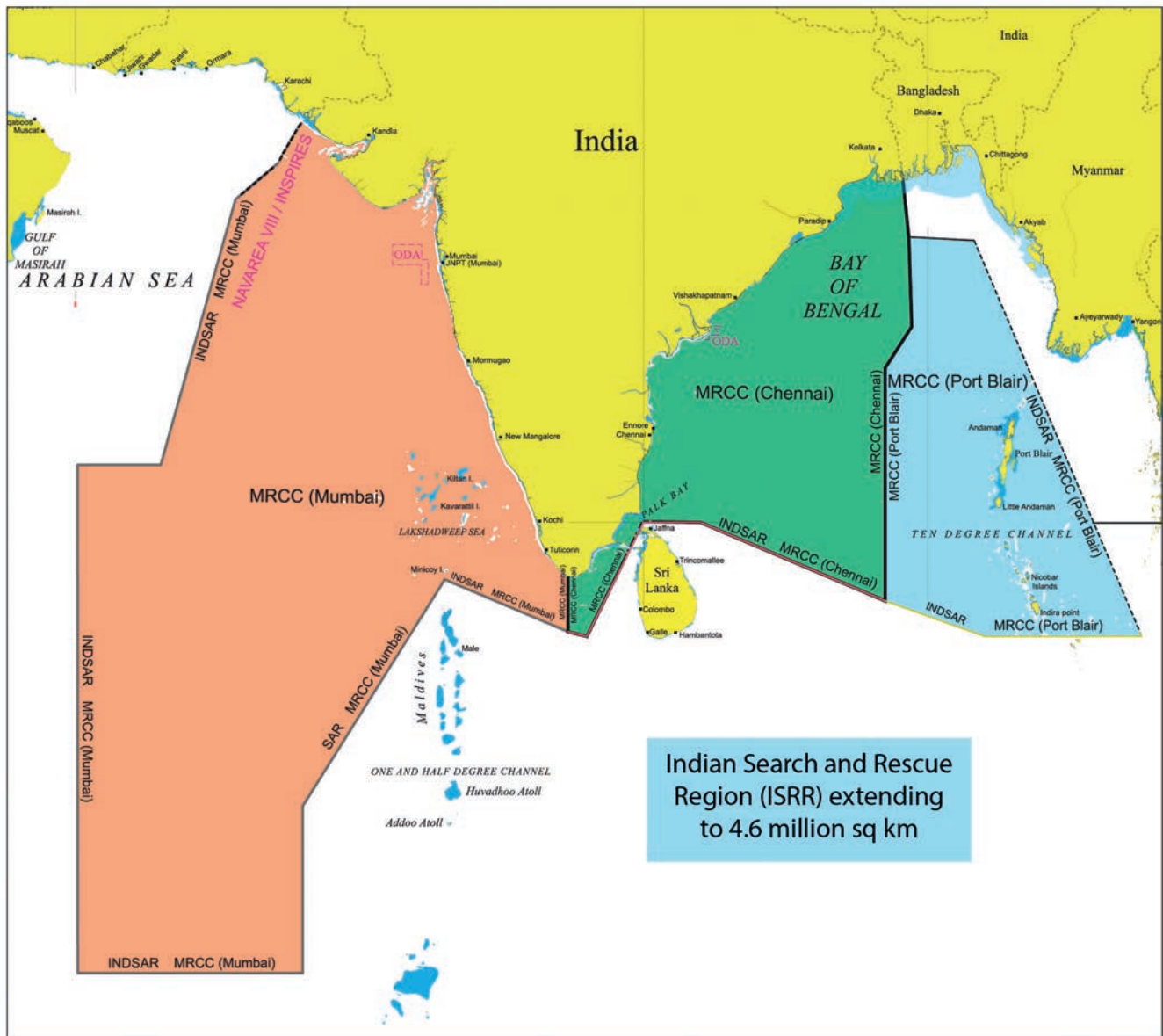
than 400 Coastal Security operations have been conducted within the EEZ since 2009, in coordination with all stakeholders.



CG Coastal Security Operations Off Kolkata

- **Exercise Sea Vigil:** The maiden, large scale, pan India Coastal Defence Exercise, SEA VIGIL-19, steered by the *IN* was conducted along the entire Indian coastline and the EEZ on 22–23 January 2019. The Exercise was conducted with the aim of simultaneously activating all agencies involved in the coastal security construct, and identifying gaps and mitigating measures. Other than the *IN* and the CG, all remaining stakeholders involved in the nation's Coastal Security framework also participated in the Exercise. The second edition of this Exercise was conducted in January 2021.

Search and Rescue: SAR is an important function of the CG, as it is the nodal agency for coordinating maritime SAR in the Indian Search and Rescue Region (ISRR) extending to 4.6 million sq km.



Indian Search and Rescue Region

Significant SAR Missions Conducted by the CG

Date	Operation/Location	Remarks
25–29 March 2011	Operation Bachaav/ Myanmar	The Operation was conducted by CG Ships <i>Varad</i> , <i>Durgabai Deshmukh</i> , <i>Aruna Asaf Ali</i> , and <i>Diglipur</i> for SAR of missing Myanmar fishermen. A total of 133 Myanmar fishermen were rescued.
12 June 2013	Rescue Mission/South of Kavaratti Island	CGS <i>Varuna</i> and a Dornier 228 were pressed into service, which resulted in rescue of 22 crew from the vessel <i>MV Asian Express</i> .
12 October 2013	Rescue Mission due to Cyclone Phailin/Southwest of Paradip Port	CGS <i>Vajra</i> conducted rescue of 18 fishermen and 2 fishing boats.

Date	Operation/Location	Remarks
1 January 2014	Assistance/Off the Kerala Coast	CGS C-404 assisted a disabled fishing boat.
2 February 2014	Assistance/Off Goa	CGS C-148 provided technical assistance to the flooded boat MFB <i>Sabitya</i> .
9 September 2014	Rescue/Off North Okha	Two Air Cushion Vessels and a Marine Police Boat rescued fishermen from a partially sunk fishing boat <i>Suvarna Raj</i> .
17 February 2015	Rescue/Off Elephanta Islands, near Mumbai	ACV H-194 was pressed into service to rescue 78 passengers stranded off Elephanta Island on the boat <i>Navrang</i> .
9–20 August 2016	Rescue Mission/North Bay of Bengal	257 Indian fishermen and 66 Bangladeshi fishermen were rescued.
22 July–29 September 2016	Operation Talash/Bay of Bengal	Operation Talash for missing IAF AN-32 aircraft.
4 April 2017	Assistance/Off Colombo, Sri Lanka	CGS <i>Shoor</i> was pressed into service for joint firefighting assistance along with the <i>IN</i> to a Panama-flagged container vessel, MSC <i>Daniela</i> . The fire was brought under control after 30 hours, on 6 April 2017.
13 January 2018	Rescue/Parnaka Beach, Dahanu, Maharashtra	CGS <i>Dahanu</i> rescued 34 school children from a capsized private boat.
17–18 January 2018	Assistance /Off Kandla Port	CGS <i>Samudra Puvak</i> provided firefighting assistance to India-flagged MT <i>Genessa</i> .
6 March 2018	Rescue /West of Agatti Island	Fire onboard container MV <i>Maersk Honam</i> , rescued 23 out of 27 crew.
21 January 2019	Rescue/Off Kurmagadgudda Island	With coordinated efforts from <i>IN</i> , local fishermen and Coastal Security Police teams, rescued 19 out of 35 tourists from a capsized boat.
25 January 2019	Rescue/Off Prongs Lighthouse	CGS C-439 rescued 7 crew onboard the sinking vessel MSV <i>Amar Jyoti</i> .
16 March 2019	Assistance/Off New Mangalore	CGS <i>Vikram</i> and CGS <i>Sujay</i> undertook firefighting and de-flooding operation onboard Research Vessel ORV <i>Sagar Sampada</i> , which carried 36 crew and 16 scientists.
26 May 2021	Assistance/Eastern Seaboard, Andaman and Nicobar Islands	CG teams ensured safe return of 265 fishing boats that were out at sea, as a preventive measure against the Very Severe Cyclonic Storm 'Yaas', which made landfall on the Odisha coast.
30 May 2021	Assistance/Off Colombo, Sri Lanka	CG worked in tandem with Sri Lankan authorities, to extinguish a massive fire onboard container vessel MV X- <i>Press Pearl</i> off Colombo, Sri Lanka.



SAR Operations Off Tuticorin



Firefighting Operations for Singapore Flagged MV X-Press Pearl Off Sri Lanka

CG Participation and Activities at ReCAAP:

India continues to be an integral part of the Regional Cooperation Agreement to Combat Piracy and Armed Robbery (ReCAAP) against ships in Asia, and aims at information sharing, capacity building, mutual legal assistance and cooperative agreements in the field of prevention of piracy and armed robbery. The agreement involves twenty countries, and CG is the nodal organization in India for the implementation of the measures under this agreement. Some of the CG's major contributions through the decade at this forum include:

- The CG, along with the ReCAAP Information Sharing Centre (ISC), co-hosted the Capacity

Building Workshop at Goa on 14–18 November 2011.

- An International Seminar on 'Regional Cooperation for Safe and Secure Sea' was conducted on 8–10 February 2017 at Goa to commemorate the fortieth Anniversary of the establishment of the CG and the tenth Anniversary of ReCAAP, wherein fifteen countries participated.
- Later the same year, the CG co-hosted the tenth Capacity Building Workshop with ReCAAP's ISC, on 11–12 December 2017, in New Delhi.
- In August 2021, ICG Director General K Natarajan was elected as the next Executive Director of ReCAAP ISC, Singapore.⁷

Marine Pollution Response: The CG is the nodal agency for combating air pollution at sea and is the Central Coordinating Authority (CCA) for implementing the provisions of the National Oil Spill Disaster Contingency Plan (NOS-DCP). Two major initiatives by the CG through the decade include the following:

- Conduct of International Maritime Organization (IMO) Oil Pollution Preparedness, Response and Cooperation (OPRC) level 1 and level 2 courses in Mumbai, under the Indo-Maldives-Sri Lanka trilateral programme from 25 November to 6 December 2013.
- The Government of India deposited the instrument of consent with the South Asia Cooperative Environment Programme (SACEP), Colombo, Sri Lanka, on 12 May 2018 with respect to the MoU for cooperation in response to oil and chemical pollution in the South Asian Seas Region, comprising the

five maritime nations—India, Bangladesh, the Maldives, Pakistan and Sri Lanka.

National Level Pollution Response Exercise (NATPOLREX): The following were conducted during the decade.

- The third edition of NATPOLREX was conducted in January 2011 in Mumbai. CGS *Samudra Prahari* was deployed for this Exercise.
- The fourth edition of NATPOLREX was conducted at Kochi in December 2012. It aimed at testing the preparation and coordination between various agencies, in response to marine oil spills. The CG's pollution control vessel, *Samudra Prahari*, along with six other CG ships, CG aircraft, one *IN* Ship, a tanker from the Shipping Corporation of India (SCI) and vessels from Bharat Petroleum (BPCL) and the Cochin Port Trust took part in the Exercise.
- The fifth edition of NATPOLREX was conducted on 10 December 2013 in Mumbai. Seven CG ships, two CG helicopters, two CG Dornier aircraft, one ship, one IAF C-130J Super Hercules aircraft, two vessels of the ONGC, one tug of the Jawaharlal Nehru Port Trust (JNPT), one tug of the Mumbai Port Trust and one tanker of SCI participated in the Exercise. In addition, representatives of Mumbai, State Disaster



NATPOLREX VI Off Mundra

Management Authority, National Institute of Oceanography, Oil Industry Safety Directorate, Maharashtra Pollution Control Board and other oil companies witnessed the Exercise.

- The sixth edition of NATPOLREX, titled '*Swachh Lehar*', was conducted at sea off Mundra on 21 December 2016. The highlight of the Exercise was participation of two CG Pollution Control Vessels (PCVs) and integration of IAF C-130J Super Hercules aircraft into the Oil Spill Disaster Management System for aerial assessment/delivery of Oil Spill Dispersant (OSD) for mitigation of the spilt oil. Two representatives from Sri Lanka, and one each from Bangladesh and Australia, also participated in the Exercise as International Observers.
- The seventh edition of NATPOLREX was held in Mumbai on 7–9 January 2019. During the Exercise, twenty-four foreign delegates from nineteen countries and seventy-five Indian delegates from Central and State departments, major and non-major ports, Oil Handling Agencies and Oil Installation Onshore participated.

Indian Coast Guard Academy at Azhikkal: The foundation stone for the Coast Guard Academy to be built at Azhikkal, Kerala, was laid on 28 May 2011. The Academy was to cater for training requirements of all maritime-specific courses for personnel of the CG, Navy, Marine Police and personnel of the littoral countries. However, the project hit a hurdle in 2019 with the new Coastal Regulation Zone (CRZ) rules that barred constructions in environmentally sensitive areas near the coast.⁸ Subsequently, in September 2020, an alternative site of 158 acres in Mangaluru in Karnataka,⁹ was allocated for setting up of this Academy.

International Cooperation

Giftng and Transfer of Ships

Permanent Transfer of CGS *Varaha* to Sri Lanka:

CGS *Varaha*, which had been given on lease to Sri Lanka in April 2006, was permanently transferred to Sri Lanka in August 2015.

Giftng of CG Boat Interceptor Boat C-405 to the

Seychelles: CG Interceptor Boat C-405 was gifted to the Government of the Seychelles in January 2016.

Transfer of Interceptor Boat to Mauritius:

Interceptor Boat C-139 was transferred to Mauritius in March 2017.

Transfer of CGS *Varuna* to Sri Lanka:

CGS *Varuna* was transferred to Sri Lanka for training and EEZ surveillance purposes in September 2017.

Giftng of Interceptor Boats to Government of

Mozambique: Two interceptor boats—C-442 and C-443—were gifted to Mozambique in 2018.

Memoranda of Understanding Concluded

For the establishment of collaborative relationship to combat transnational illegal activities at sea and develop cooperation between Coast Guards of countries in the region, the following MoUs were concluded:

- with the Vietnam Coast Guard (VCG) on 25 May 2015;
- with the Bangladesh Coast Guard (BCG) on 6 June 2015; and

- with the Sri Lanka Coast Guard (SLCG) on 9 May 2018.

Notes

- 1 https://indiancoastguard.gov.in/content/290_3_History.aspx; Last accessed on 18 July 22 1030 hrs
- 2 Ministry of Defence (2012). *Annual Report 2011–12*. New Delhi: Government of India. <https://www.mod.gov.in/sites/default/files/AR1112.pdf>
- 3 Comptroller and Auditor General of India (2011). ‘Chapter 5: Patrolling and Security Issues’. In *Performance Audit on the Role and Functioning of the Indian Coast Guard*. New Delhi: Government of India. https://cag.gov.in/uploads/download_audit_report/2011/Union_Performance_Defence_Services_Role_and_Functioning_Indian_Coast_guard_7_2011_chapter_5.pdf
- 4 Ministry of Defence (2010). *Annual Report 2009–10*. New Delhi: Government of India. <https://www.mod.gov.in/sites/default/files/AR910.pdf>
- 5 PIB/MoD press release (31 January 2021): Indian Coast Guard will celebrate 45th Raising Day. <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1693670#:~:text=Indian%20Coast%20Guard%20is%20celebrating,and%2080%20aircraft%20by%202025>.
- 6 Hiranandani (Retd), Vice Admiral GM (2008). ‘Indian Coast Guard’. Excerpt quoted in *Indian Defence Review*, 15 May 2012. <http://www.indiandefencereview.com/interviews/indian-coast-guard/>[Excerpted from: Verma, B, Hiranandani, GM, and Pandey, BK.(2009) *Indian Armed Forces*. New Delhi: Lancer Publishers.]
- 7 MEA press release (5 August 2021): Election of Mr. K. Natarajan as next Executive Director of ReCAAP. https://www.mea.gov.in/pressreleases.htm?dtl/34138/Election_of_Mr_K_Natarajan_as_next_Executive_Director_of_ReCAAP
- 8 PIB/MoD press release 2 December 2019: Setting up of Coast Guard Academy in Kerala. <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1594521>
- 9 Defence PRO, Bengaluru. ‘India’s first Coast Guard academy to come up at Mangaluru’. 19 September 2020, 1846 hrs. https://twitter.com/Prodef_blr/status/1307307542335250433





3

Force
Multipliers
and Enablers

15

Communications and Networking Signalling Transition

⚓ Introduction

Communications have been an integral component of naval operations since time immemorial, always a decisive factor in war and a vital asset contributing to the successful conduct of naval operations. Historically, naval communications were broadly classified as either audio (bells, whistles and horns) or visual (flags and lights). Over the years, the scope of naval communications has expanded significantly. Flags, and later Morse, have given way to state-of-the-art radios and satellite communications (SATCOM).

These advances have laid the foundation for revolutionizing personal, organizational and social communications. Evolution of radio communication technologies have not only aided emergence of the ubiquitous cellular phones, but also helped our Armed Forces to make the voyage from wireless sets to SATCOM and Software Defined Radios (SDRs). Networking technologies have paved the way for the transition from field telephones to integrated networks with gigabit data rates, as also broadband internet. Current times are also witness to the progressive infusion of Artificial Intelligence (AI) technologies that are poised to further revolutionize the use

of the electromagnetic spectrum. Advanced communication-system capabilities lead to information superiority, which is essential for success in military operations.

⚓ Naval Communication Reorganization

In the period under review (2011–21), the Indian Navy (*IN*) communications branch underwent a significant reorganization. The post of Assistant Chief of Naval Staff (Communications, Space and Network-Centric Operations; ACNS [CSNCO]) was created on 9 April 2013 and a new directorate—the Directorate of Networks and Space Organization (DNSO)—set up.

The CSNCO Division now comprises the Directorate of Naval Signals (DNS), the Directorate of Networks and Space Operations (DNSO), and the Directorate of Network-Centric Operations (DNCO). The ACNS (CSNCO) is responsible to the Director General Naval Operations (DGNO) (a post also created in April 2013) for all matters related to Communication, Electronic Warfare (EW), Space and Network-Centric Operations. He is the Class Authority on aspects of Communication, EW, Space and Cyber issues. In addition, the CSNCO division is also responsible for the following:

- Control of Strategic and Tactical Communications and EW, and envisioning policy matters relating to terrestrial networks;
- Overseeing policy matters pertaining to space-based communications and applications, including security aspects; and
- Overseeing aspects related to communication security on all types of communication links.

Further, in 2019, consequent to directives of the Commanders Conference 2018, the management of naval networks—including the Naval Unified Domain (NUD), Security Operations Centre (SOC) and Networks Operations Centre (NOC)—was placed under the ambit of the ACNS (CSNCO) under DNSO, which had hitherto been the responsibility of the Directorate of Information Technology (DIT). The DIT would continue to carry out the maintenance functions, applications development, procurement and life-cycle management of the networks. This was primarily done to iron out the various overlaps in the duties of the DNSO and DIT.

⚓ **Role of Communications in the Indian Navy**

The vast area of operations of the *IN* and the continuous expansion of its roles and responsibilities, makes it challenging to specify the role of communications in modern warfare. Naval Communications provide a link between the Commander and his force, whilst concurrently acting as a tool to establish domain awareness of battle space. From the firing of a missile to the launching of an aircraft from a carrier deck, communications have a major role to play in each facet of operations. Robust communication systems in the *IN*—encompassing air, submarine, terrestrial and space-based systems—are mainly utilized as

an information dissemination tool, a command and controls enabler that: facilitates efficient and reliable communications in the area of operations; has flexibility to adapt to changing scenarios in a network-centric operational environment; is scalable for joint operations with sister services; and is interoperable with foreign navies. Thus, documenting specific roles of Naval Communications is a complicated task. Nevertheless, key milestones in *IN* communications achieved over the last decade are outlined in the paragraphs below.

⚓ **Radio Communication and Electronic Warfare**

The Directorate of Naval Signals (DNS) deals with the issues related to Naval Communications and Electronic Warfare. In addition to operational Communication and EW issues, the Directorate's major efforts are directed towards pursuing future acquisitions, and formulating policies and plans towards a robust communication organization in the Indian Navy.

The Electronic Warfare Operations Support Centre: The EWOSC, located at Karanja (Mbi) also functions under the operational control of DNS, and is the nodal centre for operational activities pertaining to EW including database management. The EWOSC was established as an independent unit on 11 March 2013 and designated as the nodal agency for managing the *IN*'s EW database. The EWOSC provides EW operational support to all *IN* Ships, submarines, and aircraft. A significant milestone during the decade was Project Sanchay, II sanctioned in March 2016. The Project is in the process of induction, as a replacement for the current Sanchay EW Op Support Network, and aims to provide an online EW support system accessible even at sea due to improved, robust and secure radio frequency (RF) and space-communication

networks. Project Sanchay II is planned to be deployed in all geographical locations as the current Sanchay system.

Sanchar 2.0 System: Erstwhile Sanchar Automatic Message Switching System (AMSS), which was the *IN*'s introductory AMSS for naval signal traffic across all *IN* units and establishments, has been replaced with Sanchar 2.0 developed by WESEE. It was commissioned on 10 February 2022, by the Chief of the Naval Staff (CNS). This was a major step in making the signal distribution in the *IN* go paperless.



Launch of Sanchar 2.0 by CNS

Advanced Composite Communication System (ACCS): The CCS was indigenously developed by Bharat Electronics Ltd (BEL) for the *IN* about three decades ago. There have been successive upgrades of the system capabilities over the years,

keeping pace with evolving technology and the *IN*'s requirements. The various upgraded versions are the CCS MK1(1980s vintage), MK2 (1990s vintage), MK3 (early 2000 vintage) and current Advanced CCS. The ACCS is a fourth-generation IP-based Integrated Communication System, designed to provide ship-to-ship, ship-to-shore, and ship-to-air communication over VLF, HF, V/UHF and L Band, along with control, remoting and monitoring of radios. INS *Delhi* was the first ship to be installed with an ACCS during the Medium Refit of the ship in 2019.

Software Defined Radio (SDR): The *IN* has been operating legacy communication sets (which are designed on hardware-based architecture) fitted on ships, aircraft, submarines and shore establishments. These single purpose, hardware-based radios have limited capability in terms of data throughput, security, electronic countermeasures (ECCM), and networking. The *IN* envisioned replacement of the legacy radios with multi-band, multi-function, multi-role/mission SDRs progressively. This technology was needed to improve information-sharing and situational awareness through secure voice communications and high data-transfer capabilities. The SDR is a radio in which the operating parameters can be altered over a broad frequency range by making a change in software.

The SDRs are intended to implement enhanced capabilities such as mobile networking, and offer greater flexibility by being able to run more than one waveform or legacy waveforms, on a single hardware platform. Thus, SDRs also help reduce the number of radios installed on board various platforms. SDRs are a key enabler in implementation of next-gen network-centric operations. Accordingly, the development of an SDR for *IN*, under a project with Defence

Research and Development Organisation (DRDO) was undertaken by a consortium comprising the Defence Electronics Applications Laboratory (DEAL), Dehradun; Centre for Development of Advanced Computing (CDAC), Trivandrum; Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru; WESEE; and BEL (Bengaluru), with the aim to harness the expertise of all key players in such a hi-tech project. With induction of these SDRs in 2021, the *IN* has become first of the three Services to operationally exploit indigenous SDRs.

Electronic Support Measures (ESM) Systems: The Varuna ESM system was developed by the Defence Electronics Research Laboratory (DLRL) and manufactured by M/s BEL (Hyderabad). A contract was signed with M/s BEL (Hyd.) for procurement of the ESM systems for fitment on medium-sized ships in March 2014. The system has completed induction and has provided a much-required fillip to the EW capability of the fleets. Another ELINT system, Sanket-S ESM, was procured to augment the ELINT capabilities of minor war vessels. The contract was signed for purchase with M/s BEL (Hyd.) in September 2011 and has completed induction in the Indian Navy. Programme Samudrika was sanctioned in July 2012 for the development of EW systems for ships and aircraft, with DLRL as the developing agency and BEL (Hyd.) as the production agency. The Programme is monitored by a three-tiered mechanism with apex-level monitoring by Samudrika Steering Committee (SSC) chaired by the Deputy Chief of the Naval Staff (DCNS). The programme has successfully developed an indigenous ESM system for ships and aircraft and is in the process of induction.



Varuna ESM System
Source: DRDO

Project Amber: The *IN* was operating the only VLF station in the country at INS *Kattabomman*, Tirunelveli. The installation of one additional VLF transmitter, called Project Amber Phase I was approved by the Government of India in July 2010. Project Amber Phase I VLF transmitter, co-located at INS *Kattabomman* was commissioned in 2014 and commenced transmitting on 31 January 2015.

Integrated Broadcast Application (IBA): The *IN* has been using separate terminals for copying different general RF broadcasts based on frequency and utility. In order to optimize manpower and limited space onboard assets, the Integrated Broadcast Application (IBA) has been developed by WESEE in 2018 and commenced exploitation in 2020 to enable efficient reception/transmission of digital broadcasts on a single terminal onboard, including priority handling of messages over the Naval RF broadcast.

⚓ Network-Centric Operations

Network Centric Operations (NCO) are an emeshed combination of technology and tactics, with the former exponentially multiplying the effectiveness of the latter. The NCO capabilities are primarily aimed at achieving information superiority for collation into a Common Operational Plot (COP)

for a Cooperative Engagement Capability (CEC). NCO is characterised by the rapid acquisition, processing and exchange of mission-essential information amongst all the stakeholders to operate from a COP to partially lift the 'fog of war'.

The Directorate of Network-Centric Operations is responsible for all NCO-related activities of the Indian Navy. This includes efforts towards:

- Operationalizing the *IN*'s NCO capability;
- Operations and maintenance of the *IN*'s situational awareness operational network Trigun;
- Development as well as procurement of advanced NCO solutions;
- Planning and development of applications for use at Information Management and Analysis Centre (IMAC); and
- Functioning of the Information Fusion Centre–Indian Ocean Region (IFC-IOR) and the Coastal Radar System (CRS) with select countries.

Network-Centric Operations are based on the premise that a robustly networked force improves information sharing. This, in turn, enhances the quality of information, provides shared situational awareness, and further enables collaboration and self-synchronization thereby increasing combat effectiveness. The measure of this combat effectiveness is the timely and accurate delivery of ordnance on target. The *IN* has been actively pursuing the incorporation of niche technologies—Multi-Platform Multi Sensor Data Fusion (MPMSDF), and High Level Network Management/High-Speed Data Links to intelligently manage the networks and provide assured Quality of Service, Time Synchronization, Network Security, Satellite Communication and Geospatial Referencing, etc.—towards realization of this NCO capability. The important projects and

initiatives undertaken by the Directorate are briefly discussed in succeeding paragraphs.

Indian Maritime Situational Awareness System: IMSAS is the Trigun Upgrade Project, being jointly pursued by Defence Research and Development Organization (DRDO)/CAIR and DNCO. The Project envisages a phased development of software and provision of suitable hardware towards development of Maritime Domain Awareness solutions for afloat, airborne and shore-based C² centres. The IMSAS Build 1 (Trigun version 5.0) was implemented *IN*-wide in December 2018, along with customized hardware; IMSAS Build 2 (Trigun version 6.0) was deployed as a Proof of Concept (PoC) on select *IN* platforms in February 2020; and IMSAS Build 3 was deployed pan-*IN* in October 2021.

Project National Maritime Domain Awareness (NMDA) Project: Consequent to the Mumbai terror attacks in November 2008, the *IN* prepared an approach paper outlining a nationally integrated approach to MDA. In November 2010, the National Committee on Strengthening Maritime and Coastal Security (NCSMCS) accorded 'Approval in Principle' for Project NMDA. Thereafter, the *IN* was directed to forward a Cabinet Note to the Cabinet Committee on Security (CCS) for the Project to create an institutionalized mechanism to integrate all stakeholder ministries consisting of seven Government of India ministries and fifteen national agencies. The *IN* was steering the Project, but after the creation of post of National Maritime Security Co-ordinator (NMSC) in February 2022, the Draft Cabinet Note was suitably amended and is being progressed for necessary approvals by the Department of Military Affairs.

National Command Control Communications and Intelligence Network: The NC³I Network is an independent network interlinking twenty

IN and thirty-one CG coastal stations, including Joint Operations Centres (JOCs) as well as the IN and the CG Headquarters. The Network was implemented as part of the augmentation of maritime coastal security measures by the Central Government, after the 26 November 2008 terrorist attacks in Mumbai. The IMAC, which is the Network Operations & Nodal Data Centre of the NC³I Network, was inaugurated by then Defence Minister, Shri Manohar Parrikar, on 23 November 2014. The Network generates a real-time Common Operational Picture (COP) of the near coastal and maritime area by gleaning surveillance data on maritime coastal security from various commercial and domestic sources. The VSAT overlay also acts as terrestrial lines connectivity.



CDS visit at IMAC

Information Fusion Centre–Indian Ocean Region (IFC-IOR): The IFC-IOR was launched in December 2018, using the existing facilities at IMAC, Gurugram, with approval for participation by forty member countries. The IFC-IOR aims to enhance maritime security and safety through collaboration with partner countries and multiple

national groups. Since then, the Centre has established linkages with twenty-five countries and thirty-five Maritime Security (MARSEC) centres. The Centre today hosts International Liaison Officers (ILOs) from eleven countries, and two International Observers who joined for three months in April 2022.¹



Engaging with Partners for Enhancing Maritime Domain Awareness (MDA)

⚓ Network and Space Operations

Communication and network-centric capabilities centred on space applications are some of the powerful ICT-based enablers of contemporary warfare. Space applications are the most effective modern tools for communications as well as ISR functions. Network centric capabilities of the force dictate the conduct of modern warfare. Therefore, synergy between communications, space applications, through satellites primarily, have provided for secure and high throughput communications with widely dispersed units making it a key enabler for IN fleets.

The Directorate of Network and Space Operations is the nodal agency for the IN for coordination of all Space and Network related issues. The DNSO also functions as the IN's Space Cell for interactions with the Ministry of

Defence (MoD), Headquarters Integrated Defence Staff (HQIDS), and other organizations like the ISRO for space-related issues. The *IN* Satellite Communications span the Rukmani, MSS and VSAT overlay networks providing a secure communication backbone for extending various operational and Op logistics applications to sea as well as to island territories. The non-commercial or indigenous *IN* SATCOM assets mentioned above are outlined in succeeding paragraphs.

Project Rukmani: The Integrated Communication Network System (ICNS), code-named Project Rukmani was conceived under an MoU signed by the MoD and the Department of Space (DoS) in March 2006 at a total cost of Rs 950 crore. The Project has been executed by ISRO through its commercial arm, Antrix. The major deliverables include GSAT-7 satellite and the Integrated Communication Network System (ICNS) comprising Ground segment, viz., Hubs, and User segment, viz., C, Ku, and UHF SATCOM terminals on ships, submarines and aircraft. Replacement program for GSAT 7, launched in Aug 2013 and has a life of approximately twelve years is being progressed.

Mobile Signalling System (MSS): The MSS was commissioned in 2006 and the shore-to-ship link was made operational in 2008. The MSS is used for messaging between units at sea and shore. The system has been constantly transforming since 2010 for better communication security and data throughputs. MSS is the second online indigenous SATCOM system inducted into the Navy. Multiple Hubs for supporting the MSS Network are operational and *IN* ships, aircraft, submarines and air stations have been installed with MSS terminals.

Navy Enterprise-Wide Network (NEWN): NEWN was commissioned on 14 January 2004. Its primarily role is the setting up of a signals

exchange network among twenty-two Naval stations. This infrastructure was progressively enhanced and augmented to interconnect the Metropolitan Area Networks (MANs) and Local Area Networks (LANs) pan-Navy. Progressively NEWN connectivity was extended to more stations and was also extended to ships on jetties through the implementation of last-mile connectivity, in June 2010. Technology upgrade for NEWN in terms of hardware, protocols and configuration was undertaken to transform the NEWN network into Next-Generation NEWN (Nex-NEWN) in 2012. This was aimed at providing a more secure, reliable state-of-art redundant network which improved the security and quality of service provided.

Presently, Nex-NEWN connects more than fifty naval nodes at various stations across the country and acts as Naval Information Highway, interconnecting various Naval stations and units through terrestrial circuits, and VSAT bandwidth. Nex-NEWN also interfaces with the Rukmani Satellite-based Network for extending connectivity to afloat and airborne platforms. The project VSAT Overlay for Nex-NEWN was executed by M/s Bharat Electronics Limited (BEL) in October 2011, so as to provide SATCOM redundancy to terrestrial links.

Project Naval Communication Network (NCN)

Network for Spectrum: A Tri-Services nationwide project, Network for Spectrum (NFS) was sanctioned by the Cabinet Committee on Infrastructure (CCI) on 3 July 2012 at a cost of Rs 13,334 crore for the setting up of terrestrial network for all the three Services in lieu of the spectrum being surrendered by MoD. It was further enhanced to Rs. 24,664 crore in 2018. The Project is divided into two major segments.

- Creation of a pan-India Tri-Services Optical Fibre Cable (OFC) network interconnecting more than four hundred stations of the three Services, utilizing 57,000 km of National Long Distance (NLD) inter-city OFC. This segment is being steered by the Army. Specific areas of responsibility have been distributed amongst the three Forces. The *IN* is responsible for the coastal OFC route.
- Creation of Service-specific access networks for connecting units within a station, which is steered by respective SHQs. For the *IN*, it entails provisioning of an exclusive 3,000 km of Access OFC backbone with end-to-end connectivity to units within all Naval stations.

Naval Communications Network: The Naval component of Project NFS has been named the NCN. In order to provide focused attention for implementing Project NCN, a separate NCN Cell was established in January 2015. The NCN will support net-centric operations, a key enabler for the war-fighting/administration operations of the *Indian Navy*. The entire Project NCN is divided into four major components: Inter-city OFC connectivity; Intra-site OFC connectivity; Naval Equipment; and, Secrecy Devices. The Project is currently at an advanced stage and aims at shifting the naval networks from the present BSNL-leased lines to a dedicated fibre-optic backbone by 2022. The broad deliverables and advantages of Project NCN are as tabulated below.

Deliverable	Advantages
Exclusive Defence Fibre (Steered by Army with representatives from all three Services)	<ul style="list-style-type: none"> • Better security. • Major increase in bandwidth. • Caters for future bandwidth requirements of Navy vis-à-vis NCO.
Naval Access Network	OFC interconnecting all stations of the Navy.
Network Operations and Security Operations Centre (NOC/SOC)	Two NOCs and SOCs operating under a central NOC/SOC would provide a 24 x 7 monitoring facility.
Data Centres	A unified location for hosting various intra-Navy applications and provisioning access control.
Unified communication	<ul style="list-style-type: none"> • Provisioning of video telephones to all units and Command functionaries. This would ensure greater interaction and regulate frequent travel. • Studio-quality Video Conferencing facility. • VOIP telephones for better security management.
Setting up of Cloud Infrastructure on lines of Infrastructure as a Service (IaaS) model	<ul style="list-style-type: none"> • An enterprise class solution capable of building an independent private cloud as per IaaS model is being set up. • All <i>IN</i> applications will be designed and provisioned on the private cloud (IaaS) with the functionality of self-service, auto scaling, and high availability.
Satellite overlay	<ul style="list-style-type: none"> • For provisioning connectivity to the Andaman & Nicobar, and Lakshadweep & Minicoy Islands. • Transportable Satellite Terminals for HADR operations, remote site connectivity and OFC overlay.

🚢 Indigenous Messaging Applications

Indigenous Mobile Messaging applications *SAMVAD*, developed in 2020 by the Government of India entity Centre of Development for Telematics (C-DOT) to serve as an indigenous and secure alternative to private/foreign-based mobile messaging applications. The application supports the Android/IOS platforms and provides all functionalities akin to private messaging applications, along with enhanced security features and provides personnel with a safe and secure ‘on-the-move’ messaging application.

Government Instant Messaging System (GIMS) is another messaging application, developed and hosted by National Informatics Centre (NIC) under the Ministry of Electronics & Information Technology and is intended for use by various Government of India departments. This also has the same features (like private/foreign messaging applications) and is compatible with Android and IOS platforms. The *IN* has been among the first few organizations involved in the PoC trials of the GIMS application since 2019. The application is hosted on the NIC cloud Meghraj, and would be managed in a federated manner by NIC and *IN* representatives.

🚢 Conclusion

Naval Communications have seen a quantum leap in terms of development and

standardization over the last decade. It has been one of the most crucial facilitators in enhancing the operational reach of the *IN* to what is now. Ships, submarines and aircraft operate independently or in task groups seamlessly with communications that are greatly enhanced in robustness, reliability and security. Bearing in mind the fast-growing technology and applications in the field of communications, in 2014 the *IN* promulgated a comprehensive ‘Indian Navy: Space Vision 2014–2027’ charting out the route for space-based applications and utility. The Communications branch in the *IN* had become such a niche specialization that in 2017, a Communications Doctrine was published providing a guideline to personnel on all the facets of communications—mainly at the operational level. One of the driving forces of the rapid development of communications in the *IN* has been the harnessing and sound employment of modern-day technology. Communications in the *IN* envisions a full spectrum capability to support operational and strategic decision-making requirements in the complex twenty-first century maritime environment.

Note

1. Australia, France, Japan (Resident DA), the Maldives, Mauritius, the Myanmar, Seychelles, Singapore (Resident DA), Sri Lanka, UK and the US. In addition, two Observers from South Africa also joined the Centre in April 2022 for three months.



16

IFC-IOR and IMAC

Enhancing Maritime Domain Awareness

⚓ Introduction

The Indian Ocean Region (IOR) is the commercial highway for large seaborne traffic and critical for the prosperity of many nations. The vastness and connectivity of the oceans also present numerous challenges associated with the maritime domain, such as piracy and armed robbery; trafficking of humans, arms and contraband; Illegal, Unregulated and Unreported (IUU) fishing; and maritime terrorism, to name a few. For India, as a prominent maritime nation, it became indispensable to address these challenges on the seas and, therefore, Maritime Domain Awareness (MDA), as well as information sharing—both within organizations and with other maritime security-related regional organizations—became critical.

The terror attacks on Mumbai on 26 November 2008 highlighted the need to pace up the augmentation of the maritime security infrastructure of the Indian coastline and the seas beyond. The attacks also compelled inter-agency cooperation within the country and with other regional partners, through information assimilation, processing and sharing to achieve holistic maritime security in the Indian Ocean Region (IOR).

⚓ Information Management and Analysis Centre: Inception, Role and Scope

Consequent to the Cabinet Committee on Security (CCS) meeting on 9 February 2012 for setting up of the National Command Control Communication and Intelligence (NC³I) System Network for coastal and maritime security, the Indian Navy (*IN*) established the Information Management and Analysis Centre (IMAC) along with fifty-one subsidiary nodes among the *IN* and the Coast Guard (CG).

The dual responsibilities of the IMAC involve integrating data feeds from national and international sources for developing a Common Operational Picture (COP) for Operational Centres in the *IN* and CG; and monitoring and analysing the white shipping traffic plying in the IOR towards identifying various maritime security challenges in India's Area of Interest.

⚓ National Command Control Communications Intelligence (NC³I) Network

The NC³I is an independent network interlinking twenty *IN* and thirty-one CG Coastal Stations, including joint operating centres (JOCs) and the



Inauguration of IMAC (2014)

headquarters of both Services. The IMAC, along with the NC³I Network, was inaugurated by (then) Raksha Mantri (RM), Shri Manohar Parrikar, on 23 November 2014 at Gurugram, Haryana.

The NC³I network progressively integrates multiple sensors for developing MDA and for inter-agency coordination. Further efforts have been focused on consolidation of hardware, software and manpower training aspects. It is envisaged to strengthen the build-up of a comprehensive MDA for all maritime agencies, and on being a maritime information database. The entire NC³I network was sanctioned in March 2012 and was integrated by Bharat Electronics Ltd (BEL), Bengaluru, in January 2014.

The NC³I Network is envisaged to strengthen and expand National MDA by creating a COP, to provide information and database to pan-India maritime agencies. Indigenous efforts to deploy an MDA-Decision Support Software (MDA-DSS) are underway, Version 3.0 of the MDA-DSS has been deployed at IMAC in October 2020, which would be used across all the fifty-one nodes, after successful testing.

The COP is developed through the fusion of the following data:

Coastal Surveillance Network (CSN): The CSN receives feeds from radar, Automatic Identification System (AIS), meteorological and Electro-Optical (EO) camera, which have been fitted along the Indian coastline. The feed is tapped at the CG's four Regional Operational Centres (ROCs).

National Automatic Identification System (AIS): The AIS is mainly intended to enhance the Safety of Life at Sea (SOLAS) through safe navigation in the marine environment. The SOLAS regulations require ships that have an AIS system on board to exchange data ship-to-ship, and with shore-based facilities. The AIS transponders are fitted on merchant ships, air and traffic management systems and global shipping databases. The National AIS receives the feeds from AIS receivers fitted along the Indian coastline, and the Directorate General of Lighthouses and Lightships (DGLL) integrates the data at National Data Centre (NDC) Mumbai prior to sending feed to IMAC.



IMAC: Monitoring the Oceans

Space (AIS): The feed is received from commercial sources.

Long-Range Ship's Identification and Trafficking (LRIT): This is used for transmitting the ship's position to Government agencies for SOLAS and during emergency Search and Rescue (SAR) operations. The LRIT data is received from the Directorate General of Shipping.

Vessel and Air Traffic Management System (VATMS) East and West: The AIS feed and that of radar stations located on oil rigs in Mumbai and Visakhapatnam, are integrated into the network.

Merchant Ship Informational System (MSIS): White Shipping information that is shared by friendly foreign countries (FFCs), is integrated by MSIS and included in the network.

Sub-20 m Tracking of Fishing Boats: The Indian Space Research Organization (ISRO) has developed an indigenous transponder for tracking of sub-20 m fishing vessels using the GSAT-6

satellite. The satellite feed also forms a part of the data available to NC³I Network.

⚓ Information Fusion Centre–Indian Ocean Region (IFC-IOR)

Setting up of IFC-IOR

The proposal for setting up an IFC-IOR was first mooted by the *IN* in end 2016, through an approach paper forwarded to the Ministry of Defence (MoD), towards assuming/further cementing the mantle of a preferred security partner for the region.

A presentation on the initiative was thereafter made by Navy in March 2017 to MoD and Ministry of External Affairs (MEA) representatives.¹ The proposal focused on the necessity of establishing a collaborative information sharing mechanism with FFCs towards enhancing maritime security cooperation. A case for Approval in Principle (AIP) of Hon'ble RM for the proposal was taken up in

August 2017. The AIP for preparation of a Draft Project Report (DPR) was thereafter accorded in September 2017.



Launch of IFC-IOR (2018)

Necessity/Urgency to Set up IFC-IOR

Maritime Environment in the IOR: Maritime terrorism, piracy, gun running, contraband, human trafficking, unauthorized use of electromagnetic spectrum in territorial waters, environmental pollution, IUU fishing, hydrological data gathering/exploitation of Exclusive Economic Zone (EEZ), and unidentified/unregulated shipping are some of the activities that have a direct bearing on our maritime/national security. The IOR is also prone to a large number of natural disasters that require the seas around to be used for providing succour, and is vital to world trade and economic prosperity of several nations (with 75 per cent of the world's maritime trade and 50 per cent of daily global oil consumption passing through the IOR).

Extra-Regional Presence: In view of its strategic nature, the IOR has always seen considerable extra-regional maritime presence. This presence increased considerably post the 9/11 attacks in the US, and post the advent of piracy off the Horn of Africa. The IOR is thus characterized by jostling for influence by practically all the influential powers and considerable power play thereon.

Requirement of Collaborative Effort: Response to challenges in the IOR, in addition to increased deployment of security forces, requires high quality and reliable MDA. However, the nature of the maritime domain and the sheer scope of activities in the IOR make it impossible for countries to address MDA and Maritime Security requirements, individually. Hence, collaborative effort, as also collaborative mechanisms, between like-minded maritime nations, is considered essential.

Collaborative Maritime Information Exchange: Towards progressing maritime collaboration in the IOR, the *IN* has been given the mandate by the CCS/Hon'ble RM to conclude agreements for unclassified White Shipping Information Exchange (WSIE) with thirty-eight partner nations bilaterally, as also with three multinational groups. Agreements with twenty-two countries and one multinational construct have been concluded. Further, the *IN* at this time was proactively engaging with countries in the IOR, especially with those in our immediate vicinity and other leading extra-regional players, towards enhancing maritime cooperation. This included not only information sharing but also capacity building. The *IN* has helped set up Coastal Radar Chains (CRS) in Sri Lanka, Mauritius, the Maldives and the Seychelles. Efforts are also in hand to replicate this model in certain other IOR countries towards enhancing their individual maritime security endeavours.

Multilateral Constructs: Despite the presence of a number of multilateral information-sharing constructs in the IOR, a pan-IOR construct

for collaboration and information sharing was conspicuous by its absence. Considering the challenges in this region and the need for bolstering maritime security, a collaborative mechanism covering the entire IOR, steered by the *IN*, was considered a necessity.

Launch of IFC-IOR

On 22 December 2018, to meet the contemporary maritime challenges through a collaborative framework of information sharing, the *IN* established the Information Fusion Centre–Indian Ocean Region (IFC-IOR) at Gurugram.

The Centre has since emerged as a nodal maritime information hub having linkages with twenty-five countries and more than thirty-five Maritime Security (MARSEC) centres. The importance of the IFC was highlighted by the Hon'ble PM at the United Nations Security

Council (UNSC) during a High-Level Open Debate on 'Enhancing Maritime Security: A Case for International Cooperation' (9 August 2021). International Liaison Officers (ILOs) from eleven countries² have joined the IFC till date, and many more are expected to join in future. The first ILO from France joined on 2 December 2019.

Maritime Information Sharing Workshops (MISWs)

IFC-IOR conducts various MISWs with partner nations and multinational constructs for collaborative maritime safety and security. Towards this, IFC-IOR conducted an MISW in June 2019 and delegates from about thirty countries of the IOR and beyond, participated in the two-day event. A BIMSTEC Coastal Security Workshop (coordinated by NSCS) was also conducted in November 2019.³ An India–European Union



International Liaison Officers at IFC-IOR

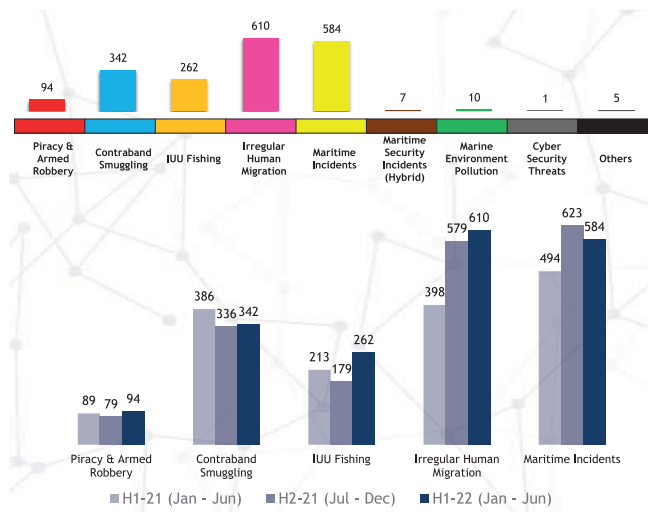


Maritime Information Sharing Workshops (2019)

Interoperability MDA Workshop was jointly conducted by IFC-IOR and EU's Critical Maritime Routes Indian Ocean (CRIMARIO) programme on 8 December 2021.

Periodic Reports

The IFC shares the analysis of maritime-related events such as IUU fishing, human trafficking, narcotics and piracy, with its linkages through regular updates in the form of periodic reports. These maritime issues are also hosted on the IFC-IOR website,⁴ and on the IFC-IOR Twitter handle for a wider audience.

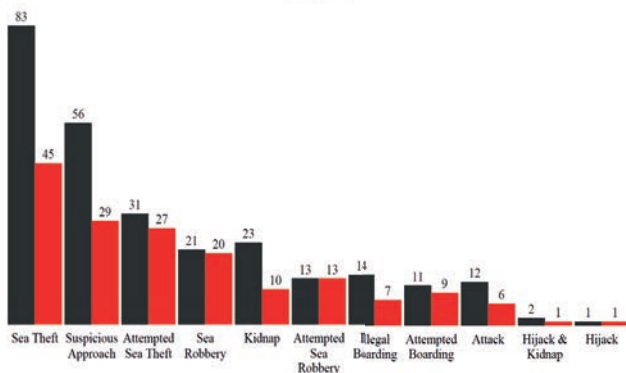


Incident Mapping

Conclusion

Information Management and Analysis Centre, Gurugram, is the National Centre for Network Operations and Nodal Data Centre and is responsible for the continuous and secure operations of this critical network. It is entrusted with generating and disseminating comprehensive and actionable COP by merging diverse inputs sourced from various maritime agencies. It functions round-the-clock, supporting nationwide maritime security.

Type of Incident 2020 vs 2021



Incident Logging

As a regional repository of maritime data, IMAC and the IFC-IOR are aligned with the principles under India's vision of Security and Growth for All in the Region (SAGAR). The IFC-IOR actively liaisons with international maritime centres in the region, viz., IFC Singapore, RMIFC Madagascar, RCOC Seychelles, MSC Oman among others, for comprehensive and credible information sharing. Despite being nascent in its establishment, the IFC-IOR has made notable inroads in the region with more international participation being sought. Together, the establishment of IMAC and IFC-IOR have been a significant step by India

towards promoting maritime safety and security in the region.

Notes

- 1 DNCO: Directorate of Network-Centric Operations; JS (N): Joint Secretary (Navy); JS (IC): Joint Secretary (International Cooperation); JS (D&ISA): Joint Secretary (Disarmament and International Security Affairs); ACNS (CSNCO) – Assistant Chief of Naval Staff (Communications, Space and Network-Centric Operations); ACNS (FCI): Assistant Chief of Naval Staff (Foreign Cooperation and Intelligence)
- 2 Australia, France, Japan, the Maldives, Mauritius, Myanmar, Singapore, the Seychelles, Sri Lanka, the UK and the US.
- 3 BIMSTEC: Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation; NSCS: National Security Council Secretariat
- 4 Website of IFC-IOR available at <https://www.indiannavy.nic.in/ifc-ior/index.html>



17 | Logistics

Sustaining Operational Readiness

⚓ Introduction

The Indian Navy (*IN*) today remains the principal manifestation of India's maritime power and plays a central role in safeguarding and promoting its security and national interests in the maritime domain. The *IN*'s roles and responsibilities have expanded significantly over the years in response to changing geo-economic

and geo-strategic circumstances. Today, India interacts more actively with littoral states of the Indian Ocean Region (IOR) and employs maritime security engagement as a cornerstone of her regional foreign policy initiatives. To effectively confront the multifarious challenges the *IN* faces in the complex and widening maritime areas of interest of the twenty-first century, it has increasingly focused on Operational Logistics.



Fleet Tanker in Operation

The ability to develop, maintain, sustain, train and operate force levels is dependent on the incumbent support infrastructure. As force levels and technologies are enhanced, the support infrastructure will also need to be developed and upgraded, with the necessary allocation of land and budget to enable wider Naval shore support across all coastal states and Union Territories (UTs). In pursuit of maintaining and improving the required reach and sustainability for Naval operations, the *IN* constantly reviews and refines its logistics support structures, to ensure that its combat units and formations receive quality maintenance and logistics support, while maintaining a high operational tempo.

Maritime logistics now impacts all Naval functions, in peace and conflict. The logistics supply chain is being continuously strengthened commensurate with the growing force levels, related increase in inventory and support infrastructure, envisaged a higher tempo of operations, and simultaneous support to maritime forces operating in dispersed areas.

Additionally, there has also been a higher incidence of natural disasters and regional instabilities over the past decade, necessitating increased deployment of the *IN* for Humanitarian Assistance and Disaster Relief (HADR) operations and Non-combatant Evacuation Operations (NEOs). The primary role played by the *IN* in the execution of Mission Sagar and Operation Samudra Setu during the COVID-19 pandemic have further magnified the importance of logistics and associated supply-chain management in the IOR and beyond. The ways and means to address such non-traditional threats require a revised focus and suitable augmentation of logistical capabilities in some areas, along with further pursuit of a broader, cooperative approach across the region.

Strategy

The Indian Maritime Security Strategy, 2015 (IMSS 2015) notes that one of its pillars for maritime strategy is Operational Logistics, and emphasizes, ‘through smooth and effective budget-management, it has been the endeavour to stretch every rupee to the maximum in ensuring that frontline operations are backed robustly by a responsive and efficient operational logistics structure’.¹ To achieve its goal, the *IN* has adopted a strategy by augmenting existing infrastructure and creating additional logistics nodes, enhancing or restructuring organizational and functional hierarchies where required, reinforcing human capital, and harnessing technologies (including software) to enhance agility and responsiveness of maritime logistics. The *IN*’s long-term strategy for enhanced availability of combat-worthy platforms includes:

Equipment ‘Through Life Support’: Provision of Through Life Support (TLS) for all new and legacy equipment and systems, catering to the faster obsolescence and shorter supportability of modern technologies against the requirement for their utilization over longer timeframes.

Operational Logistics Support: Identifying the criticality of operational logistics, the TLS in August 2017 promulgated the *Operational Logistics Doctrine*, which aims to ‘lay down the principles that would guide planning and conduct of operational logistics during war and peace, so as to ensure effective and efficient support to all fighting and support units’. The doctrine laid emphasis on the induction of tankers and afloat support ships with enhanced capacity to replenish fuel, ammunition and provisions at sea, and provide onsite maintenance and medical support in distant areas for Naval platforms.



Annual Logistics Conference

Operational Turn Round (OTR) facilities:

Improved OTR facilities for the range of Naval forces and inventory at all Naval harbours and select ports in India, with a focus on the island groups.

Cooperative Logistics: Logistic support arrangements for OTR and Underway Replenishment (UNREP), in the farther reaches of our areas of interest, in cooperation with friendly maritime forces operating therein.

Joint Logistics: The centrality of jointness in military operations is well established and accepted. Development of common doctrines, coordination of strategies, joint planning and perspectives, commonality of equipment and common standard operating procedures are essential, and will continue to be a focus area as the three Services shift to Theatre Commands in the near future.

⚓ Overview of Naval Logistics

Logistics deals with generating, moving and providing the means of war. In its broadest sense,

the term ‘logistics’ signifies the total process by which the human and materiel resources of a nation are mobilized and directed towards the attainment of national security objectives.² With regard to the Armed Forces, logistics ensures that materiel or services are available in the right quantity, in the right condition, in the right place and at the right time.³ Logistics enables freedom of action, endurance and reach. As the responsibilities of the *IN* have grown, so have the challenges. Thus, there has been a greater relevance of timely, efficient and effective logistics.

During peace, logistics is vital to the *IN*'s performance of its diplomatic, constabulary and benign roles. More importantly, logistics is an extremely important facet of training for conflict. A vast percentage of the operations conducted during peacetime contribute to training units and organizations for war. Therefore, the conduct of operations during peace provides for opportunities to train and test logistical systems, procedures and infrastructure that would be utilized during war.

Naval operations whether in war, in less-than-war situations or in peace, hinge on mobility, reach and sustenance. Logistics support is inherent to all these attributes. Operations and Logistics are seen as going hand-in-hand for success in combat. It is, therefore, essential to treat Operations and Logistics as an integrated discipline rather than as distinct elements that need to come together for success. Operational Logistics (Op logistics) has always been an indispensable ingredient for success. In the last decade, Logistics within the *IN* has continued to evolve and transform. Among other imperatives—are an increase in the number of platforms and the *IN*'s focus on blue-water operations. The need to maintain a higher operational tempo and increasing intensity of deployments have dictated a higher quantum of logistics support and a quicker response time.

Logistics in the Naval context can be defined as planning and executing the deployment and sustenance of Naval forces.⁴ This includes all aspects of military operations and involves

supply, support and sustainment. Logistics deal with design and development, acquisition, storage, movement, distribution, maintenance, disposal of materiel, transport of personnel, acquisition, construction, maintenance, operation and disposition of facilities, and acquisition or furnishing of services.⁵

The *Operational Logistics Doctrine 2017* identifies three distinct scales of Logistics.

Strategic Logistics: Strategic logistics involves planning and providing resources in support of the country's Armed Forces as a whole, especially during conflict. It is the bridge between the national economy and the combat forces. The Comprehensive National Power (CNP) of the nation has to put its weight behind the war effort, through Government departments and ministries, private companies, Public Sector Undertakings (PSUs), Defence PSUs and Non-Governmental Organizations (NGOs). Inter-agency coordination is of utmost importance at this level.



Expanding to Blue Water Operations

Operational Logistics: This encompasses the logistics organization in a formally declared or undeclared theatre of operations. Op logistics extends from the theatre's sustaining base or bases to the forward-deployed units. Therefore, it links strategic logistics to tactical logistics. The main purpose of Op logistics is to ensure that all phases of action can be sustained. Effective Op logistics must balance current consumption with the need to build up logistics support for subsequent operations.

Tactical Logistics: Tactical logistics is responsible for planning and providing support to sustain battles, engagements and other tactical actions.

⚓ Challenges to Naval Logistics

Apart from the role that logistics play in operations as brought out earlier, there are a number of key imperatives that impact the planning and execution of Op logistics. The large number of ships, submarines and aircraft, as well as shore-based weapons and sensors, operating across a vast area of operations, present unique challenges in terms of the logistical support they require. Some of these challenges are enumerated below.

Dynamic Threat Environment: The proliferation of non-traditional military threats in recent years has led to an expansion in the range of operations undertaken by the Navy. Apart from the core war-fighting roles, the *IN* regularly undertakes several missions in less-than-war situations or Military Operations Other Than War (MOOTW), such as counter-terrorism, anti-piracy, Low Intensity Maritime Operations (LIMO), NEO, and HADR. The rise in non-traditional threats, especially maritime terrorism, has necessitated increased focus on coastal and offshore security. Naval platforms are required to operate in a dynamic environment, ready to respond to threats across the spectrum of conflict. Thus, logistics for support of Naval operations needs to be even more versatile

and effective to enable success in varied missions entrusted to the Navy.

Diversity of Equipment Base and Platforms: The growing *IN* and its increasing number of platforms of various origins have led to a variety of new equipment and machinery, as well as non-standardization in the equipment base, all of which requires materiel support. This necessitates larger investments in training, infrastructure and organizational structures. There is a requirement to ensure both quality and cost-effectiveness while managing this voluminous and diversified inventory. Coupled with the diversity in platforms and equipment base, is the related issue of similar class of ships, aircraft or submarines operating in geographically dispersed locations. To address these challenges, the *IN* initiated efforts to standardize equipment, weapons and sensors and to progressively reduce variations in inventory to optimum levels. This has considerably eased the requirements of maintenance, repair, training, stock and spares, and logistics management. With the Integrated Capability Development Plan (ICDP) now being pursued by the Department of Military Affairs (DMA) under the Chief of Defence Staff (CDS), the standardization efforts will encompass all three Services and the Coast Guard (CG) as well.

Advancements in Technology: Naval technology is developing at a rapid pace. Advancements in technology can be seen in all fields, including marine propulsion, ship construction, Naval weaponry, shipboard automation, Naval aircraft, satellite-based communications and surveillance systems, to the high-end arena of sea-based nuclear deterrence. Constantly evolving technology creates a unique set of logistical challenges, wherein there is a requirement to support older legacy systems as well as the latest platforms and equipment. To cater to the rapid proliferation in Naval technology, the *IN* has focused on developing effective logistical

procedures and functions, as well as infusing contemporary competencies from time to time.

Expanded Operating Environment: As India assumes its rightful place in the comity of nations, the *IN* is poised to play a larger role in the IOR and beyond. This, coupled with the presence of extra-regional navies in the IOR, will inevitably lead to greater opportunities for collaboration as well as competition. The operating environment in IOR, is thus becoming increasingly complex. To successfully fulfil assigned tasks and to safeguard national interests in this demanding operating environment, the *IN*'s Op logistics system has also matured to provide effective and efficient logistic support to our platforms across the wide canvas of operations.

⚓ Responsive Naval Logistics

Internally, *IN*'s logistics management has continuously improved in the processes of procurement, warehousing and delivery. Many of the *IN*'s stocking policies have been reviewed and synchronized with modern trends in the management of logistics functions. These functions of IHQ MoD(N) and the Material Organizations (MOs) are now integrated through the Integrated Logistics Management System (ILMS) with online provisioning, procurement and demand management functions. The system today is further integrated with combat platforms.

Over the past decade, India has also signed a Reciprocal Logistics Agreement with six countries—the Logistics Exchange Memorandum of Agreement (LEMOA) with the United States of America (US) in August 2016; Mutual Coordination Logistics and Services Support (MCLSS) with Singapore in June 2018; Provision of Logistics Support (PRLAS) with France in March 2018; Mutual Logistics Support Agreement (MLSA) with the Republic of Korea (ROK) in September 2019; Mutual Logistics Support

Agreement (MLSA) with Australia in May 2020; and Reciprocal Provision of Supplies and Services (RPSS) with Japan in September 2020. Additionally, similar agreements are at various stages of negotiations with Russia, the United Kingdom (UK), Vietnam, Sri Lanka and Indonesia.

Some of the cooperation accrued from such agreements are highlighted in the succeeding paragraphs.



India and Japan Ink Reciprocal Provision of Supplies and Services Agreement

Source: Ministry of Foreign Affairs, Japan

Logistics Exchange under LEMOA

■ Provided by the US Navy:

- Fuelling of *IN* ships at sea on seventeen occasions from USN tankers at various locations, such as the Gulf of Aden, the South China Sea and the East Coast of Oman;
- Fuelling of *IN* aircraft on five occasions on the Atsugi Island;
- Fuelling and provision of ASE/GSE for *IN* P-8I at Guam during Exercise Sea Dragon-21;
- Fuelling of *IN* Ships *Shivalik* and *Kadmatt* and P-8I at Guam during Exercise Malabar 21; and,
- GSE/ASE support for *IN* P-8I deployed during Exercise Sea Dragon in January 2022.

- Provided by the Indian Navy:
 - Transshipment of cargo from air cargo complex/INS *Dega* on two occasions to USN ships docked at Visakhapatnam Port Trust;
 - Conduct of dry run of USN aircraft at INS *Hansa*;
 - Fuelling of USS *John McCain* during Malabar 2020;
 - Fuelling of US P8A at INS *Utkrosh* in 2020;
 - Fuelling of USS *John McCain* on 4 and 6 November 2020 by INS *Shakti* during Malabar 2020; and
 - Landing of USAF C-17 aircraft at INS *Rajali* on 8 March 2021 for delivery of stores. A comprehensive list towards utilization of LEMOA is placed in Appendix A at the end of this chapter.



US P8A refuels at INS *Utkrosh*

Mutual Logistics Support with ROK Navy: This agreement was utilized during the visit of INS *Kiltan* to Busan Naval Base on 27–28 June 2021, wherein OTR services were received from the ROK Navy.

Future Plans to Expand Op-Logistic Support

- Conclusion of Logistics Agreements with the UK, Russia, Vietnam, Indonesia, Sri Lanka and Qatar are being pursued. These agreements will help in enhancing the sustenance of *IN* Ships at sea.

- Creation of Military Logistics Area and forward bases (also being pursued) with various Friendly Foreign Countries (FFCs).

⚓ **Harnessing Technology for Material Management**

The main information systems pertaining to Material Logistics are the Integrated Logistics Management System (ILMS), Integrated Victualling Management System (IVMS), Integrated Clothing Management System (ICMS) and Ships' Material Management System (SMMS). The last decade has seen considerable progress in the development of these systems.

Integrated Logistics Management System

Project ILMS was launched in 1993. An internal core team was formed, and it developed the ILMS on SYBASE RDBMS with Powerbuilder as the front-end. The ILMS was inaugurated in 1997 and has since undergone many transformations. Some of them include:

Central Server Architecture: Initially, ILMS was decentralized with databases scattered over various Units with a separate server for IHQ MoD(N) in Delhi and MOs in Mumbai, Visakhapatnam, Kochi, Port Blair and Karwar. The single-server implementation was undertaken by the team headed by the System Administrator (SA) ILMS of Mumbai in 2010. The Project carried out an extensive revamp of the database and front-end, and merged all the station-specific data after an elaborate data weeding/rationalization exercise.

Server Migration to Higher Configuration: The ILMS server was upgraded to higher versions in January 2021, with respect to Hardware, Operating System (front-end) and RDBMS (back-end). The server was upgraded from an IBM P-6 series server to an IBM P-9 series server, the Sybase ASE was upgraded from Version 15.0.3 to ASE 16.0 and OS was upgraded from AIX 5.3 to AIX 7.2.

Summary of Main Milestones Achieved: A few of the milestones achieved in ILMS include:

- Extending 24x7 availability of server starting 16 August 2016;
- Uploading of images and documents pertaining to items and enhancement of production size of ILMS Servers on 30 October 2012;
- Interfacing of Financial Information System (FIS) and ILMS in 2016;
- Roll-out of GST on ILMS tax structure in April 2016;
- Roll-out of e-Concurrence Module developed in consultation with Integrated Financial Advisers in Delhi and Mumbai in 2017;
- Setting up of facility to capture B&D spares for optimal accounting of B&D receipts in September 2017;
- Implementation of indigenization features in 2019;
- Implementation of ILMS at NSD (Chennai) in 2019;
- Facility for placing Supplement Order/Repeat order/Option Clause in 2020;
- Roll-out of Fuel Module for capturing details of fuel issued to ships in 2019; and
- Roll-out of system generated ABC values on system in January 2021.

Integrated Victualling Management System (IVMS)

To improve accountability and inventory management of the *IN*'s Base Victualling Yards (BVYs), BVY (Mumbai [Mbi]) was tasked with the development of the IVMS to automate all functions of the *IN*'s BVYs. The application was launched on 12 November 2009 and has seen several upgrades since then. It was developed in-house by the then staff of BVY (Mbi), using Oracle 10G RDBMS as the back-end database and Oracle Forms & Reports and JRE 0.6 for front-end environment. The IVMS upgrades have simplified the existing demand-and-issue procedure through online recording of transactions. This facilitates accurate accounting

and forecast of requirement, which aids in making decisions. The application has various modules such as Yard Management Module, Online Audit Module, Local Purchase and Contract module and Budget module. The details of these modules are brought out in succeeding paragraphs.

Yard Management Module: This Module manages all the victualling management activities of BVYs commencing from receipt of Demands, Purchase Orders, Certified Receipt Voucher (CRVs), Issue Vouchers, Ledgers, Daily Balance Sheets, Muster Certificate and Gate Pass, etc.

Online Audit Module: This module helps in carrying out a paperless audit of IVMS transactions, and allows respective Naval Local Audit Offices (NLAOs) to carry out the online audit of any BVY using an ILMS network-enabled PC.

Local Purchase and Contract Module: This module helps in carrying out provisioning of items, from proposal to tendering till preparation of sanction and purchase orders. Usage of this module has become limited after the implementation of the FIS.

Budget Module: This module is linked to Local Purchase and Contract modules and maintains a record of payments to various vendors. This module has become obsolete after implementation of the FIS.

Integrated Clothing Management System (ICMS)

The ICMS is an *IN*-wide application designed for fully computerized issuance of clothing and accounting. It aims to automate all clothing functions (free/on payment/on loan [for officers and sailors]). The software also includes a module for online audit of all documents pertaining to clothing stores. Presently, the application is being used by forty-nine clothing centres, fifteen NLAO offices and all Headquarters. Base Logistics Office (BLO) Visakhapatnam (V). had been coordinating Project ICMS. The ICMS was successfully implemented at

the Fleet Clothing Centre (FCC) in Visakhapatnam and a parallel-run test commenced in January 2010. The software was formally launched *IN*-wide in May 2011. The salient features of ICMS include:

Data in Respect of Officers and Sailors: All personal data in respect of officers and sailors was initially obtained from the Navy List and Commodore Bureau of Sailors (CABS) database respectively and uploaded in the ICMS. Presently, post allocation of personal numbers, all the data of the newly joined sailors is being uploaded by INS *Chilka* during their basic training. A sailor's data in the ICMS is frequently rechecked by matching it with NPO/CABS data to update the unit, rank and status of the individual.

Inventory: The clothing inventory on the ICMS was ported from ILMS in 2008. Data refinement is a continuous process, and ICMS has advanced from its initial phase and evolved as one of the most used software of the Navy. Any amendments/new introductions into ICMS are also being done in consultation with Commodore Clothing & Victualling, Cmde (CV) and Controller and System Administrator ILMS (CSAILMS).

Online Audit: The Audit module of the ICMS software was developed in consultation with Principal Controller of Defence Accounts (PCDA) and NLAO(V) was a part of the core team for development of audit module. Prior to the migration to the audit module, auditors underwent training at BLO(V), and their inputs were also taken into consideration for modifying the module. Audit of e-Clothing History Books (e-CHBs), receipt vouchers, transfer vouchers are now conducted online without any hard copies.

Prior to 2013, personnel were issued with a physical CHB endorsing items issued and items due. With the introduction of ICMS, only e-CHBs are maintained, and physical CHBs have been done away with, having been successfully migrated to

ICMS and duly audited. Digitization process has reduced administrative work manifold.

Ship's Material Management System

While the material processes and inventory management of the Depots were adequately covered under the ILMS, the benefits of the ILMS database could not be extended to the *IN*'s afloat units, which, if provisioned, would have provided greater asset visibility and inventory control. In order to bridge this gap, an initiative to interface the ILMS with ships and shore establishments was instituted. This would allow ships and shore establishments to survey and to electronically raise demands. This initial effort used a standalone PC that had a new software called the Ship's Logistics Management System (SLMS) installed. The SLMS software overcame the interfacing issues, but wider access remained limited due to the standalone nature of the equipment. The SMMS was launched in 2016 as a follow-up upgrade to the SLMS as a server client-based configuration, with each Command hosting the server for users within the Command. The system today operates in a two-tier architecture, with the tier-2 support being done by the local SA SMMS based at the Command and the tier-1 support being rendered by the SA SMMS in Delhi, who is under the CSAILMS. With its implementation, ships connected to the Naval Unified Domain (NUD) once alongside, can perform all functions related to material management.



Ship Material Management System Webpage

Defence Travel System

An e-ticketing project for online booking of rail and air tickets was implemented in 2017, with the objective of replacing manual railway ticketing on warrant and concession vouchers. The provision has facilitated booking of air and rail tickets without drawing advances and payment to the individual.

Financial Information System

The FIS is an *IN* initiative designed to provide an online platform for integrating all Naval units and organizations involved in the process of budgetary estimation, allocation and utilization, both for Capital and Revenue segments of the budget. Work on the development of an integrated and networked FIS began in June 1999. User-specific requirements were finalized by NHQ in August 2000. In November 2006, the, 'FIS Project Team' for design, development and administration of the FIS was set up. The formulation of the Request for Proposal (RFP) for the FIS began in end 2006 and culminated with the conclusion of the contract on 22 March 2010 with M/s Wipro as the System Integrator (SI), at a cost of approximately Rs 32 crore.

The system was designed around the financial processes and regulations enshrined in the Government Financial Regulations (GFRs), MoD directives, Defence Procurement Manual (DPM), Defence Procurement Procedure (DPP) and the *IN*'s organizational procedure. Eventually, a fully functional FIS integrating all units in the *IN*, Controller of Defence Accounts (CDAs) and other concerned users, was commissioned on 11 August 2012. Under the option clause, another contract—for setting up a Disaster Recovery (DR) site for the FIS, provision of Onsite Support Teams and additional SAP user licence—was also concluded with M/s Wipro in September 2013 at a total cost of approximately Rs 12.75 crore. The FIS complies with all extant Financial

Regulations (FRs) and has inbuilt checks and balances for ensuring availability of funds, use of correct minor/code heads, etc.

The FIS also serves as a database and stores data pertaining to all financial transactions carried out by various users. It caters for interfaces with legacy systems like ILMS, ILMS (Air), ICMS, IVMS, NPO, and Naval Dockyards. Further, the integration of FIS with 'Tulip', auditing software of CDAs and New Compilation System (NCS) of Controller General of Defence Accounts (CGDA) has significantly reduced the procurement to payment timeline, and enabled *IN*-wide users to ascertain and reconcile payments undertaken by CDAs. With these integrations, the system has been an effective budget-management tool for monitoring expenditure. Since its commissioning, FIS has evolved substantially in scope and functions and is presently at the core of budget management in the Navy.

In recent years several value additions have been made to the system based on experience gained, as well as to adapt it to extant financial procedures and regulations. Over the years, new Modules, such as the Letters of Credit (LCs) Module, e-NAC Module, NAs/As Module and Defence Travel System (DTS) Module, have also been added. Two in-house Op-costing modules were also developed in the FIS. The Op Planning Module (OPM)' serves as a 'Decision Support System' (DSS) to the Op planners at the Directorate of Naval Operations (DNO)/Command HQ/Op Authorities, with respect to the options for deployment of platforms, based on fuel and fiscal considerations, whilst remaining within the annual fuel budget. The 'Module for Unit Budget Ceiling' (MUBC) provides the running cost of the current year, and average expenditure under various heads based on past trends for each ship for monitoring by the Fleet HQ/Command HQ.

Government e-Marketplace (GeM)

The GeM platform was launched on 9 August 2016 as an online end-to-end solution for procurement of commonly used goods and services for all Central and State Government Ministries, Departments, Public Sector Units (PSUs) and affiliated bodies. GeM was implemented by the *IN* in October 2017. The genesis of the GeM initiative was driven by the need to deliver a step change in the public procurement process in the country and usher in an era of e-Governance by leveraging the power of digital. GeM is under constant evolution, being a digital platform, towards meeting the diverse requirements of users. Online payment for products by PCDA(N) has been implemented, and work on online payments for Services is underway. In cases where products/services are not available on the portal, the provision of customized bidding has also been introduced, and users can upload their specific requirement on GeM. Online concurrence by the Financial Advisor and online approval by Competent Financial Authority are under deliberation and likely to be implemented soon.

At present, there are more than 21 lakh products and over 23,349 services available on GeM. Rule 149 of General Financial Regulations 2017 (GFR-17) mandates the procurement of all common-use goods and services by Government agencies using the GeM portal. Since implementation in *IN*, there has been continuous progress on enhanced adoption of GeM and procurement worth Rs 890.25 crore against more than 30,000 orders, has been undertaken on GeM. Additionally, the number of orders doubled, and order value tripled in financial year (FY) 2020–21, as compared to the previous years. The *IN* also surpassed the annual target of Rs 532 crore allotted by the MoD, by placing orders worth Rs 618.86 core as of 31 December 2021.

SAHAYAK-NG, Air-Droppable Container

In December 2020, the Defence Research and Development Organization (DRDO), along with the *IN*, conducted the successful maiden test trial of ‘SAHAYAK-NG’—India’s first indigenously designed and developed Air-Droppable Container—from an IL-38SD aircraft (*IN*) off the coast of Goa. The trial was conducted by the *IN* to enhance its operational logistics capabilities and provide critical engineering stores to ships which are deployed more than 2,000 kilometres (km) from the coast. It reduces the requirement of ships to come close to the coast to collect spares and stores. Two DRDO laboratories—NSTL, Visakhapatnam and ADRDE, Agra—were involved in the development of the SAHAYAK-NG container, along the industry partner M/s Avante! for GPS integration.⁶



Sahayak-NG Air-dropped Container

⚓ **Material Organization (MO)**

Material Organizations within the *IN* provide Material Logistics support to maintain a high state of operational readiness of ships, submarines, aircraft as well as shore establishments. In the last decade, Naval Store Depot (Kochi) and Naval Store Depot (PB) were upgraded to full-fledged Material Organizations, to join the big league of MO (Mbi), MO (Visakhapatnam) and MO (Kar).

The details of the evolution of the various Material Organizations within the *IN*, are discussed in the succeeding paragraphs.

Material Organization Mumbai (MO [Mbi])

Historical Evolution: In 1954, the Ordnance Depot (Kurla) was rechristened as Naval Store Depot (Kurla) under Captain Superintendent of Yard, Bombay, an integral Material Logistics Organization, which could provide a rapidly growing *IN* the requisite logistics support. Naval Store Depot (Kurla) provided the warehousing support and Spare Parts Distribution Centre (SPDC), Mankhurd, provided the planning and procurement cover to create a new organization called the Material Organization (MO) in 1972.

The integration and operationalization of the new organization was achieved by 1974. However, the Controllerates continued to function from different locations across Dockyard, Sewri and Ghatkopar. Between 1979 and 1983 these Controllerates were shifted to Ghatkopar with the Material Superintendent also shifting office from ND (Mbi) to the present premises under the Administrative Control of HQWNC and functional control of NHQ under the Chief of Logistics Services (CLS). This era witnessed rapid growth of the *IN* with increasing operational logistics requirements due to our transition from a brown water to a blue water Navy.

The MO (Mbi) is the second largest establishment of Western Naval Command (WNC) and the largest Material Logistics Organization of the Navy. The depot area has increased from 25 acres (in 1972) to approximately 170 acres today. The depot is spread over three main locations, namely MO (Ghatkopar), NSD (Mankhurd) and NSD (Sewri) and also has its presence at ND (Mbi). The total area covered is approximately 170 acres and houses seventy-two storehouses and an administrative building.

ISO 45001:2018 certificate for implementation of Health and Safety Management Systems was awarded on 6 March 2020.

Capacity Build-Up:

- **Operational Provisioning Cell:** In order to monitor and address material issues pertaining to Safety Audit of ships and submarines at various levels, an Operational Provisioning Cell (OPC) was created at MO (Mbi) in 2017 to maintain close liaison with the platforms scheduled to undergo safety audit as per promulgated safety calendar.
- **Refit Progress Planning Section:** The RPP section is the nodal agency at MO (Mbi) for refit monitoring and entails monitoring the requirement of spares, yard material, paints, Mid-life Upgrade (MLU) equipment for replacement in tandem with timelines laid down.
- **ABER Cell:** In order to address the shortcomings involved in the procurement of upgrade equipment during refits, a revised procedure for Anticipated Beyond Economic Repair (ABER) was established and implemented in four stages—Planning, Initiation, Approval and Provisioning. The newly established ABER Cell is the single point of contact for monitoring ABER procurement progress to ensure timely processing.
- **Waterfront Survey Yard:** In order to mitigate the difficulties faced by afloat units for the survey of stores, a Survey Yard was set up at ND (Mbi) in 2017. The Waterfront Survey Yard is now the Survey point for all afloat units, except for Serviceable Survey and heavy equipment Survey such as Engines and Prime motors, etc.

Material Support for COVID-19 Pandemic: During COVID-19 lockdown, a Quarantine Facility was set up at Ghatkopar in Mumbai, with

a capacity of 134 beds. Temporary accommodation was also created for support staff.

Material Organization Visakhapatnam (MO[V])

Historical Evolution: The Naval Store Depot at Visakhapatnam was initially set up in 1942 to cater for the requirements of Naval and other general stores for ships operating in the Bay of Bengal during the Second World War. The functions of the Depot at that time were merely to obtain stores/spares from the Depot in Mumbai (then Bombay) and issue to ships/establishments on an as required basis. In April 1979, NSD, Visakhapatnam was restructured into a full-fledged Material Organization (MO). Since then, the Depot area has increased from 25 acres in 1979 to approximately 108 acres.

Over the last decade, the inventory size at MO(V) has grown multifold. The increase in inventory holding is due to enhanced force level and receipt of Base and Depot spares of Naval Offshore Patrol Vessels (NOPVs), P-28 (missile Corvettes) and P-17 (stealth Frigate) ships. Towards strengthening of Air Material management for the Eastern Naval Command (ENC), the Air Store element was upgraded as a Controllerate in November 2013.

MO(V) was awarded the ‘Environmental Trophy’ in the year 2018, and won a runners-up position in 2020. In recognition of MO(V)’s HR practices, it was also awarded the CNS Trophy for the years 2014–15 and 2017–18. An ISO 45001:2018 certificate was awarded to the organization in 2020. In addition, ISO 14001:2015 and ISO 9001:2015 certifications were awarded in 2021 for Environmental Management and Quality Management, respectively.

Capacity Build-Up:

■ **New Storehouses:** The new site of the MO has eighteen warehouses spread over 45 acres of land and the old site has six warehouses spread over 60 acres. New storehouses commissioned to

meet the requirement of newly indented ships are tabulated below.

Storehouse Name	Year
Repairable Storehouse	2017
New Heavy Lift 2	2019
Shivalik (P-17 class)	2021
AJT Hawk	2021
Tanker Storehouse	2022

■ **Operational Provisioning Cell:** Maintenance of a robust supply chain for providing spares support to Operational Platforms has been a focus area. With the evolving maritime strategy of Mission-Based Deployments (MBDs), the Depot too reoriented its functioning towards providing efficient and seamless Ops Logistics support. The creation of an Operational Provisioning Cell in 2018 is an initiative that has gone a long way in providing quick response to critical requirements of Operational Platforms. This cell’s proactive liaison with ships taken up for safety audits and overseas deployment has ensured minimal materiel deficiencies.

■ **Focus Groups for Refit Management:** The Refit Logistics section has enabled increased coordination and information flow between all stakeholders, giving increased focus to refit ships for better spares support, planning besides timely and informal decision-making towards optimum resource utilization. It has ensured timely procurements, towards meeting refit timelines. The Focus Group coordinates with various cells listed below through the Refit Logistics Management Dashboard.

Group	Year
ABER planning cell	2015
ABER procurement cells	2018
Refit Logistics Section	2018
Refit Logistics Information Dashboard	2018

- **Waterfront Survey Yard:** In order to mitigate the difficulties faced by afloat units for survey of stores, a Waterfront Survey Yard was set up adjacent to the Naval Wharf at ND(V) in 2017. With an objective of minimizing the requirement of ships' personnel to travel to MO(V), a mobile survey and a doorstep survey was implemented in 2019 for lightweight items.

International Fleet Review (IFR-16): MO(V) performed a vital role in committed planning, procurement, stocking and supply of quality material to ships and establishments participating in IFR-16. The major tasks accomplished during IFR-16 included:

- Provisioning of enhanced scale of Automatically Replenished Stores (ARS) to all ships of ENC by January 2016.
- Provisioning of an additional requirement of forty-five (various) types of paints (total 43,000 litre and outside annual review cycle) projected by ships from various Commands.
- Procurement of National Flags/Naval Ensigns of various sizes constantly underwent amendments in drawings till end December 2015. In addition, the list of foreign countries attending IFR-16 kept changing and was dynamic. This posed a challenge in terms of timely procurement and provisioning. However, with effective liaison, such teething issues were resolved.
- Procurement of ten Gemini Craft on fast-track basis to meet requirements of enhanced sea-front security.

Impact of Cyclone Hudhud on MO(V): In October 2014, extremely severe cyclone, up to hit Visakhapatnam with wind speeds up to 250 kmph, accompanied by heavy rain that caused extensive damage to the MO(V) premises. The MO being the hub for logistic support in the eastern seaboard, responded swiftly and with a sense of urgency not

only recovering from the devastation internally, but also spearheading major relief work within the ENC. The high wind speeds during the cyclone resulted in extensive damage to roof structures at eleven storehouses. This damage resulted in the ingress of water and also led to the undesirable exposure of inventory. While in-house expertise of the Controller of Technical Services (CTS) was used to gauge the serviceability of part of the inventory, some of the Russian-origin inventory was sent to ND (Mbi), while the aircraft inventory was sent to M/s HAL, Bengaluru. Additionally, arrangements were also made for representatives of OEMs such as General Electric, BE Pumps, Johnson Pumps, ACCEL, Burkhard Compressor, Cummins, Larsen and Toubro and many others for undertaking serviceability checks on their respective inventory supply.

The following actions were taken as part of relief efforts:

- Industrial canteen was made operational, and continued to operate round-the-clock to ensure availability of hygienic food to MO(V) staff engaged in restoration work. This ensured that MO(V) was able to resume normal logistical operations within three days of the cyclone making landfall.
- While the restoration of the damaged infrastructure and audit of inventory continued internal to the organization, MO(V) also provided crucial disaster-relief material to other units in ENC, as well as civil administration. Some of these include:
 - Provisioning of diesel for Meghadri Gedda Dam for pumping drinking water due to disruption of electric power supply;
 - Procuring petrol-operated chain saw, portable water tanks (1000 litre capacity), tarpaulins and portable generator sets (7.5 kVA) to significantly improve the pace of relief work; and

- Pressing in-house Fire Tenders into service to provide water supply to affected areas in Ashoka Park and Pallava Park.
- Hiring of heavy engineering equipment was undertaken at a cost of Rs 1.27 crore. These included 670 Tipper (10 ton capacity), 294 JCB earthmovers, five cranes (12 ton capacity), three tractor/trailer (40 ton capacity) and 11 loaders.

Dispatches Abroad for Op Logistics: Regular export consignments are dispatched to destinations in the US, Israel, Japan, the Philippines, the UK, Vietnam, the Malta, Seychelles and Honolulu thereby ensuring timely supply to *IN* Ships for the repair of equipment to meet their mission objectives. Apart from the Op logistic support, this organization also facilitates export of Air Stores for the repair of aircraft at the US and the UK. Further, Annual Rate Contract (ARC) for Customs clearance of import consignments arriving by air and sea have been concluded for speedy clearance.

Material Support for COVID-19 Pandemic: MO(V) was at the forefront and extended initial support to all the units in setting up of the Quarantine Facilities at ENC during the pandemic. All essential items for COVID-19, viz., ethyl alcohol for sanitizers, coir mattresses, disinfectant fluids, air circulators, safety masks, buckets, bleaching powder, country brooms, Polythene bags, etc. were expeditiously provisioned and delivered, to contain the spread within the Naval community. Further, all essential items were also delivered onboard ENC ships deployed for 'Op Samundra Setu'. Some of the notable actions include:

- **Medical Oxygen:** In order to meet the immediate requirement of medical oxygen for various COVID-Care Centres, especially during the second wave of the pandemic, and also to provide a fallback for the Civilian Administration in case of need, fast-track procurement of 2,100 CuM medical oxygen (300 Cylinders) was undertaken. A total

342 industrial cylinders were converted into medical oxygen cylinders. A rate contract for filling of 21,000 CuM (3,000 cylinders) was also concluded with M/s Ellenberrie Industrial Gases Pvt Ltd, Visakhapatnam for refilling at short notice for a period of one year.

- **Setting up of COVID-Care Centre at MO(V):** A 150-bedded COVID-Care Centre, including thirty beds with oxygen, was set up at Tanker Storehouse to cater to the anticipated surge in COVID-19 patients. The Centre was augmented with basic infrastructure, namely, cots, mattresses, pedestal fans, water dispensers, IV Stands and hygiene-related items. Medical Consumables, viz., personal protective equipment (PPE) Kits, N95 Masks, Surgical masks, disposable gloves, face shields, sanitizers, etc., were provisioned for patients and medical staff. In addition, the Centre was equipped with Oxygen Concentrators, Automated External Defibrillators (AEDs), Spray and Fogging Machines.

- **Screening of Service Personnel:** MO(V) created a reception centre at Visakhapatnam Railway Station with a waiting area providing basic refreshments, and provided support to Medical and Reception teams for screening of service personnel and families arriving by train. In addition, screening of Defence Civilians at INS *Dega* and subsequent movement to the designated Quarantine Facilities was also planned and executed by MO(V).

Material Organization Kochi (MO [Kochi])

Historical Evolution: The MO spread over an area of about 15 acres was established as Naval Store Depot in September 1951. The inventory of MO (Kochi) has progressively grown from 5,000 items at inception to more than two lakh items as on date. Consequent to the expansion of activities at

the *IN*'s Southern Naval Command (SNC), as well as the addition of dependent units/establishments and induction of new ships and aircraft, the role of this MO increased manifold, both in range and magnitude. In recognition of this change, the Naval Store Depot was upgraded to a full-fledged Material Organization in June 2011.

The Depot supports two repair yards, viz., NSRY (Kochi) and NAY (Kochi) and is also the mother Depot for aviation stores. The unit received ISO 45001: 2018 certification for occupational Health and Safety Management in October 2021.

Capacity Build-Up: Some of the key infrastructure added at MO (Kochi) in the previous decade is tabulated below.

Capacity Addition	Year
Self-Service Storehouse (MOKSSH) and Dynamic Inventory Storehouse (DISH) for expeditious transaction; Automatically Replenished Stores (ARS)	2013
New Samagri Bhavan	2015
CCTV Surveillance System covering all main buildings and storehouses	2016
Storehouse 41	2016
Automatic Storage and Retrieval System for Storehouse 41	2016
Upgradation of Integrated Logistics Management System (ILMS)	2017
Modernization of material handling equipment: 2 articulated Electric Stackers (2-ton capacity) and reach of 36 feet and a Mobile crane (12-ton capacity)	2018
Biometric Attendance System	2018
Introduction of e-FCC (Flying Clothing Certification) and migration to ILMS (Air)	2018-2019
25-ton heavy duty package vacuum packing machine	2019
Construction of Heavy-lift Storehouse (G+3)	2021

Dispatches Abroad for Op Logistics: Over the past years, MO (Kochi) has provided Op logistics support by supplying stores to *IN* Ships at various ports across the world as part of operational logistics. In addition to the routine dispatch of consignments to the Advanced Light Helicopter (ALH) detachment in the Maldives, stores were also dispatched to various foreign countries,

including the UK, the US, Oman, the Maldives, Mauritius, Italy, Israel, Malta, France, Abu Dhabi, Sri Lanka, the Seychelles. Critical requirements of *INS Tarangini* were met at various ports during LOKAYAN-18. Most of these dispatches had to be synchronized with the narrow OTR window of ships to ensure timely delivery of operational spares.

Management of Air Stores: Annual Review of Demands (ARD) is a critical scheduled exercise to evaluate and finalize the range and scale of *IN* aircraft spares. Significant changes in the ARD procedure were promulgated in December 2017, the salient points being: De-linking of rotatable spares, tools Ground Support Equipment (GSE)/ Ground Handling Equipment (GHE) (aircraft/component major spares) from ARD provisioning.

Risk-Mitigation from Recurring Floods: In light of frequent risk of flooding due to the geographic location of the organization, between 2018 and 2021, a number of mitigating measures were undertaken to minimize the impact of flooding. These included the installation of four heavy-duty electric driven, and two diesel-driven, dewatering pumps, and installation of two sluice gates to control flow from the 20-foot-long canal to the organization's geography. These measures have substantially reduced the risk of flooding at MO (Kochi) and the possible damage to critical Naval inventory held. This effort has led to substantially reducing the risk of waterlogging and flooding, as was validated during the monsoons of 2021.

HADR Operations:

■ **Op Madad:** In 2018, MO (Kochi) participated in relief operations of the SNC during the Kerala floods by providing logistics support and facilitating rescue. Immediate requirement of Inflatable craft (Gemini), OBM, lifejackets and life buoys were met by MO (Kochi) expeditiously.

■ **Cyclone Roanu:** On 19 May 2016, an operational requirement was received to supply HADR material for Sri Lanka. Three trucks with HADR material were delivered onboard *IN Ships* within twelve hours.

Material Support for COVID-19 Pandemic: In anticipation of the likely increase in demand of critical stores during the pandemic, MO (Kochi) communicated the availability of relevant material with HQSNC in early March 2020. This was significant as it provided transparency and better appreciation of material availability at HQSNC for undertaking planning and execution of COVID-19 response. In the initial phase of the COVID-19 pandemic, the Depot was tasked to load 600 tonnes of rice onboard *INS Shardul* for Madagascar. Additionally, sixty Medical Oxygen Cylinders were dispatched to Lakshadweep onboard *MPV Meghna*.

Material Organization Port Blair (MO [PB])

Historical Evolution: MO (PB) was established on 1 October 1982 as Naval Store Depot (NSD), under the then Base Repair Organization. The unit was established with an initial complement of two

Civilian Officers and thirty-two Civilian employees, with the role and responsibility limited to receipt of stores from the mainland in general and MO(V) in particular and supplying/dispatching the same to Naval units located on the Andaman and Nicobar Islands.

The Depot, in 1982, had an initial inventory of approximately 300 items, meant to cater to the requirement of two ships and seven units at that time. Headquarters Andaman and Nicobar (HQANC) has witnessed manifold increase in its role, responsibility and the number of platforms/units under its area of responsibility over the years, which has consequently enhanced the requirement of material, fuel and spares exponentially.

In light of the anticipated increase in assets at HQANC as well as the setting up of Tri-Services command, NSD (PB) was upgraded to a full-fledged Material Organization (PB) in 2013. Additionally, Delegated Financial Powers for Defence Services (DFPDS) was also sanctioned in May 2015, bringing substantial financial powers to the Material Superintendent.

In the past decade, it has been a constant endeavour of MO (PB) to ensure timely availability of all types of stores to the dependent Units of



INS Shardul at Madagascar

ANC. The inventory has witnessed rapid increase to its present number of approximately 98,077 items, catering to the needs of eighteen ships, two Floating Dock Navy (FDNs) and forty-six establishments, including the Naval Ship Repair Yard (NSRY PB).

Capacity Build-Up: Some key infrastructure added at MO (PB) in the previous decade is tabulated below.

Capacity Addition	Year
Formulation of Board for Re-Siting of MO (PB) from Haddo area (covering 5.5 acres) to Dollygunj (covering 40 acres) in view of the increase in number of assets and expansion of NSRY (PB).	2017
Infrastructure Accretion at MO (PB) – creation of facilities like Controller of Procurement (CPRO) section and Gas Store house, thereby increasing the storage capacity.	2019
Establishment of Tri-Services Advance Detachment (TRISAD) at Chennai and Tri-Services Detachment at MO (TRIDAMO) in Port Blair, as an initiative to increase the efficiency of Op Logistics.	2020
Shifting of Survey and Scrap Yard to Dollygunj as part of initial phase of re-siting of MO (PB) and setting up of scrap yard, storehouse and other infrastructure worth Rs 45 lakh.	2021

Operational Logistics: MO (PB) provides not only Op Logistics support to local afloat and shore units/establishment in Port Blair, but also logistical cover for over 700 nautical miles (nm) from north to south for Andaman’s covering outlying units such as INS *Kohassa* (Diglipur), 37 Wing AF (Carnic), INS *Kardip* (Kamorta) and INS *Baaz* (Campbell Bay). In addition, a considerable amount of effort was undertaken to provide replenishments to support units on various islands for sustained presence and operations. Further, in order to strengthen the operations of the Tri-Services Command and to establish synergy, TRISAD at Chennai and TRIDAMO in Port Blair were established in 2020 (see table above), for effective and optimal supply-chain

management. The TRISAD ensures that critical items are forwarded to MO (PB) without any delay, while the TRIDAMO at MO (PB) takes the onus of further distributing the stores to the concerned establishment/unit in Port Blair or outlying units.

Material Organization Karwar—MO (Kar)

Historical Evolution: MO (Kar) came into existence as a Naval Stores Depot (NSD) in 2006 with a complement of one service officer, one civilian officer, five sailors and three civilian personnel. The infrastructure available was constructed as part of the truncated Phase I of Project Seabird. The Depot is spread over an area of four acres. As an NSD, the organization had limited financial powers and functioned as a Receipt and Dispatch Depot, completely dependent upon MO (Mbi) to provide all support—essentially operating as a satellite depot of MO (Mbi).

In light of the anticipated increase in assets at Karwar and the impending arrival of INS *Vikramaditya*, NSD (Kar) was upgraded to full-fledged Material Organization in 2009.

Capacity Build-Up: A few of the key infrastructure added at MO (Kar) in the previous decade is tabulated below:

Capacity Addition	Year
Self-service Karnataka Naval Area Stationery Counter	2014
Bearing and cartridge counter	2015
FID Zone at the Lightweight Storehouse	2018
Storehouse for <i>Vikramaditya</i>	2019

Support for *Vikramaditya*: INS *Vikramaditya* was commissioned on 16 November 2013 and joined the *IN* Fleet in January 2014. In order to ensure efficient spares support to INS *Vikramaditya*, a storehouse was envisaged in 2017 at MO (Kar), which was constructed by March 2019 for shifting

of over 15,000 spares held at MO (Mbi). The Storehouse is also equipped to enable stocking of 4,055 spares for maiden Normal Refit (NR) of the ship, which commenced on January 2021.

⚓ Allied Organizations and Other Initiatives

Indian Naval Ship Hamla

To meet the increasing demand for writers in the rapidly expanding Navy in the early 1940s, the Training Centre at the Naval Depot, Bombay, took the initial responsibility to recruit and train officers and sailors for the Supply and Secretariat (S&S) Branch in as short a time as possible. In 1941, for the first time in the Navy, a Cookery School was established at HMIS *Khanjar* and later in 1944, it was shifted to HMIS *Akbar* at *Kolsbet*, Bombay. The cooks and stewards were recruited on the merit of their previous experience. In 1945, the S&S school was also moved to HMIS *Akbar*. For the first time, training for the writers, store assistants, cooks and stewards was conducted in a single unit.

Training for S&S personnel, including catering personnel, under one roof at HMIS *Akbar* in Mumbai ended within two years of commencement, when it was closed down in 1947. The Cookery School, along with the S&S School, was shifted to HMIS *Venduruthy* at Cochin (renamed Kochi in 1996). The desire of the Branch to have a fully autonomous training establishment finally came to fruition in 1953 when a decision was taken to temporarily site the school at Marve, as an independent establishment headed by a Supply Officer as the Commanding Officer of INS *Hamla*.

The S&S School shifted from Kochi to its present site at Marve, Mumbai. In 1981, the Long Logistics and Management Course (LL&MC) was introduced at INS *Hamla* for equipping officers from various branches to undertake logistics functions. On 24 April 1984, with a princely holding of two desktop computers, a very modest

beginning was made in computer training with the commissioning of an Electronic Data Processing (EDP) Training Centre. The first Long EDP Course of twenty-four weeks duration commenced on 2 September 1987. A new Catering School at the present site in *Hamla*, with state-of-the-art catering equipment, was inaugurated on 18 June 1990, giving a major boost to dedicated training in catering in the Navy.

Setting Up of JSTI (Catering): Based on the recommendations of the Shekatkar Committee Report, one of the areas identified for developing greater synergy with a modicum of efficiency was Training. Catering was one of the ten disciplines initially identified as amenable for the creation of an Armed Forces Training Institute (AFTI) or a Joint Services Training Institute (JSTI). To study the feasibility of the same, a Joint Services Study Group (JSSG) Catering was created based on HQIDS directives with a member from each of the three Services. The *IN* was designated as the Lead Service. The JSSG visited all catering training establishments of the three Services and met as required to deliberate upon the requirement and modalities for functioning. In addition, the JSSG made several presentations to appropriate authorities at HQ Integrated Defence Staff (HQ IDS), NHQ and HQSNC.

As a part of the recommendation of the JSSG, the erstwhile Naval Institute of Hospitality and Catering Technology (NIHCT), which was established in 1966 with the aim to impart professional training to Naval Chefs and Stewards, has been re-designated as Joint Services Training Institute (Catering) in September 2018. The institute provides professional training to chefs and stewards from all three Services from their basic course to super specialization. Indian Naval Ship *Hamla* is the first organization in all three Services to commence training as a JSTI. The training of the first batch of Indian Air Force



Passing Out of IAF Trainees

(IAF) trainees was successfully completed in January 2019 and the first Indian Army Class III to Class II upgradation course was completed in May 2019. On average, about 300 personnel from the Army and 240 from the IAF undergo training from the JSTI every year.

Affiliations and Accreditations

University Affiliation and Accreditation of LL&MC: The Long Logistics and Management Course (LL&MC) had been affiliated with Goa University for awarding of MBA in Logistics Management (MBA [LM]) since 2002. This affiliation was based on a No-Objection Certificate for affiliation with Goa University, issued by the Government of Maharashtra in concurrence with Mumbai University since 2002. Goa University

withdrew the affiliation without any prior intimation, quoting Supreme Court of India order dated 11 February 2005, which imposes restrictions on Universities to accord affiliation to colleges/institutes outside the jurisdiction of the territorial limits of the state with effect from the thirty-second LL&MC, which commenced in July 2013.

INS *Hamla* approached Mumbai University for the affiliation which was agreed to and commenced from the Academic Year 2014–15 onwards for the Masters in Management Studies (Logistics Management) programme and award of an MMS (LM) degree. Additionally, verification and validation of LL&MC, which is accredited to AICTE since 2008, was taken up and completed in November 2018.

■ **NAAC Accreditation:** Thereafter, a proposal for Accreditation of INS *Hamla* by National Assessment and Accreditation Council (NAAC) as Management College affiliated to the University of Mumbai was initiated, as the same is a mandatory qualitative requirement for permanent affiliation with the University of Mumbai. Stage-I of registering INS *Hamla* under the All India Survey on Higher Education (AISHE), Ministry of Human Resource Development, was completed on 22 February 2019. Subsequently, Stage-II, Institutional Information for Quality Assessment (IIQA) was completed on 8 July 2019. On 29 October 2019, charges towards a Stage-III Self Study Report (SSR) were paid to the authorities. Final validation and an on-site visit followed by Institutional grading and accreditation by NAAC is pending, and is likely to be completed in the near future.

■ **Affiliation with DIAT, Pune:** An MoU for affiliation between INS *Hamla* and Defence Institute of Advanced Technology (DIAT), Pune was signed in June 2018 for award of certification to Information Technology Management Course (ITMC), and an Information Technology Basic Course (ITBC) for a period of five years. As part of the MoU, the unit is harnessing the expertise of the deemed university on emerging technologies in the IT domain.

Infrastructure Upgrades

Dedicated Web Application based e-Learning Lab: An online training lab was commissioned in November 2017 to provide online training on Central Public Procurement Portal (CPPP)/Defence Procurement Portal (DPP), Government e-Market (GeM) and Defence Travel System to officers and sailors undergoing training at INS *Hamla*. The lab comprises of forty nodes enabled with internet and is utilized to conduct practical training sessions.



Digital Web-Based Learning Lab

Training Auditorium: A training auditorium was commissioned in July 2017. The auditorium is used extensively to conduct training workshop.

Virtual Training Lab: Virtual classrooms as part of the Project National Knowledge Network (NKN) was set up in December 2017. The classrooms aid in conducting classes at three different locations with a single instructor.

Shifting of Naval Institute of Computer Applications (NICA) to Administration & Training (A&T) Block: The complete infrastructure of NICA including network connection was shifted from its old location in catering building to A&T block and commenced operations in the new location from January 2019. The training infrastructure at the new location has been upgraded extensively and includes state-of-the-art facilities like a server farm, IT hardware and networking labs, internet and NUD labs, AV classrooms, LAN, n-computing solutions, thin clients, licensed software, web applications, Virtual Reality lab, ergonomic smart classrooms and furniture, among others to undertake high-end IT training.

Green Initiatives: As part of the Green Initiatives, a 350 kilowatt (kW) Solar Power Generation Plant was set up and became operational in July 2019 at a cost of Rs 485.47 lakh. Installation of the Rooftop Solar Power Plant has resulted in considerable savings. Within a span of nine months, 290,531 units of electricity corresponding to Rs 25.86 lakh savings have been accrued.

Setting up of Software Training Lab: As most of the logistics functions today are software based, it was inevitable that the Logistics Officers and Sailors are provided with extensive hands-on training for operating various software used in the *IN*—like the ILMS, FIS, SMMS—at a software lab set up in February 2021.

Victualling Yards

Joint Logistics Node (JLN) at Base Victualling Yard (Mumbai): Government Sanction for implementation of Joint Logistics Node was issued in October 2020. The Joint Logistics Node (JLN)⁷ at BVY (Mbi) was set up by HQWNC to meet requirements of units and establishments of the Army and the IAF co-located in Mumbai region. The Joint Logistics Node, Mumbai is one of the first of many projects initiated by the HQIDS, towards achieving jointness and synergy among the three services.



Launch of Joint Logistics Node

Based on Government of India sanction, five specific areas—ration, main grade fuels, consumables/POLs/hygiene chemicals, civil hired transport and salvage disposal—have been identified for integration. A total of sixty-four units of the Army and four units of the IAF have been added to the charter of JLN, Mumbai, which is in addition to the 20,000 Naval personnel in and around Mumbai. The JLN Mumbai was inaugurated at BVY (Mbi) on 1 April 2021 by the CDS via video conference in the presence of FOC-in-C(W).

Base Victualling Yard (Visakhapatnam): BVY(V) undertook numerous initiatives towards energy and

environment conservation. Some of these efforts are tabulated below.

Initiative	Year
Solar-powered back-up for storehouses	2017
Solar Water Heaters/Solar Cookers	2017
Installation on 19 smart streetlights	2018
Procurement of Battery-Operated vehicles (one e-auto and two e-scooters)	2018 & 2021
Introduction of e-Ration Demanding System module on PURAB to facilitate all ships and establishments for placing demands, thus reducing paper waste.	2018

New Infrastructure added in the last decade is tabulated below.

Initiative	Year
Demolition and construction of Clothing and Messtraps (C&MT) store – P-15	2013
Construction of Fresh Zone storage of 8-ton capacity for storing fresh provisions	2019
Demolition and construction of C&MT store – T4	2020
Construction of 20-ton capacity cold room	2020
Construction of HADR store	2020

Base Victualling Yard (Mumbai): A 60-ton capacity weigh bridge was installed at BVY (Mbi) in 2020.

Base Victualling Yard (Kochi):

- Petroleum Oil Lubricants (POL) service station was created at SNC by BVY (Kochi) in 2020, with a view to obviate the difficulties caused by non-availability of POL facilities in Naval Base or nearby.
- Eco-friendly humidifier was commissioned at Sugar storehouse, first of its kind in the Navy. The equipment absorbs humidity from the surrounding air and converts it to potable water through a four-stage filtration system.

Base Victualling Yard (Port Blair): BVY (PB) was set up in 1977 to cater for the victualling and clothing requirements of Armed Forces personnel

on the Andaman and Nicobar Islands, from all three Services, the Coast Guard and the Border Road Task Force (BRTF). The Yard also extends logistic support to visiting ships and various detachments of other Commands. Some of the major milestones include:

- During Mission Sagar in 2020 and 2021, INS *Kesari* and INS *Jalashwa* were replenished with dry and fresh provisions, as well as items for HADR operations.
- It was in 2019 that the Yard adopted its new crest and motto, which states: ‘*Sarvottam, Samaybadh Sarvada*’.

Base Victualling Yard (Karwar): Some of the major milestones include:

- **Replenishing INS *Vikramaditya*:** INS *Vikramaditya*, with a complement of over 1,600 personnel, has been based in Karwar since 2013. Due to large complement and prolonged deployments, the ship requires considerable stocking, which has been catered for by BVY (Karwar). In view of this high demand, the Yard has established containerized embarkation of victuals onboard INS *Vikramaditya*, which has resulted in a 40 per cent reduction in OTR.
- **Payment Issue Facility ‘Santushti’:** To meet the additional requirement of the residents on payment basis, victualling outlet ‘Santushti’ was inaugurated on 3 November 2017.
- **New Cool and Cold Room:** A new cool and cold room was commissioned on 4 August 2021 with the capacity of 10-ton storage in each section.
- **Continuity of Service During COVID:** Some of the major activities undertaken include:
 - Sustained replenish operations for *Vikramaditya*, *Aditya* and *Shubhdra*, despite constraints in manpower and supply chain.
 - Sustained provisioning of fresh and dry

provisions to 400 families, Dockyard Apprentice School and Project Seabird staff while ensuring social distancing norms. The Yard also facilitated doorstep delivery of provisions to families that were quarantined.

ISO Certifications

Base Victualling Yard (Visakhapatnam)

ISO 9001:2015 Certification: As a mark of recognition of the stringent internal quality control and management systems being implemented in the Yard, BVY(V) was awarded ISO 9001:2015 certification for quality systems management, in January 2020. It also instituted an in-house Lab testing facility for food items.

ISO-22000 Certification: The unit has laid a lot of stress on streamlining the entire system of food-handling, stowage and distribution and has obtained ISO-22000 certification for food-safety management, which is the highest internationally recognized certification for the food industry. Towards this, two rounds of audits were conducted by external auditors in December 2019, and the certificate was awarded to the unit in January 2020.

ISO 14001:2015 & ISO-22000:2018 Certification: In recognition of the efforts put in by the Yard towards environmental conservation and responsible management of various environmental issues including management of residual products of rations, disposal of foliage/bio-degradable products, processes adopted for warehousing and preservation the Yard was awarded ISO-14001:2015 and ISO-22000:2018 certifications in January 2020.

Base Victualling Yard (Kochi)

ISO-22000:2018 Certification: The unit was awarded certification for Food Safety Management in 2021.

ISO-9001:2015 Certification: The unit was also awarded certification for Quality Management in 2021.

Base Victualling Yard (Karwar)

ISO-14001:2015 Certification: The unit was awarded certification for Environment Management in March 2021.

ISO-22000:2018 Certification: The unit was awarded certification for Food Safety Management in March 2021.

ISO-9001:2015 Certification: The unit was also awarded certification for Quality Management in March 2021.

Naval Pay Office

Historical Evolution: In 1945, the Naval Pay Office was established as a Centralized Pay Accounting organization to maintain pay accounts of all Royal Indian Navy (RIN) personnel, with Pay Master-in-Chief RIN heading the office. It was set up in the Sanatorium Building in Versova, Bombay. The officer's wing of the office was shifted to the Chicago



Interactive NPO Website

Building at MG Road, Bombay. In the latter part of 1946, both wings (officers and sailors) were shifted to Fort Barracks, Bombay, adjacent to the old REX Cinema. On 15 August 1947, the office was again shifted to Talwar Camp, the site of the present Naval

Transport Pool. In 1950, the office was renamed the Indian Naval Pay Office. Finally, in 1952, the entire unit of the Indian Naval Pay Office was shifted to its present premises at Castle Park, adjacent to Angre Fort. It was christened as Naval Pay Office (NAVPAY or NPO), Bombay in 1956.

Paperless Office

Interactive NPO Website: In keeping with NAVPAY's constant endeavour to keep up with the pace of technology in the environment and to move towards a paperless office, an interactive website was developed by NPO in 2018 with in-house expertise. This rendered enhanced provisions for users, ships and establishments, such as updation of bank details, change of subscription, online fund-withdrawal application, DigiLocker and most importantly an eQuery module facilitating swift response to queries raised by *IN* personnel. The interactive options available online on the upgraded website under individual login included the following features:

- Change of DSOP/AFPPF subscription;
- Change of bank allotment;
- Submission of Final/Temporary Withdrawal applications from DSOP/AFPPF;
- Submission of provisional IT declaration (housing and non-housing);
- Updating of DSOP/AFPPF nominees;
- Updating of PAN Card; and
- Updating of Aadhaar Number.

Discontinuation of Statements of Entitlement (SEs) and Form 16 in hard copy

History of SE Printing: The NPO used to print more than 70,000 SEs of officers and sailors every month, which consumed 80,000 sheets of paper (equivalent to 160 reams) including misprints. Printing of SEs was achieved by the system using a priority schedule for the units, to ensure that those for far away units were printed before those

for nearby units. The SEs of units located in the Andaman and Nicobar Islands were printed first, and so on. The SEs of local units were printed in the end. This exercise involved dedicated efforts of a team of three sailors and two civilians over a period of four days, thus consuming 160 valuable man-hours.

Apart from manual efforts of printing and thereafter physical dispatch of these SEs to the units of the officers and sailors by NPO, the efforts of segregation and dispatch of these SEs were also repeated at various stations by Fleet Mail Office/ Unit Staff. The SEs to places/units not covered by Fleet Mail Office were dispatched by normal post. The same effort of segregation and dispatch was again repeated at units employing scant human resources, who could otherwise be more gainfully utilized.

History of Form 16 Printing: Similarly, Form 16 (Annual Salary Certificate), was prepared on the basis of cumulative details of gross taxable salary period. Contributions to Provident Fund/Group Insurance/Indian Naval Benevolent Association, other tax-saving instruments as declared and acted upon by NAVPAY, payment of interest and repayment of principal pertaining to House Building Advance (HBA) & Naval Group Insurance Fund (NGIF). These certificates were generated once in a year for every service personnel drawing salary from NAVPAY and for those who retired. Form 16 was printed by NPO and then dispatched for all personnel.

Present Scenario: With successful hosting of the NPO website on the National Informatics Centre (NIC) server (<https://navpay.gov.in>) and on the Naval Unified Domain (INTRANET - navpay.paschim.mil), the details of entitlement of pay and allowances are electronically available to all personnel. The SEs and Form 16 can now be downloaded and printed as and when required. The physical printing and dispatch of SEs to

personnel every month having become redundant, was discontinued in January 2016. Also, a new NPO Internet website (open domain) hosted on the IN's website (<https://indiannavv.nic.in>) was also launched on the NIC server. The provision and availability of online Statement of Entitlement and Form 16, both on intranet as well as intranet, has substantially improved service delivery and productivity.

Discontinuation of Pay Books

Brief History: The Pay Books, which were also known as *Bhartiya Nausena Vetan IN 231/232* (231 for sailors and 232 for Officers), were introduced in 1949 as a log book for the purpose of maintaining records of salary payments directly made to individuals, along with ration money, special ration allowance, temporary withdrawal, and final withdrawal. The entries were made by the unit Logistics Officer, with respect to the details of all the payments made to the individual. The pay books also had entries of leave details.

Purpose of Pay Book: The main role of the Pay Book was to serve as a log/record of all the payments made to the individual. The monthly pay, along with the sundry payments, was given to the individuals on pay-day with all due entries made in the Pay Books. The individuals deposited the Pay Book in the ship's office for the payment calculations to be made, checked and entries to be made by the writer in the Pay Book.

The Pay Book consisted of eighty pages. The first page held the personal particulars; the second page held details of when the Pay Book was issued to the individual. Pages three to five consisted of instructions for holders and pages six to nine contained instructions for the paying officer. Pages ten to seventy-five had entries of the payments made to the individual in whose name the Pay Book was issued. The Pay Book also had the details of medical records of the

individual, as in records of hospitalization, sick-bay admission, dental inspection/treatment, AME & Medical categorization, details of vaccinations, etc. It also had the Nominee details for Provident Funds (AFPP/DSOP), Death-cum-Retirement Gratuity, etc.

Change-over to Digital Records: Owing to the centralization of Payment Authorities, the usage of the Pay Book had subsided, and orders were promulgated for their discontinuation with effect on 1 May 2015. The Pay Books of all sailors and officers were recalled by NPO from units/ships. Around 57,000 Pay Books were submitted by IN personnel. The Pay Books are being held at NPO for the purpose of maintaining individual records. Receipt and accounting of these 57,000 Pay Books was undertaken by forming a special team.

Salary Remittance Mode Changed from ECS to NEFT

Brief History: Till March 2018, remittance of salaries for IN personnel was done through the Electronic Clearing System (ECS), with the help of fifteen scheduled banks holding salary accounts of IN personnel, wherein NPO forwarded individual cheques to these banks at the end of the month for crediting salaries. The process also involved clearance of cheques by the Reserve bank of India (RBI) and further remitting of salary by banks, which was a laborious and time-consuming procedure and often required follow-up and liaison with the banks to ensure timely crediting of salaries. It generally took minimum three working days for the amount to be credited into the beneficiary accounts.

ECS to NEFT: The NPO, in consultation with RBI, opted to change the mode of payment of IN personnel from ECS to the National Electronic Funds Transfer (NEFT) mode. The entire Naval salary was converted into NEFT mode, which benefitted NPO in saving effort and time. With the

new payment mode of NEFT, it takes only two to three hours for remitting salary into the individual's account. Phase-wise details of changing payment mode are listed below.

Phase	Bank	With effect from
I	Andhra Bank, Bank of India, Canara Bank, Central Bank of India, Dena Bank, Indian Bank, IDBI Bank, Yes Bank, Union Bank of India, Punjab National Bank	May 2018
II	Axis Bank and Syndicate Bank	June 2018
III	ICICI	September 2018
IV	HDFC	November 2018
V	SBI	January 2019

Genform Management System

Brief History: The Genform Management System (GMS) is one of the major software of the *IN* which records a number of activities such as promotions, movements, leave, pay and allowances, and many others. Genforms contains the details of the individual and the details of the event. The NPO, which hosts the Genform Management System, acts as a nodal agency for individual Genform-raising authorities at the unit level. All Genforms raised by the authorized units are centrally processed at NPO, which then generates salary and related benefits to the individual Naval personnel.

GMS 1.0: The GMS software was initially developed in 2004 by using MS access as back-end, and ASP Classic as front-end to technological obsolescence the maintenance of the software, as well as tamper-proofing the database became challenging. Further, the software was compatible with Windows XP but was not compatible with higher versions of the Windows Operating System. In order to overcome these issues, the GMS software is continually upgraded to keep abreast with the developments in hardware, software and IT security.

GMS 5.0: A new version of the GMS was designed and developed using ASP.net as front-end and Oracle 10g express edition as back-end in 2015 by an in-house team. It facilitated various advanced security features and a user-friendly interface, which optimized various processes and enhanced the performance of the entire system. This new version of GMS facilitated the implementation of new utilities, to process voluminous datasets in efficient manner. The GMS 5.0 was successfully rolled out and implemented pan-*IN*, Command-wise in 2015–16. It is presently running successfully in more than 370 units.

Instant Messaging Services

To reach out to the *IN* fraternity, a response mechanism was institutionalized in 2018 for acknowledging receipt of various documents through SMS services, wherein the individual would receive instant communication on their mobile phone/s.

Demob IPA

The Demob Individual Pay Account (IPA) was introduced in 2018, wherein monthly remittance of outstanding dues for retired personnel was done akin to the way it was done for active personnel. This resulted in remittance of all dues in a speedy and more regular manner and also led to a significant decrease in the inflow of Right to Information (RTI) petitions, Centralized Public Grievance Redress and Monitoring System (CPGRAMS) claims and other forms of filing grievances.

Disbursement of Other Payments and Allowances

The NPO took the initiative of disbursing sundry payments for all Naval personnel in 2015, such as education allowance and ration allowance, etc., which were earlier paid by local Imprest account holders. The significant change in the disbursement of such allowances has led

to a considerable reduction in the handling of cash, digital monitoring and record-keeping of such transactions.

Implementation of Seventh Pay Commission

Upon promulgation of orders regarding implementation of the Seventh CPC by the MoD vide *Gazette of India* dated 3 May 2017, the NPO undertook the following activities towards implementation of Seventh CPC:

Fixation of Basic Pay as per Seventh CPC:

Fixation of basic pay for a total of 77,952 personnel through the generation of authorization slips and their audit subsequently by PCDA(N) was undertaken. An amount of Rs 8,34,37,54,451 was credited as arrears of pay and allowances in the month of May 2017. Thereby, the *IN* became the first among the three Services to successfully implement the Seventh CPC.

Bunching of Pay: As part of activities under implementation of Seventh CPC, NPO carried out 'bunching of basic pay' of a total 5,297 eligible personnel and payment of arrears of Rs 37,29,79,339 towards the same was undertaken.

Implementation of Date of Next Increment (DNI):

With the revised DNI policy promulgated by IHQ MoD(N)/DPA on 5 November 2020, the NPO undertook an exercise to identify and inform all affected personnel through their respective commands and carried out fixation of DNI for a total of 24,131 sailors and 2,735 officers.

Directorate of Transport

Prior to 2017, the procedure for procurement of 'B' class (General purpose) vehicles, as replacement for downgraded vehicles, took as long as two to four years before new vehicles were given to the units. This caused considerable hardship to field units/establishments in the interim. The Directorate of Transport approached

the MoD in 2012 for implementation of an Annual Vehicle Procurement Plan (AVPP), in line with a similar system being followed in the IAF and the Army. The proposal was approved by the Government and the MoD in July 2017, for operational vehicles (except staff cars). With the implementation of the AVPP, vehicles are now provided to the units before or immediately on vehicles being downgraded. This has resulted in enhanced operational availability of transport to *IN* units. From its implementation in 2017 till date, over 892 vehicles have been procured through AVPP.

Naval Pension Office (NAVPEN)

The NAVPEN was set up on 1 December 2013, co-located with the Commodore Bureau of Sailors (CABS), with an aim to act as a single window organization managing all activities related to retirement of sailors, award of pension, resolution



Naval Pension Office

of legal and medical issues, ex-servicemen welfare for Officers and Sailors. The unit maintains the record of all Naval personnel who have retired or been discharged from Naval service.

Prior to setting up NAVPEN, pension-related functions were handled separately by CABS, Naval Pay Office (NPO) and Directorate of Personnel. There was a need to have a single window to address this crucial HR issue. NAVPEN commenced handling Sailors' pension on 1 February 2014, and on 1 April 2014, a part of the demobilization section of NPO joined the unit and started handling the Officers' pensions also. The charter was further enriched with the integration of the Release Centre, Verification Centre and Master Record Room with effect from 1 May 2014 after which NAVPEN was fully functional as per its role. Over the years, NAVPEN has established itself as an integral and important HR unit in the Service as a supportive and credible organization for the veteran community.

Naval Civilian Pay and Pension Office (NCPPO)

The NCPPO was set up in Mumbai on 10 December 2013. On formation, NCPPO initially operated from an old dockyard building at ND (Mbi) and was later shifted to INS *Tanaji* on 31 October 2018. The NCPPO's primary role is to ensure that pay, allowances and pension issues of Naval Civilian Personnel are handled in a professional manner under a 'single-window' system. The NCPPO's basic responsibility is to ensure correct authorization and timely disbursement of various pay and allowances to all Naval Civilian Personnel. The *IN* employs approximately 47,000 defence civilian personnel who are paid from Naval estimates. These employees are posted in approximately 150 Naval establishments across the country. The NCPPO is

headed by an Officer-in-Charge of Commodore rank and is placed under the administrative control of the HQWNC.

Conclusion

An effective Logistics arm is not only essential for core military operations, but also has huge bearing on day-to-day functioning that includes planning, forecasting and execution of the budget and inventory management of spare parts and other items, as well as the morale of personnel. In the last decade, the growth in terms of logistical capabilities and capacities have mirrored the expansion of the *IN*'s force levels and maritime footprint. The *IN* has leveraged multiple Logistics Sharing Agreements with Friendly Foreign Countries to support farther operational reach for its assets and sustenance of maritime operations. The *IN*, with its experience of the Tri-Services Command on the Andaman and Nicobar Islands has also taken a lead in promoting Tri-Services synergy. The setting up of Joint Services Training Institute (Catering) in September 2018 at INS *Hamla*, and the Joint Logistics Node at BVY (Mbi), are some of the early steps taken towards the planned setting up of 'Theatre Commands'. Additionally, the *IN*'s Logistics Arm has been a key force-multiplier in providing vital support across the country as was exemplified during the COVID-19 pandemic. Digitization of services to Naval personnel has been a major thrust area and has led to increased levels of satisfaction among the workforce. The growth in the logistical capabilities in the previous decade have contributed immensely to the combat readiness of ships, submarines and aircraft. The Arm, now in the ongoing decade, is set to further recalibrate its supply-chain strategies and systems in line with global best practices through technology adoption.

USN Supplies to IN

Date of Transaction	Receiving Agency	Store/Services	Place of Transaction
22 March 2019	INS <i>Trikand</i>	Fuel LSHSD	Fuelling at Gulf of Aden
25 September– 3 October 2019	IN aircraft P-8I	JP-5	Fuelling at Atsugi, Japan, during deployment (total 5 occasions)
4 October 2019	INS <i>Sahyadri</i>	Fuel LSHSD	Fuelling at Sasebo, Japan, during Exercise Malabar 2019.
5 October 2019	INS <i>Kiltan</i>	Fuel LSHSD	Fuelling at Sasebo, Japan, during Exercise Malabar 2019
1 November 2019	INS <i>Kiltan</i>	Fuel LSHSD	Fuelling at South China Sea/Java Sea
4 February 2020	INS <i>Mysore</i>	Fuel LSHSD	Fuelling at East coast of Oman
9 March 2020	INS <i>Sunayna</i>	Fuel LSHSD	Fuelling at East coast of Oman
14 September 2020	INS <i>Talwar</i>	Fuel LSHSD	Fuelling at Gulf of Aden
28 October 2020	INS <i>Trikand</i>	Fuel LSHSD	Fuelling at Gulf of Aden
5 December 2020	INS <i>Tarkash</i>	Fuel LSHSD	Fuelling at Gulf of Aden
10–28 January 2021	IN aircraft P-8I	Fuel/JP-8	Fuelling of IN P-8I at Guam during Exercise Sea Dragon 2021 (total eleven occasions)
12 February 2021	INS <i>Mysore</i>	Fuel LSHSD	Fuelling at Gulf of Aden
26 March 2021	INS <i>Talwar</i>	Fuel LSHSD	Fuelling at Gulf of Aden
13 July 2021	INS <i>Tarkash</i>	Fuel LSHSD	At sea
18 August 2021	INS <i>Trikand</i>	Fuel LSHSD	At sea
27–28 Aug 2021	IN aircraft P-8I	ASE, GSE, Misc. Support & fuelling	Logistics support to IN P-8I at Guam during Exercise Malabar 2021
29 August 2021	INS <i>Shivalik</i>	Fuel LSHSD	Fuelling at Guam during Exercise Malabar 2021
29 August 2021	INS <i>Kadmatt</i>	Fuel LSHSD	Fuelling at Guam during Exercise Malabar 2021
23 September 2021	INS <i>Trikand</i>	Fuel LSHSD	Fuelling at Gulf of Aden
10 December 2021	INS <i>Ranvir</i>	Fuel LSHSD	Fuelling at Gulf of Aden
13 January 2022	IN aircraft P-8I	ASE, GSE support & fuelling	Logistics support to IN P-8I at Guam during Exercise Sea Dragon 2022

IN Supplies to the USN

Date of Transaction	Supplying Agency	Receiving Agency	Store/Services	Place of Transaction
13 June 2019	HQENC/MO (V)	USS <i>John P Murtha</i>	Transportation of cargo.	Visakhapatnam
16 July 2019	INS <i>Hansa</i>	US Navy Team	Interaction/Visit to INS <i>Hansa</i> .	Goa
30 September 2019	INS <i>Hansa</i>	US Navy	Dry run of 1 cargo aircraft at INS <i>Hansa</i> , with 4 members on ground for coordination.	Goa
14–15 November 2019	HQENC	USS <i>Germantown</i>	Transport of 12 cargo pallets from INS <i>Dega</i> to Vizag Port Trust for USS <i>Germantown</i> .	Visakhapatnam
24 September 2020	HQANC/MO (Pbr)	US Aircraft P-8A	Supply of fuel.	Port Blair
4 November 2020	INS <i>Shakti</i>	USS <i>John S McCain</i>	Exercise Malabar 2020.	Visakhapatnam
6 November 2020	INS <i>Shakti</i>	USS <i>John S McCain</i>	Exercise Malabar 2020.	Visakhapatnam

Notes

- 1 Indian Navy (2015). *Ensuring Secure Seas: Indian Maritime Security Strategy*. Indian Navy Naval Strategic Publication (NSP). 1.2 New Delhi: Ministry of Defence (Navy), Government of India. https://www.indiannavy.nic.in/sites/default/files/Indian_Maritime_Security_Strategy_Document_25Jan16.pdf
- 2 Logistics Précis, Navy 7, DSSC Aug 2014, pp. 1.
- 3 Ministry of Defence (Logistics for Joint Operations, Joint Doctrine Publication 4-00, DCDC, UK, pp. 4. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/458596/20150721-DCDC_JDP_4_00_Ed_4_Logistics_Secured.pdf
- 4 Department of Defense (US), Dictionary of Military and Associated Terms, Joint Publication 1-02, pp. 142. https://irp.fas.org/doddir/dod/jp1_02.pdf
- 5 NATO Glossary of Terms and Definitions AAP-06, pp. 2-L-5. https://www.coemed.org/files/stanags/05_AAP/AAP-06_2019_EF.pdf
- 6 'Heavy' refers to aircraft that have a maximum take-off weight (MTOW) of 300,00 pounds/136 tonnes or more. MoD/PIB press release (30 December 2020): Maiden Flight Trial of SA-HAYAK-NG, Air Droppable Container. <https://pib.gov.in/PressReleasePage.aspx?PRID=1684799>
- 7 Tri-Services Joint Logistics Node was also set up at the Andaman and Nicobar Command in Port Blair in January 2021.



18 | Indian Naval Safety Organization

Promoting Safety as a Way of Life

⚓ Introduction

Admiral Sunil Lanba, (then) Chief of Naval Staff, in his Safety Message to the Indian Navy on 1 January 2019, noted:

As we deploy actively across the sea—often under imperfect, hazardous and demanding conditions—we need to view combat readiness and safety consciousness as the two sides of the same coin, the optimum performance and operational safety are mutually inclusive terms.

A safe living and working environment are essential requirements for societies and organizations to operate optimally. It is particularly relevant for military organizations, as the Armed Forces perpetually operate in hazardous situations that place personnel and materiel in a constant position of risk. The Armed Forces are required to undertake their tasks with calculated risks. The element of prior calculation provides the principle of ‘safety to the Forces’ when operating in an environment that is perpetually fraught with unseen vulnerabilities.

Unlike war-fighting skills for which militaries are trained, accidents while on duty are often unprecedented; nonetheless, not something that one is unprepared for. It may be argued that with the right training and associated doctrinal and

infrastructure underpinnings, it is possible to prepare for unforeseen contingencies—firstly, to anticipate and prevent accidents, and secondly, to mitigate the consequences of an accident/incident occurring.

The Indian Navy (*IN*), for long, lacked a specific safety vertical with doctrinal aspects, technical and material requirements, as well as Standard Operating Procedures (SOPs) outlined as a central organization. Eventually, the adoption of safety as a crucial facet for successful operations emerged as a remedial outcome of the analysis of several accidents and incidents that took place in the previous decade on the *IN*’s ships and in its shore establishments.

This chapter broadly gives an overview of the establishment of the Indian Navy Safety Team (INST) in 2017. It also covers the evolution of organizational structure, responsibilities of the INST, as well as the key activities carried on by it since its inception to achieve its stated objectives.

Background: The past decades witnessed a series of accidents in the *IN*, resulting in loss of life as well as materiel. These included incidents on ships at sea as well as dockyards. Severe damage to *INS Agray* (2004), collision of *INS Trishul* with a merchant vessel (2005), death of six sailors due to explosion onboard *INS Magar* (2006), sinking of *INS Prabhar*

after collision (2006), were some of the unfortunate incidents in the previous decades highlighting the range of vulnerabilities while at sea.

Accidents such as these brought the crucial aspect of safety to the limelight and to the *IN* leadership, both as the lack of a safety-related institution/central agency within the *IN* and as the lack of well-established safety precautions and SOPs. The acknowledgement of these facts and realities led the then Chief of Naval Staff (CNS) to introduce 'Safety Road-Map' in 2006. In furtherance of the same, in 2007, the then Vice CNS (VCNS) wrote to the Commanders-in-Chief (C-in-Cs) to build up consensus on the proposed approach paper for the implementation of the Safety Regulations within the Navy.

⚓ Evolution of the Safety Organizational Structure

The continuity of accidents from 2007 to 2011 led to questions about safety practices as well as erosion of professional pride, morale and confidence of the *IN* as a fighting force. The accidents included the capsizing of INS *Vindhyagiri* (2011), the sinking of the Submarine INS *Sindhurakshak* due to a major fire in 2013 and the tipping of the Frigate INS *Betwa* while at the Mumbai dockyard (2016) that led to loss of human lives and materiel. The setback to the image of the *IN* compelled the top Naval leadership to revisit the topic as a pressing issue.

In 2011 and 2012, the safety organization was initially envisaged to be centred on coordinating directorates at NHQ and Safety Class Authorities (SCA) at the apex level. The concept of *Class Authority* (CA) referred to each specialist domain where these authorities were responsible for analysing accidents and incidents, reviewing safety regulations and procedures, as well as issuing policy directives in their respective domain specializations.

For the Ops division, a separate vertical was created at Commands that percolated to fighting formations such as ship- and submarine-based safety committees. The system was further refined in July 2013 to strengthen procedure through inclusion of a formal audit. Hence, Command Level Safety Audits (COMSAT) and Operational Level Safety Audits (OLSAT) were included in 2014. In furtherance to the initiative, dedicated Command Safety Officers were appointed gradually—November 2014 in the Eastern Naval Command, May 2016 in Southern Naval Command and 2017 in the Western Naval Command.

Additionally, the Comptroller and Auditor General (CAG) of India conducted a special audit in 2016 to study the accidents in Naval ships and submarines. The CAG audit undertook a study of thirty-eight accidents that occurred between 2007 and 2014. The CAG outcome report emphasized the limited nature of the then present safety system and lack of Government sanction to the *IN* Safety Organization that had existed since 2014.

⚓ Establishment of INST: Structural and Operational Aspects

After being deliberated in various *IN* fora, including at Commanders Conferences, the issue of the *IN* Safety Organization was conceptualized for implementation in two phases. The first phase was implemented with the setting up of INST in December 2017, as part of the envisaged full-fledged Indian Navy Safety Organization (INSO). The second phase is yet to be implemented. The INST is co-located with the training command due to the inherent advantages of being closely associated with Flag Officer Sea Training (FOST), training schools and operational units at the field level.

Vision Statement of INST: The focus of the INST has been to provide a comprehensive institutional

approach to safety in the *IN* as proposed in its vision statement:

‘The INST aims to provide a focused and institutionalized impetus to the practice of safety in the Indian Navy, enhance safety consciousness of the naval community, and imbibe a robust culture of safety among all *IN* personnel afloat and ashore.’

Mission Statement of INST: The roadmap for Safety, detailing the actors, procedures and practices has been promulgated in the Mission Statement of INST, as follows:

In coordination with all stakeholders, including Command Safety Committees and Safety Class Authorities [SCAs], the *IN* Safety Team will aim at enhancing safety consciousness and the culture of safety amongst service and civilian personnel and their families in all *IN* units. The *IN* Safety Team will ensure effective collation and dissemination of safety-related information, procedures and practices pan-Navy; conduct safety training capsules at all levels; and promulgate safety policies and advisories.

Vision Document: In order to provide direction and momentum to the new team, a Vision Document, based on the draft charter, was prepared. Each charter was converted into actionable points and sub-divided into the following seven sections for ease of execution, monitoring and record keeping:

- Policy;
- Training;
- Reports and Returns;
- Audits;
- Accidents/Incidents;
- Seminars/Workshops; and
- Administration.

In the pursuit of execution of its charter, some foundational activities were undertaken

by the Safety Training Team (STT). The activities included collation of all policies, advisories, Books of Reference (BRs), handbooks published by IHQ MoD (N), Command HQs and all SCAs. Additionally, Safety Management and the Human Factor Analysis and Classification System Capsule (HFACS) as a part of training was conducted at Western Naval Command.

Charter of INST: The INST acts towards empowering all personnel with the requisite training, tools and understanding of safety concepts, so as to collectively adopt a proactive safety culture that identifies risks, implements mitigating strategies and manages hazards without compromising the mission accomplishment. It is responsible for the centralized implementation of the *IN*'s safety policies, programmes and training.

Presently, the complete charter of the Inspector General (Safety), as and when instituted, has been assigned to INST. The execution, however, has been limited to ship safety, ashore and industrial safety domains, pending augmentation of qualified manpower from other branches/specializations. The INST is to:

- Promulgate policies and steer procedural aspects with pan-Navy implications in consultation with Class Authorities and IHQ for enhancing safety. It also deals with the specific subjects/disciplines to be addressed during periodic ‘Safety Stand Down’.
- Monitor the timely receipt of Safety Audit reports as per the laid down Audit Calendar, as well as the implementation and effectiveness of remedial measures for Safety Audit observations by Command HQs.
- Liaise with the CAs and Command HQs to ensure the dissemination of knowledge of factors adversely affecting safety, and recommend remedial measures. The INST also coordinates with the sister Services, Government agencies and private

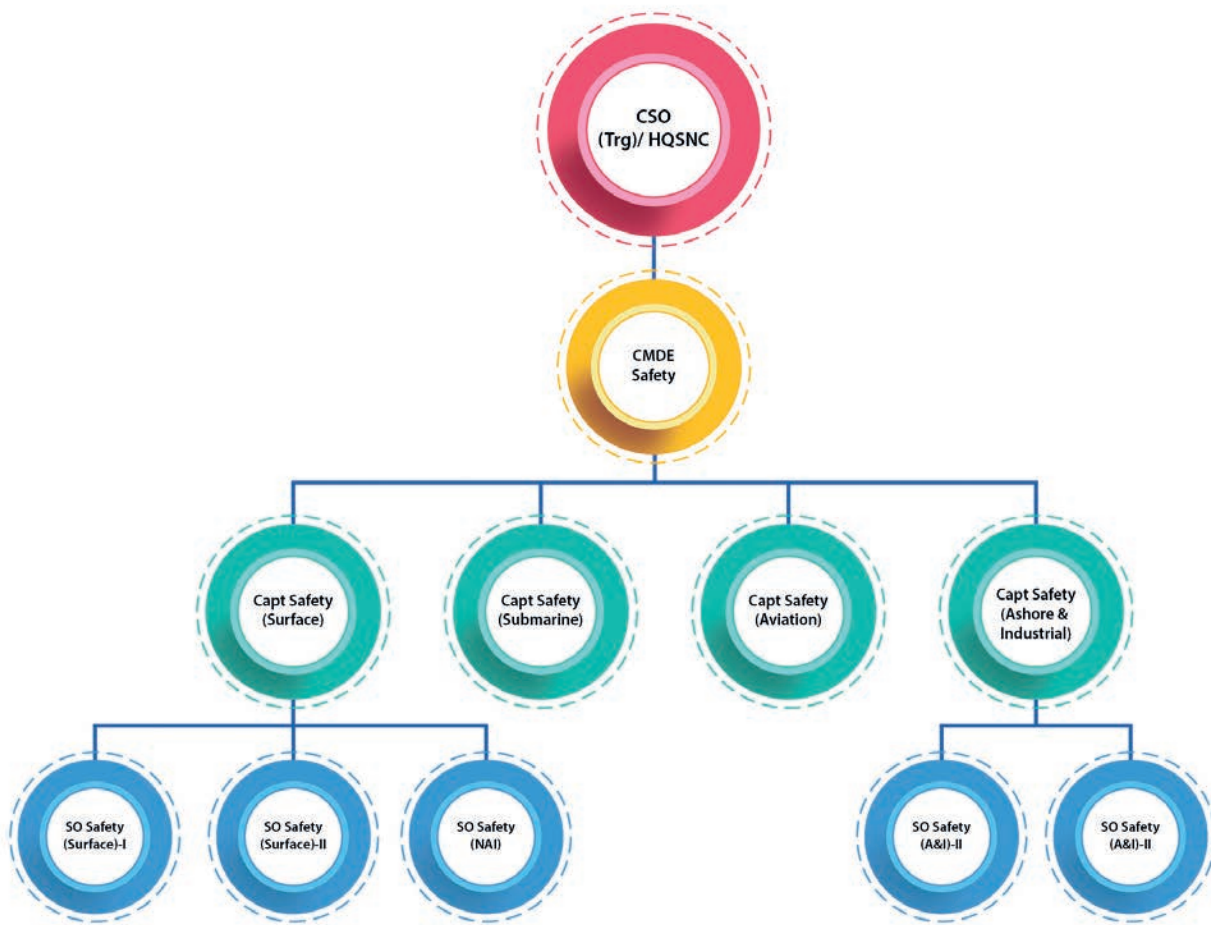
organizations engaged in hazard awareness to imbibe best practices in concert with CAs.

- Review the functioning of Command Safety structures, updation/revision of Safety BRs and safety orders and Safety Equipment Allowance list and its IN-wide promulgation.
- Conduct a systematic review of the effectiveness of safety programmes and promulgate an Annual Safety Report comprising trends, analysis and mitigating factors based upon statistical data on accidents. It also organizes safety seminars, workshops, courses and participation in such activities conducted by external agencies to observe best practices elsewhere.

Safety Training Team (STT): The foundation activities for setting up of INST began in July 2017, by appointing officers of executive and technical branches to HQSNC with an aim to strengthen the safety training vertical under CSO (Training). The Safety Training Team (STT) commenced its mandate in July 2017.

⚓ INST: Current and Future Organizational Structure

The full-fledged proposed *IN* Safety Organization is to be headed by a two-star Admiral (Inspector General – Safety). The case for augmentation of manpower and provision of a permanent building is currently under consideration at NHQ/MoD/ Government of India. The current organizational structure (Phase I) is as follows:

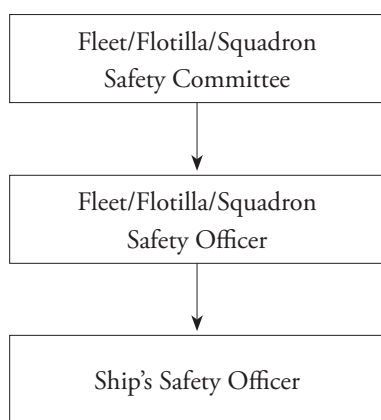


Revamped Safety Organization

Apex Level Structure: The Directorate of Naval Operations (DNO) is the nodal Directorate at IHQ MoD(N) to oversee the organizational framework and policy promulgation related to Safety. The Apex-level structure comprises of SCAs and respective ‘Coordinating Directorates’ at IHQ MoD(N) for each specialist domain.

Command-Level Organization: At the Command level, a ‘Committee on Safety’ under the chairmanship of the Chief of Staff, acts as the single-point authority to coordinate safety related aspects with other SCAs.

Fleet/Flotilla/Squadron Level: At the Fleet level, a Fleet Safety Committee has been constituted under the Fleet Operations Officer (FOO) with a suitable Fleet Staff Officer nominated as the Fleet/Flotilla/Squadron Safety Officer. Similar safety committees have been constituted with suitable representation at Flotilla and Squadron levels. Fleet/Flotilla/Squadron Safety Committees meet on a quarterly basis, with participation of Ship Safety Officers. The organizational structure of Fleet/Flotilla/Squadron/Ship Safety Organization is shown below:



Safety Organization at Field Level

Responsibilities of Safety Class Authorities: Responsibilities of SCAs, in respect of their specialist domain, include analysing incidents,

accidents and all safety infringements, including near misses for review, formulation and promulgation of ‘Safety Acquaints’ (Acquaints are akin to Advisories) for dissemination of lessons learnt and policies (with respect to safety) in their specific domains after due approval of IHQ MoD(N). They are also required to conduct safety-assessment inspections of units/establishments and forward a separate safety assessment to concerned directorates. Furthermore, SCAs promulgate Safety BRs and Templates, Safety Orders and periodic safety updates, and also conduct Safety seminars and workshops in Commands at regular intervals.

Safety Organization Onboard Ships: Consequent to the promulgation of Navy-wide safety organization in October 2012, detailed amplifying orders with regard to the safety organization onboard all *IN* Ships was promulgated by FOST in March 2014 and August 2021. The ship’s Safety Committee is required to meet quarterly and tasked with enhancing safety awareness by ensuring safe practices, analysing safety infringements and instituting corrective measures.

Safety—Information Sharing and Reporting: One of the key elements of the *IN*’s Safety enhancement roadmap is the conduct of regular Safety Programmes providing opportunities for personnel to discuss Safety matters and learn from individual and collective experiences.

■ **Safety Alerts:** The ‘Safety Alert’ signal was instituted to facilitate quicker dissemination of critical corrective/preventive measures to all ships, in case of an accident/incident/near miss/safety infringement due to material failure of equipment or non-observance of SOPs. This signal is released by the FOST and considered akin to a First Information Report (FIR), essentially containing only preliminary

information about the likely cause of the incident/accident. Three ‘Safety Alert’ signals released in 2020 and nine in 2021.

The alert, followed by remedial actions, is further followed up by a ‘Safety Advisory’ by FOST which emerges from a detailed analysis of the incident/accident, and lists various procedural, organizational and material recommendations, if required, to prevent further recurrences.

- **Safety Advisories:** As a part of safety initiatives, Safety Advisories are meant to encourage a strong safety culture at the organizational, professional and individual levels. Directorates at IHQ MoD(N), Command Headquarters, SCAs, Op Authorities and INST are the functionaries authorized to issue Safety Advisories, with INST mandated to be the nodal point. Some safety advisories promulgated were based upon a specific issue—such as an increase in road-traffic accidents, leading to a Safety Advisory being promulgated on 30 June 2020 for shore establishments related to residential, school and road safety.

Similarly, when a few instances of fire were reported in civil hospitals on account of high oxygen content in ambient air, caused by increased medical oxygen use due to COVID-19 patients, a safety advisory was issued by INST on 3 June 2021, with special emphasis on reduction of risk due to flammables and medical oxygen. The advisory, along with a poster depicting its salient points, was also handed over to the Ministry of Health for promulgation in Government and private hospitals.

The cumulative status and comparison of Safety Advisories issued from 2018 to 2021 are tabulated below.

Year	Safety Advisories Issued
2018	44
2019	97
2020	97
2021	34

Policy on Reporting: Keeping in view the stringent procedures adopted for maintaining effective safety on naval assets, a policy for reporting incidents was instituted. The Policy obligates the reporting of accidents/incidents within four hours of occurrence, by an Incident Report (INCREP) Signal by the unit. The INCREP signals are to be followed up with a detailed ‘Follow-up Report’ on the accident/incident within seven days.

⚓ INST: Key Activities

The section below overviews the key activities carried out by INST that includes publication of Safety documents, conducting training workshops, knowledge repository and dissemination as well as institutional outreach.

Safety-Related Publications

Annual Safety Review: The Annual Safety Review (ASR) was institutionalized under chairmanship of the VCNS with effect from Safety Year 2017. The focus of the *Annual Safety Report* is to monitor safety standards of IN units/establishments and to review effectiveness of safety-related measures instituted by various authorities. The INST presents the *Annual Safety Report* of the preceding safety year with a three-year roll-on perspective during the ASR. The ASR is attended by representatives from IHQ MoD(N), Command HQs, SCAs and other relevant stakeholders, in order to enable

a comprehensive review of safety and re-emphasize it as a focus area across all domains of the Navy.



Maiden Annual Safety Review (April 2018)

Promulgation of a Safety Syllabus: As promulgated by the Safety Charter, a structured safety syllabus across all phases of training was formulated to develop the safety culture of naval personnel. It was approved by IHQ and introduced for all officer and sailor courses with effect from Training Year 2018–19. The common safety syllabus is relevant to Officers from INA to Higher Command Courses and Sailors from *Chilka* to CPO (Management) Courses.

Inclusion of INST in Safety-Related Communications: Consequent to the promulgation of the charter, all safety stakeholders are mandated to share information with INST to enable an *IN*-wide trend analysis and the retention of the *IN*'s safety statistics by INST as the nodal organization.

CNS Safety Message to *IN*: Based on the INST's recommendations, a 'CNS Safety Message to the Indian Navy' was released on 1 January 2019. Significant concepts—'safety as a second nature', adherence to SoPs, measures for risk mitigation, improving reporting culture, and eradication of normalization of deviance—have been highlighted in the CNS' 'Course to Steer' message on 16 October 2019 and serve as key focus areas for all the safety capsules and workshops conducted by INST.

Promulgation of Safety Documents: The INST has authored an *Indian Navy Safety Management Manual* (INSMM) and uploaded it on its website to enhance a pan-*IN* safety culture. Salient aspects of the manual have also been incorporated into training capsules. The INST also conducts lectures and shares pre-course material with trainees prior to their completing safety capsules. The INSMM is a stepping stone towards the development of a Safety Book of Reference.

Safety Website: An INST web application was launched during ASR-2019 for hosting on NUD for reporting safety infringements. The website provides information about INST, information on safety policy for afloat, ashore and industrial units. The application was developed indigenously through M/s Sakura Solutions, New Delhi.

Human Factor Analysis and Classification System (HFACS) and Accident Maps (AcciMaps)—Handbook and Training: The HCAFS is a scientific tool to investigate accidents and incidents from individual to organizational levels; AcciMaps, an accident mapping system, is used for identifying causes from human factors to systemic causes in organizations. The INST has prepared a handbook in consultation with HQNA, which can be used for training on use of HFACS and AcciMaps; and for aiding investigators in the application of HFACS and AcciMaps during inquiries and investigations.

The handbook was released for pan-Navy use by the VCNS during ASR-21. The maiden training capsule on HFACS and AcciMaps was conducted by INST in January 2021. Thirty-three officers from various units/establishments of SNC participated. Subsequently, training capsules on HFACS and AcciMaps were conducted for WNC units in Mumbai and for ENC units at Visakhapatnam simultaneously in September 2021.

Safety Training Courses/Workshops

Attachment Course for Safety Officers:

Consequent to discussions during ASR 2019 on the training of Safety Officers, INST conducted Safety Capsules in Kochi in November 2019 and February 2020 for officers tenanted safety appointments at all Commands. They were provided training on subjects such as Safety Theory, Ship Safety, Ordnance Safety, Operational Risk Management (ORM) and safety data analysis. The course was stopped in view of the ongoing COVID-19 Pandemic and rescheduled to mid-2022.

Variety of Safety Capsules Conducted: The INST conducts a number of Safety Capsules covering various safety-related topics at Commands and training establishments. These provide an overview of Safety Theory, Safety Organization in the *IN*, ORM, HFACS, best practices, and lessons learnt from accidents/incidents.

Safety capsules are being conducted for the following courses: Command and Area HQs (both Officers and Sailors); Naval Higher Command Course (NHCC) and Defence Services Staff College (DSSC); CO/XO PCT, including S/M CO/PCO QC; EO and LO PCT; Long Course (Indian); Sub Lt (Tech) at CELABS, 1 TS; and CPO (Management) at *Agrani*.

Operational Risk Management Workshops and Training:

To provide impetus to *IN*-wide implementation of ORM, INST conducted ORM Capsules at Commands and ORM Workshops for officer courses such as CO/EXO PCT, Long Courses and SLt (X) Technical courses. These ORM workshops focused on: (i) amplifying the benefits of ORM in managing risks; and, (ii) stressing the team effort required to prepare ORM compliant checklists. Workshop participants were also closely guided through the process of preparing ORM-compliant checklists.

Standardization of Conduct During Safety Stand

Down: Dissemination of Safety issues important during 'Safety Stand Down' are promulgated by INST in consultation with SCAs. These inputs aim to provide impetus to develop a safety culture that reiterates relevant aspects of safety theory and addresses common safety observations.

Knowledge Repository and Dissemination

Dissemination of Lessons Learnt: INST collates and analyses reports of all accidents/incidents/infringements which have been investigated through BoI/TBoI and OMI. Lessons learnt are shared with Commands in the form of Advisories/information to prevent similar safety lapses in future. Inputs are also being disseminated to training schools for use by the Incident Study & Analysis Cells (ISACs), and for appropriate inclusion/amendments in the training curriculum.

INST Data Cell: A dedicated Data Cell is functional at INST, to collate and archive data pertaining to Safety Audits, Incident Reports (INCREPs), Incident Signals (INSIGs), and Quarterly Safety Reports from Commands and extracts from Quarterly Safety Committee Meeting reports from units. This data is used to classify and statistically analyse accidents/incidents with the aim of identifying likely flashpoints and pan-Navy trends. The charter of the Data Cell is to collate and archive data, generate accident-related statistics including analysis, and identify likely flashpoints. It also identifies material issues affecting safety and pan-*IN* trends on a quarterly basis to generate safety trends specific to Commands.

Analysis of Safety Data: INST undertakes comprehensive analysis of observations raised during safety audits, accident and incident information-based on INCREPs, INSIGs, BoIs, and Quarterly Safety Committee Meeting reports

to identify trends and flashpoints, and these are highlighted in the *Annual Safety Report*.

Safety Interaction with External Agencies: INST holds formal interactions with higher formations of *IN*, sister Services and several external agencies, including industrial/Government organizations with an aim to understand the best safety practices, safety policies, new concepts in safety training, activities being conducted to promote safety, etc.

IN-RN Interaction: As part of knowledge sharing in the field of Safety with other like-minded navies, a Royal Navy delegation from the UK, headed by Navy Safety Director of the Royal Navy Safety Centre, along with three officers and Resident NA UK, visited Kochi in June 2019. The two Navies exchanged views on salient safety-related issues such as safety organization, policies and procedures, risk appetite, ORM, safety audits, accident investigation procedures, reporting culture, Safety training.

Policy Letters Issued

As a part of continuous upgradation of its systems and SOPs, INST has promulgated policy letters based upon Annual Safety Reviews over the years. Some of them are mentioned below:

Firefighting Onboard During Refit: During ASR-19, efficiency of repair yards in combating fire onboard was deliberated and INST undertook a study on the feasibility of enhancing the role of dockyards in firefighting onboard ships and submarines undergoing refits. In March 2020, the policy for firefighting during refits was promulgated to enhance the capability of dockyards.

Industrial Safety Courses: The need for qualified Safety Officers for industrial units was discussed during ASR-18. It was brought out that the existing recruitment rules regarding the recruitment of permanent Safety Officers, needed amendments, and approvals for amendments would take time.

Therefore, it was agreed to promulgate a list of safety courses for personnel tenanting billets of Safety Officers at industrial units. The INST coordinated with various agencies and private institutions to identify suitable courses. The list of approved courses was formally promulgated in April 2020.

Safety Inspection Format for Annual Inspection of Shore Units: A proposal for inclusion of 'Form 162 on Safety' in the Annual Inspection Report of shore units pan-*IN*, was discussed during ASR-19. Based on the inputs received from Commands and SCAs, a draft format was promulgated in April 2020.

Institution of Pan-*IN* Safety Awards: It was hoped that this initiative would enhance: (i) interest in safety matters; (ii) effectiveness of already established safety programmes; and (iii) help strengthen the culture of safety at the working level. The institution of pan-*IN* Safety Awards was discussed in ASR-19 and an INST draft policy letter on the same was promulgated in April 2020.

Indexing Safety Advisories: Indexing and cataloguing Safety Advisories centrally was discussed during ASR-18, and INST was mandated to be the nodal point for safety advisories. Draft Safety Advisories are now being forwarded to INST prior to promulgation, and this facilitates cross-domain exchange of safety information. All Safety Advisories are also hosted on the INST website for easy access by all concerned.

Contractor for Safety Audit and Management: The concept of a Contractor Safety Audit and Management is relevant to Dockyards, Naval Ship Repair Yards (NSRYs), Fleet Maintenance Units (FMUs) and shore establishments authorized to conclude contracts. Accordingly, a Safety Advisory on Contractor Safety Audit and Management was issued in July 2020. The Safety Advisory provides

detailed guidelines and implementation of a six-step process—selection of contractor, contract preparation, award of contract, orientation capsules and training for workers, managing contractor safety at field, and post-contract evaluation—for undertaking contractor safety audit and management. Civil works undertaken by MES contractors have, however, been kept out of the ambit of the Safety Advisory.

Promulgation of Policy on Indian Naval Accident and Incident Classification System (INAICS) and Revised Safety Reporting Mechanism: During ASR-18, the requirement for the promulgation of a comprehensive accident policy, applicable to all types of *IN* units was proposed by the INST to enable drawing of correct conclusions/inferences from statistical analysis. Consequently, INST undertook a study of all current orders on classification of accidents, and the INAICS and Revised Safety Reporting Mechanism Policy was brought into force with effect from 1 March 2021.

Safety Equipment for Yard Craft and Ocean-Going Vessels: In the absence of a policy on safety equipment for personnel manning yard craft and ocean-going vessels, INST proposed a scale of authorization of safety equipment in July 2018. This proposal was for ocean-going vessels and yard craft (including tugs, fuel barges, ferry craft etc). The scaling of Safety Equipment Allowance List was promulgated in September 2021.

Safety Equipment Allowance List (SEAL) for Newly Inducted Afloat Platforms: In consultation with HQST, the INST proposed a draft SEAL to IHQ/DNO for all newly inducted afloat platforms. The allowance list was drawn up with due consideration to the role/tasking and size of the ship. The promulgation of the list is a continuous process along with the commissioning of new ships. The last SEAL was promulgated in September 2021.

⚓ Future of *IN* Safety Organization

As per the revised projections, the *IN* is expected to grow to a 170-ship Navy by the year 2027 with aircraft and associated support organization ashore. Therefore, Safety needs to be incorporated to safeguard men and materiel from accidents. The goals and aspirations of this nascent organization, with modest human resources, is hinged on support of Commands, SCAs and all agencies that have a stake in enhancing safety in the thoughts and deeds of Service personnel, civilian work force, their families and hired workers, whose collective efforts contribute to the *IN*'s safety performance.

Considering the rapid pace of expansion planned for the *IN*, there is a requirement to fortify the safety organization to bring it at par with those existing in advanced navies and other Services around the world. Towards this, an INST for Government sanction for Unit and manpower accretion for the creation of an *IN* Safety Organization was forwarded on 27 January 2018.

The vision of the *IN* is to become an efficient fighting force and conduct successful operations, creating a minimal-risk environment for both its personnel and materiel. The establishment of INST has been a conscious attempt to build an overarching safety culture for operations at sea as well as at shore establishments. In addition to building secure systems for operations, the INST is focused on safety implementation through procedures, and through programmes that create awareness.

⚓ Conclusion

The increased speed of operations in the *IN*, accentuated by increasing complexities of state-of-the-art systems on board ships, submarines and aircraft, require stringent and utmost adherence to safety. The decade gone by will be remembered for some of the major reforms undertaken by the

IN at all levels of operations afloat, sub-surface, air and on land. The new safety architecture put in place has helped improve safety culture, facilitated smooth flow of incident information necessary for causal analysis and dissemination of lessons learnt.

Information gleaned through such incidents, and its availability centrally, has been a key enabler for Naval designers for incorporating improvements in ship construction standards, as

well as their inclusion in the training curriculum across all levels of personnel. Since 2018, the *IN* has also started conducting a safety review at the apex level every year, with the twin objective of providing an opportunity to take stock of all aspects concerning operational and functional safety, identify and initiate institutional steps to reduce the occurrence of incidents and provide an organizational framework to strengthen safety culture in the Indian Navy.



19 | Human Capital Management

Professional, Resolute and Prepared

⚓ Introduction

The Indian Navy (*IN*) is progressively occupying greater focus, largely due to changed geo-political considerations and its proven track record of responding with alacrity to eventualities/contingencies in our maritime neighbourhood. Consequently, the demands and indeed the expectations placed on the *IN* are on the rise. Delivering on these requires the *IN*'s Human Capital to be professional, resolute and prepared, as identified in the *IN*'s 'Human Capital Strategy' of 2018 (HCS 2018; first promulgated in 2013 and revised in 2018).

A well-trained and motivated personnel base (officers, sailors and defence civilian staff) is the *IN*'s most valuable asset and forms its core, enabling the utilization of other materiel assets towards achieving its strategic goals. However, attracting and retaining quality manpower has become increasingly difficult in recent years due to the ever-increasing range of job opportunities outside the Armed Forces in India's healthy, upward-looking economy. The core focus of the HCS 2018 is, therefore: attract, recruit and retain the right (quality) manpower.

The Indian Maritime Security Strategy of 2015 (IMSS 2015), also identifies this as a goal of the *IN*, and vital to its combat credibility:

[the need] to attract the best of India's youth to join its ranks, provide them with efficient and effective training, and a living and working environment that fosters professionalism, motivation, loyalty and innovation. Maintaining the right quality and numbers of personnel, and instilling in them a sense of pride, ownership and commitment, along with ensuring their adequate personal and professional growth.¹

The *IN* intends to build its future through the integrated concept of People, Assets and Combat Efficiency (PACE), with People, the human capital of the *IN*, being the integral cog to its syncretic approach for capability creation. Advent and induction of new technology requires to be in sync with the availability of a well-trained and motivated personnel base. Therefore when capability enhancement was sought by the Maritime Capability Perspective Plan it was imperative that the *IN* formulate an HCS to transform the human resource into a more tangible asset and to plan and integrate personnel into the *IN*'s strategic needs. In pursuit of this objective, the first HCS was promulgated in 2013 (and later revised in 2018). Aligning with this strategy, a training doctrine and an HCS that focused on Defence Civilians, were published in 2014.

The HCS 2018 guides the maintenance of a professional and motivated human-resource (HR) base, developing its expertise and war-fighting skills, while offering optimum employment. These documents have laid down the essential objectives for each element of the overall HR management envelope and include human capital, recruitment, training and career management. This chapter broadly covers the initiatives, policy directions, infrastructure growth in support of Human Capital management.

At the beginning of the last decade in 2011, the manpower shortage in case of officers (excluding medical and dental officers) was 21.5 per cent; and in case of sailor's it was 22.65 per cent. The *IN* today comprises more than 110,000 uniformed and civilian personnel (uniformed manpower component is about 75,000), but still continues to face a significant shortfall in both uniformed and civilian personnel. The shortfall of uniformed personnel as on December 2021 was about 10 per

cent for officers and 15 per cent for sailors, while shortage of civilian manpower as on March 2018 was close to 37 per cent, and it continued to persist around this figure in May 2021.

⚓ Transformation of Human Capital

According to most estimates, the Indian economy is expected to continue to grow over the next few decades, resulting in increased urbanization, an improved job market and an enhanced standard of living. Consequently, the *IN* would need to take proactive steps to enhance the 'attractiveness quotient' for young men and women, so as to draw the right quality of personnel.

The *IN*'s Human Capital is arguably the most important factor that will shape its growth—by transforming its platforms and infrastructure into effective capabilities. While the *IN* will grow in terms of capability, its manning is planned to be leaner and, to a large extent, vertically specialized.



Human Capital: The Force Behind a Capable and Credible Indian Navy

The *IN*, therefore, will require a quality workforce of adequate size for planned growth to fructify. In order to integrate with the *IN*'s overall growth plan, Human Capital needs to evolve while addressing both tangible and intangible aspects of workforce management. Tangible aspects include workforce size with a plan to meet quantitative requirements. Intangible elements (more difficult to predict/quantify) essentially include aspects related to socio-economic demographics, quality of life expectations and projected economic growth.

In the decade gone by, the *IN* was cognisant that demands from various quarters would mean that resources—financial, materiel and human—would be scarce, thereby necessitating stringent HR planning norms. Submission of the Shekatkar Committee Report in December 2016, and subsequent implementation of various recommendations aimed at 'cutting the flab' are indicative of intent at the highest levels, of optimizing manpower in the Armed Forces. The *IN* identified that the 'more is better' culture based on manning philosophies, could not be sustained and needed to end. Manpower optimization has therefore been a key driver of the *IN*'s HR initiatives. Towards this end, a 'Board for Optimal Manning of Platform/Establishments' was constituted, the findings of which were presented in 2018 and are being actively pursued.

The *IN* also identified technology as a key enabler of its capabilities in the twenty-first century. Technology with its expected impact—on not just the platform, weapons, systems and equipment—but also on automating routine, non-core functions (onboard and ashore) would require a transformative change in the Human Capital. Personnel of the future *IN* would be far more technologically savvy than they are now, and this would inevitably translate into significantly altered career, professional and personal aspirations.

Additionally, it has now become imperative that the Armed Forces approach HR matters from a Tri-Services approach to a greater extent. This is particularly relevant in the context of macro issues such as management of Short Service Commission (SSC) officers, employability/induction of women in the Armed Forces, pay, allowances and other benefits, service conditions, and synergized training and operations. Whilst aspects unique to a particular Service would continue to remain important, especially where they contribute to the overall readiness/effectiveness of the Service, inter-Service deliberations/consensus would assume greater focus in years to come.

In light of the anticipated change in dynamics pertaining to Human Capital, the *IN* implemented a number of initiatives. Some of the prominent ones are enumerated in the succeeding paragraphs.

BTech for Officer Induction

In response to the technological progress across all domains and the ever-growing need to operate sophisticated ships, submarines and aircraft with skill, the *IN* set a plan in motion more than fifteen years ago to move from a mix of BSc and BTech/BE officer cadre to a BTech/BE dominated cadre. In pursuance of this objective, the Indian Naval Academy (INA), Ezhimala, commenced the first BTech Course in June 2009, with the first batch passing out in May 2013. Shortlisting for 10+2 BTech Cadet Entry is based on JEE-main score to iron out the differences in marking by various boards. This scaling-up of educational criterion prior to commissioning of an officer in the Service, was a significant step by the *IN* to meet the technical challenges of the twenty-first century. More than 1,700 officers have completed BTech at INA since the inception of this course.

With the regular commencement of BTech Courses at INA, the Naval College of Engineering (NCE) at INS *Shivaji*, Lonavla, was eventually wound down in July 2014. This also marked the

end of the 10+2 cadet entry scheme for cadets who underwent the four-year Naval Engineering Course (NEC), as well as the avenue for ex-NDA (National Defence Academy) and the Naval Academy (NAVAC; at INS *Mandovi*) officers to undergo the three-year Basic Engineering Course (BEC). While the NAVAC at Goa was shut down with the commencement of training at INA, a case was taken up by the *IN* to align the exit qualification of naval officers passing out from NDA with the *IN*'s new 'all BTech only' criterion.

To this end, between 2014 and 2016, cadets passing out from NDA were conjoined with INA cadets for the last year (semesters VII and VIII). The ex-NDA cadets would be put on onboard 1 Training Squadron (1TS) ships and Fleet ships for a duration of six months each. After successful completion of two years (one year at INA and one year onboard ships) post passing out of NDA, these officers were awarded an MSc (Applied Electronics) degree by Jawaharlal National University (JNU). Consequently, in June 2016, BTech in Applied Electronics and Communication Engineering commenced for naval cadets at NDA, thus bringing parity to the entry-level qualifications between the two training academies (NDA and INA). Cadets ex-NDA undergo their VII and VIII terms at INA, after completing the first six terms (three years) at NDA, and are designated as INAC (BTech-N).



INA: Shaping Future Leaders

Short Service Commission

The SSC entry is an important means of mitigating shortages in junior ranks whilst keeping the *IN* 'young'. The Ajay Vikram Singh Committee (AVSC), as also the Seventh Central Pay Commission, recognized the importance of the SSC entry scheme. Under the SSC scheme, officers (male and female) began to be inducted into 1991 into the Education, Logistics, Hydrography, Air Traffic Controller and Law cadres. April 2000 witnessed the introduction of the Direct Entry SSC scheme for officers of Engineering and Electrical branches of the Submarine cadre. The next year, the *IN* began inducting officers through the University Entry SSC scheme into its Engineering and Electrical branches. In the same year, i.e., 2001, SSC officers (male) were also inducted into the Executive Branch, and (male and female officers) were inducted into the Naval Constructor Cadre.

In February 2002, it was decided to extend the period of commission for SSC officers from seven to ten years, along with a provision to extend it further to a period of fourteen years. According to the revisions in the stated policy, the officers were also stipulated to be placed on the Emergency List for a period of five years, after the expiry of their SSC contracts. In May 2002, the training of the SSC officers was brought at par with the Permanent Commission (PC) officers of their respective branches or cadres. The SSC officers were given the option for a PC, not later than the eighth year of their service. The extension of service was possible for a period of up to two years, with the total service being limited to fourteen years. In May 2008, the SSC (Observer) Entry Scheme was introduced and was open to both male and female candidates.

Candidates inducted through this scheme were exempted from the mandatory requirement of afloat tenures at the ranks of Lieutenant/Lieutenant Commander and the award of watch-

keeping certificates. The same year, the Government approved the grant of PC to SSC (male and female) officers in Education, Naval Architecture and Judge Advocate General (JAG) branches. The decadal evolution of the SSC cadre is listed in the succeeding paragraphs.

Selection of SSC Officers for Multi-engine Helicopter Courses and QF/QNI Courses: To meet the expanding wings of Naval Aviation, the induction and grooming of a capable aircrew was deemed necessary. Accordingly, in 2011 meritorious SSC aircrew were made eligible for the empanelment for selection for multi-engine helicopter courses as well as Qualified Flying Instructor (QFI)/Qualified Navigation Instructor (QNI) courses. The empanelment was subject to signing an undertaking to serve for five years post completion of the course, with a maximum permissible tenure of fourteen years of service.



Trailblazers: First Women Airborne Tacticians
Receiving Their Wings

Changes to Induction in SSC Cadre: The year 2012 witnessed some major changes related to induction in SSC, which included:

- Induction of SSC (Sports) officers into Executive Branch;
- Introduction of SSC X (IT) Entry;
- Revision in age limit for aviation pilot (Pilot and Observers) from nineteen to twenty-four years;

- Scope of University Entry Scheme enhanced for induction of pre-final year and final year graduate students into the Executive SSC (Pilot and Observers) on a regular basis; and
- Introduction of SSC Pilot Scheme.

In 2014, the terms and conditions for PC and SSC officers under the University Entry Scheme (UES) were further revised. Accordingly, the UES entry was extended to pre-final year and final-year graduate students to all branches of the Navy. In order to overcome the shortage of junior officers for various staff duties at seniority levels of ten to fourteen years, a policy was approved in November 2014, mandating a change in the initial engagement period of SSC officers from ten years to twelve to fourteen years.

To enhance the quality of intake of SSC officers, the ranking of JEE Mains has now been implemented as the primary consideration for shortlisting of candidates for Service Selection Boards (SSBs) of 10+2 BTech entry since the January 2018 batch at INA Ezhimala.

PC for SSC (Technical): In 2015, it was decided that SSC Technical officers would be considered for grant of PC in the sixth and seventh year of service in order to meet Service requirements. In order to retain the expertise gained by the SSC (Technical) officers in core areas of technology and to ease the existing shortages, a 'One Time Waiver' for the grant of PC to SSC (Technical) officers, commissioned before 1 January 2005 was accorded. Similarly, an additional chance for granting of PC to SSC (Technical) officers from Submarine and Air Technical Specializations was also accorded. This chance was provided to those SSC (Technical) officers in the aforementioned specializations who were commissioned between 1 January 2005 and 31 December 2006.

The guidelines for determining the eligibility of officers for grant of PC to SSC officers included

demonstrated performance, medical category and discipline. In order to ensure that the selection of SSC officers for grant of PC was based on all-round performance of an officer, additional considerations—such as performance in courses, recommendation in Annual Confidential Reviews (ACRs) and recommendation for PC—were also included in March 2019.

Re-employment of IN SSC Officers in the Coast Guard: In 2016, a policy for the re-employment of IN SSC officers in the CG was introduced. The provisions of the policy made SSC officers eligible for re-employment in the CG on completion of twelve years of service in the Navy. It was decided that the volunteering officers would be re-employed in the CG as per the CG's rules and regulations. The broad modalities of the terms and conditions included the re-employment of IN's SSC officers as Commandant (Junior Grade) in the CG, and their promotion based on the Coast Guard (Seniority and Promotion) Rules, 1987.

Cadre Restructuring

The report of the AVS Committee was submitted to the Government in 2003, and the Committee's recommendations were implemented in two phases: AVSC I was enacted in March 2005; and AVSC II in 2008. The recommendations were implemented over a ten-year period from 2008 to 2017. These involved upgradation of 360 select rank vacancies. Further, acceleration of promotion to the rank of Captain at eighteen years of Service (from the erstwhile twenty-one years) was also implemented by 2014. Some of the salient recommendations implemented include the following:

AVSC II Recommendations for Select Ranks: The AVSC II recommended an increase in the number of vacancies in select ranks, through upgradations of billets. The upgradations sanctioned for the IN included 4 Vice Admirals, 14 Rear Admirals and

324 Commodores/Captains. In order to ensure proportionate distribution of vacancies across branches as well as batches, and to prevent a sudden expansion in the higher ranks, it was decided that the stated upgradations would be implemented over a period of ten years, i.e., from 2008 to 2017.

Promotion to Captain, and Captain (Time Scale): The AVSC I promulgated Captain (select) to be the first Select rank in the Navy. The rank of Captain (Time Scale) was introduced to promote Commanders after twenty-six years of commissioned service. The promotion was granted irrespective of vacancies and was against the sanctioned strength of Commanders and below. Captains (TS) were mandated to hold appointments tenable by Commanders. The Superannuation age of Captain (TS) was maintained at par with that of Commanders, which was fifty-four years of age. In 2009, the period of service required for promotion to the rank of Captain was reduced from twenty-one years to nineteen years. The idea of further reduction of the timeline for promotion to Captain was under consideration in 2010. After considering the various service-specific factors, in 2010, it was decided to further reduce the period of service for promotion to Captain from nineteen years to eighteen years.

'Pull Factor' Upgrades—Commodore/Captain: One of the major initiatives of AVSC was the lowering of age profile of officers by reducing promotion timelines. However, the Committee also acknowledged that promoting officers relatively earlier would result in the proliferation of ranks (to accommodate officers in higher ranks for a longer duration until superannuation), which was not deemed desirable. In order to mitigate this problem, the AVSC recommended a two-pronged approach. The short-term measures consisted of creation of additional vacancies in Select Ranks (Pull measures), and were implemented as AVSC

II in 2008. The long-term measures consisted of providing an attractive exit policy through 'Peel' measures.

The Peel measures were intended to provide a viable exit policy, thereby reducing stagnation in Select ranks. On 13 July 2010, Army HQ submitted a Draft Cabinet Note (DCN) for the implementation of the 'Peel Measures', which had been recommended by the AVSC. Consequently in 2016, certain aspects concerning the identification of billets in the rank of Commander, for upgrade to the rank of Captain/Commodore as a part of the Tri-Services 'Peel Factor' proposal were enumerated. The proposal projected a total of 900 upgrades, with the 'Peel Factor' vacancies planned to be distributed over a period of fifteen years, at an average rate of sixty vacancies per year. To identify the existing billets in the rank of Commander which may be considered for upgrade to the rank of Captain, a tentative list of billets that may be upgraded was issued. The upgrades were proposed mostly in various Headquarters, administrative billets, shore organizations, support staff and other miscellaneous billets. In order to retain the existing functional as well as the command-and-control hierarchy, upgrades in sea-going/operational billets, with the only exception of Air Squadrons/MARCOS units, were not proposed.

Revitalization of Air Technical Specialization: A policy letter on the revitalization of Air Technical Specialization was promulgated in December 2018, wherein Air Engineer/Air Electrical (AE/AL) were converted to 'non-sea going' vertical within the parent E/L branches. The PC officers appointed to Aviation billets were considered to be 'equivalent to sea time' in the rank of Lieutenant Commander/Commander.

Retention of Rank of Commodore on Appointment as Fleet Operations Officers: In 2016 it was decided that Commodores, if appointed as Fleet Operations Officer (FOO), would

retain the rank of Commodore on/during the appointment. Earlier, Commodores, if appointed as FOO, reverted to the rank of Captain during the tenure as FOO.

Rationalization of Executive Branch Specialist Billets: The years 1999–2006 witnessed reduced officer intake, primarily due to restrictions on addition of new infrastructure at Naval Academy (NAVAC), INS *Mandovi*, due to impending drawdown of NAVAC and commissioning of the INA at Ezhimala. This resulted in a decrease in the number of junior officers. To meet the IN's expansion plans, manpower induction saw a marked increase from 2007. However, it was decided that the newly inducted officers would be deployed as non-specialists from the year 2012, and as specialists beginning the years 2014/2015.

By 2010, discussions on the requirement of specialist officers for new commissions in the future was being assessed. Subsequently, it was decided that officers would continue to be deputed for Specialization courses on completion of two years as Non-Specialists. Further, the following billets were rationalized till 2014:

- Removal of Specialist Surface-to-Surface Missile Officer (SSMO) onboard Brahmaputra class, and appointment of Non-Specialist officer as SSMO in lieu;
- Reduction of one Direction Officer from INS *Viraat*;
- Reduction of Electronic Warfare Officer (EWOs) from Rajput class, and nomination of Master Chief Petty Officer (MCPO) as EWO in lieu;
- Removal of Navigating Officer II from Talwar class and follow-on ships;
- Removal of one Long Gunnery officer onboard Talwar class follow-on ships; and
- Appointment of MCPOs, as Close Range Gunnery Officer (CRGO) onboard capital ships.

Cadre Restructuring of Group ‘Y’ Sailors: In 2010, the MoD approved a proposal regarding cadre restructuring of Group ‘Y’ sailors in the *IN*,² by upgradation of 1,417 posts of Leading Seaman (LS)/equivalent to Petty Officer (PO). The proposal intended to rationalize the promotion timeline of junior sailors of ‘Y’ pay group to Petty Officer (PO) rank, in order to meet the current and future manning requirements due to the technological advances in the Navy. It stipulated junior sailors’ ratio as 1:3 for all trades of Senior Secondary Recruit/Matric Recruit/Non-Matric Recruit (SSR/MR/NMR) entry sailors, based on the present and future operational imperatives of the Navy. Further, it was decided that the timeline for selective promotion to the rank of Petty Officer will be brought down from the existing nineteen years to fourteen-and-a-half years of service, thereby ensuring the second promotion within the initial enrolment period of fifteen years. The proposal further specified the grant of Chief Petty Officer – CPO (Time Scale) rank to all POs of ‘Y’ Pay Group after completion of minimum twenty-one years of service, during the last year prior to release from service as a ‘Peel’ measure, with the following provisions:

- Service conditions for CPO (TS) rank—rank equivalence, employability/billeting and re-engagement criteria—to continue as per the substantive rank of PO; and



Keeping an Eye on the Machinery

- CPO (TS) ranks will be counted against the existing sanctions/vacancies of PO rank posts of the respective Branch/Cadre.

Empowerment of MCPO Class I and II: In order to empower and entrust the MCPOs with higher responsibilities, the employment of MCPOs was approved in staff billets at IHQ MoD(N) and Command Headquarters in the place of Lieutenant Commander/Lt billets, in August 2014. The tentative posts identified at Command Headquarters/IHQ MoD(N) included (but were not limited to) the following:

- SO (Telecom);
- SO (Works);
- SO (Photo);
- SO (IT);
- SO (Log)/SO (Victualling)/SO (Clothing);
- Assistant Naval Provost Marshal; and
- SO (Transport).

Re-Engagement of Sailors: In order to prevent shortages as well as to ensure the retention of trained manpower for a longer duration, a policy of re-engagement of sailors was promulgated in 2014. It extended the maximum service permissible in rank by two years, for those serving in the ranks of LS, PO, Chief Petty Officer (CPO), Master Chief Petty Officer, second class (MCPO II) and Master Chief Petty Officer, first class (MCPO I).

Commission Worthy (CW) Entry Scheme: Approval was accorded towards following changes in the CW Entry Scheme in May 2021:

- All sailors shall be under twenty-two-and-a-half years of age. The earlier criterion was under twenty-two-and-a-half years of age for Non-Artificer sailors and under twenty-four years of age for Artificers, with the provision for age relaxation up to one year at the discretion of CNS.
- The CW (Artificer) and CW (Non-Artificer) schemes were merged into a single scheme.

- All sailors, irrespective of the type of entry would be eligible for CW scheme only after completion of basic training at *Chilka* and afloat attachment (post ab-initio training). The earlier criterion required Non-Artificer sailors to have completed induction training before appearing for the written examination, while Artificer sailors holding Artificer 5th class or higher rank were permitted.

⚓ Organizational Restructuring

Women Officers' Empowerment

Women officers in the *IN* are given equal opportunities in all aspects of the services. The appointment of the women officers is planned with the aim of best utilizing their qualifications, talent, expertise, aptitude and experience gained during various tenures. In fact, the *IN* has the maximum percentage of women in its workforce among the three Services, at 6.5 per cent. At present, induction of women officers as SSC officers is open in Law, Logistics, Observers, and Air Traffic Controller (ATC) cadres of the Executive Branch; in the Naval Constructor cadre of the Engineering Branch; and in the Education Branch. In addition, women officers are also inducted as Medical, Dental and Military Nursing Service (MNS) officers. The strength of women personnel in the *IN* as of March 2022 is tabulated below.

Branch/Cadre/Specialization	Strength of Women Officers (excluding Medical/Dental/Nursing officers)
Executive (Logistics)	134
Executive (Law)	8
Executive (Observers)	73
Executive (Pilot)	10
Executive (Air Traffic Controller)	80
Executive (Naval Armament Inspectorate)	34
Executive (Provost)	1

Branch/Cadre/Specialization	Strength of Women Officers (excluding Medical/Dental/Nursing officers)
Executive (Sports)	1
Education (General Service)	120
Education (Met.)	26
Engineering (Naval Constructor)	72



Women Power: Grit, Grind and Glory

Some of the major initiatives in the last decade with regard to women empowerment are listed below:

Permanent Commission for Women Officers: Grant of PC to SSC women officers is permitted in ten out of eleven career avenues open to them, viz., Education, Logistics and Law in 1991, Air Traffic Controller (ATC) in 1993, Naval Construction Cadre in 2001, Observer in 2008, Pilot and Naval Armament Inspectorate (NAI) in 2017, Sports, Musician and lateral induction to Provost specialization in 2019. Forty SSC women officers were granted PC in December 2020. This is in addition to the nine women officers who were granted PC prior to the Hon'ble Supreme Court of India's judgment of March 2020 regarding the cadres/branches wherein SSC (men and women) officers were being considered for PC.

Appointment to Frontline Combat Platforms: Women officers were appointed onboard warships commencing December 2020, at par with male officers. Women officers were posted onboard

Shivalik class, Visakhapatnam class, Tankers and INS *Vikramaditya*.

Observer Officers on Helicopters: Until 2019, women officers were being commissioned as Pilots and Observers only for shore-based aircraft. However, in order to employ women at par with male officers, women officers have also been streamed as specialist Observers into active flying duties commencing 2020, wherein they operate from shipborne flights.

Remotely Piloted Aircraft (RPA) Stream: The RPA stream was opened up for women officers. The first woman officer, Lieutenant Commander Shivani Pansalm joined RPA squadron in March 2021.

Diplomatic Assignment: A woman officer, Lieutenant Commander Karabi Gogoi, was appointed as Assistant Defence Attaché (ADA), Moscow, for the first time in June 2020.

Foreign Assignments: One woman Observer officer was deputed overseas to the Maldives in September 2020, as part of Dornier aircrew for a period of one year. In addition, women officers were also deputed abroad for shorter durations as part of Mobile Training Teams (MTTs) and other engagements.

Provost Specialization: Commencing 2020, Provost Specialization was also opened up for women officers and the first woman Provost officer joined the Specialization in March 2021 after successful completion of At-Arms course.

Appointment of Officers to Tri-service Organization for Promotions to Higher Ranks

With growing recognition of developing Tri-Services jointness in December 2020, the *IN* promulgated a policy in December 2020, which stipulated a tenure in Tri-Services organizations as

mandatory promotion criterion to the rank of Rear Admiral for Executive Branch officers.

Appointment of Law Cadre Officers at Fleet Headquarters

Over the years, the *IN* has positioned itself as a Blue Water Force. With expanding Area of Operation of the Fleets, expertise in Maritime Law became a necessity. In 2014, it was decided to depute officers of Executive Branch and Law Cadre for International Maritime Law courses. Subsequently, one Law officer, referred to as the Fleet Assistant Judge Advocate (FAJA) was appointed to the headquarters of both the Western and Eastern Fleets. It was also stipulated that the FAJAs must be deputed on ships deployed for Patrol of Gulf (PoG) missions and Joint Operations. Further, it was decided that they must also be deputed to sea for all major exercises and deployments of the Fleet to develop their understanding and interpretation of laws relating to Rules of Engagement, Laws of Conflict, Military Justice, Maritime Laws, including Piracy, Innocent Passage, Hot Pursuit, Search, Boarding Operations and International Laws pertaining to Salvage, Interpretation of UNCLOS, Environment Law and Administrative Law.

Revision of Qualification Criteria—Command and Professional Management Examinations

With the revision of promotion-related timelines under AVSC II, the eligibility criteria for Command and Staff College Entrance Examinations were earlier modified in July 2006. The eligibility conditions were revised from 'Lt Cdr [Lieutenant Commander] (on promotion) to Lt Cdr with six years seniority' to 'six to twelve years of commissioned service' for Professional Management and Staff College Examination (PME/SCE) and from 'Lt Cdr with three years seniority to Cdr with one year seniority', to 'Nine to fourteen years of commissioned service'.

The qualification criteria of the Command Examination (CDE) and Professional Management Examinations (PME) were further revised in 2014, with regard to the qualifying marks, grading methodology and syllabus. Certain regulations governing qualifications of PME and CDE were also introduced. It was made mandatory for an officer to appear and attempt to clear all PME papers in the first attempt, in order to become eligible for the Overseas Staff Course. Further, practical assessment in Ship Handling Simulator was included as part of CDE Oral Board. In 2013, a new provision was added, which made it compulsory for the officer to appear in all papers pertaining to the Specialization in the first attempt. The officer would be disqualified on failing to appear for all papers. Other criteria and policy revision included:

- No limitation on number of attempts for PME;
- Minimum eligibility to appear in the examinations set to date of promotion to Lt Cdr;
- No antedated seniority will be awarded to officers who clear the examination after seven years in the rank of Lt Cdr; and
- Issuance of 'Show Cause Notice' to officers who do not clear the examinations within twenty years of service.

Mandatory Qualification in PME for Promotion to Commander—SD List Officers

In 2009, a new policy on mandatory qualification in PME for promotion to the rank of Cdr was introduced. This policy included all officers of all Branches/cadres with the exception of SD, Medical, and Dental Officers. Subsequently, qualification in PME for promotion to Cdr was made mandatory for SD List officers too.

Selection of Officers for DSSC/TMC

The AVSC recommendations had accelerated the promotion to the rank of Captain, thereby lowering

the age profiles of Captains. This led to a reduced availability of officers in the rank of Commander in staff billets after the Staff Course for a period of only two years. The availability of Commander in Staff billets was further reduced to one year, for them to be considered for two sea times in rank. The short spells of staff appointments, necessitated the selection and deputation of officers for the Defence Services Staff College (DSSC) at Wellington and Technical Management Course (TMC) a year earlier. Accordingly, in 2016 it was decided that officers would be considered for selection for the DSSC in their thirteenth year (First Look) and fourteenth year of service (Second Look). For TMC, officers were to be considered for selection in their fourteenth year (First Look) and fifteenth year (Second Look) of service. In order to implement this change without affecting officers under consideration in the calendar year blocks, it was decided that officers from three Look Years would be considered for DSSC for the calendar year 2016–18 and for TMC 2018–19. Beginning from the years 2019 and 2020, the policy of 'Two Look Years' was reverted to, for selection to DSSC and TMC, respectively.

Implementation of Rank-Based Designations

In 2018, in order to facilitate easy identification of designations and its correlation with seniority of the officer holding the position, especially in places with co-located offices of all three Services, it was decided that officers posted in Service HQs and inter-Service organizations would be required to change over to rank-based designations. This change was implemented on 30 July 2018. The rank-based designations adhered to the following guidelines:

- Acronyms for Directorates be used, where applicable, to avoid duplication/lengthy designations. For example, PDME (Principal Director Marine Engineering) was re-designated as Cmde [Commodore] (ME);

- Roman numerals to be used as suffix to differentiate officers of same rank holding the same designation, e.g., Commander: Cdr (Pers) - X (II), Cdr (Pers) - X (III);
- Time-Scale Captains to be indicated as Capt (TS) in rank-based designations, wherever applicable, e.g., Capt (TS) (MPR) – NRO); and
- Rank-based designation may be used in the same line in the signature block to avoid repetition. However, ‘Captain (IN)’ may be used to indicate rank as hitherto, in correspondence with sister Services/external agencies.

Change in Nomenclature of Sailors’ Trades

Taking into account the changing job specifications, enhanced educational qualifications of the sailors, as well as the induction of advanced equipment by the IN, as well as the feedback from retired personnel, IHQ MoD(N) undertook a comprehensive review of sailors’ trade nomenclatures. The review factored-in the job specifications for each trade, post-retirement job prospects, nomenclatures in the civilian world and those used in other navies. The new nomenclatures of sailors’ trades were promulgated in March 2016 and came into force on 1 July 2016. The revision of trade nomenclatures did not bring about any change with regard to terms and conditions of service, pay and perks, etc. It only signified changes in the use of ranks/nomenclatures for addressing the sailors and for use in various written communication, report/returns, Service documents, etc. The list tabulated below includes the trades for which a new nomenclature was issued.

Previous Nomenclature	New Nomenclature
Shipwright Artificer SWA	Hull Artificer HA
Seaman (Quarter Armourer) SEA (QA)	Seaman (Gunnery Weapon) SEA (GW)
Seaman (Radar Controller) SEA (RC)	Seaman (Gunnery Sensor) SEA (GS)

Previous Nomenclature	New Nomenclature
Seaman (Underwater Controller) SEA (UC)	Seaman (Underwater Sensor) SEA (US)
Seaman (Survey Recorder) SEA (SR)	Seaman (Hydro) SEA (HY)
Radio Operator (Tactical Networks) RO (TAC)	Communication (Tactical Networks) COM (TAC)
Radio Operator (Telecommunication Networks) RO (TEL)	Communication (Telecommunication Networks) COM (TEL)
Radio Operator (Special) RO (Spl)	Communication (Electronic Warfare) COM (EW)
Naval Airman (Safety Equipment) NA (SE)	Naval Airman (Safety & Survival) NA (S&S)
Air Crew Man Diver ACMD	Naval Airman (Flight Diver) NA (FD)
Writer WTR	Logistics (Finance and Administration) LOG (F&A)
Store Assistant SA	Logistics (Material) LOG (MAT)
Cook (Officers) CK (O)	Logistics (Officers’ Chef) LOG (OC)
Cook (Sailors) CK (S)	Logistics (Sailors’ Chef) LOG (SC)
Steward STD	Logistics (Steward) LOG (STD)
Topas TOP	Hygienist (up to LDG): Hygiene Supervisor (PO and above) H/HS

For example, erstwhile Petty Officer Cook (Officers) was now re-designated as Petty Officer Logistics (Officers’ Chef).

Defence Representation Abroad

In 2015, the Ministry of Defence reviewed the defence representation by the Armed Forces abroad, and revised the norms from allocation of billets to be maintained by the three Services from rotational to a single Service nomination basis.

Country	Previous Rotation	Rotation Year	Allotted to
Czech Republic	Army/IAF	2016	Army

Country	Previous Rotation	Rotation Year	Allotted to
Iran	Army/IAF	2016	Army
Italy	IA/IN/IAF	2017	Army
Nigeria	Army/IN	2017	Army
South Korea	Army/IN/IAF	2015	Army
Sudan	Army/IAF	2015	Army
Indonesia	Army/IN	2015	IN
Japan	Army/IN/IAF	2016	IN
The Maldives	Army/IN	2015	IN
Qatar	Army/IN/IAF	2017	IN
Brazil	Army/IN/IAF	2017	IAF
Egypt	Army/IAF	2016	IAF
Sweden	Army/IN/IAF	2015	IAF
The UAE	Army/IN/IAF	2015	IAF

As reflected above, single service allocation was given to the *IN* for Indonesia and the Maldives in 2015, for Japan in 2016 and Qatar in 2017. Taking into consideration the extent and nature of defence cooperation with these countries, specialized officers in the rank of Captain were earmarked for each billet. Details as follows:

Country	Branch
Indonesia	Electrical
Japan	Executive
The Maldives	Executive
Qatar	Executive/Logistics

Porbandar as 'Family Station'

From April 2017, the Navy Children School (NCS) started classes up to class VII. Accordingly, Porbandar was declared a Family Station for personnel with children studying up to and including class VII, from the academic year 2017–18.

Exit Policy–Sailors

Over the years, it was observed that many sailors find it difficult to adapt to the environment of the *IN*, despite their best efforts. In order to facilitate

the discharge of such sailors, an Exit Policy for Sailors was first promulgated in 2008. According to the provisions of this policy, all sailors except Direct Entry Diploma Holder (DEDH) entry sailors who wished were permitted to leave service within the first two years of service, while in case of DEDH sailors, this period was restricted to one year. Such applications were forwarded by the Commanding officers to Commodore Bureau Of Sailors (CABS) through the Administrative Authority. The educational certificates of the sailors were used to verify their antecedents. Post verification, the applications were forwarded to IHQ MoD(N) along with detailed recommendations.

In 2012, the policy was further refined and in the place of using educational certificates, police verification was accepted for the purpose of verification of antecedents of the sailor. In 2014, the Exit Policy of Sailors was further streamlined, wherein directives were issued that the application for discharge by a sailor were to be processed expeditiously.

Manning Plan

The manpower available for positioning in various units is calculated as the net of inductions and exits on account of superannuation, retirement and release from service. The Manning Plan (MP) is revised on the basis of Maritime Capability Perspective Plan (MCP) and the Manpower Induction Perspective Plan (MIPP). Some of the major milestones in the last decade are listed below:

- Manning Plan 11 for sailors was promulgated in October 2011.
- The Commanders Conference held in 2013 discussed the issue of excess manpower (sailors) posted onboard ships in detail. The deliberations concluded that a certain amount of excess

over the Manning Plan was crucial in order to maintain the operational and functional efficiency of afloat units, to ensure availability of greater number of professionally qualified sailors for use in emergencies. Accordingly, in 2014, it was decided to maintain the status quo with respect to the existing manning philosophy of ships.

- MP-17 for sailors was promulgated in 2017. During its formulation, a comprehensive review of manpower was undertaken with the aim of ensuring optimum manning of ships, submarines and shore establishments.
- The Manning Plan 2018–22 for officers was promulgated in 2018.
- Taking into account the shortage of Medical sailors, the Manning Plan 11 rationalized the number of medical billets. This was aimed at providing manpower to newly commissioned ships and coastal stations of the *IN* and the CG, along with overcoming shortages at military hospitals.

Rationalization of Manpower

In light of improvements in training, operational logistics, advances in machinery/equipment automation, improvements in IT infrastructure and sophistication of platforms, as well as actual availability of manpower, a decision was taken for determining optimal manning of *IN* Ships, submarines, air squadrons, units and establishments. The study under stewardship of the then Chief of Personnel Services, Vice Admiral R Hari Kumar (and Chief of Naval Staff, as this is being written) commenced in March 2017 and concluded in March 2019, and examined various aspects related to manning in order to arrive at recommendations to optimize. Some of the issues addressed by this study included rationalization of operational manning, maintenance requirements, tasking and also explored the feasibility of introducing smart

working philosophy, augmentation of IT systems and support infrastructure. Some of the salient recommendations made by this study and currently under implementation include:

- Rationalization of action manning onboard ships;
- Institution of scientific/methodical process for manpower prediction for new construction ships, and incorporation of Human Engineering aspect into various processes;
- Detailed study to be undertaken by various stakeholders on ‘Operator-Maintainer’ concept;
- Matching of maintenance requirements with manpower availability;
- Quantification of man-hours for various operational, technical or administrative domains;
- Rationalize large number of ‘Verticals’ in the Electrical Branch;
- Feasibility of remote watch-keeping onboard ships; and
- Shore-based accommodation for all personnel, married as also in-living.

Induction and Recruitment

Short and long-term manpower induction planning is derived from overall naval plans with due consideration to accretions and depletions in the sanctioned strength. The long-term review is carried out once in five years to forecast the requirement for a period of fifteen years; this period is typically aligned with the currency of the MCPP. Past and anticipated trends of inductions, accretions and exits are also factored into the long-term review. The short-term review is undertaken every year, and covers a two-year period to facilitate formulation of a ‘Roll-on Annual Induction Plan’.

According to HCS 2018, to meet all anticipated manpower requirements over the next decade, the annual induction growth needs to be sustained. This increase is primarily due to the long pending

accretions for aviation, operational support and support organizations taken up with the Government.

With regard to sailors in the *IN*, the sanctioned strength of sailors witnessed a steep increase from the year 2010 to 2017. Over the last decade, the sanctioned strength of sailors has gone up by about 25 per cent. By 2016, the training capacity at INS Chilka was increased by about 70 per cent. This capacity augmentation was not only to cater for the increased intake, but also for the future growth in assets of the Indian Navy. It is expected that the full utilization will help facilitate reduction in shortages to desired levels by 2032, considering the anticipated growth in the sanctioned strength. According to HCS 2018, the training capacity is expected to increase to 3,000 by 2032.

The past decade saw a strong thrust being given to the enhancement of awareness among the youth. The *IN* faces competition from a number of other career options that are available, hence no effort is spared to ensure that quality, motivated, young men and women join the Service. Regardless of the competition from other emerging sectors, the *IN* through its HCS 2018, aims to provide the youth of the country—both men and women, a novice or an experienced professional—opportunities which are more than just a ‘job’. The *IN*’s decision for BTech qualification for a majority of officers at entry-level; and increased entry-level education qualification for sailors, have laid the foundation for addressing future technological challenges. Further, *IN* officers also regularly interact with and address a large number of school and college students, especially in their own alma mater, to spread awareness and motivate them to join the Indian Navy. Some of the major policy changes related to induction and recruitments initiated in the past decade are enumerated in the subsequent paragraphs:

Officers’ Induction

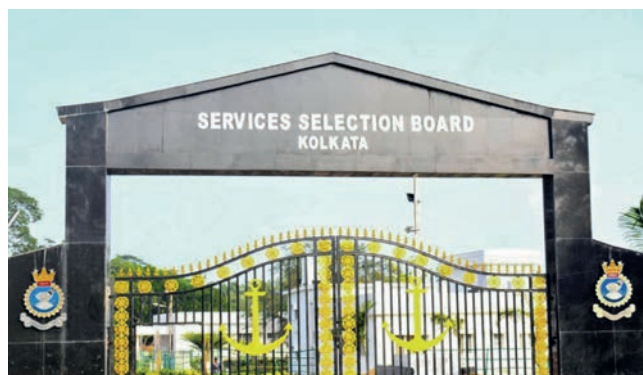
Earlier the *IN* managed officers’ selection through two Service Selection Boards (SSBs), i.e., 12

SSB, Bengaluru (functioning from the Army Selection Centre, South) and 33 SSB, Bhopal (functioning from Army Selection Centre, Central). In addition, the *IN* also operates two temporary Naval Selection Boards (NSBs)—NSB(V) at NAMAC Area, Visakhapatnam and NSB(C) at INS *Agrani*, Coimbatore.

The MoD approved the setting up of an additional SSB at Diamond Harbour, Kolkata in 2006. Subsequently, in 2014 approval was also accorded for setting up a Naval Selection Centre (NSC) comprising three SSBs at Visakhapatnam. The manpower at all SSBs and NSB (once commissioned) would include two Interviewing Officers, four Group Testing Officers (GTOs), one Testing Officer (TO) and three psychiatric evaluators. Additionally, a Logistic officer and Medical officer were also appointed at the NSBs at Visakhapatnam and Kolkata to facilitate essential administrative tasking.

SSB (Kolkata) Diamond Harbour

The SSB Kolkata commenced setting up on 26 September 2006, and was operationalized on 14 May 2019. It is administered by the Navy. Spread over an area of over 26.71 acres, it is capable of providing boarding and lodging facility to male and female candidates. With the operationalization of this SSB, the NSB at Coimbatore was closed down in 2019.



SSB Kolkata

NSB (Visakhapatnam)

The Government of India sanctioned the setting up of HQ Naval Selection Board at Krishnarayapuram, Visakhapatnam, along with associated manpower on 21 February 2014. The sanction for infrastructure for NSC at Krishnarayapuram was accorded on 19 July 2021. The NSC is sanctioned to have three Selection Boards. The Project is expected to be completed by July 2025.



NSB Visakhapatnam

Sailor Recruitment

The *IN* viewed that the shortages in respect of sailors were temporary, largely due to accretions in the Sanctioned Strength and increased momentary trend in retiring on completion of initial engagement period. With the enhanced training capacity at INS *Chilka* from 1,650 to 2,800 in 2016, full capacity utilization is underway and is expected to bring shortages to desired levels by 2032.

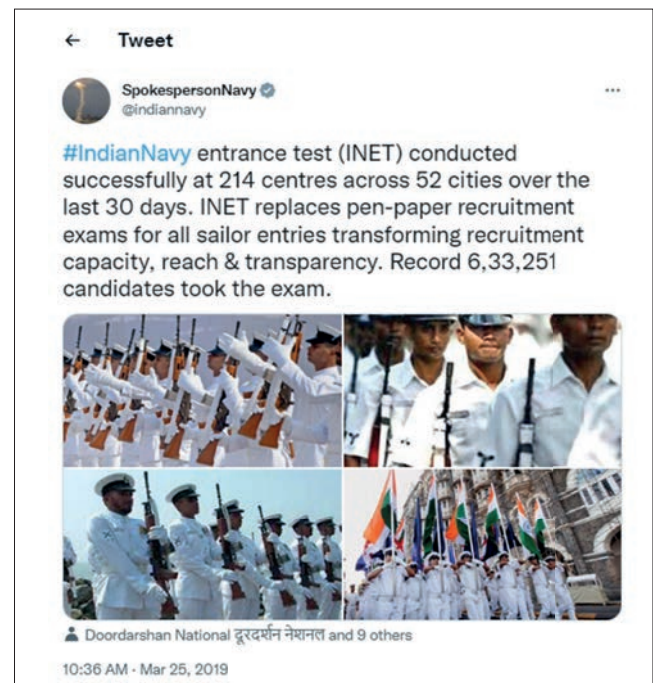
As the *IN* did not have any permanent infrastructure/offices in many of the states, approximately thirty-three Recruiting Centres were activated at various places throughout the country for the duration of recruitment tests for sailors. These have helped in improving the accessibility of recruitment centers in remote places, including rural areas.

Enhanced Accessibility for Candidates

The features of the *IN* recruitment website (www.joinindiannavy.gov.in) were enhanced with online receipt of applications for all types of entries both in respect of officers and sailors. Important information such as call from SSB, appointment letters, admit cards and results are now disseminated through this website. An MoU was signed between the *IN* and CSC e-Governance Services India Ltd on 27 November 2017. This MoU enabled candidates desirous of joining the *IN*, to reach any of the more than 2.5 lakh Common Services Centres (CSCs) across India, and avail assistance in filling up online application forms. The service was made available at a nominal cost. The CSCs provided assistance in correctly filling-up application forms, scanning and uploading relevant documents and making payment for examination fees.

Indian Navy Entrance Test

The INET is the *IN*'s computer-based online examination started in 2018. The first INET was conducted on 25 February 2018 for



INET: Digitizing Recruitment Exams

Artificer Apprentice entry and registered an overwhelming response with the participation of nearly 45,000 candidates for 415 vacancies. With this success, the *IN* pioneered among the three Services, a shift from the conventional pen and paper mode to computer-based examinations. Subsequently this mode of entrance test was also extended to sailors' entry in all branches except Musician and Sports. The entrance test for graduate-level candidates aspiring for both PC and SSC officers was also included under the ambit of INET and was designated as INET-O.

Setting up of Regional Career Counselling Offices (Navy)

With the aim of enhancing the *IN*'s reach and presence throughout the country, and in order to sustain a systematic recruitment, Regional Career Counselling Offices (Navy) were deemed essential. The HCS 2013 envisioned one RCCO(N) per state, in a concept similar to the Army's organization of Zonal Recruiting Offices (ZROs) and the Air Force's Airmen Selection Centers (ASCs). A proposal was mooted for designating existing NCC units as RCCOs with minimal augmentation of manpower. The proposal, however, did not fructify due to ongoing manpower shortfall.

Training

The growing complexities of the military and technological environments demand higher emphasis on the professional development of personnel through effective naval training. It was therefore imperative that the training processes within the *IN* were in harmony with the changes occurring in the military domain. In order to meet emerging security challenges, the *IN* focused on continuously updating and upgrading operational philosophies as well as periodic revision of training philosophy to keep abreast with the changing

nature of work profile and the skill sets needed. The *IN*'s training philosophy continued to evolve in the last decade with the overarching aim of converting Human Resource into Human Capital. The focus was on all-round and balanced development of officers, sailors and naval civilian personnel, by providing them appropriate knowledge and skills and preparing them to undertake wartime as well as 'less than war' functions efficiently and effectively.

The increasing sophistication of new platforms and the introduction of emerging technologies such as nuclear and electric propulsion added new dimension to the training needs. In addition, to meet the aspirations and needs of the future trainee, training models were increasingly based on the use of scientific and technological tools such as simulators, 3D models, cut-away sections and Computer Aided Instruction (CAI) packages to enhance the comprehension levels of trainees. Though details of changes in the training infrastructure and philosophy are dealt with in a separate chapter in this volume, some of the salient initiatives taken in the last decade are enumerated in the succeeding paragraphs.



Raise-Train-Sustain

Sub Lieutenants (Executive) Technical Courses

With continued improvement in the conduct of training, changing skill requirements and new induction of platforms, a need was felt to rationalize the training time for the Sub Lieutenant (Executive)

Technical Courses (SLt [X] Tech course). Subsequently, the revision and re-vitalization of SLt (X) Tech course was undertaken in 2011 and the duration of training was reduced from fifty to thirty-eight weeks. This reduction was targeted at classroom instructions, while at the same time the duration of watch-keeping, which is an essential form of on-the-job training, was increased from six to eight months.

Technicalization of Officer Trainees

All officers joining the Executive Branch commencing July 2019 were BTech graduates. This was made possible with the commencement of BTech for Naval Cadets at NDA from June 2016.

Leadership, Mentoring and Grooming

Societal changes have had a profound impact on the *IN* as an Organization. Recognizing the need to mentor and groom young officers who remain impressionable and susceptible to changing social values and norms in their environment, was an added facet of training. Additionally, a similar need was also felt for the SSC officers who are older and have personalities pre-moulded by their past experience and may take time to adjust to Service environment. In pursuance of this objective the following initiatives were undertaken:

CELABS to CoE: In 2015, the Centre for Leadership and Behavioural Studies (CELABS) at Kochi was re-designated as Centre of Excellence in Ethics Leadership and Behavioural Studies, in order to foster concepts of inspirational and ethical leadership. Soft skills like counselling and motivation techniques, effective communication, social graces and etiquettes, and self-analysis were also included in the curriculum.

Indian Navy Leadership and Management Studies Board (INLMSB): Headed by the FOC-in-C South (Chairman), INLMSB was

set up in February 2016 with the charter of steering research on issues related to leadership, management and military studies. The board included Controller of Logistics, Director General Naval Operations, Assistant Chief of Personnel (Human Resource Development), Assistant Chief of Materiel (Dockyard and Refits), Assistant Chief of Materiel (Information Technology and Systems), Integrated Financial Adviser (ex-Southern Naval Command), Principal Director Naval Training, Deputy Commandant, Naval War College (substituted by Commandant, Naval War College in September 2016), and Director CELABS. The Chief of Staff, Southern Naval Command and Commanding Officer, INS *Agrani* were also added as members of the board in May 2017.

Financial powers of up to Rs 500 lakh for research through the private sector and Rs 10 crore through Government agencies was approved. Today, proposed research projects are forwarded to the Chairman for consideration and approval, who appoints a suitable training unit as the Sponsor Agency responsible for drawing up an MoU and formulating the plan for the research project and its subsequent implementation. Issues identified by field formations are assigned to INLMSB for studies so as to identify optimal solutions. Since inception, the INLMSB has completed seven projects on diverse subjects related to officers' training, selection processes, issues pertaining to low medical category and mentoring/grooming of sailors, as well as focused on enhancing professional satisfaction, ethics and leadership in the Service.

The biography of former Chief of Naval Staff Admiral RL Pereira, *With Pride and Honour*, authored by Cdr Anup Thomas was published on 22 April 2016 under the aegis of the INLMSB. The book chronicles the life and times of Admiral Pereira, and serves many 'leadership lessons' having significance in the domains of both military and civil society of today.

Guidelines on mentoring and grooming of young officers were also promulgated in July 2017.

Flag Officers Leadership and Management Enterprise (FLAME)

The FLAME programme was revived in 2017 after a hiatus of ten years, with an aim to ensure that the newly selected Flag Officers prepared themselves for higher levels of decision-making and also to prepare them and their spouses to assume a leadership role in the naval community. FLAME, in addition to talks on national security, jointness, acquisition and force planning, also includes talks on leadership, man-management, community development and public relations.

Training Curriculum

The major professional courses during a sailor's career are training-oriented. During the past decade, batches at INS *Chilka* witnessed intensive training on naval orientation, value system, drill, physical training (including swimming) and introduction to weapons training. A detailed review of training of sailors was carried out by the *IN* in 2013–14 by a multi-disciplinary Board of Officers. A revised training pattern for *IN* sailors was subsequently implemented in February 2014 with rationalized training duration and content at various downstream training units. The curriculum was further refined in a review undertaken in 2017.

In light of the induction of new platforms with cutting-edge technology, a need was felt to augment training curriculum and facilities. Some of the major training courses initiated are listed below.

Kalvari Basic Course: With an aim to reduce the overall training timelines for *Kalvari* training, conduct of the *Kalvari* Basic Submarine Course for officers and sailors commenced in 2019.

Remotely Piloted Aircraft (RPA) Internal Pilot (IP) and Observer (OB) Instructor Course: In order to address the shortage of IP and OB

instructors for RPAs, and to provide additional avenues for RPA officers for Aviation Specialization courses, one vacancy each for an RPA-IP and an RPA-OB was obtained from the Indian Army and the first set of *IN*RPA officers were deputed for an RPA IP/OB instructor course on 12 January 2019 at the School of Artillery, Deolali.

Ab-Initio Training of Aviation Technical Specialization: Following much debate and discussion on the topic of 'Revitalization of Aviation Technical Specialization' during the Commanders Conference held in 2012, it was decided that ab-initio training and career progression aspects be reviewed towards revitalization of the Specialization. It was also directed that in order to meet the requirements of the Specialization, the intake and recruitment of SSC Aviation Technical Officers would be increased. In 2013, the final measures for revitalizing Aviation Technical Specialization were promulgated. It specified the continuation of the existing ab-initio training pattern for PC officers, while the pattern of training for the SSC officers was revised. The candidates were provided an option at the time of applying for SSC (Tech.) Entry to join either Surface Navy/Aviation/Submarine Specializations.

The measures also stipulated that the induction of SSC Aviation officers under the SSC (Tech.) scheme would be continued without any change, along with the appointment of PC officers from Aviation Technical Specialization to sea billets in the rank of Lt Cdr/Cdr. Also, SSC officers appointed to aviation billets would be considered equivalent to sea time for promotion to the rank of Commander.

Masters and Doctorate Programmes

The *IN* has been availing approximately seventy-five vacancies per year for postgraduate (PG) courses in India at various IITs and other reputed institutions to build up expertise in technical fields. In addition,

officers were also encouraged to pursue Masters/PhD in niche, defence-related spheres of study. The *IN* is now also actively pursuing avenues to train officers in niche technical courses at prestigious institutions abroad. These would supplement the MTech courses availed of in India. Additionally, with the increasing demand for PhD programme, an application for sixteen additional vacancies was made by Naval War College, Goa to Mumbai University in 2017, which was subsequently approved in 2018. Another case was taken up to further increase ten seats in February 2020. Currently, twenty-four PhD seats are allocated for the Naval War College.

Professional Enhancement Courses

In March 2022, the *IN* implemented a policy to offer professional enhancement courses in niche domains such as Data Science, Data Analytics, Data Engineering, Cyber, Network, Homeland Security, Forensics, Project Management, Finance, Works, Supply Chain Management, Inventory Management, Artificial Intelligence, Machine Learning, Maritime Law, Law Affairs, Social Media Management, Hospital Administration and others. These courses have been on offer effective May 2022 to those officers who have not been nominated for Staff Course, Technical Management Course or Postgraduation in the seniority of thirteen to fifteen years of service. Subsequently, as a follow-on/refresher course, officers would once again be entitled to avail such courses between twenty to twenty-three years of service. This policy is aimed at building a future-ready workforce.

Career Management

Career management in the *IN* aims to create an environment for constant professional and personal growth, ensure job satisfaction through focus on core competencies, foster a culture of competence, innovation and creativity onboard ships, submarines, air squadrons and establishments

by identifying niche skills and talent among personnel and channelizing them for the benefit of the Service and the individual. Empowerment of senior sailors to take on higher responsibilities was also continuously pursued during this decade. Whilst some aspects of career progression have already been covered under the section Cadre Restructuring earlier in this chapter, other initiatives aimed at enhancing satisfaction levels with respect to career progression and management are listed in the succeeding paragraphs.

Promotion for 'Staff Stream' Officers

The *IN* introduced the concept of 'Dry' and 'Wet' listing in the 1990s. Accordingly, officers from a particular batch were selected and sent to sea in the rank of a Commander and Captain. With the aim of increasing the Clearance Factor (ratio of officers 'Wet' Listed to the number of officers considered in a batch) and to provide vital sea-experience to the younger generation of officers, the sea time for officers of the rank of Captain and Commander of the Executive Branch was reviewed in 2002. In July 2009, the former nomenclatures 'Wet Listed' and 'Dry Listed' were re-designated as 'Ops Stream' and 'Staff Stream', respectively. The same year, promotion under 'Staff Stream' was also introduced. The rationale was to reward continued good performance of the 'Dry Listed' officers in the Executive, Electrical and Engineering branches, which otherwise due to the pyramidal rank structure lost on much-deserved promotion avenues. These officers were also provided with the option of being promoted to Captain (Select) under the category of 'Staff Stream' as long as they were within the Promotion Threshold, i.e., the numerical ranking, above which all individuals in a batch become eligible for promotion. In 2016, it was further decided to rename the 'Op Stream' and 'Staff Stream' as 'Sea Stream' and 'Ashore Stream' respectively, and to continue with the earlier

policy of providing promotion prospects to the 'Ashore Streamed' officers for their contribution to the Service.

Continuation in Service of Capt (TS) Ranked Officers

In 2015, it was directed that Capt (TS) ranked officers could continue in service till fifty-six or fifty-seven years of age. The policy letter stipulated that all Capt (TS) officers in service in the *IN*, who were due for superannuation on attaining the age of fifty-four years, were to be allowed to continue in service till they attained the age of fifty-six years for all other branches, and fifty-seven years for the Education Branch.

Sailors' Career Management

Promotions of sailors, an effective HR management tool and an incentive for personnel to contribute were allowed on the basis of years in service (time-based) and vacancy (roster-based). While the fundamentals of such promotion mechanisms were based on sound rationale, differences in rank hierarchy amongst various branches sometimes imposed undesirable constraints on the system. The promotion prospects of sailors spread across twelve branches and forty-one specializations therefore varied in each case. A need was, therefore, felt to address this issue of disparity in time taken for promotion of sailors of different branches and specializations among Non-Artificers. This was addressed through multiple initiatives, some of which are listed below:

Review of Career Profile of Sailors (RECAPS):

In 2010 the Government of India approved the Review of Career Profile of Sailors (RECAPS). This initiative aimed at enhancing the functional efficiency and professional satisfaction. RECAPS enabled the promotion of sailors in all branches to Petty Officers rank by roster within fifteen years of initial engagement. The timeline for promotion was

then adjusted progressively over the next five years, based on the fulfilment of qualification criteria and availability of vacancies. RECAPS ensured that timeline for promotion is uniform to the extent possible with minimum variation across Branches and Trades. The implementation of this policy in the last decade has been vital to retention of skilled manpower.

Modified Assured Career Progression Scheme (MACPS):

According to the recommendations made by the Sixth Central Pay Commission, a revised Assured Career Progression Scheme for Personnel Below Officer Rank (PBOR) of the Armed Forces was introduced in 2008. The scheme was identified in the *IN* as the Modified Assured Career Progression Scheme (MACPS). The MACPS provided three financial upgradations, counted from the direct entry grade on completion of eight, sixteen and twenty-four years of service respectively. No change was mandated regarding designation, wearing of rank badges, employability and criteria or limits of re-engagement, which



Practicing Evolution at Sea

continued to be based on the actual rank held by the PBOR. Financial benefits linked to pay, such as Family Accommodation Allowance (FAA), House Rent Allowance (HRA), Cash in Lieu of Quarters (CILQ), House Building Advance,

Transport Allowance, Travel Entitlements and Terminal benefits were, however, scaled up. The implementation of this policy in the last decade has been vital to the retention of skilled manpower.

Honorary Rank of Chief Petty Officer: The Government approved the introduction of the Honorary rank of Chief Petty Officer, CPO (Hon) in 2011. It was stipulated that sailors of the rank of Petty Officer/equivalent (excluding Artificers) were made eligible for grant of CPO (Hon) after completion of minimum of twenty-one years of meritorious service as of the date of grant. It was decided that a Screening committee constituted in the Navy would consider the grant of CPO (Hon) to eligible sailors, whose applications were received at the Bureau of Sailors. This grant entitled them to draw the financial benefits of CPO rank, while in service and after release. The scheme also helped in maintaining healthy promotion timelines for PO and CPO ranks. The policy promulgated provided the following entitlements to sailors promoted to CPO (Hon):

- Grade pay of CPO and 3 per cent increment;
- Increase in all allowances related to grade pay; and
- Associated pensionary benefits.

Sea Service Points: Since 2015, one point for each completed month is added for the CCP (Course-Cum-Promotion) Roster for a sailor serving afloat, thereby putting a sailor serving afloat at an advantage when compared with his peers ashore.

Increase in Accelerated Promotion Scale: In June 2017, the accelerated promotion scale for afloat units was increased from 15 per cent to 25 per cent of the borne strength in a particular rank, whilst maintaining status quo at ashore units.

Appointment of Sailors as Staff of NA/DA abroad: Sailors are deputed as assistants in the staff of Naval Attache's/Defence Attache's (NAs/DAs) abroad. In 2014, revised guidelines for selection of

sailors for appointment to staff of NA/DA abroad were issued. The guidelines included details on the selection procedure and its sequential stages, such as Professional Performance Evaluation Board, written examination, interview, final selection, approval of Government and language course, if required. In 2019–20, twenty-seven sailors were deputed for a period of three years as NA/DA staff at the Indian High Commission/Embassies abroad. In addition, new sanction for positioning sailors at Dhaka (Bangladesh) and Manama (Bahrain) was also received, with their eventual appointment likely to be completed by end of 2022.

Welfare

Policy for Transfer of Officers and Sailors with Special Needs Children

A transfer policy was introduced in 2013 to provide institutional support to officers and sailors with special children/differently abled children/adults or paraplegic/spastic children/adults. The stated policy offered transfer of such officers and sailors for extended durations to meet the requirement of specialist treatment. The policy also included children who, though not requiring specialist treatment, needed to be continually attended by their parents.

Stress Management

In order to address the growing need for managing stress within the naval community, various measures have been undertaken over the past two decades. Regular psychological counselling courses for sailors have been conducted since 2007. Two courses, of three months duration each, beginning in March and September each year, have been conducted to train senior non-medical sailors. Since 2013, periodic counselling courses for Divisional Officers have also been conducted in all commands. The courses are undertaken by psychiatrists posted to

hospitals to sensitize junior officers on the nuances of stress management.

Naval Community Support System

The Naval Community Support System (NCSS) was created with the objective of providing institutional welfare and community support for naval personnel and their families. To further help naval personnel and their families, a 'Naval Community Day' has also been institutionalized every quarter. The Naval Community Day comprises lectures by professional marriage counsellors, open discussions between Service personnel and spouses based on case studies, as well as other counselling services and mentoring procedures. Subsequently, in February 2015, the *IN* institutionalized the community support system at various Naval Commands. Details as follows:

- The Command Welfare Office was designated for the conduct of Naval Community Day lectures at Command/units, and included mentoring, stress-management classes, and other social issues impacting domestic welfare.
- The Command Medical Office was designated for improving awareness and instituting support measures for health education, including mental health.
- Regional Naval Wives' Welfare Association (NWWA) centres were empowered to provide professional marriage counselling services for the naval community.

Policy on 'Spouse Co-Location'

In order to facilitate marital harmony, the *IN* endeavours to post married couples serving in the Armed Forces at the same station, subject to Service requirements. In 2017, policy provisions for 'Spouse Co-location' was promulgated, which outlined the modalities and conditions for spouse relocation, meeting the individual aspirations as

well as organizational goals. It outlined in details the various legal and administrative aspects, along with the Service conditions.

Management of 'U' Graded Officers

The pyramidal structure of the Armed Forces entails career progression beyond a certain stage, only for a limited number of officers. Whilst those who 'make it' to higher ranks continue to be routed through subsequent milestones, the retention and gainful employment of superseded officers ('U' Graded) is increasingly considered vital. In order to motivate such officers with no promotion prospects, the *IN* devised a policy to provide stability in key billets whilst tapping their domain expertise. This also enabled the officers an opportunity to participate in their own career management, wherein, superseded officers were encouraged to provide regular, formal inputs for facilitating their appointment planning. Towards this, the policy on 'Management of "U" Graded officers' was promulgated in September 2016.

Consultative Career Planning

With the aim of enhancing satisfaction, consultative career planning of officers was initiated with the promulgation of billets due for turnaround (since end 2019) on the website of the Directorate of Personnel (DOP) Branch. Officers were permitted to volunteer directly to DOP. The subsequent selection was based on the relative suitability of officers. The list of billets available on a volunteer basis were also updated periodically.

Naval Regimental System

The NRS was established in 2011, with the aim of providing proactive support to widows of deceased naval personnel and has been reaching out to them and providing 'on the spot-time bound' grievance redressal and reassurance of the *IN's* support.

Towards this, seven Command Regimental System Officers (CRSOs) with their teams maintain pan-India contact with Widows, Next of Kin (NoKs) and Ex-Servicemen (ESMs). To achieve the aim of NRS, a database of all naval widows was compiled by CRSOs within the Area of Operations of the respective Command HQ. Capturing of data in respect of 8,805 naval widows translating to about 80 per cent of the total database was completed and the balance was being pursued aggressively.

Course for Retired Personnel

The *IN* tied up with the National Skill Development Corporation (NSDC) for up-skilling of retiring defence personnel for various job opportunities. The first skill development course on Climate Change and Risk Mitigation by the NSDC was conducted at the School of Naval Oceanography and Meteorology (SNOM) from 28 May–8 June 2018 for twenty retiring sailors.

Veteran Sailors' Forum – WhatsApp Group

Post October 2017, all retirees automatically become the members of the Veteran Sailors' Forum (VSF). The members of VSF have been clubbed into groups on WhatsApp and all important information, including various job opportunities, are regularly disseminated through these WhatsApp groups, and also through DESA and Indian Naval Placement Agency (INPA) websites.

System for Pension Administration (Raksha) – SPARSH

The Central Pension Disbursement platform, SPARSH, was launched on 1 July 2021, and it was made mandatory to process pension applications of retiring officers online only through SPARSH-compliant forms hosted on the DOP website. This platform overcame the challenges of non-uniformity arising from multiple application

silos in different services and departments, non-standard claim forms, pension disbursement through multiple Payment Distribution authorities, procedural delays, missing data and many others by providing an omni-channel for pension-related service delivery, a centralized data repository and integration with many internal (within the departments) as well as external (banks) systems.

MoU for Placement of Ex-Servicemen

The following MoUs were concluded by the INPA:

- An MoU was concluded with Monster.com on 14 March 2018, wherein the firm agreed to provide various career services and render higher visibility for the INPA's registered members.
- An MoU for employment of *IN* Ex-Servicemen in Qatar Emiri Naval Force (QENF) was concluded on 5 April 2019.
- An MoU for employment of retired/retiring personnel at Flipkart Mother Hubs/corporate offices was concluded with Flipkart on 15 September 2021.
- An MoU for employment of retired/retiring personnel, widows, NoK and medically disabled personnel in diverse roles such as engineering, projects, IT, IT security, HR, finance and accounts, operations, security, nursing and medical investigations was concluded with Optum Global Solution (India) Pvt. Ltd. on 29 October 2021.
- An MoU for employment of retired/retiring personnel, widows, NoK and medically disabled personnel was concluded with India Infoline Housing Finance Limited on 27 January 2022 to facilitate their employment across the country in various roles, such as projects, IT, IT security and administration, sales and management roles.

Initiatives by the Directorate of Ex-Servicemen Affairs

DESA was established on 30 June 1988 with the aim of providing focused attention to issues concerning ex-naval personnel/widows/dependents and to assist in the resettlement process. Since inception the Directorate has continued to evolve in scope and charter with the changing socio-economic trends. Some of the changes incorporated in the past decade include the following:

Pre-Retirement Capsule: Towards ensuring structured exit formalities for officers, DESA commenced delivery of a Video Conference on Pre-Retirement formalities in December 2012 and this is now being conducted on a quarterly basis with participation from all Commands. Representatives of various professional Directorates involved in the retirement formalities interact with future retirees on issues which are considered important and a prerequisite for a satisfying retired life. The event is coordinated and moderated by DESA.

Skill Development and Entrepreneurship (SD&E): This section was established at DESA in 2016 to pursue skill-development initiatives for retiring naval personnel. The section pursues mapping of skill-sets of naval personnel with National Skill Qualification Framework (NSQF) established by the NSDC, skill certification of retiring naval personnel under the concept of 'Recognition of Prior Learning' (RPL), setting up of national diving skill standards, engagement of *IN* in the Aviation and Aerospace Sector Skill Council, etc. The section also progresses the initiative to conduct entrepreneurship training for serving/retired naval personnel and their dependents.

Transition to Merchant Navy (MS): This section was established at DESA in September 2020. SSC, Long Navigation and Direction officers (one each) were posted to progress smooth transition of *IN* retired/retiring personnel into the Mercantile Marine.

Corporate Social Responsibility (CSR): In 2018, DESA was designated as the nodal Directorate for routing CSR funds within the *IN*. Consequently a CSR section was established in October 2018, where all proposals meriting funding through CSR funds are routed, which, in turn, examines each proposal and forwards its recommendation to the *IN* CSR committee. Sahara Hostel, a hostel for naval widows was constructed in New Delhi at a cost of Rs 5.28 crore, utilizing CSR funds and was inaugurated on 25 May 2019.

Retirement Kit: Since May 2015, officers superannuating each month are being handed over a retirement kit folder containing Pension Payment Order (PPO), Last Pay Drawn Certificate (LPDC), Certificate of Service (Discharge Book), Sea Service Extract and Post Retirement Death Insurance Extension Scheme (PRDIES).

Centralized Membership Procedure of Navy Foundation and Veteran Sailor's Forum: It was observed that a large number of retired naval officers and sailors were not subscribing to the membership of Navy Foundation (NF) and VSF. Lack of connect with the parent service through these forums resulted in certain unfounded misgivings, apprehensions and eventually resulted in grievances that could have been easily avoided through participation in the activities conducted by the two associations. Accordingly, in order to increase the membership base, a new centralized procedure for membership of NF and VSF was implemented in July 2017, wherein all retiring officers and sailors fill in the membership forms as part of their outgoing formality. The membership fees are being regularized centrally by DESA from Indian Naval Benevolent Association (INBA) to concerned chapters and VSF on a six-monthly basis.

Civilian Personnel

Civilian personnel constitute about 37 per cent of the *IN*'s manpower, and contribute significantly

to the Service in all domains. Naval civilian personnel, working in Dockyards, Material Organizations, Naval Armament Depots, Service and Command Headquarters, and other naval organizations, directly impact the overall performance of these organizations. Seventy-five per cent of the *IN*'s Civilian Personnel are involved in operational, maintenance and combat-support roles, whereas the balance 25 per cent are involved in support services such as administrative and logistics functions.

The Induction Plans in respect of civilian personnel are drawn up separately, since their recruitment processes vary. Civilian personnel in the *IN* work in thirty-nine distinct cadres. Recruitment of Group 'A' and Group 'B' (Gazetted) civilian officers is conducted by the Union Public Service Commission (UPSC), recruitment of Group 'B' (Non-Gazetted) and Group 'C' all India Cadres, viz., Drawing Staff, Armament Staff etc., were carried out by respective Directorates or Commands who control each cadre. For ministerial posts (administrative), CSO (P&A) of respective Command Headquarters are the appointing authority; and for technical posts, Admiral Superintendent Dockyard (ASDs) are the appointing authority.

The Directorate of Civilian Personnel (DCP) is the nodal authority at IHQ MoD(N) dealing with matters related to the *IN*'s civilian employees. The DCP was first established in NHQ in 1964 with one Captain, one Deputy Director Civilian Personnel (DDCP), one Senior Civilian Staff Officer (SCSO), one Deputy Adviser, three Civilian Staff Officers (CSOs), six Assistant Civilian Staff Officers (ACSOs) and supporting staff. In 1991 it was classified as one of the nine Controlling Directorate for civilian employees, which included Tracers, Scientific Staff and Translators. With the aim of improving administrative and functional efficiency in

the management of civilian personnel, a new Directorate of Civilian Personnel (DCPS) was set up in 2002. The major functions of the DCPS included duties related to Pay and Pension, service conditions, discipline, vigilance, court cases, industrial relations and labour welfare, Joint Council Meeting (JCM) and dealing with Federations/Associations.

With the *IN* poised to grow rapidly in the coming decade, the requirement to manage this vital component of naval workforce was imperative. Some of the major highlights with regard to naval defence civilians are enumerated below.

Directorate of Civilian Manpower Planning and Recruitment

In order to facilitate smooth conduct of civilian recruitment, the Directorate of Civilian Manpower Planning and Recruitment (DCMPR) was created in 2014.

Centralization of Civilian Recruitment at IHQ MoD (N)

The recruitment of Naval Civilians (Non-Gazetted) posts was earlier done at the Command level. The recruitment was a regional process with limited youth participation, besides being time-consuming and opaque. In 2016–17, an Outsourcing Civilian Contract was finalized for a pan-Navy Centralized Computer-Based Examination for Civilian Recruitment. The percentage of civilian recruitment at DCMPR stood at 0.03 per cent in 2018–19, but improved substantially post introduction of centralized online examinations for a total of 1,895 vacancies in the last three years. The centralized civilian recruitment at Naval HQs /DCMPR has increased to 48 per cent and is expected to increase to 100 per cent by December 2022, thereby taking away this load from the Commands and lower formations.

Smart Performance of Appraisal Report Recording Online Window (SPARROW)

Annual Performance Appraisal Report (APAR) is an objective assessment of the work and conduct of a Government servant. Timely rendering and maintenance of APARs, therefore, assumes importance not only in the interest of service but also in the interest of the employee. Rendering of APARs was done manually till March 2020. The *IN* launched rendering of APARs online for officers through SPARROW with effect from 1 April 2020. Rendering of online APARs is now extended to all Gazetted Naval Civilian officers.

Strategic Communication with Civilian Personnel

Strategic communication with civilian employees was implemented from 15 August 2019 using Short Messaging Service (SMS) through M/s NIC. This facility was aimed at sharing information on various policy matters and creating a favourable information sharing environment with the *IN*'s civilian employees.

HR Management During COVID-19

The COVID-19 pandemic necessitated that the *IN*'s HR machinery respond proactively to maintain optimal planning and rotation of personnel for career progression, training and other service requirements. Various HR measures were implemented to mitigate the effects of COVID-19 on *IN* personnel. Some of the notable ones included:

- Cancellation of around 4,600 outstation transfers in 2020. Outstation transfers and movement of on temporary duty has been minimized;
- Local release of sailors' post retirement from March 2020, up to September 2021;
- Permitted revoking of approved premature release applications for officers and unwillingness for extension of service;
- Regularization of overstay of leave due to COVID-19 lockdown in 2020.
- Conduct of online Naval Selection Board (NSB) and PG selection interviews; and
- Waiving of swimming tests for promotions.

COVID-Care Centre at Naval Dockyard (Visakhapatnam) for Defence Civilians: A 200-bed facility for Defence Civilians was set up at ND(V). It included twenty oxygen beds and fifteen beds for ladies. The oxygen beds were equipped with a multi-parameter monitoring system and a remote monitoring facility.

Conclusion

The *IN*, in the last decade, witnessed the induction of new technologies, and with it came new capabilities at an unprecedented rate. However, induction of new technology by itself does not translate into operational capability unless it is matched by presence of a well-trained and motivated human resource. Human capital challenges such as having capable leaders, building workforce skills, driving high performance, and ensuring career progression, can be addressed through an effective Human Capital Strategy. Accordingly, the *IN*'s Human Capital Strategy (2013 and 2018) seeks to align induction, training and grooming of Human Resource to the *IN*'s overall plan of development. Despite challenges such as resource crunch, shortages in manpower, sizeable inventory of ageing assets, assets with varied levels of sophistication and changing maritime threat environment, the operational and combat capabilities of the *IN* have improved steadily and compare quite favourably with those of other major navies.³

Managing Human Capital of the *IN* is a complex, multi-layered and dynamic effort, which needs to constantly adapt and fine-tune strategies. In the last decade, Human Capital Management efforts by the *IN* have been implemented across the breadth and depth of the HR management verticals

such as induction, training, in-service conditions, welfare and resettlement. The efforts in the last decade must be seen as a continuum of the *IN*'s institutional ethos to build a cohesive and skilled workforce. The *IN*'s move towards technicalization of officer's entry, positioning of women in combat roles on warships, introduction of CPO (Honorary), appointment of women officers in diplomatic roles, increased intake and training capacity have been some of the decadal milestones of the *IN* with regards to management of Human Capital.

The Chief of the Naval Staff, speaking on the eve of Navy Day 2021, noted,⁴ 'Navy's workforce has a major contribution towards achieving the aim of a Combat Ready, Credible, Cohesive and Future-Proof Force. We have instituted responsive HR management, contemporary training, proactive administration and greater integration of the naval community', which is a sign of the *IN*'s continued

focus on building a capable, highly skilled, motivated and future-ready workforce.

Notes

1. Indian Navy (2015). *Ensuring Secure Seas: Indian Maritime Security Strategy*. Indian Navy Naval Strategic Publication (NSP). 1.2 New Delhi: Ministry of Defence (Navy), Government of India. https://www.indiannavy.nic.in/sites/default/files/Indian_Maritime_Security_Strategy_Document_25Jan16.pdf
2. All *IN* sailors are categorized as 'X' and 'Y' for salary accounting purpose. Artificer Apprentices (AA) fall under Group 'X' while others in Group 'Y'.
3. Chauhan, P. (2019). 'Challenges Confronting the Indian Navy in the Emerging Indo-Pacific War Zone.' *Bharat Defence Kavach*, 21 April. The author is a retired Vice Admiral of the Indian Navy. <https://www.bharatdefencekavach.com/news/expertopinion/challenges-confronting-the-indian-navy-in-the-emerging-indo-pacific-war-zone/68268.html>
4. Baranwal, J. (2021). "We need to be not just a strong and modern Navy, but also a future proof Navy": Admiral R Hari Kumar, Chief of Naval Staff.' *SP's Naval Forces*, Issue 6. <https://www.spsnavalforces.com/story/?id=784&ch=We-need-to-be-not-just-a-strong-and-modern-Navy-but-also-a-future-proof-Navy>



20 | Naval Training

Creating a Future-Ready Force

⚓ Introduction

The growth of the Indian Navy (*IN*) is well on course to fulfil its various roles and responsibilities towards safeguarding national interests. The *IN* is committed to enhancing its force levels in order to emerge as a formidable blue-water force. Despite fiscal constraints, it has continued to grow in size, manifestation, ambition and most crucially in capability. This growth in the *IN*'s capabilities can be attributed not only to the growth of war-fighting assets—be the surface, sub-surface or in the air, and their support infrastructure—but also to sustained focus on training the human component, which remains vital to combat or non-combat operations.

The growth of the *IN*'s human resources, the all-important pillar of *IN*'s transformation, is as significant as the rapid expansion and technological modernization of its assets. The transformation of this human resource into human capital is accomplished through the process of training. Training is, therefore, the most important function undertaken by all navies in peace—time. The *IN* too therefore, devotes substantial focus and resources towards training of its personnel.

**In December 2020 (then) Chief of Naval Staff
Admiral Karambir Singh noted:**

As the character of conflict evolves, traditional ways of doing business no longer assures success. Hardware is only a limited hedge

against increasingly complex and competitive space. What counts in the final analysis is the knowledge, theoretical grounding, mental acuity and competence of our men and women.



Women and Men of the Indian Navy
Working Shoulder to Shoulder

Training in the *IN* is, therefore, not merely a professional function or variable of force-level growth, but also a vital lever to develop skills across a range of domains considered fundamental to the consolidation and up-skilling of current, as well as future *IN* capabilities and roles. Identifying the value of training as a force-multiplier, the Human Capital Strategy of 2013 was followed up with the Indian Navy Training Doctrine (INTD) in 2014.

Indian Navy Training Doctrine (2014): This doctrine provided macro-policy guidelines pertaining to training principles and organizational setup, and procedures for planning and conducting training, both for Indian and international trainees.

The INTD document targeted two categories: (i) training authorities, schools and establishments, providing them a common approach to steer all ongoing initiatives pertaining to training in the *IN*; and (ii), those outside the *IN*'s training organization, providing them a ready reckoner on the *IN*'s training organization and processes.

The INTD also recognized that the training process was not just limited to formally run courses at training institutes, but remained a ubiquitous and ongoing process. Therefore, it was the collective responsibility of all formations within the *IN*, to keep the Force credible and combat-ready. Technological advancements in hardware, diversity of naval inventory (both indigenous and foreign original equipment manufacturers [OEMs]), increased maritime presence due to the changing nature of threats (traditional and non-traditional), continued shortages of manpower, and urban-rural diversity during recruitment, were some of the factors highlighted by the INTD as well, and these continue to challenge training models within the Navy.

The INTD notes:

As India assumes increasing importance in the new Regional Matrix, the *IN* is poised to play a larger role in the IOR. This coupled with the presence of extra-regional navies in the IOR will inevitably lead to the *IN* having increasing encounters/interactions with foreign navies while on beat. Additionally, the operating environment in IOR, where the *IN* has significant presence is becoming increasingly dense with higher volume of traffic that is plying the seas. Therefore, to successfully fulfil assigned tasks and safeguard national interests in this complex operating environment demands not just cutting-edge naval platforms and systems but also professionally trained and combat ready officers and sailors to man them.

The growth of training infrastructure and capabilities can be gauged with a reference to their historic evolution. Till the outbreak of the Second World War, all training establishments of the Royal Indian Navy (RIN) were concentrated inside the RIN Dockyard, Bombay (now Mumbai). These were the Seamanship School, the Signal School, the Gunnery School, the Mechanical Training Establishment, the Boys' Training Establishment and the Anti-submarine School. There were no schools for training in the torpedo, radar and electrical disciplines. There were also no facilities for training officers who had performed been deputed to the Royal Naval Establishments in the United Kingdom (UK) for basic and advanced training in all disciplines. Fast forward seven decades later, post-Independence, the *IN* has transformed from a brown-water coastal force into a potent maritime force in the Indian Ocean Region (IOR), with an ever-increasing maritime footprint beyond the IOR.

As this chapter dwells on the growth of training in the *IN* as a continual process, therefore some of the text predates the ambit of this volume (2011–21) to give the reader a single-point perspective and narrate the evolution of the training vertical.

Training in Tune with the Maritime Capability Perspective Plan (MCP) 2012–27: The *IN* is a modern Navy with over 140 ships and 200 aircraft, steadily expanding in accordance with its Maritime Capability Perspective Plan (MCP) 2012–27. It has been developed around indigenous, eastern- and western-origin hulls, with a diverse mix of sensors, weapons and associated equipment. Training for such a mix, inevitably, has been a huge challenge. The training establishments have also grown in numbers, scope and capability to match the aspirations of a large-mindset Navy. From a dependent Navy, the *IN* today has built-in substantial self-reliance in training with over thirty in-house training establishments. These naval

training schools/establishments are divided into categories A and B, depending upon the nature of training provided (whether it is officer and/or sailor-oriented), and the training load.

The *IN's* success in extending the service life of its ships and submarines is a testimony not only to the success of its operational and maintenance strategies, but also to the training imparted. This success has been one of the key motivators for friendly foreign navies to look to the *IN* for training their personnel.

Net Exporter of Training Assistance to Friendly Foreign Countries (FFCs): The number of training vacancies for foreign trainees from 2016 to 2021 has gone up from 887 to 1,126. Naval training today is an important cog contributing to the fulfilment of the *IN's* diplomatic role.

Highlighting the significance, (then) Chief of Naval Staff Admiral Karambir Singh noted in February 2020:

On the training front, the Indian Navy has emerged as a favoured destination for Naval training in the

region, covering the entire spectrum of professional military training ranging from various ab-initio, courses to mid-level specialization, all the way to senior-level courses like the Higher Command and the National Defence College.

The training function has evolved from a dependent to an increasingly independent model. This has resulted in the *IN* becoming a net exporter of training assistance to FFCs. Additionally, to meet specific requirements and assist in developing resident expertise, the *IN* also deputs Training Teams to some countries on their request. Over the past four decades, the *IN* has trained more than 15,000 personnel from the Navy, Coast Guard (CG) and Marine Police of about forty-five countries. Presently, the *IN* offers around 25 training courses for officers and 100 courses for sailors, covering a variety of disciplines. Apart from formal training, the *IN* also provides assistance to FFCs for operational sea-training of their ships. This allows friendly maritime forces to avail quality training from India, which strengthens their skill-sets and capabilities in an economical manner, whilst enhancing mutual relations.



Foreign Training: Security and Growth for All in the Region

Notwithstanding, this established self-reliance in training, the *IN* continues to undertake attachments and exchanges of personnel with other maritime forces, for training interaction, gaining operational experience, sharing and developing skill-sets, building interoperability and strengthening maritime diplomacy. These include reciprocal positioning of naval personnel in diplomatic billets, training and technical support teams, and going onboard each other's ships for short durations, especially at sea (termed as 'sea riders').

In addition, during various port visits and overseas deployments, the opportunity to provide exposure and training in specialized areas onboard the visiting ships, as per the host Navy's requirements, is availed of. The *IN* also continues to avail of a few training courses with other navies, under similar programmes or reciprocal arrangements, to gain insight into their training techniques, doctrines and procedures.

Evolution of Training Verticals

The decade under review, described elsewhere in this volume as a 'decade of geopolitical churn', witnessed a proliferation of threat types resulting in the expansion of scope for military operations by the Indian Navy. These threat types ranged from core war-fighting operations and missions that characterized less-than-war situations such as anti-piracy, counter-terrorism, Low-Intensity Maritime Operations (LIMO), Non-combatant Evacuation Operation (NEO), cyber warfare and coastal security, to peace-time operations such as maritime surveillance, Humanitarian Assistance and Disaster Relief (HADR), and search and rescue (SAR) missions. Such engagements—coupled with the introduction of new-generation assets, and other dimensions such as Nuclear, Space, Network-Centric Operations (NCO)—have necessitated the continued evolution of training verticals. Some of

the focus areas in the decade under review include the following.

Maritime Law

International law and norms act as a proven template for the conduct of maritime relations and resolution of maritime issues between nations, which include handling divergence and enabling maritime security cooperation. Respect for international law and promotion of its principles at sea would, therefore, continue to be accorded due attention by the Navy.

However, the *IN*'s Indian Maritime Security Strategy (IMSS) recognizes that there have been instances where some states have not respected the established international legal regimen or even their own commitments, and others where non-state actors have been able to, or are enabled to, operate outside state jurisdictions. In such cases, the risk of maritime instability and insecurity suddenly rises, and is catered for in the *IN*'s security matrix. The IMSS notes that the *IN* will have to remain prepared for contributing to, and continuing to play an important role in, national efforts towards enhancing India's relations and engagement with FFCs, and strengthening the international legal regime at sea, for all-round benefit.

Collaboration with Gujarat National Law University

In light of the continued and expanded maritime presence established by the *IN* over the years, and the commencement of Mission-Based Deployments (MBD), special focus was accorded towards training in maritime law. Gujarat National Law University (GNLU) and the *IN* entered into a collaborative arrangement for the capacity building of *IN* personnel on the Laws of the Sea, Maritime Law and International Law through academic, research, and training programmes. A Memorandum of Understanding (MoU) to this

effect was signed in May 2020 for a period of three years. The MoU aims to provide two types of courses—Long Courses (twelve weeks) and Short Courses (four weeks)—covering Laws of the Sea, Maritime Law and International Law.

Operational Analysis

The art of war is the skillful application of military knowledge and military power to obtain desired results. These skills are drawn from an amalgamation of study, observation, experience and instinct and include application of military leadership, military art and military science that are closely linked and intertwined. For the defence context, Operational Analysis enables the evaluation and analysis of military problems to provide decision-makers with a scientific basis to improve military operations or capability. Better informed decision-making may utilize analysis to predict and compare the outcomes of alternative strategies and decisions.¹ It depends, in large measure, on the personal acumen and ability of the military commander and his/her staff to: (i) effectively use military science to analyse the situation and manage resources; (ii) utilize military art to envision situations and solutions beyond available scientific knowledge or processes; and (iii) execute effective military leadership to ensure the efficient conduct of operations.

The requirement of a Naval Operations Analysis Course to create a pool of OA-qualified officers was discussed at the fourth Indian Naval Strategic and Operational Council (INSOC) meeting held in October 2010. In order to build operational analysis capability/expertise for the future, deputation of officers for OA courses in India and abroad, and setting up an OA training school in India, were considered.

The Indian Navy Tactical Evaluation Group (INTEG) forwarded a draft concept paper on

Operations Research and System Analysis (ORSA) training towards the development of OA capability and expertise in the *IN* to the Integrated Headquarters, Ministry of Defence (Navy; or IHQ MoD[N]). As a consequence, OA training has received dedicated focus in the previous decade. To start with, a tailor-made six-week-long Naval Operational Analysis (NOA) course was conducted in May 2011 and then in November the same year, with twenty-five officers attending each course.

The *IN* also deputed an officer each to the Naval Postgraduate School (NPS), Monterey, the US, in 2011, 2012, and 2022 for pursuing MS in Operational Analysis. The syllabus of this course included probability theory, statistics, mathematics, simulation and analysis, combat modelling, search and detection cost-benefit analysis and decision theory, naval tactical analysis, joint campaign analysis, and wargaming.

Based on the experience, field requirements, inputs from INTEG and requisite criteria for OA capability, a delegation comprising representatives from the Directorate of Naval Training (DNT) and INTEG visited the Indian Institute of Technology (IIT) Bombay in January 2018, to ascertain the feasibility of conducting a tailor-made course for the Navy. The course would be akin to the ORSA course conducted at the Army Logistics University (ALU), the US. A detailed proposal for a sixteen-week-long Naval Operations Analysis course to be conducted at IIT Bombay, was formulated by INTEG and submitted in July 2018. Approval was accorded to conduct the course for eight officers every year, commencing January 2019. The first course at IIT Bombay was conducted from January to May 2019, and this been continued since then.

Technology

The *IN*'s major advancements range from latest trends in marine propulsion, ship construction,

naval weaponry, shipboard automation, satellite-based communications and surveillance systems, to the high-end areas of sea-based nuclear deterrence. To cater for this rapid proliferation in naval technology, there was a need to focus on developing and infusing core competencies among personnel at regular intervals.

The period under review (2011–21) stands out for the increasing use of technology by the *IN* in the conduct of training. Increased use of simulators, virtual reality, like-to-like live equipment bays, Computer-Based Training (CBT) packages, e-learning, online examinations, and many others have contributed to providing training content on demand and also significantly improved its delivery and effectiveness.

In recognition of these challenges, the *IN* chose to transform through the technicalization of its human resource: (i) through the Bachelor of Technology (BTech) programme at the Indian Naval Academy (INA) at Ezhimala; and (ii) the elevation of recruitment standards for sailors to 10+2 with science background.

The *IN* focused its efforts on enhancement, not just in a wide range of training verticals, but also by creating Centres of Excellence and adding significant infrastructure to cater for the growing need of its growing workforce for training in new disciplines.

Centres of Excellence (CoE)

The *IN* has actively pursued the establishment of CoE in various field to channelize research and innovation in areas of importance. In pursuit of this vision, a number of existing establishments were designated as ‘Centre of Excellence’ based on their niche expertise and professional vertical. A list of such CoEs is tabulated here.

Unit	Area of Expertise
INS <i>Shivaji</i>	Centre of Excellence for Marine Engineering Technology
INS <i>Valsura</i>	Centre of Excellence for Electrical, Electronics, Weapons and Sensors Centre of Excellence for Artificial Intelligence/Big Data Analytics
Signal School	Centre of Excellence for Naval Communication and Electronic Warfare
School of Naval Oceanology and Meteorology (SNOM)	Centre of Excellence for Ocean and Atmospheric Sciences
National Hydrographic School (NHS, Goa)	Centre of Excellence for Hydrographic Survey
Naval Institute of Aeronautical Technology (NIAT)	Centre of Excellence for Aeronautical Science and Technology
INS <i>Dronacharya</i>	Centre of Excellence for Gunnery and Missile Systems
Anti-Submarine Warfare (ASW) School	Centre of Excellence for Anti-Submarine Warfare
Navigation and Direction (ND) School	Centre of Excellence for Nautical Science and Naval Operations
Observer School	Centre of Excellence for Air Navigation and Operations
Diving School	Centre of Excellence for Diving Technology
Maritime Warfare Centre (MWC, Kochi)	Centre of Excellence for Wargaming
CELABS	Centre of Excellence in Ethics Leadership and Behavioural Studies
National Institute of Hydrography (NIH, Goa)	Centre of Excellence for Hydrographic Surveying

Training Infrastructure

Boost to Training Infrastructure: Major training related infrastructure was added to various training establishments in the decade under review.

Year	Name of the School	Infrastructure
Training Infrastructure		
2011	INS <i>Dronacharya</i>	Naval Small Arms Trainer (NSAT)
2011	INS <i>Valsura</i>	ELLORA MK1 EW Suite
2012	INA	IN's first baffle range, Arjun Baffle Range
2012	Signal School	RUKMANI SATCOM terminal
2012	INS <i>Dronacharya</i>	Brahmos loading/unloading facility
2012	INS <i>Dronacharya</i>	Brahmos Cut Section
2012	Seamanship	Damage Control Training Facility (DTCF) Avinash
2012	School of Medical Assistants (SOMA)	Training annexure with internet bay, a server and a library
2012	INS <i>Shivaji</i>	Steering Gear Live Bay
2012	SNOM	Inauguration of SNOM annex (P-350) Building
2013	INA	The largest in the IN, and state-of-the-art, Marakkar Watermanship Training Centre (MWTC)
2013	INA	The IN's first polyurethane resin synthetic-track stadium
2013	Signal School	Infosec Laboratory
2014	INS <i>Hamla</i>	Watermanship Training Centre
2014	SOMA	Audio response system
2015	ASW School	ASTRA torpedo firing yard
2015	INA	Squadron 'Fighter'
2015	Naval Special Warfare Tactics and Training Centre (NSWTTC)	Close Quarter Battle complex
2015	NIAT	Dornier airframe centre section with wing
2015	INS <i>Shivaji</i>	1 MW Cummins DA
2015	INS <i>Shivaji</i>	Prototype Vikramaditya Boiler
2015	INS <i>Valsura</i>	System Integration Laboratory
2015	INS <i>Valsura</i>	AK 630 Training Complex
2015	CELABS	Two-storied building, which houses classrooms with modern training aids, examination hall, auditorium (seating capacity: 100), library and offices
2016	NSWTTC	Constructed an explosive store
2017	INS <i>Chilka</i>	50 m swimming pool
2017	INS <i>Mandovi</i>	'Sarang' Sailor's Institute
2017	INS <i>Valsura</i>	SSM training complex
2018	Naval War College (NWC)	Automated Operational Level War Gaming Centre
2018	SNOM	Integrated Automatic Aviation System
2018	INS <i>Valsura</i>	Medium Voltage Training Lab
2018	INS <i>Valsura</i>	Integrated Bridge System
2019	ASW School	Training Complex
2019	NSWTTC	All-weather day/night basketball court
2019	NSWTTC	Airborne Cell
2019	SOMA	A 3D Laboratory
2019	SNOM	Numerical Weather Prediction (NWP) laboratory
2019	INS <i>Shivaji</i>	Integrated Platform Management System Laboratory
2020	Anti-Submarine Warfare (ASW) School	Mine Warfare Data Centre
2020	INS <i>Satavahana</i>	Motor training bay
2020	NIH	Two Survey Motor Boats (SMBs) were inducted for imparting practical afloat training
2020	NIAT	P-8I Weapons Store Management Demonstrator

Year	Name of the School	Infrastructure
2020	NIH	Block 'Pearl' was commissioned. It accommodates 44 male trainees
2020	INS <i>Dronacharya</i>	Shtil Missile Model
Administrative Infrastructure		
2012	NIH	A new block 'Darshak' for the accommodation of 10 (male) international officers was commissioned
2015	NAIT	Senior sailors single living accommodation 'Tejas' and 'Dhruv' were commissioned
2015	CELABS	New Administrative Building
2017	INS <i>Dronacharya</i>	In-living accommodation for ninety senior (male) officers – Balaram Building
2017	INS <i>Dronacharya</i>	In-living accommodation for forty-eight male officers – Bhishma Building
2017	ASW School	In-living accommodation for 360 (male) ASW trainees
2019	INS <i>Chilka</i>	Dining Hall for 500 personnel
2019	INS <i>Mandovi</i>	Inauguration of new wardroom mess
2019	Indian Navy Physical Training (INPT) School	Block 'Bidur' for International trainees, developed into cabin-type accommodation
2019	SNOM	A new seven-story building was commissioned
2020	ND School	Single-living accommodation for trainee sailors
2020	NIH	Pearl Block, to accommodate 44 trainees
Simulators/Trainers		
2011	INS <i>Dronacharya</i>	MDA simulator
2011	Observer School	Navigation & Tactical Simulator
2012	Seamanship School	DCTF Avinash Simulator
2012	INS <i>Satavahana</i>	Firdaus Mogal IGLA Simulator
2012	INS <i>Shivaji</i>	1241 RE Simulator
2013	ASW School	Dhwani indigenous Sonar Simulator
2013	INS <i>Dronacharya</i>	Brahmos Simulator
2014	Signal School	Simulator Complex, <i>INDRIYA</i>
2014	INS <i>Shivaji</i>	MCS-5 Simulator
2014	ND School	ECDIS Simulator
2014	INA	Dhwani, acoustic trainer
2015	ASW School	HUMSA-NG Tactical Simulator
2015	INS <i>Satavahana</i>	An acoustic trainer <i>Dhwani</i>
2015	SFNA	The Multi-Tasking Aviation Exposure Station (MTAES)
2015	Naval Aviation Training Management System	Mig-29K Simulator
2015	SNOM	Ocean Internal Wave Simulator
2016	ND School	The Combat Management System Simulator
2016	ND School	Advanced Aircraft Direction Simulator
2018	SOMA	Medical Simulation Centre (MSC)
2018	INS <i>Shivaji</i>	Onega Simulator
2019	INS <i>Dronacharya</i>	Kashmir emulator with SSR simulator
2019	ASW School	ALOFAR Simulator
2019	SFNA	Specialist Vehicle Simulator
2020	ND School	Multi-Function Surveillance and Threat Alert Radar Simulator
2020	INS <i>Vishwakarma</i>	A hydraulic trainer
2020	INS <i>Vishwakarma</i>	Augmented Reality (AR)-based welding Simulator
2020	INS <i>Dronacharya</i>	Shtil Fire Control System (FCS)

⚓ The Growth and Trajectory of the Navy's Training, and Training Establishments (2011–21)

Indian Naval Academy (INA)

During the early 1960s, it was realized that the turnaround of the National Defence Academy (NDA)—approximately forty naval cadets every six months—would not meet the requirements of an expanding naval force. It was thus decided to set up a dedicated naval academy at Cochin (now Kochi). The Indian Naval Academy (INA) was commissioned in January 1969 with a capacity to train eighty naval cadets annually. By the mid-1970s, doubling of this annual turnaround capacity from 80 to 160 due to the steady increase in induction through the years had increased both infrastructure and training needs.

By 1976, a decision was taken to shift INA to Goa, in order to overcome these challenges. By 1986, the INA had shifted from Cochin to INS *Mandovi* in Goa. This shift also necessitated shifting the (then) Goa-based sailors' Seamen Training Establishment (STE) to a new facility INS *Chilka* in Odisha, in the vicinity of Lake Chilka. The STE infrastructure also required remodelling to suit the training requirements of cadets.

Simultaneously the *IN* submitted a proposal to the Government for a new (and permanent) INA, keeping in view future growth requirements. Essential requirements included a site in the vicinity of the sea/a lake for seamanship and watermanship training, and which, despite being near a railhead, would be remote from any town or city. Desirable requirements included not only a bracing and moderate climate, but also that the location be within a short distance of a naval port.

Eventually, in 1979, the Government accepted the need for a permanent naval Academy, and the Government of Kerala offered 960 hectares of land at Ezhimala, north of Kannur (Cannanore)

in northern Kerala. In 1982, the Government approved the Ezhimala site and gave the Kerala Government a soft medium-term loan to acquire the land and rehabilitate evacuees. The Foundation stone for the academy was laid in January 1987.

In 1986, the Chiefs of Staff Committee constituted an inter-Service committee of the three Vice Chiefs, with a twofold purpose. The first was to examine the training profile of officers (across the three Services) consistent with the requirements of modern warfare. The second, to devise new training syllabi that would: (i) increase the technical content of services training—starting from the NDA level, going right up to the National Defence College (NDC) level; and (ii) increase inter-Services interaction in training.

The inter-Service committee had made several recommendations on which there was broad-based consensus. However, the Air Force (IAF) and the Army rejected one recommendation—only BTech graduates could seek entry into NDA; and not 16.5 to 19.5-year-olds who had just passed class 12 (as was the case). While the Navy was keen on this suggestion, the other two Services were not.

A decade later, in 1996, a proposal was formulated by the *IN* to reduce manpower costs by 'technicalizing' all officers with a BTech degree. This would be done as follows: NDA cadets aspiring to join the Navy would complete two-year basic training at NDA, while studying the first two years of a BTech course. This would be followed by two years of technical study and training at the INA, Ezhimala and the cadets would graduate as officers with a BTech degree. Army and IAF aspirants at NDA would follow the same pattern, gaining further technical training at the Indian Military Academy (IMA), Dehradun, and at the Air Force Academy (AFA), Dundigal, respectively. This proposal did not find support with the IAF and the Army and was, therefore, not pursued.

Earlier in 1995, approval had been accorded by the Ministry of Defence for a training-load of



INA: Cradle of Officers' Training

600 cadets in the Bachelor of Science (Special) curriculum, that was hitherto being followed by the *IN* for officers' training. Since the mid-1980s the *IN* has pursued its quest for technologization of the Service, including a shift to an all BE/BTech officer cadre from induction-stage onwards. This goal was attained in stages, with the *IN* obtaining approval for an upgrade to the initial training-curriculum of Executive [Branch] Officer cadets in 2002. From the three-year BSc (Special) degree, the curriculum would now offer a four-year BTech (Electronics, Telecom & IT) degree. This would help the young officers to cope better with technology advancements as they grew with the Navy.

Additionally, approval was also obtained to shift the Naval College of Engineering at INS *Shivaji*, which conducted the 10+2 BTech course to INA, Ezhimala. This move required INA to scale up its then envisaged throughput of 600 cadet trainees to 750 cadets per batch. Though the current throughput of INA is about 1,600 cadets on an average annually, the institution recorded a peak throughput of about 1,400 cadets in 2014, which is indicative of the planned spare capacity to not only train Indian Navy cadet trainees, but also of trainees from FFCs.

This foundation for this planned expansion in capacity was laid down much earlier.

On 6 April 2005, Phase 1 of building INA, Ezhimala, was completed with INS *Zamorin* being commissioned as the Academy's 'parent naval establishment'. Training commenced in August that year, with the first batch of the Naval Orientation Course (Regular).

Indian Naval Academy, officially inaugurated and dedicated to the nation on 8 January 2009, welcomed its first BTech Course batch—the 84th Indian Naval Academy Course (84 INAC)—in July the same year. The Passing out Parade of 84 INAC, held on 25 May 2013, marked the Navy's pioneering shift to an all-BE/BTech-officer cadre. This was a quest the Navy had relentlessly pursued since the mid-1980s.

On 20 November 2019, the INA was presented with the President's Colour by the Supreme Commander of the Indian Armed Forces, President Ram Nath Kovind, on the occasion of the INA's fiftieth anniversary (since the inception of the Naval Academy at Kochi). Some of the major milestones in respect of INA are listed below:

Training Infrastructure:

- **Arjun Baffle Range (2012):** The Arjun Baffle Range, inaugurated on 12 February 2012, is the *IN*'s first baffle range. The range enables firing of small arms up to Light Machine Gun (LMG)

from three firing points, by six personnel simultaneously.

- **Marakkar Watermanship Training Centre (2013):** The largest in the *IN*, the state-of-the-art MWTC with a wide array of sailing, rowing and power boats, was inaugurated on 5 August 2013.



Watermanship Training at INA

- **Chola Athletic Stadium (2013):** The *IN*'s first polyurethane resin synthetic-track stadium was inaugurated on 14 September 2013 at INA. The stadium is equipped to host a range of athletic fixtures including hammer throw, discus throw, javelin throw, shot put, long jump and steeplechase.



Synthetic-Track at INA

- **NKN/NPTEL Studio (2014):** The National Knowledge Network (NKN) and the online web-based National Programme on Technology Learning (NPTEL) were set up in 2014 to stream quality technical videos, lectures and

lessons from faculty at IIT, and at the National Institute of Technology (NIT). Since the introduction of NKN, the lessons are available in classrooms, as well as in individual cabins through the Academic local-area-network (LAN) for facilitating learning on demand.

- **Induction of Dhvani Trainer (2014):** Dhvani is a one-of-its-kind acoustic trainer, designed and developed by the Naval Physical and Oceanographic Laboratory (NPOL), Kochi. Installed at INA in 2014, the simulator bridges the gap between theoretical and practical knowledge of sonar technology and use.
- **Kautilya Auditorium (2017):** The auditorium, with a seating capacity of 1,735 personnel, was inaugurated on 21 November 2017.



Kautilya Auditorium

Curriculum Updates:

- **The *IN*'s All-Tech Officer Cadre (2014):** Commencing 2014, INA conducts a BTech (Applied Electronics & Communication) course for the Executive Branch; a BTech (Electronics and Communication Engineering) course for Electrical Branch; and a BTech (Mechanical Engineering) course for Engineering Branch cadets. All ex-INA officers post 2014 are thus BTech degree holders, at the very minimum.
- **Introduction of BTech Syllabus for Ex-NDA Cadets (2016):** NDA introduced the BTech

syllabus from 136 Course which commenced from Autumn Term 16 (June 2016). Naval Cadets since then complete the first six semesters of BTech (Applied Electronics and Communication) at NDA, and report to INA for their seventh term.

- **Subsuming of 1TS (2021):** All Executive Cadets, post completion of INA training, used to undergo a Sea Training Phase onboard First Training Squadron (1TS) for six months, which was followed by afloat attachment onboard Fleet ships and Sub Lieutenant (SLt) Executive (X) courses at various professional schools. The overall training duration was six-and-a-half years. In order to reduce the overall training duration by six months, it was recommended that the Sea Training Phase onboard 1TS be subsumed into INA training. Accordingly, approval for subsuming the 1TS training phase—as an internship for the Term VIII of BTech within the INA BTech curriculum—was accorded in March 2021. The policy was implemented with effect from June 2021 (Autumn Term 2021) for 101 INAC and 139 NDA course.
- **Introduction of Internship for E&L Midshipmen (2021):** With the subsuming of 1TS for Executive Officers, the BTech syllabus for the Mechanical Engineering (ME), and Electronics and Communication Engineering (ECE) courses was also revised to include four weeks of Internship in the VIII term. The Internship phase includes attachment within Naval Dockyard (ND), Fleet Maintenance Unit (FMU) and other units at various commands.

Sporting Events:

- **Sabhiki Cup Hosted by INA in 2013:** The erstwhile Hexagonal championships involving the six Indian military training academies

was renamed as the Sabhiki Cup in 2013. It is a sports competition held every alternate year among Pre-Commissioning Training Academies (PCTA)—IMA, NDA, INA, AFA and the Officers Training Academy (OTA), Chennai. The INA has been participating in this competition since 2009, and hosted the event in 2016.

- **Bakshi Cup Won Twice by INA (2017 and 2019):** The Bakshi Cup and Sabhiki Cup competitions are held every alternate year. Instituted in memory of late Major General MC Bakshi, erstwhile Commandant of the NDA, the Bakshi Cup is held to foster competition in sporting events such as Basketball, Hockey, Football, Volleyball, Tennis, Cross-Country and Squash. Until 2013 it was held between the cadets of NDA and IMA. In 2013, it was decided to include INA in the Bakshi Cup. Since then, INA has been participating in the Bakshi Cup and hosted the event for the first time in 2014. The INA won the Bakshi Cup in 2017 held at NDA, and subsequently also in 2019 when the event was hosted at INA.



Taking Home the Trophy

- **Admiral's Cup 2019 became the Largest Military Sailing Event in the World:** The Admiral's Cup Sailing Regatta is conducted by the *IN* every year in November/December, in Laser (Radial) class. It has gained popularity since 2010, when it began, and over the years, each consecutive edition has seen wider

participation. The sailing teams comprise young naval officers/cadets/midshipmen and one Officer-in-Charge as team coordinator.

In 2019, invitations were extended to fifty-five countries for the tenth edition of Admiral's Cup. Twenty-eight teams from twenty-seven countries (including two Indian teams, one each from NDA and INA) participated, making it the largest military sailing event in the world. The event aims to strengthen naval ties, showcase INA, project the *IN* and promote sail training.

- **Biangular Sailing Regatta:** Formerly a triangular sailing regatta involving NDA, INA and the Naval Engineering Course (NEC) the event was curtailed to a biangular competition with the closure of NEC from Spring Term 2013. The Biangular Sailing Regatta is now a competition between NDA and INA, every term. This regatta is conducted alternately at Peacock Bay (NDA) and Kavvayi Backwaters (INA). The INA has taken the lion's share of victories on a year-on-year basis. The races at this event include *Enterprise Class* and *Laser Bahia* boats.

The Honour Code – The Cornerstone of Authentic Leadership: Far more than any weapons or technology, it is the great sense of chivalry, honour and integrity consistently displayed by the Indian Armed Forces that our countrymen have always admired and are proud of. It is, therefore, vitally important that the foundational roots of these values are imbibed by the *IN*'s leaders of tomorrow, who start their naval journey at INA. Underpinning this conviction must be the clear awareness in their minds that an officer can lead men into battle and order them to stake their lives, only if he/she has moral ascendancy over them. Such ascendancy comes naturally to those who have the strength of character to distinguish right from wrong, and the courage to always choose the harder right over the easier wrong.

In order to achieve this, an Honour Code system has been an integral part of military academies across the world. The aim of the Honour Code system is to inculcate in the trainee officers and cadets the highest standards of honesty, integrity, honour and loyalty to the Service.

Implementation of the Honour Code System at the INA is undertaken by an Honour Code Committee comprising:

- Chairman: The Academy Cadet Captain (ACC);
- Deputy Chairman: The Academy Cadet Adjutant (ACA);
- Secretary: VII Term cadet;
- Members: Three Squadron Cadet Captains (SCCs), one cadet each from II to VII terms, and two trainees from 'O' Courses;
- Officer Guide: Adjutant; and
- Representatives: The SCC, Divisional Cadet Captain (DCC) DCC and Divisional Cadet Adjutant (DCA) of the concerned trainee, two nominated coursemates from the same squadron of the trainee.

Prefabricated Accommodation ('Fighter' Squadron): In order to cater for the increasing strength of cadets and mitigate the infrastructure gap, a prefabricated squadron named 'Fighter' for accommodating 225 cadets was inaugurated on 25 November 2015.

Indian Naval Ship Chilka

On 1 January 1948, the old Directorate of Training and Education was split into two separate Directorates—the Directorate of Weapons and Training; and the Directorate of Naval Education. In the pre-Partition era, the Boy's Training Centre for the Navy encompassed two establishments, HMIS *Bahadur* and HMIS *Dilawar*, both in Karachi. Partition led to the search for a suitable location for a Boys' Training Establishment (BTE) in India. A temporary training centre was

set up at Bombay and later shifted to INS *Circars*, Visakhapatnam in December 1947.

The initial training of Stoker boys was undertaken at the new BTE in Visakhapatnam in 1948. Additionally, in the 1950s, the training of direct-entry sailors began to be conducted at the Basic and Divisional School at Cochin. This too, however, was a temporary arrangement. As more boys were inducted, the search for alternative locations became an ongoing process. The primary requirement for the new location was proximity to the sea where young sailors could be taught boat-work, sailing and basic seamanship. By 1962, the BTE had started getting congested, and sanction was obtained to expand the establishment and acquire land from the Visakhapatnam Port Trust and from private owners, to tide over the congestion challenge.

In 1965, when the decision was taken to base Russian-origin ships in Visakhapatnam and build a major naval base there with a new Dockyard, it was decided to shift the BTE to Paradeep Port in Orissa (now Odisha). This also, however, could not be pursued as the multistorey buildings that were to house the BTE, were occupied by personnel of Paradeep Port. Once again, the *IN* started seeking suitable alternative sites.

While the hunt for still on, the *IN's* proposal was accepted to site the new Seaman Training Establishment (STE) at Goa in 1968. In 1969, approval was accorded for the construction of the STE on a 230-acre site on a hill at Reis Magos, five miles north of Panaji, close to the northern bank of the River Mandovi. The STE was envisaged with a capacity to train 500 direct-entry sailors at a time. On 9 October 1969, the foundation stone of the STE was laid, and it was eventually commissioned as INS *Mandovi* in 1976. Almost simultaneously, in 1969, the *IN's* search for a suitable location for a permanent BTE fructified with the selection of a 1,600-acre site on the banks of Chilka Lake

in Orissa, where 1,200 boys could be trained at a time (the throughput has more than tripled as on date). The construction of this new establishment commenced in 1973, and it was eventually commissioned as INS *Chilka* on 21 February 1980.



INS *Chilka*

The primary role of INS *Chilka* is to conduct ab-initio (basic entry level) training for sailors joining *IN* and Naviks joining the Coast Guard (CG). Over the decade, almost 10 per cent of INS *Chilka's* trainee turnaround has been for the CG. It provides them adequate exposure for further training at the respective training schools. Irrespective of the assigned branch, swimming, physical fitness, military bearing arising out of drill and parade training, basic and practical skills in handling and firing of weapons, Nuclear Biological and Chemical Defence (NBCD), Seamanship, First Aid and Survival at Sea are some of the core areas of training for all recruits.

Some of the salient decadal milestones are listed below:

Increased Throughput: The throughput of INS *Chilka* has increased 300 per cent in the last ten years. More so, the batch of February 2019 has been the largest so far in the history of INS *Chilka*, with 3,743 trainees inducted. It has been able to augment the infrastructure in a planned manner to absorb the additional load, and ensure that the required manpower is made available to the downstream schools as per the Manpower Perspective Plan in accordance with Human Capital Strategy.

Republic Day—Best Marching Contingent Trophy (2013 and 2022): For the first time in the history of the *IN*, trainees from *INS Chilka* were nominated to take part in the Republic Day Parade 2013. Stringent selection criteria saw the shortlisting of just 260 trainees from about 3,000 trainees. Based on preliminary performance, this group of 260 trainees was further spruced down to 175 trainees to form the *IN* marching contingent at the Republic Day Parade. A dedicated team was formed for training the 175 selected trainees. Concerted and enthusiastic efforts by the trainees and the training team, as well as a ‘whole-of-unit’ approach was adopted by *INS Chilka*.

Ever since then, the Naval Republic Day Parade contingent has been provided by *INS Chilka*. This feat was repeated in 2022, when the *IN* once again bagged the coveted Best Marching Contingent Trophy.

Improvements in Branch Allocation Procedure (2017): Branch allocation is a vital function to keep adequate force-levels across the various professional streams in the Navy. Though personnel choice is important, the overarching requirement is based on the future growth trajectory of various disciplines. In order to automate this process, and to eliminate human intervention, a software—the Indian Navy Branch Allocation System for



IN Marching Contingent at the Republic Day Parade

The selected trainees were provided with targeted training in parade drills, which included 8-kilometre (km) marching practice every day. These efforts resulted in the Navy winning the Best Marching Contingent Trophy in the Republic Day celebrations of 2013 at New Delhi, for the first time since 1950.

Sailors (INBASS)—was developed. The INBASS software, first introduced in 2017, continues to provide efficient, transparent, and bias-free branch allocation to sailors.

Takshashila—New Education Building Complex (2017): As part of continued efforts towards training

infrastructure augmentation and modernization, the existing fifty classrooms available were increased to sixty-five, with the setting up of the new Takshashila education building complex in 2017.

Renovated Basketball Court (2017): The basketball court was renovated in 2017 to include a covered shed. In addition to basketball games, the court is utilized for combined lectures, conduct of Basic Life Support (BLS) training, and screening motivational movies.

Commissioning of 50 m-Length Swimming Pool (2017): An additional 50 m swimming pool was commissioned on 12 January 2017. With the commissioning of this pool, INS *Chilka* now has two 50 m swimming pools.



50 m Swimming Pool: INS *Chilka*

Infantry Weapon Training Simulator (2018): The IWTS was commissioned in October 2018 to provide young recruits with practical experience on handling weapons, firing practice and urban warfare.

Sensitization on Safety and Social Media (2018): A formal safety syllabus was incorporated into the curriculum with effect from 2018. Since then, sixteen periods within the training syllabus have been earmarked for safety and social media-related topics. In addition, to make trainees aware of the perils of social media, topics related to IT and Information Security (INFOSEC) have also been made part of the syllabus.

Commissioning of Galley and Dining Hall (2019): To meet the requirements of the increased number of trainees (male), a Galley and Dining Hall, able to cater to 500 male trainees at each sitting, was inaugurated on 11 July 2019.



Commissioning of Galley and Dining Hall

Project Infrastructure Augmentation (2019): The unit had obtained administrative approval for Project Infrastructure Augmentation Project at INS *Chilka* at a cost of Rs 138 crore in March 2019. This will mitigate training and administrative infrastructure shortfalls in the station. The ground-breaking ceremony was conducted in January 2021 and the Project is likely to be completed by May 2024. Salient augmentation includes provisioning of additional thirty-six classrooms, one examination hall (500-trainee capacity), office spaces, a conference hall, an IT complex with labs, accommodation for training staff, and a Sailors' Institute.

Training in the Shadow of COVID-19 Pandemic: Faced with challenges arising out of the COVID-19 pandemic, training models were suitably modified to ensure training continuity without impinging on training standards. In order to achieve mandatory social distancing norms, the Weekly Training Programmes (WTPs) were modified so that academic and outdoor training activities could be spaced in a staggered manner at different locations.

A COVID-Care Centre (2021): The 150-bed isolation Centre was opened for the local populace of Khorda district in May 2021. It also provides an additional fifteen bed oxygen facility at Indian Naval Hospital Ship (INHS) *Nivarini* (which was set up to treat mild symptomatic COVID-19 positive patients by reappropriating the in-living block of Angre division).

Flood Relief (2011 and 2021): The Commanding Officer of INS *Chilka* also dual hats as the naval Officer-in-Charge of Odisha. Thus INS *Chilka* works closely with the local administration, especially in discharge of the *IN*'s Benign role at the district and state levels. Historically, Odisha has been prone to severe cyclones. As part of the *IN*'s stated intent of being the first responder, especially in the maritime geographies, over the years—through INS *Chilka*—it has built considerable infrastructure and support mechanisms in response to mobilization prior to the imminent arrival of a cyclone and relief activities post the cyclone.

This decade witnessed three major cyclones in this region. Cyclone Phailin made landfall at the coast of Gopalpur in Odisha on 12 October 2013, with maximum sustained speed of 200–210 kmph. In the aftermath of the cyclone, a flooding situation arose in various parts of Balasore District due to heavy rains. Teams from INS *Chilka* were deputed to four villages to provide relief. They rendered first-aid medical care to 265 villagers, cleared three blocked roads, evacuated about 600 marooned villagers and provided relief to another 1,500 stranded villagers from Balasore. They also distributed nearly 15 tons of relief materials. Similar assistance was also extended by INS *Chilka* to the local administration and population during Cyclone Titli in 2018 and Cyclone Fani in 2019. In recognition of these efforts, INS *Chilka* was awarded the Unit Citation in 2019.

Indian Naval Ship Shivaji

An establishment for training officers and sailors of the *IN*, the CG and personnel from twenty friendly foreign navies, INS *Shivaji* is located in Lonavala. Its mandate includes providing training on marine engineering, damage control, firefighting, and Nuclear, Biological and Chemical Defence (NBCD), through a range of professional degree and certificate courses.

The establishment INS *Shivaji* traces its origins to the erstwhile, 'Stokers Training School' at HMIS *Dalhousie*, in Naval Dockyard, Bombay. To provide scope for further expansion, and to isolate trainee sailors from the country's politics, the Royal Indian Navy (RIN) decided to shift the training establishment from Bombay to a remote location and chose Lonavala. The establishment was commissioned by then Governor of Bombay, John Colville, as HMIS *Shivaji* on 15 February 1945, which subsequently was rechristened post-Independence as INS *Shivaji* on 26 January 1950.

Prior to July 2014, INS *Shivaji* had three premier institutions, viz., Centre of Marine Engineering and Technology (CMET), Nuclear, Biological and Chemical Defence (NBCD) School and the Naval College of Engineering (NCE) which was reassigned as a Centre of Excellence (CoE) following the closure of NCE in 2014. The establishment conducts more than 500 courses for officers and sailors and has an annual training throughput of more than 2,800 officers, 7,800 sailors and 250 international trainees.

The training infrastructure at INS *Shivaji* has seen substantial additions and improvements in the previous decade, in an effort to keep technical training abreast with the latest inductions and advancements in the technology sector.



INS *Shivaji*: Receiving the President's Colour

1241 RE MCR Simulator (2012): The simulator was commissioned in 2012 and is extensively used for undertaking training on Main Engine controls and operations.



1241 RE MCR Simulator

Steering Gear Training Live Bay (2012): M/s Veljan make steering gear systems are part of many *IN* Ships. A steering gear bay was commissioned in July 2012.



Steering Gear Training Live Bay

MCS-5 Simulator (2015): The MCS-5 simulator was commissioned in March 2014. It is utilized for undertaking training on Main Engine controls and operations for WJFAC/FAC class of ships.

1 MW DA Cummins KTA50D M(1) (2015): This Diesel Alternator is the standard fit on the newly inducted platforms of the *IN*, such as the Kolkata,

Talwar, and Shivalik class of ships. In order to give first-hand experience on the exploitation and maintenance of these DAs, a shore-based 1 MW DA of similar make and model was commissioned in January 2015, and it also provides backup supply to the entire base.



1 MW DA Cummins KTA50D M(1)

Omega Simulator (2018): The simulator was commissioned in October 2018 and is utilized for undertaking training on Auxiliary Machinery Controls and operations of various systems onboard Talwar/Teg class of ships.

Vikramaditya Training Complex (2019): The VTC was commissioned in May 2019 and is used for imparting training on boiler and other auxiliaries. It consists of Static Bay, Simulator Room, Technical Library, e-Learning Bay and two classrooms that can seat fifty men each. Static Bay is equipped with VKD boiler, turbo blower unit and arresting gear models for practical demonstration and training.



Vikramaditya Training Complex

IMTP Kolkata (2020): Integrated Multimedia Training Package (IMTP) of Kolkata-class

engineering systems was developed by M/s Applied Research International, New Delhi. The IMTP is used as a comprehensive training tool for all P-15 A/15 B PCT courses. The Project includes 3D virtual walk with detailed information about various equipment and systems of Kolkata-class of ships.



IMTP Kolkata

Integrated Platform Management System Lab (2019): The lab was set up in 2019. The IPMS trainer is extensively used to impart training on sensor and Remote Terminal Unit (RTU) integration, and basic techniques of data communication. It also has fault-inducing method to task trainees to identify the fault and undertake corrective actions.



Integrated Platform Management System (IPMS) Lab

Process Control Lab: The Lab was set up in December 2019 and is being used to impart training on sensors and software integration. It aids to improve understanding of basic functionality of automated control systems and also helps trainees to undertake basic and advanced Arduino-based projects to resolve field-level problems onboard ships.

Power Electronics Lab: The Power Electronics Lab was commissioned in January 2020. The lab

consists of PLC training boards, which are being utilized to train trainees on coding Ladder Logic programmes, concepts of basic embedded systems, power electronics components like logic gates, rectifiers and practical appreciation of Analog to Digital Conversion.

Closure of Naval College of Engineering (2014):

With the regular commencement of BTech Courses at INA, Ezhimala, the Naval College of Engineering at INS *Shivaji* eventually was wound down in July 2014. Since inception and prior to its formal closure, twenty-five batches of the four-year Naval Engineering Course, and 108 batches of the three-year Basic Engineering Course (BEC) graduated from NCE; 109 BEC was the last course and comprised foreign trainees only.

Centre of Excellence – Marine Engineering (2014):

The CoE (ME) was inaugurated in July 2014 as a nodal organization to undertake resolution of on-field technical problems, carry out research and development (R&D) in collaboration with industry and academia, and also undertake technology-update courses. The CoE has concluded multiple memoranda of understanding (MoUs) with IIT Bombay and the Indian Institute of Science (IISc) Bengaluru, for collaborative R&D on critical projects such as a CO² based air-conditioning system, additive manufacturing, and many others.

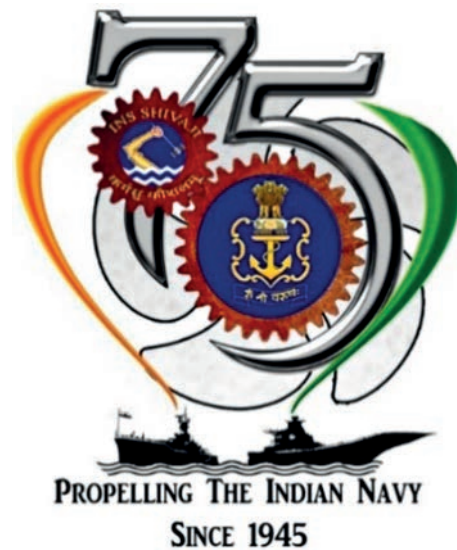
New Courses Introduced: List of new courses introduced is tabulated below.

Course	Duration (in weeks)
Officers	
Air Technical Officer	3
Embedded Technology for Engineering Machinery Control System	3
ISO CAT – I/II Noise & Vibration	1
Sailors	
Control ME	9

Course	Duration (in weeks)
HA/APP	1
Nuclear Maintenance Specialization Course	2
Nuclear Submarine Specialization Course	2
ISO CAT – I/II Noise & Vibration	1

Platinum Jubilee: INS *Shivaji* celebrated its seventy-fifth glorious year from 15 February 2019 to 15 February 2020. The Platinum Jubilee being a very significant milestone for any organization, showcased the growth and achievements of INS *Shivaji* since inception in 1945. The Platinum jubilee logo that immortalizes the axiomatic resolve, unyielding commitment and incessant evolving of the alma mater of Naval Engineers was unveiled during the celebrations as it proudly marched into its seventy-fifth year.

Award of President’s Colour: INS *Shivaji* was awarded the President’s Colour on 13 February 2020, in recognition of its stellar service to the nation over the past seventy-five years.



Platinum Jubilee Logo

Recognition by MSDE: In March 2022, the Ministry of Skill Development and Entrepreneurship (MSDE) recognized INS

Shivaji as the Centre of Excellence (CoE) in the field of Marine Engineering. This recognition was the first of its kind for any military organization. This recognition will solidify INS *Shivaji*'s position as a preferred training institution for R&D collaborations with industry and academic institutions.

Indian Naval Ship Valsura

Situated on Rozi Island (off Jamnagar, Gujarat), HMIS *Valsura* was commissioned on 15 December 1942 as the RIN's Torpedo Training School, and was modelled after the Royal Navy's torpedo school HMS *Vernon* in Portsmouth. Post-Independence the establishment was renamed INS *Valsura*. The primary role of this training establishment is to

train officers and sailors in basic and advanced topics related to electrical, electronics, IT, weapons and sensors. It also trains CG personnel, and personnel from the dockyards and from various friendly foreign navies.

Today, INS *Valsura* houses the Electrical Equipment School, Electrical Technology School, Basic Electrical School, Information Technology School, and the Centre for Electronics Engineering Training Design. In January 2020, with continued emphasis on technology adoption and up-skilling, a Centre of Excellence for Artificial Intelligence and Big Data Analytics was set up at INS *Valsura*.

Some of the major training infrastructure that has been added at INS *Valsura* in the previous decade is listed below.



INS *Valsura*: Receiving the President's Colour

ELLORA MK1 (2011): An Electronic Warfare system, ELLORA MK1 comprising Electronics Support Measures (ESM) and Electronic Counter Measures ECM suites was installed and commissioned in 2011. The system is being utilized for conducting hands-on training.

Centre for Electronics Engineering (2012): With the advancement of technology, the Centre underwent expansion (addition of new wing) in September 2012 to cater to the need for additional classrooms and laboratories. The new wing is a mirror image of the existing building and consists of three integrated Lab-cum-classrooms.



Centre for Electronics Engineering

System Integration Lab (2015): The lab designed by WESEE was commissioned in April 2015 and houses various sensors, NavAids and weapon systems interfaced with Combat Management System (CMS).

MOD-CMS (2015): Combat Management System (CMS) is an advanced version of Computer-Aided Action Information Organization (CAAIO) system designed by BEL (Ghaziabad), which interfaces multiple sensors, radars and weapons. The system was commissioned in May 2015.

AK 630 Training Complex (2015): The AK 630 is a fully automatic naval close-in weapon system based on a six-barrel 30 mm rotary canon. The training complex for this gun system was commissioned in November 2015.

UHF SATCOM and HUMSA-NG Terminal (2016): UHF Satellite communication terminal and HUMSA-NG system were installed in 2016 for training purposes.

Purga FCS (2017): In order to ensure that the maintainers/operators remain updated about the latest weapon platforms and receive related training, the ASW Fire Control System (FCS), Purga-17 was commissioned in March 2017.

Garpun Bal and Club SSM Training Complex (2017): Garpun Bal—long range surveillance and Fire Control Radar—and Club SSM training complex were commissioned in March 2017.

BrahMos SSM Training Complex (2017): This facility was commissioned in April 2017 and is being extensively utilized in training.



BrahMos SSM Training Complex

Medium Voltage Training Lab (2018): A Medium Voltage (MV) Lab was commissioned in January 2018 to train personnel of all branches (Electrical, Engineering and Executive) and prepare them to operate platforms with Integrated Full Electric Propulsion (IFEP).

Integrated Bridge System (2018): The installation and trials of a Kamorta class-based IBS was completed in a record time of forty-one days by

M/s Elcome Marine Ltd, and the system was commissioned in June 2018.

Centre of Excellence for AI/BDA (2020): The CoE (Artificial Intelligence/Big Data Analytics) was commissioned at INS *Valsura* in January 2020 with the aim of imparting training on algorithms for data analysis, various unsupervised and supervised algorithms and predictive modelling. Since its inception, the Centre has executed various projects in the fields of Natural Language Processing (NLP), Computer Vision, Conversational AI and Internet of Things (IoT). An AI-based predictive maintenance system was developed by INS *Valsura* and deployed onboard INS *Sunayna*. The system has been integrated with Mota Monitoring System (MMS) to capture real-time data and predict failure of critical rotating machinery.



Training for the New Age

In order to augment the capacity at the CoE, an MoU was concluded with external technical academic institutions for deputation of MTech and PhD students to undertake Navy-specific projects in the field of AI and BDA. A three-day workshop on ‘Leveraging Artificial Intelligence (AI) for Indian Navy’ was also organized on 19–21 January 2022.

Design and Deployment of OFMS Software: INS *Valsura* designed and developed the Online Feedback Management System (OFMS), which is being used by all the units for rendering feedback

on various courses. The system is being extensively used pan-Navy since its commissioning in December 2016.

Development of Naval Veteran Forum – Handshake: A pan-*IN* Naval Veteran Forum, ‘Handshake’, was developed at INS *Valsura*. The software provides an online platform for veterans to interact with each other.

Award of President’s Colour: INS *Valsura* was awarded the President’s Colour on 25 March 2022 in recognition of its stellar service to the nation.

Indian Naval Ship Hamla

Prior to Independence, recruitment to the RIN as cooks and stewards was done on the basis of past experience. No formal training was imparted to personnel in these cadres. In order to cater for the rapid expansion and manpower requirements of the RIN during The Second World War, a training centre for training of Writer (Logistics) sailors was opened at the Indian Naval Depot, in Mumbai in 1941. This marked the commencement of formal training for the Supply Secretariat and Domestic Branches. This facility was later shifted to a larger premises at Fort Barracks in 1943, to accommodate training of Supply Officers and Stewards as well.

In 1945, the school, once again, moved to HMIS *Akbar* (Kolshet), where the Cookery School had been earlier shifted. After closing down of HMIS *Akbar* in 1947, and the amalgamation of the Supply Secretariat and Domestic Branches, as an interim measure the combined training was shifted to Cochin, at INS *Venduruthy*. It was here that all the training sections of the Supply Secretariat and Domestic Branches were combined for the first time and placed under the charge of a Supply Officer.

INS *Hamla*, today a Logistics training base, traces its beginnings to a combined amphibious operations base at Malir in Karachi and at Versova

in Mumbai (known as Hamla I and *Hamla II*, respectively in the pre-Independence era). During the Second World War, the present location of INS *Hamla* was a part of the network of combined operations training centre. Meanwhile, a landing craft wing commissioned on 6 May 1943 in Mumbai, was named HMIS *Hamla*war. The base later split to Indian and British wings, the former retaining the original name and the latter adopting HMS *Marve*. On 15 January 1946, the RN base at Marve and the crafts stationed there were taken over by the RIN and *Hamla*war, *Hamla I* and *Hamla II* were all amalgamated, and the entire establishment was renamed as HMIS *Hamla*.

Soon after Partition in 1947, the Boys Training establishment was accommodated at HMIS *Hamla* for a short duration. The establishment thereafter lapsed into inactivity for over seven years, during which it remained merely a maintenance and disposal base for the landing craft and other equipment, left behind by the British Forces in 1946.

Subsequently, post recommissioning of HMIS *Hamla*war as INS *Hamla* on 6 January 1954, the

entire training of Supply Secretariat and Cookery School was once again shifted from Cochin to Mumbai at INS *Hamla*. This marked the historic transition of the erstwhile operational base into a full-fledged training establishment.

While most of the details of INS *Hamla* are covered in the chapter on Logistics in this volume, some of the major milestones from a training perspective are highlighted below:

Establishment of Joint Services Training Institute (Catering):

In order to enhance combat capability and re-balance defence expenditure of the Armed Forces, the Committee of Experts (Shekatkar Committee) had recommended certain aspects pertaining to Joint training such as merger/creation of Joint Services Training Institutes (JSTIs) for various disciplines. The *IN* was nominated as the lead Service for training in Catering. As a result, JSTI (Catering) was established at INS *Hamla* in September 2018 and personnel from the Indian Army and Air Force also undergo training there annually. The first course commenced in September 2018. The JSTI (Catering) was certified as 'Eat Right Campus' with a five-star rating from the



INS *Hamla*

Food Safety and Standards Authority of India (FSSAI), New Delhi.

An MoU with National Council of Hotel Management & Catering Technology (NCHMCT): INS *Hamla* signed an MoU with NCHMCT, Noida, for the award of Diploma to CPO 'Q' Courses for Chefs and Stewards. The aim of the MoU is to help in ensuring that the training is relevant and incorporates best practices in the civil hospitality world. Based on the previous experience, a MoU for award of Diploma Certificates to PO 'Q' Course was also signed between NCHMCT and INS *Hamla* on 14 May 2019.

Indian Naval Ship Dronacharya (Gunnery School)

In September 1939, the RIN had a handful of training establishments to cater to the needs of its small flotilla, and these training establishments were all located inside the Naval Dockyard at Bombay. By the time the Second World War ended, several training establishments had sprung up all over the country. Post-Independence, Gunnery School of the RIN, HMIS *Himalaya* at Karachi was awarded to Pakistan. Therefore, a need was felt to establish Gunnery school for the newly formed Indian Navy. Accordingly, the Gunnery school had a modest beginning on 12 October 1948 inside the Naval Base on Wellington Island, Kochi. It was a gunnery training establishment for junior officers with basic gunnery-training facilities (at the present day NIAT). Later, on 30 October 1952, the training of Gunnery sailors was shifted to *INS Venduruthy*.

Theoretical aspects of various courses were covered at Gunnery School, while practical tracking and firing was undertaken at a geographically separated location at the Naval Coastal Battery located at Fort Cochin. The advanced gunnery training course was introduced in 1954, a Specialist Course for Gunnery Instructors was introduced in 1957, and an Indian Long Gunnery course was

introduced in 1958. This geographical separation, although both in Kochi, resulted in considerable wastage of training time and resources. On 8 March 1978, to overcome these challenges, a new establishment (*INS Venduruthy II*) for conducting all aspects of gunnery training was set up at Fort Cochin, by merging the Gunnery School with the Naval Coastal Battery. Later, on 27 November 1978, the school was rechristened and emerged as a newly commissioned establishment—*INS Dronacharya*.



INS Dronacharya: Gunners' Abode

With the commissioning of the Leander-class equipment in 1978, the quality of training in the establishment took a quantum leap. Under the aegis of Project Vajra sanctioned by the Government of India in 1984, work on the construction of buildings for housing fire-control equipment, classrooms, living accommodation, dining facilities for sailors and officers and installation of gun mounts commenced in 1987. By 1990, when the Project was completed, *INS Dronacharya* had a formidable array of weapons and sensors that motivated trainees and imbued them with a burning desire to excel at gunnery and missile warfare. The unit further expanded with the acquisition of 38.9 acres of land in September 1986, which paved the way for substantial augmentation of training infrastructure as mentioned below:

Naval Small Arms Trainer (2011): The NSAT was installed at INS *Dronacharya* on 15 March 2011. This facility provides a near to real experience of various combat scenarios and provides real-time scores/results to the firers for evaluation.

Kill House (2014): A Kill House was commissioned on 25 April 2014 for imparting practical training on tactical movements inside a merchant ship for Sagar Prahari Bal (SPB) and Visit Board Search and Seizure (VBSS). Static slithering facility and ambient noise simulation facility provisioned in the Kill House has added realism to the VBSS and Sagar Prahari Bal (SPB) training being undertaken at the unit.



VBSS Training

Command and Control Training Facility (2016): With an aim to increase proficiency and operational skill accrued through training, a Command and Control Centre was set up on 5 March 2016 to practice Command and Control orders in a near-real environment. Adequate telling lines and practice scenarios were made available for the trainees. The facility has been optimally used by officers undergoing Long Courses and Pre Commissioning Training (PCT).

BrahMos Training Facility (2019): In order to provide practical training in a realistic environment, a BrahMos loading/unloading facility was set up in May 2019, wherein the Container Vertical

Integrated System (CVIS) was sourced from INS *Chennai* and a cut section of the BrahMos missile was also sourced so as to augment practical training on loading/unloading of the missile. This facility has helped in providing hands-on training on loading and unloading practice on BrahMos missile.



BrahMos Training Facility

Ship Weapon Complex Simulator (2020): Installation of ship-specific weapon simulators commenced in April 2013, with the commissioning of the P-17 (Shivalik-class) simulator. The P-15 A (Kolkata-Class) simulator complex commissioned in March 2020 has been the latest addition.

Green Initiatives: The unit has been persistently focusing on green initiatives to help make our environment cleaner and greener. Towards increasing the green cover, the Miyawaki technique of afforestation to build dense, native forests was implemented. The unit planted 525 plants in a total area of 320 sq. m and is being nurtured.

Naval Institute of Aeronautical Technology

Set up with the objective of training air technical personnel for maintaining the *IN's* first Sealand aircraft, the Naval Air Technical School was established in 1956 in a hangar at Naval Air Station, INS *Garuda*. Over a period of time and with the induction of new aircraft, the School has grown exponentially in terms of its infrastructure, human

resource and training facilities. The School was rechristened the Naval Institute of Aeronautical Technology (NIAT). The NIAT was shifted to its present location in 1978 and in 1981 was upgraded to Category 'A' establishment.

It was on the recommendation of Dr APJ Abdul Kalam, then Scientific Advisor to Raksha Mantri (RM), who was so highly impressed by the infrastructure and faculty of the Naval Air Technical School, that the school got upgraded to an Institute. Today, NIAT can proudly claim to be the largest aeronautical technical training establishment among the three Services and in the country. It is affiliated with Cochin University of Science and Technology (CUSAT) and offers MTech, diploma and about thirty different certificate courses, the highest number by any training establishment. The MTech, post-Diploma and Diploma programmes have also received approval by the All India Council of Technical Education (AICTE).



NIAT Kochi

Some of the milestones in the decade under review are listed below:

QAS (Navy) Course started (2013): Quality Assurance Services (Navy) course was started in April 2013 to enhance the pool of QA inspectors for appointments at squadrons, air stations and yards for providing QA coverage to flying machines like Chetak, Kamov-28, UH3H, IL-38 and also to oversee the seamless transition to modern aircraft such as the Hawk, ALH, MiG-29K and P-8I.

Defence Civilians' Course (2014): Air Technical Orientation course for newly recruited civilian personnel at aircraft yards commenced in December 2014 as an annual affair to provide insights into various servicing and maintenance practices followed in aviation.

MiG-29K Simulator (2015): State-of-the-art MiG-29K simulator training facilities comprising PT-29K (Cockpit Procedure Trainer) and IASO-29K (Multimedia Enabled Interactive Computer Aided Classroom Environment) were commissioned on 1 July 2015. The simulator has been extensively utilized for imparting practical and theoretical stream training of MiG-29K aircraft which includes ground as well as flight procedures.



MiG -29K Simulator

Dornier Centre Fuselage (2015): Dornier airframe centre section along with wing, was received ex-HAL, Kanpur on 9 January 2015. The fuselage was converted into a walk-through model to give exposure to constructional details and location of important Line Replaceable Units (LRUs) and has been used for escape drill practice for technical personnel and aircrew.

CUSAT Certification (2015): The Chief 'Q' courses conducted by NIAT for non-artificer aviation technical sailors were recognized for award of BSc degree, viz., BSc in Aeronautics (Mechanical)

for CPOAF (Chief Petty Officer Air Fitter) and CPOAOF (Chief Petty Officer Air Ordnance Fitter) courses, BSc in Aeronautics (Electrical) for CHELA (Chief Electrical Air) course and BSc in Aeronautics (Avionics) for CHELA (Radio) course. These three programmes were approved by Cochin University of Science and Technology (CUSAT) on 10 April 2015.

Commemoration of Diamond Jubilee (2016): NIAT celebrated the Diamond Jubilee in June 2016. An international seminar commemorating Diamond Jubilee on the theme 'Challenges in Maintenance and Training of Fixed and Rotary Wing Naval Air Assets' was conducted. M/s Boeing, M/s Rolls Royce, Defence Research and Development Organization (DRDO) labs and Defence Public Sector Units (DPSUs) presented papers during the seminar.

Udaan Auditorium Rechristened Kalam Auditorium (2018): In order to commemorate and honour the significant role of Dr APJ Abdul Kalam, former President of India, towards the upgradation of Naval Air Technical School into Naval Institute of Aeronautical Technology, the Institute's auditorium 'Udaan' was rechristened as 'Dr Kalam Auditorium' on 20 February 2018.

MoU with PSG College of Technology (2018): A landmark MoU was signed between the PSG College of Technology (PSGCT), Coimbatore and the *IN*, on 29 October 2018, coordinated by NIAT, Kochi. The MoU was signed by Director NIAT, Commodore YC Pandey, on behalf of the *IN* and by Dr R Rudramurthy, Principal PSGCT in the presence of Rear Admiral K Swaminathan, CSO (Trg), Headquarters Southern Naval Command (SNC). The MoU has benefitted with faculty exchange programme, sharing of research and

development labs, joint R&D projects, providing expertise in academics, development of training infrastructure, and Transfer of Technology (ToT) on mutual interest areas. The provision of four seats for *IN* personnel for pursuing post-graduation and unlimited seats for research are the other key highlights of the MoU.

Air Technical Mid-Career Course (2019): Post revitalization of the Air Technical branch, the erstwhile Mid-Career Course was rechristened as Air Technical Mid-Career Course in 2019. The Course is conducted for officers with ten-to-fourteen-years seniority. The course was conceptualized as a Mid-Career Course in 2008, and the maiden course conducted in 2009. A total of nine courses have been successfully completed till date, with 105 Air Engineer Officers (AEOs)/Air Electrical Officers (ALOs) successfully completing the course from NIAT.

Centre of Excellence (CoE) in Advanced Aero-Engine Technology (2021): In order to address the design and reliability issue of RD-33 MK engine powering the MiG-29K fleet, a Centre of Excellence (CoE) in Aero-engine technology was established at NIAT in August 2021. The CoE aims to prioritize training on finer nuances of design, manufacture and maintenance of aero-engines. It is also envisioned to build in-service knowledge capital, encourage research and advanced studies, innovative projects besides enhancing the repository of knowledge and offering implementable solutions to myriad challenges being faced in the field. With an aim to build such knowledge base, lectures by Russian OEM on Aero Engine Technologies on various topics related to construction, maintenance and operation of RD-33MK, TV3-117 and BK-2500 engines were conducted in November 2021.



Demonstration of AR/VR to Raksha Mantri

Inauguration of Advanced Virtual Training and Research Lab (2021): A dedicated AVATAR Lab for the development of CBTs based on Augmented and Virtual Reality, was inaugurated in February 2021.

Demonstration of AR/VR to RM (2021): During the visit of RM, Shri Rajnath Singh, to Kochi on 25 June 2021, in-house developed Augmented and Virtual Reality (AR/VR) based training packages utilized by the Institute were demonstrated for capabilities of Augmented and Virtual Reality in imparting classroom instructions.

Digi-Locker Implementation for Issue of Certificates and Marksheet (2021): On 8 November 2021, NIAT became the first naval unit to issue certificates and marksheets through DigiLocker. The same was also publicized by National Academic Depository (NAD) team on their Twitter handle.



Setting Up of Additive Manufacturing (AM) Training (2022): An Additive Manufacturing training facility with one heavy-duty Fused Deposition Modelling 3D printer, using Poly Lactic Acid as a raw material, was commissioned on 16 March 2022. Further, a computer-aided design (CAD) centre is being set up at the Institute

to ensure that the personnel trained on additive manufacturing also have working knowledge of CAD, an essential prerequisite for design and modelling.



Technology Infusion in Training Curriculum

To further enhance the capabilities and harness the full potential of Additive Manufacturing, NIAT has also envisioned the integration of Reverse Engineering (RE) process with Additive Manufacturing (AM). In pursuance of this ‘end state’, the Institute undertook a project of ‘3D surface reconstruction using structured light imaging and computational geometry’. The Institute developed 3D models of various objects/components with high-level accuracy. The generated 3D models have been utilized in structural and flow-analysis software and a 3D model utilizing Additive Manufacturing has been developed as a technology demonstrator. To gain complete ownership rights of this intellectual property generated, the Institute filed for a patent pertaining to ‘Reverse engineering of aviation military components through 3D surface reconstruction using structured light imaging and computational geometry’ in January 2022.

P-8I Maintenance Simulator Handing-Over Ceremony (2022): A P-8I simulator procured from OEM M/s Boeing, the US—consisting of

one Virtual Procedure Trainer (VPT) and two Electronic Classrooms (EC)—was commissioned on 3 February 2022. The facility provides a virtual environment to perform inspections and identify component locations, and also to perform ‘O-level’ maintenance procedures and troubleshooting. The simulator also provides independent, self-paced study models to reinforce/enhance lessons learned from formalized instruction.



P-8I Maintenance Simulator

Maiden Air Logistics Management and Indigenization Course: Maiden Air Logistics Management Course and indigenization course for sailors was conceptualized and initiated by the Institute. Further, an exhibition on ‘Technology for Training’ was organized by this Institute on behalf of HQSNCR, during the Tri Services Training Commanders Conference.

Inauguration of Future Technology Lab: Future Technology Lab comprising state-of-the-art technologies, viz., Internet of Things (IoT), Artificial Intelligence, Augmented Reality and Virtual Reality (VR)-based training was commissioned at Institute. The trainees are given

experience of various aircraft and systems with the help of immersive and non-immersive Virtual Reality techniques.



Future Technology Lab

National Institute of Hydrography (NIH)

Training in the field of hydrography was conducted onboard *IN* survey vessels until the establishment of a Hydrographic School at *INS Angre*, Bombay in 1959, which was later shifted to *INS Venduruthy* at Kochi on 21 October 1961. There, it operated from a temporary facility provided in the Gunnery School for a short duration and for most of its remaining existence in Kochi, it operated from the Navigation Direction School. In the face of need for further expansion, a sanction for establishing a permanent Hydrographic School was first issued in April 1965, initially at Cochin, and then at Visakhapatnam, but was eventually commissioned at Goa on 29 November 1978. In 1980, the Hydrographic School was accorded the status of a regional survey training centre for the Asian region, and in May 1981, the second wing of the Hydrographic School was completed.

In 1984, the Hydrographic School was recognized as the regional training centre for South East Asian and African countries, extending its reach to Africa and the South East Asian shores. Due to its international nature and sole national

position in training, the school was rechristened the National Institute of Hydrography (NIH) on 5 June 2009.



National Institute of Hydrography, Goa

Today the NIH provides material and training support to Hydrographic Teams proceeding to Antarctica, prior to their proceeding for the expedition. A detailed account of the cadre is provided in a separate section in this volume. However, a few of the decadal milestones in respect of NIH are appended below:

- In order to enhance its training capabilities, two new Survey Motor Boats (SMBs) were inducted in 2020 to impart practical training.
- In September 2020, the Long Hydrography and Basic Hydrography courses were certified as Category 'A' and Category 'B' courses, by the International Hydrographic Organization constituted under the International Board of Standards of Competence for Hydrographers and Cartographers, for a duration of six years.

Anti-Submarine Warfare School

Initially christened as HMIS *Machlimar*, the school owed its origin to the growing importance of ASW during the Second World War. It was commissioned on 26 December 1942 at a temporary structure in Versova in Bombay, to impart training in anti-submarine operations. Simultaneously, a Torpedo School, HMIS *Valsura*, was commissioned at Rozi



ASW School

in Gujarat on 15 December 1942. Following the end of the Second World War in September 1945, the facility at Versova was moved on 10 September 1946 to temporary barracks within the precincts of HMIS *Venduruthy* at Cochin and was also followed by shifting of the Torpedo School from Rozi to Cochin in September 1947. This combined formation was christened as the 'Torpedo and Anti-Submarine Warfare School' (TAS School) in November 1955.

Later, in October 1985, the school was renamed as Anti-Submarine Warfare (ASW) School. From the 30 officers and about 300 submarine 'detector' rates that graduated from the ASW School in 1985, the School now conducts more than 60 officer and sailor courses and more than 700 officers and 1,000 sailors pass out from the portals of the School each year.

MHSS Simulator (2011): The Shore-Based Training Simulator (SBTS) of the Mine Hunting Sonar Suite (MHSS) was installed at the School by M/s Thales Underwater Systems, France and was inaugurated by the CNS on 28 April 2011. The system consists of an instructor console and three operator consoles from where training is undertaken on simulated mine-hunting operations.

HUMSA 'NG' Simulator (2012): The Hull-Mounted Sonar Advanced (HUMSA NG) is the standard SONAR fitted onboard all ASW platforms, commencing with the Shivalik, Kolkata and Kamorta class of ships. A simulator, designed and developed by Naval Physical and Oceanographic Laboratory (NPOL), was inaugurated by Shri Anantha Narayan, Director NPOL on 25 September 2012, and is used for operator training.

Astra Firing Range (2015): The Astra Firing Range with padded walls and sand pit to facilitate light-weight torpedo firing practice, was commissioned on 19 February 2015.

Petya Block (2019): A pre-fabricated classroom complex, comprising five smart classrooms with each class accommodating about thirty trainees, was inaugurated on 20 December 2019 to augment training capacity at the school.



Commissioning of Petya Block

Diving School

The Diving School commenced functioning in 1954 as an integral part of the erstwhile TAS School and was institutionalized as an independent school on 1 May 1972. It was accorded the status of category 'A' establishment/school on 1 May 1982. The school imparts training to all categories of divers in the *IN*:

Ship Diving Courses for Officers And Sailors:

A Ship's Diver (SD) is a qualified diver trained to undertake dives from a ship. The SDs meet the day-to-day underwater diving requirement of the ship at sea and when in harbour. They are qualified to undertake diving up to 35 m depth using open circuit diving equipment.

Aircrew Divers for Sailors: Aircrew Divers are those SDs who are trained to undertake search and rescue operations from a helicopter as well as train aircraft crew in underwater escape drills.

Clearance Diving Officers: Specialist divers who undertake mine clearance operations to clear ports and harbours of naval mines laid by the enemy, and use explosives under water to remove obstructions, thus making harbours and ports safe for navigation. They are also entrusted with safe disposal of Improvised Explosive Devices (IEDs) and Unexploded Ordnance in the naval areas. They are trained to execute special operations for the Indian Navy. To qualify as a CD officer or sailor, the volunteer has to undergo training for about a year.

Clearance Diving Courses Class I, II and III:

CDIII, CDII and CDI are mandatory qualification courses for CD sailors seeking to acquire advanced skill-sets, as well as to earn their promotion.

The Diving School also provides training to CG officers and sailors in diving, as well as to the Army Para Commandos and Engineers in carrying out special operations and for rescue and salvage. The School also imparts training to officers and sailors from friendly foreign navies of Mauritius,

the Maldives, Vietnam, Sri Lanka, the Seychelles, Kazakhstan, Myanmar, Thailand and Malaysia, etc. In addition to these, the Diving School also conducts its flagship International Diving Standards Course (IDS) for civilians. Decadal milestones in respect of Diving School are listed below:



Diving School

Training and Infrastructure:

- **Award of Degree from CUSAT:** The School was recognized as 'Centre for Diving and Underwater activities' by CUSAT in March 2009. Post this recognition, the school has pursued and obtained approval for the Clearance Diving Officer Courses (CDO) and Petty Officer Clearance Diver (PO 'Q' CD) courses for award of Master of Science (MSc) degree in Diving Technology, and Diploma in Diving Technology respectively.
- **Phasing Out of BASCCA Sets (2013):** The Breathing Apparatus Self-Contained Compressed Air (BASCCA) air diving sets from M/s Aquarius, England, the workhorses of *IN* divers for more than three decades, were completely phased out in October 2013. These were replaced by advanced air sets Divator 324 of M/s Interspiro, Sweden, and have positive pressure facemasks.

- **Diver's Hand-Held SONAR (2013):** To train *IN* divers in search and salvage of underwater objects, diver's hand-held SONAR was inducted into the *IN*, and training on the equipment commenced in December 2013. Since its induction, the equipment has been widely used for the purpose of training in Mission Planning, underwater navigation, combat and special operations, underwater mine detection and object detection, amphibious operations and Combat Beach Recce (CBR).
- **Induction of Salvage and Mine Lift Bags (2014):** New salvage and mine lifting bags (made by Sub Salve, the US) were inducted into the *IN* in January 2014. With the induction of these bags, the Diving School has not only imparted invaluable training to trainee divers on salvage and mine operations, but has also actively participated in multiple salvage operations.
- **Integrated Diving and Recompression Chamber Complex (2017):** On 10 October 2017, the Chiman Singh Block was inaugurated at the Diving School, Kochi. This new Diving and Recompression Chamber Complex (RCC) has been named after Chiman Singh, PO CD (Retd), who had been awarded the Maha Vir Chakra for his contribution in the 1971 Indo-Pak War on the eastern front. The new block comprises RCC, air-conditioned and non air-conditioned stores, faculty-based classrooms, Diving School Laboratory, EOD model room, and conference halls/briefing rooms.



Diving and Recompression Chamber Complex

- **Upgradation of Diving School Laboratory (2020):** Upgradation of compliance standard for the Diving School Laboratory from IS 1967-5321 to NATO STANAG 1441 (ADVip 03) was verified by Board of Officers with Naval Materials Research Laboratory (NMRL) scientists on 3 March 2020.

Innovations and Indigenization:

- **Indigenous Six-Men Recompression Chambers (2013):** In December 2013, two new six-men indigenous recompression chambers manufactured by M/s Lalit Pipes, Mumbai, with maximum depth of 70 m, were installed in the school. The RCCs are lifesaving equipment quintessential for conducting various diving-related activities. Some of the specified uses include Recompression Chamber dives, surface decompression, therapeutic decompression, oxygen tolerance test of trainees, Hyperbaric Oxygen Therapy (HBOT), testing of Submarine volunteers to ascertain their suitability for serving in the Submarine Arm.
- **Oxygen Recycling System (2019–20):** During the COVID-19 pandemic, Lt Cdr Mayank Sharma, ex-Diving School, designed and developed an 'Oxygen Recycling System (ORS)' capable of increasing the endurance of medical



Aadyant: Oxygen Recycling System

oxygen cylinders used in hospitals for COVID-19 patients by two to four times. The system was patented and has been approved by the Drug Controller General of India. Christened 'Aadyant', the device is also being progressed for mass production through transfer of technology.

- **Compact Automatic Poisonous-Gas Absorption Module (2022):** The module was designed by the unit to absorb vapours of five poisonous gases—CO₂, NO, NO₂, SO₂ and HCL/HF—so as to provide time for personnel to escape from a smoke filled area in case of fire. The design was successfully proven by practical trials in Diving School Lab and was being progressed for mass production. The patent for CAPAM with full specification was filed by the *IN* in March 2022. Earlier during the Combined Commanders Conference held at Kevadia Gujarat, in March 2021, the Hon'ble Prime Minister appreciated the invention and praised the efforts of the Diving School.

Naval Special Warfare Tactics and Training Centre

The NSWTTC is the Marine Commando (MARCOS) training and tactical centre located within INS *Mandovi*, Goa, and was established in 2002. Prior to 2002, the training of the MARCOS was conducted at INS *Abhimanyu*, in Delhi.

Among its many roles, the unit conducts training for Basic and Vertical Specialization Courses in operations for Special Forces (SF) officers and sailors from the *IN* and sister Services. The units also conduct Chief of Naval Staff (CNS) Security course for MARCOS and non-MARCOS sailors. In April 2015, NSWTTC was designated as the Class Authority as well as Safety Class Authority for Special Operations and Diving Operations in the Navy.



NSWTTC Goa

Maiden Safety Audits of all MARCOS and Diving units, were undertaken in 2019. Progressively (since February 2015) the appointment of Officer-in-Charge has been elevated from the rank of Commander to the rank of Captain/Commodore. As recent as May 2019, its charter was further expanded to include airborne training and safety. Some of the salient decadal milestones in respect of NSWTTC are listed below:

Close Quarter Battle Complex—Kill House (2015): The Close Quarter Battle complex was constructed in 2015. It provided a significant fillip to training as Close Quarter Battle is the basic requirement for any Special Operations, wherein realistic combat training including live ammunition using small arms and 9 mm carbine, is being undertaken.

Rappelling and Slithering Tower (2016): The construction of Rappelling and Slithering tower in 2016 provided an edge to training as until then was entirely dependent (for conduct the Special Heli-Borne Operations insertion techniques) on INS *Abhimanyu*, Mumbai.



Rappelling and Slithering Tower

Explosive Store (2016): A new explosive store was constructed in 2016 with updated safety features to house explosives used in the conduct of training.

Asymmetric Warfare (2018): With the increasing trend in asymmetric threat to vital installations, military bases, and critical infrastructure NSWTTC also commenced Asymmetric Warfare Capsules (AWC). The maiden AWC to train trainers in various Naval Command headquarters was undertaken in February 2018. These personnel have subsequently been utilized to train the Command Quick Reaction Teams (QRTs). A one-day capsule was also commenced for officers undergoing Naval Higher Command Course (NHCC), Defence Services Staff College (DSCC) and a three-day capsule for other long-format courses.

Airborne Cell (2019): Consequent to the expansion of its charter in 2019, an airborne cell was set up at the unit in 2019, focused on airborne operations for MARCOS.

Navigation and Direction School

The Radar Direction Finding (RDF) Branch of the *IN* started in 1942 was the forerunner of the present-day Navigation and Direction cadre of the Navy. The sailors were recruited from Seamen branch and given practical training in operation of radar sets. For some time thereafter, the RDF branch merged with the Communication branch and selected Communication sailors were imparted Radar training at HMIS *Himalaya* in Karachi. In 1945, Radar training was introduced as a special qualification for Seamen and the branch was split into Radar plotter and Radar controller sections. Post-Independence and partition, a temporary facility was set up at Naval Barracks, Bombay, but was soon shifted to Cochin. The school was inaugurated at its present location on 12 August 1952 and started with 'Basic Radar Plotter Training'.

The first Radar Plotter 'Instructor' course was conducted in 1957, and the first Long Navigation and Direction specialist course for officers was conducted in 1958. As the school grew in stature, it also began conducting courses for officers and sailors of friendly foreign navies in 1967. The first foreign Long 'N' course was conducted in 1970. Since then over 2,200 officers and over 850 sailors from friendly foreign navies have been trained.

The corresponding numbers for the decade 2011–21 were over 750 Officers and about 240 sailors. The growing mandate and training load on the School has witnessed a simultaneous increase in instructor and staff strength (in 1952 the establishment had just five officers and six sailors). The present strength is twenty officers and forty-five sailors.



ND School: Training the Navigators

Some of the salient decadal milestones in respect of the Navigation and Direction School are listed below:

Maritime Domain Awareness (MDA) Trainer (2011): A second, twenty-node Maritime Domain Awareness (MDA) trainer 'TRIGUN' was inaugurated on 11 October 2011, in order to augment the training capacity of the existing MDA trainer. The trainer is used to provide practical-oriented training on surface picture compilation, scouting, target tracking, identification and colour coding of contacts, etc. Currently there are

100 nodes which are used to train personnel on operating this system at sea.

Operations Room Trainer (2013): The upgraded Operations Room Trainer (ORT) was commissioned on 12 March 2013. The trainer provides basic procedural training in fleet Action Information Organization (AIO) ranging from air defence, Surface Action Group (SAG) and ASW to multi-threat scenarios.

ECDIS Simulator (2014): The School commissioned an Electronic Chart Display Information System (ECDIS) simulator in November 2014, with a capacity of fifteen trainees and one instructor to provide training on exploitation and basic maintenance of similar systems fitted onboard ships.

CNS Trophy (2014): The CNS trophy for 'Best All-Round Performance' in the Long Navigation and Direction (*IN*) course was instituted by the then Chief of Naval Staff Admiral RK Dhowan on 12 June 2014.

Advance BVR Capsule (2015): Beyond Visual Range (BVR) training capsule is being conducted for *IN* officers at Air Force Station, Lohegaon, Pune. The capsule is aimed at providing field exposure on air direction tactics and warfare to Long Course participants. The first course was conducted successfully on 19–25 May 2015.

Aircraft Direction Simulator (2016): With the induction of the MIG-29K aircraft for carrier-based operations, a need was envisioned for an advanced simulator to train Navigation and Direction officers in fighter control with beyond visual range (BVR) tactics. To overcome this challenge, an Aircraft Direction Simulator was commissioned on 5 September 2016.



Aircraft Direction Simulator

Master Navigator Trophy (2020): The Master Navigator Rolling trophy was instituted by the unit to honour the most senior serving Navigator and Vice Admiral AK Chawla (then Flag Officer Commander-in-Chief at Southern Naval Command) was the first recipient of the trophy in July 2020.

Sagar Parikrama III (2021): Training the all-women crew of *Sagar Parikrama III* on various aspects of ocean navigation, including General



Training All-Women Crew of Sagar Parikrama III

Navigation, Ship Handling, ROR, Astro-navigation and tides, was conducted for the first time from 23 July to 1 September 2015. The second set of the crew was trained from 4 to 23 April 2016, and included a strength of three officers. Toward the *IN*'s first female solo circumnavigation planned in

the year 2023, one officer underwent the Navigation and Direction School Phase of *Sagar Parikrama* on 12–29 November 2021.

Naval Air Operations School

The Observer School has come a long way since its inception in 1960. It undertakes basic training of Observers from the *IN*, *CG* and officers from friendly foreign countries. The school traces its roots to the Meteorological School at *INS Garuda* in 1960. In 1975, the school became a sanctioned unit and was christened a premier CAT 'A' training institution. Since 2002 the School has been recognized as a 'Centre for Excellence in Maritime Air Operations' by Cochin University of Science and Technology (CUSAT). The School conducts two Regular Observer courses, two SSC Observer courses and two Qualified Navigation Instructors (QNI) courses each year. Additionally, it undertakes periodic capsules for various courses. The school also conducts training for FFCs since August 2008, and has trained officers from Sri Lanka, Bangladesh, Mauritius and Vietnam.

With the induction of new generation state-of-the-art aircraft, the operation of advanced mission suites and firing of weapons exceeded the duties of Navigators. The term 'Observer' no longer suitably defines the huge ambit of responsibilities discharged by these air crew. Consequently, on 26 November 2021, it was changed to Naval Air Operations Officer and the Observer school was renamed the Naval Air Operations School.

As the *IN* expanded its role as the 'preferred security partner' in the IOR and with the induction of advanced Maritime Reconnaissance (MR) aircraft, the role of these platforms and the men/women manning the systems became prominent. With the expansion in fleet of MR assets, a need was felt to scale up the induction of Air Operations Officers. At present, the School graduates more than fifty trainees from the *IN*, *CG* and FFCs.



Naval Air Operations School

The school celebrated its Diamond Jubilee with activities spanning over two days, starting 7 March 2022. The event marked sixty glorious years of training that the school has imparted since its inception in 1960. The school witnessed some significant enhancements in infrastructure and training, during the decade under review and these are mentioned below:

Training Infrastructure (2016): A new building was commissioned in May 2016. The building houses well-equipped classrooms, a Training Design and Evaluation Cell, an e-Learning Bay and a briefing hall named after Late Vice Admiral Mihir K Roy, one of the first Observer Cadre officers and the first to make it to the Flag rank from this cadre. The Mihir Hall seats 108 people.

Qualified Naval Instructors Course (2016): In 2016 the Navigation Training School at Air Force Station, Begumpet conducted the first QNI course with two trainees. Today, in addition to basic instructional ethics and aviation subjects, QNIs trained at the school are also exposed to various subjects related to Tactics and Maritime Air Operations.

Simulator Training in Tactics and Air Navigation (2020): The Observers (Air Operations Officers) operate advanced aircraft with state-of-the-art

sensors, armed with long-range weaponry and capable of flying with an extended reach across the oceans. In order to enhance the situational awareness of a trainee and simulate the environment for various navigational and tactical exercises, the simulator 'STRATA' was inaugurated on 24 December 2020.

Indian Naval Ship Satavahana

The INS *Satavahana* derives its name from the historic Satavahana dynasty that once ruled the eastern coast of Peninsular India, from late second century BCE to early third century CE. The unit was originally an integrated training establishment (*Circar II*) set up on 11 March 1974, with the aim of training officers and sailors for ships and submarines of Soviet origin. Later, on 21 December 1974, the establishment was rechristened and formally commissioned as INS *Satavahana*. Post 1986, surface naval training was discontinued and *Satavahana* became an exclusive submarine training establishment.

The unit is the premier submarine training establishment of the Indian Navy. The primary role of this frontline training establishment is to impart world-class submarine and escape training to meet the stringent performance objectives and exacting standards of the Submarine Arm. Training in INS *Satavahana* is carried out by the Submarine School (SMS), the Escape Training School (ETS), and the School of Advanced Undersea Warfare (SAUW). The SAUW was established in December 2006 in the premises of INS *Satavahana*, to train the crew of nuclear submarines. Today, SAUW has developed into a state-of-the-art training school with excellent simulators and training infrastructure. Training for the Scorpene class and the P-75(I) submarines is also being set up at *Satavahana*.



INS *Satavahana*

Salient decadal milestones in respect of INS *Satavahana* are listed below.

Training Infrastructure:

- *Kalvari* training wing was set up in September 2017.
- The Nuclear Safety Wing was added in October 2019. It houses a life-size model of the equipment space above the reactor, enabling hands-on training for various Potentially Nuclear Hazardous Jobs (PNHJ) as well as compartment familiarization.



Nuclear Safety Wing

- Steering Stand Simulator for Shishumar-class submarines was added in February 2020.
- The Submarine School successfully established a Motor Training Bay at the *Sindhughosh* Trainer for efficient training and evaluation of main motor operators in March 2020, with basic interlocks, including a mock-up model of a propulsion motor telegraph.

- An Integrated Simulator Complex for S3 and follow on submarines was added in April 2020.

School of Medical Assistants

Initially set up as the Sick Berth School at Sewri, Mumbai in 1943, it was brought under PMO Barracks (presently INS *Angre*) in 1946 and practical training being conducted at MH Colaba (now INHS *Asvini*). On 8 July 1954, a full-fledged Sick Berth School was established in INHS *Asvini*. On 15 April 1964, the Sick Berth School was placed under the Naval Medical Research and Training Centre, Bombay. In October 1967, the School was renamed the School of Medical Assistants (SOMA). Both SOMA and the Institute of Naval Medicine (previously known as The Naval Medical Research and Training Centre) were brought under INHS *Asvini* in 2005.

Professional and qualification training is provided to sailors of the medical cadre at SOMA. Additionally, international students from friendly countries are trained there. The school also trains the *IN* team for the inter-services Technical Training Competition held periodically at the Army Medical Corps Centre and School at Lucknow.

Under the aegis of the Naval Maritime Academy, SOMA conducts two First Aid courses for Mariners. These courses are recognized by the Ministry of Shipping and Surface Transport, Government of India. The School also conducts Hygiene and Sanitation courses for PO Hygienists, and Field Trauma Medicine Training for the *IN*'s MARCOS. Since 2009, SOMA has been affiliated with the Maharashtra University of Health Sciences, Nasik, for ten certificate courses in various paramedical specializations. In 2010, the Government of Maharashtra University and Health Sciences, Nasik further recognized SOMA for conducting fifteen two-year paramedical diploma courses for Medical Assistants.



School of Medical Assistants

Salient decadal milestones in respect of SOMA are listed below:

Recognition as Comprehensive Resuscitation Training Centre (2019):

The School was accredited as a Comprehensive Resuscitation Training Centre (CRTC) by the Indian Resuscitation Council on 7 February 2019. American Heart Association (AHA) accredited Basic Life Support (BLS), Advanced Cardiovascular Life Support (ACLS) and International Trauma Life Support (ITLS) courses are conducted by SOMA for Medical Officers, Nursing Officers, Paramedical staff and trainees and non-medical personnel.

Inauguration of 3D Training Lab (2019):

A 3D Lab for better understanding of human anatomy, physiology, and the pathology of diseases, was inaugurated on 15 October 2019.

Augmentation of Training Infrastructure (2019):

A new seven-storey building was commissioned on 28 May 2019 to cater to the increasing training load and for the augmentation of training facilities at the school. The building has the provision for more classrooms, various labs and an examination hall.

Indian Naval Paramedics Skill Competition:

In order to encourage *IN* paramedical personnel to enhance their skills and inculcate a sense of competitiveness, IHQ_MoD(N) has designated

SOMA as the nodal agency for conduct of Indian Naval Paramedics Skill Competition (INPSC). Medical Sailors are assessed for skills in Nursing procedures and technical competency in handling medical and surgical emergencies in this competition. The first such competition was conducted by SOMA in September 2018.

School for Naval Airmen (SFNA)

The initial set up in Naval Aviation began in December 1952, when the Navy had taken over the civil airfield in Wellington Island at Cochin and named it *Venduruthy II*. This Naval Air Base was commissioned on 11 May 1953 and named *INS Garuda*. The requirement for technical and non-technical tradesmen and supporting facility thus became essential for the Aviation cadre. The first school for the Aviation wing to train non-technical Aviation sailors was set up on 17 August 1956 in the old *Garuda* barracks. Sailors from all cadres were selected for the Naval Aviation cadre and trained in Aircraft Handling and Firefighting. The School was renamed as the School of Naval Aviation (SONA) in 1958. In 1960, a Motor Transport Driving wing was included in the charter of the School in order to train personnel in aircraft handling movement in confined spaces (Carrier/Ship's decks) and also handling of Light Motor Vehicles (LMV) and Heavy Motor Vehicles (HMV). In the same year the SONA was rechristened the School for Naval Airmen, in short 'SFNA'.

With increase in the induction of Naval Aviation assets and their allied manpower, the SFNA shifted its location to present-day NIAT in 1978. However, in the face of exponential growth in Naval Aviation, this facility also anticipated shortfalls, and thus the SFNA was shifted to its present location at Kochi on 19 July 2010.



School for Naval Airmen (SFNA)

Some of SFNA's salient decadal milestones are listed below:

Change in Nomenclature of Courses AH Trade Sailor (2014): In April 2014, the nomenclature of courses for AH Trade Sailors were changed. Basic Motor Transport Driver (BMTD) course was changed to Basic Aviation Vehicle Operator (BAVO) course and Advanced Motor Transport Driver (AMTD) course was changed to Specialist Aviation Vehicle Operator (SAVO) course.

Recognition as Centre for Excellence and Affiliation with CUSAT (2015): The School trains nearly 650 officers and 2,200 sailors annually, and was formally recognized as a 'Centre of Excellence for Aviation Studies and Airport Management', by Cochin University (CUSAT) since 2015.

SFNA celebrated Diamond Jubilee (2017): SFNA celebrated sixty glorious years on 17 August 2017. The Diamond Jubilee being a very significant milestone for any organization, the SFNA has showcased its growth and achievements since its inception in 1957.

Operation Madad (2018): The School was actively involved in activities that showcased *IN's* prowess during Operation Madad. Consequent to the flooding of the civil airport during the Kerala floods of 2018, SFNA was converted to civil dispersal for civil flight operations.

Commissioning of Specialist Vehicle Simulator (2019): To implement more ‘Hands-on’ training, the School commissioned the Specialist Vehicle Simulator. The simulator comprises modules of crane, forklift and aircraft-towing tractor. The aircraft movement with tractor simulator is a motion simulator capable of simulating a ship’s motion (roll, pitch and yaw). The Specialist Vehicle Simulator was inaugurated on 10 April 2019.



Specialist Vehicle Simulator

Signal School

This school owes its genesis to the Second World War training of Indian ratings for service on board Royal Indian Marine (RIM) Ships as Signallers. The school was first established at Carnac Bunder in 1919 (towards the end of the Second World War). It was converted into a permanent establishment in 1920 inside Naval Dockyard. In 1939, the school was constructed and commissioned as HMIS *Talwar* at Bombay. HMIS *Talwar* was decommissioned in August 1946, and a new Signal School was set up at Kochi in the same month at a temporary location. On 23 June 1955, the foundation stone for a permanent building for Signal School was laid, and the School formally shifted to its present location at Cochin in 1958. Over the years, the school has remained focused on nurturing highly qualified personnel with requisite expertise in Naval Communication, Electronic Warfare and Information Warfare.



60th Anniversary Celebrations of Signal School

Some of the Signal School’s salient decadal milestones are listed below:

Rukmani Terminal (2012): With emerging trends in satellite communication, the School has been laying substantial emphasis on training of personnel on Satcom terminals. Towards this aspect, the School installed Rukmani Satcom terminal on 11 January 2012.

Instructor Course for EW Sailors (2013): In consonance with the Navy’s thrust towards consolidation of EW through induction of advanced systems and specialized training, the School had proposed conduct of EW ‘Instructor’ course for EW sailors on the lines of Signal Instructor (Tac) and Wireless Instructor (Tel) courses. Hitherto, EW sailors were undergoing WI (Tel) courses. The maiden EW ‘I’ course was conducted in 2013.

Induction of New Equipment (2018): In order to provide requisite exposure to trainees, a National Knowledge Network (NKN) node was installed to provide access to certified knowledge portals to trainees in June 2018.

Restructuring of Training (2020): The merger of Tactical (Tac) and Telegraphist (Tel) cadre sailors was approved by Naval Headquarters in January 2020. The first batch of COM (Communication) II Ops course commenced in March 2020 followed by the LCOM (Leading Communication) ‘Ops’ course in November 2020 and POCOM (Petty Officer

Communication) ‘Ops’ course in December 2020. Additionally, realizing the growing importance and functionality of Information Warfare (IW), Cyber Security has been incorporated in the Training curriculum. A brief capsule on space technology was also introduced in 2016 for officers undergoing Long C course.

NCN Training Lab (2020): The Naval Communication Network (NCN) Training Lab was inaugurated on 29 July 2020. The Lab is designed to provide comprehensive/realistic training in operation and management of the NCN Lab.



NCN Training Lab

Indian Naval Ship Agrani

In the early years of the *IN*, a school known as the Petty Officers School was established at INS *Venduruthy* in Cochin for conducting Petty Officers Leadership Courses. In December 1960, the Petty Officer’s School was shifted to West Hill, Kozhikode, and subsequently commissioned as INS *Varakkal* on 20 February 1961. The gradual growth of the *IN* also saw the expansion of this establishment at Kozhikode. On 22 April 1965 INS *Varakkal*, was shifted from Kozhikode to Red Fields, Coimbatore. On 18 September 1965, INS *Varakkal*, the Rifle Range at Madukkarai, and the Aircraft & Engine Holding Unit at Sulur,

were amalgamated under a single command and commissioned as INS *Agrani*.

The school imparts leadership and management training to senior sailors. The objectives of Leadership and Management training is to enable senior sailors to perform the duties of middle-level managers, enhance their leadership qualities and prepare them to excel in administrative responsibilities. In addition to training, the unit is also designated for the administration, selection, and training of the Naval Shooting Team for International/National and Inter-Services Shooting Championships.



INS *Agrani*

Salient decadal milestones in respect of INS *Agrani* are listed below:

Inauguration of Navy Children School Coimbatore (2016): Navy Children School, Coimbatore was inaugurated on 30 March 2016.

Navy Shooting Team (2019): The Navy Shooting Team, as well as the infrastructure, has witnessed significant changes since 2011. The new building for Navy Shooting Team, inaugurated in 2013, consists of the latest facilities such as a sound-proof motivation hall, and an air-conditioned magazine with Armoury/Bullet Deflection Plates. The shooting range was further upgraded with a state-of-art system in 2019, which includes an eight-lane indoor air-conditioned 10 m Range.



New Facility for Navy Shooting Team

Closing Down of NSB Coimbatore (2020):

The Naval Selection Board (C), which was operationalized as a Ty NSB(C) within the premises of INS *Agrani* since May 2001 was closed down on 31 May 2020.

TOPS (Target Olympic Podium Scheme): Niraj Kumar, PO LOG (Mat), 251928-R has been selected by the Government of India/Ministry of Youth Affairs and Sports for Target Olympic Podium Scheme towards, preparation of Olympics 2024. The sailor has been selected for representing the country at the three position 50 m rifle event.

Centre of Excellence in Ethics, Leadership and Behavioural Studies

The Centre of Leadership and Behavioural Studies (CLABS) was set up at Kochi on 31 March 1994 as a first of its kind unit in the *IN* to include humanities-oriented topics—such as leadership, organizational behaviour, motivation and gender sensitization—in its curriculum. In the following years, taking into account the changes in technology and economy, a need to transform the mandate of the Centre was felt. The new and broader mandate sought to address the challenges that faced contemporary military leadership and accommodate newer ideas and perspectives. It assimilated and instilled the tenets of ethical

leadership and a sense of unlimited moral liability among military leaders, along with imbibing the ideals of Naval Service—Duty, Honour and Courage.

Accordingly, in 2015, CLABS was transformed into the Centre of Excellence in Ethics, Leadership and Behavioural Studies (CELABS). The CELABS functions as the nodal agency for all leadership and ethics-related areas of study in the Navy. The Centre trains more than 1,100 officers from a wide spectrum of seniorities each year. It also serves as the parent school for Young Officers (YOs) during their SLt courses. The Centre also imparts Leadership and Ethics training through workshops to sister Services, other uniformed Services and law enforcement agencies, as well as to International Officers from FFCs.



Centre of Excellence in Ethics, Leadership and Behavioural Studies

Some of the salient decadal milestones in respect of CELABS are listed below:

Southern Naval Command Leadership Conclave (2017):

On 15 September 2017 CELABS conducted a Leadership Conclave at INS *Valsura*, which discussed Ethical Leadership in a military paradigm and methods for charting the course of leadership development in the Indian Navy.



Leadership Conclave

Tri-Services Course (2017): The Centre has conducted a week-long Tri-Services Leadership and Ethics capsule, since 2017. The scope of participation has been enhanced to include the CG and law enforcement agencies and aims to extend it to other uniformed Services as well as the Civil Services.

Twenty-fifth Anniversary Activities (13–15 March 2019): The year 2018–19 marked the Silver Jubilee of CELABS. The celebrations witnessed the enactment of a leadership play based on ‘The

Caine Mutiny’, a day-long seminar on ‘Work–Life Balance’ and the unveiling of a Motivational Mural at CELABS premises. Also, an auditorium-cum-motivation hall at CELABS was revamped with state-of-the-art infrastructure and named ‘Firdaus Hall’ in the memory of Late Lt Cdr Firdaus Darabshah Mogal, Shaurya Chakra (Posthumous).

Movie on Social Graces and Etiquettes: A twenty-minute video on *Military Conduct and Social Graces* for young officers of the *IN* was conceived and filmed at CELABS and has been uploaded on the Naval Unified Domain.

INPT School

The oldest unit of the *IN*, the INPT School traces its origin to its establishment in Karachi. After independence, the school was shifted to Kochi. A number of administrative and operational challenges in the following years resulted in it being frequently shifted. In 1951, the school was relocated to Mumbai and then back to Kochi in 1990. Post shifting of erstwhile Naval Academy to Ezhimala, a decision



Tri-Services Leadership Capsule

was taken to shift the School once more to its present location at INS *Mandovi*, Goa in February 2010.



INPT School

The school conducts physical training for physical trainers of the *IN*, CG and FFCs, along with courses in Lifesaving for PT and other branch sailors of the *IN* and FFCs. The School conducts seventeen courses in a training year based on promotional link and other physical fitness related courses. Some of the salient decadal milestones are listed below:

Lifesaving Training (2017): An MoU between INPT School and National Institute of Water Sports, Goa was signed on 22 October 2013 to introduce lifesaving training both on the beach and open sea for *IN* personnel.

Commencement of Certificate Course in Yoga for Ex-Sports Quota and PT Sailors (2017): A certificate course in Yoga successfully commenced at INPT School for ex-Sports Quota and PT Sailors in 2017. Kaivalyadhama Yoga Institute, Lonavala, a Government of India-approved institute, was chosen for this course.

Commissioning of PT School Building (2018): The foundation stone for the new school building was laid on 3 February 2017 and the building was commissioned the following year, on 5 September 2018.

Renovation of Foreign Trainees Block (2019): International trainees block 'Bidur' was developed into a cabin-type accommodation to enhance

habitability, and the construction of the block was completed on 15 March 2019.

Maiden PT III 'Q' Course for Sports Quota Entry Sailors (2020): A maiden PT III 'Q' course for sports-quota-entry sailors post release from *IN* teams, was undertaken at INPT School in 2020.

Naval Provost and Regulating School (NPRS)

The Naval Provost and Regulating School is the *IN*'s premier institution, with regard to conducting professional training for Naval Provost Branch. The *IN*'s Regulating School came into existence in 1943 at HMIS *Dalhousie* in Mumbai, which was later commissioned as INS *Angre* in 1951. The courses conducted here were conversion courses for Regulating Petty Officer and higher rank examinations for Master-At-Arms. In 1948 the school was moved to the Naval Provost barracks at Talwar camp (near NT Pool) in Mumbai, where the Leading Patrolman course was introduced in 1950. The school was relocated to INS *Kunjali* at Gun Carriage Basin, Colaba, Mumbai in 1954 and was called the Regulating School.

The first SD (Reg.) course commenced on 1 January 1965, and the first regular At-Arms 'Q' Course started in the year 1971. In 1985 the school was moved to the Robert House complex near the US Club, Colaba and later to Old BV Yard near Colaba Fire Station in 1987. In 1992 the school saw a new base in the T1-T3 building at the old INS *Trata* complex in Mumbai. It was in 1997 that the regulating school returned to INS *Kunjali*, Mumbai, before it was finally shifted to its current location at INS *Mandovi* as the Naval Provost and Regulating School on 3 August 2009.

The Motor Transport and Driving School is an integral part of the School and imparts instructions on riding and driving of service vehicles to all provost personnel and to the sailors nominated for Motor Transports Driver's/Dispatch Rider's courses.



Naval Provost and Regulating School

Some of the salient decadal milestones in respect of NPRS are listed below:

Augmentation of Training Programme and Facilities: Citing a Branch Shortage with regards to personnel, the school initiated additional LPM courses to facilitate adequate manpower for Navy-wide requirements.

Best Driving School in Goa, 2019: In 2019 the Government of Goa awarded the School the Best Driving School award.

Maiden Training of Women Officers (2020): Training was initiated for the first time for Women



Maiden International Women Officer Training Course

Officers at Arms. It was conducted at the Naval Provost and Regulating School in 2020–21. Lt Cdr Sneha Rai, was the first to complete the At-Arms ‘Q’ course in March 2021. The first batch of Sri Lankan Women officers also completed their At-Arms ‘Q’ course in 2019.

Naval Institute of Educational and Training Technology

The NIETT had a humble beginning on 25 April 1971, with an initial mandate to prepare study material for Higher Examination Tests (HET) and other In-Service Examinations. In 1976, the mandate was revised to include conduct of basic training in Teaching Methods and Training Technology for Education Officers. The unit was later tasked with training the sailors on ‘Methods of Teaching’. The unit was sanctioned on 22 December 1986. Subsequently, the scope of the Institute was enhanced to include multiple courses on Training Technology as well as Training Management.

Today, the Institute conducts a range of courses from Training Technology Courses for junior sailors undergoing their Petty Officer Qualification Course, to advanced Training and Design Management Course for Officers-in-Charge, Training Captains/Commanders, and Chief Instructors of Training Schools/Establishments. In addition, the Institute also houses the Centre for Training Aids Production (CTRAP) consisting of Video Facility and Government Printing Press since 1988. The CTRAP was set up with the aim of supporting all Training Schools/Establishments of the *IN* with the production of high-quality Training Films and reproduction of training literature, such as docket and handbooks/handouts.



Naval Institute of Educational and Training Technology

Some of the salient decadal milestones in respect of NIETT are listed below.

Inter-Service Synergy (2017): Trainees from the Army, and the IAF have started attending



Capacity Sharing

Training Design Management Course (TDMC), Training Technology Officers (TTO) and Training Technology Sailors (TTS) courses from December 2017.

Consultancy and off-Campus Courses (2018): The Institute has been providing consultancy in the field of ‘Training Technology’ to various naval training units and other Tri-Services establishments such as DSSC, Wellington and NDA, and Khadakwasla, and also to the Navy Education Society. In addition, the unit has also been conducting off-campus capsule courses on ‘Training Technology’, Media Engagement, etc. In 2018, the Institute commenced a short Refresher Course for Education Officers to equip them to cope with the changing roles of an Education Officer.

Association with IIT Bombay (2020): The Institute approached the Centre for Educational Technology at IIT Bombay, for collaboration. Subsequently, NIETT, in association with IIT Bombay, conducted the first-ever Massive Open Online Courses (MOOC) for officers coming for SLt (Education [Edn]) Courses during 2016–18. Finally, MTech in Educational Technology for Edn officers started in the year 2020.

School of Naval Oceanography & Meteorology

The School’s vision is to develop professional excellence among officers and sailors in the core competencies of meteorology and oceanology. This it aims to achieve through sound pedagogical and skill-based flexible training processes, supplemented by innovative research, adapted to the ever-changing techno-scientific environment to provide optimum prognostic support across the full spectrum of maritime operations.

The beginning of training in meteorology in the *IN* can be traced to early 1949, when an instructor, Lieutenant I Chawla, was deputed to the United Kingdom (UK) for a course in meteorology.

The meteorological services in the *IN* formally commenced with the commissioning of the first Naval Air Station, *INS Garuda* at Kochi on 11 May 1953. During the early days, the Met Office at *INS Garuda* had an implicit element of Government sanctioned manpower for training personnel in meteorology. With the passage of time, in June 1968, a separate Meteorological Training Section was established inside *INS Garuda* exclusively to meet the *IN*'s training needs. This Meteorological Training Section was re-designated as Meteorological Training School (MTS) in October 1974. New infrastructure for this school, and its current location was added in April 1977.

The School was rechristened the School of Naval Oceanology and Meteorology (SNOM) on 1 November 1985. As a premier training institute, SNOM has invested fruitful efforts in keeping abreast with the latest technologies and training methodology to impart professional and in-depth training to the officers and sailors in the fields of Meteorology and Oceanography.



School of Naval Oceanology & Meteorology

Some salient decadal milestones in respect of SNOM are listed below:

Oceanography (International) Course (2014): SNOM started conducting the Oceanography (International) Course for officers from FFCs from 2014.

Ocean Internal Wave Simulator (2015): To facilitate a better understanding of the ocean surface and subsurface processes, such as internal waves and

their significant role in underwater operations, a high-tech Ocean Internal Wave Simulator (OIWS) was commissioned in 2015.

CUSAT Certification (2015): In December the Advanced Met Course and the PO 'Q' Met Course were affiliated with CUSAT for the award of MSc (Applied Met) and Diploma in meteorology.

Inter Service Training for Indian Army Officers and Ors (2018): As part of Inter-Services Synergy in Training, the School commenced Inter-Services training for the Officers and Other Ranks (ORs) of the Army. The maiden Basic Met Capsule course for Officer/JCO/ORs was conducted on 12–21 April 2018.

Maiden Skill Development Course for Retiring Met Sailors (2018): The maiden Skill Development course on Climate Change and Risk Mitigation by National Skill Development Corporation (NSDC) was conducted at SNOM from 28 May–8 June 2018 for twenty retiring Met Sailors.

Numerical Weather Prediction Lab (2019): An NWP laboratory for training on technology-intensive weather forecasting techniques was inaugurated on 22 August 2019.



Numerical Weather Prediction Lab

Miscellaneous:

Year	Activity
2014	Conduct of national symposium, METOC-2014.
2018	Installation of Air Quality Index display at three different locations in SNC.
2018	Installation of training node of Integrated Automatic Aviation Meteorological Systems (IAAMS).

Year	Activity
2018	Upgradation and re-exploitation of Upper Air Sounding System (UASS).
2019	Conduct of maiden Numerical Weather Prediction (NWP) Course.
2020	Conduct of maiden online course by IMD for AMTC-181 Course.

Seamanship School

With the main objective of providing institutionalized training in Seamanship to all naval personnel, the school was established on 1 January 1976. The school began training from the barracks of the erstwhile B&D School and the present building was commissioned on 2 January 2001. Since the last Government Sanction in 1982, the spectrum and gamut of Seamanship Training and curriculum at the school have undergone major changes. The school has been entrusted with the additional tasks of training of officers and sailors in NBCD, Hull Maintenance, Watermanship activities and the Damage Control Training Facility (DCTF).



Seamanship School

The training infrastructure at Seamanship School was further augmented with the commissioning of Damage Control Training Facility (DCTF) 'Avinash', a state-of-the-art training facility for conducting practical Damage Control Exercises in realistic situations. The facility has been designed and constructed by Goa

Shipyard Limited (GSL) and was handed over to the school on 31 March 2012. This DCS is utilized for practical simulator-based DC exercise training for personnel at Kochi undergoing courses, ships under work-up by INWT as well as other afloat units at Kochi.



Damage Control Training Facility (DCTF) 'Avinash'

With increased strength of trainees, six additional classrooms were added to school's present infrastructure in June 2012.

Naval Construction Wing (NCW)

After the formation of the Corps of Naval Constructors in 1957, induction to the Corps was from graduates in Naval Architecture, Mechanical or Civil Engineering disciplines from reputed Engineering Colleges. However, the number of candidates joining through this model was not commensurate with the requirements of the Navy.

The 10+2 (Tech) Naval Engineering Course (NEC) at INS *Shivaji* commenced in 1985 for induction of technical officers as cadets. Padma Shri S Paramanandan, being the Head of the Department of Ship Technology at CUSAT at the time, facilitated a scheme for providing eight seats in each batch undergoing BTech (Naval Architecture and Shipbuilding [NA&SB]) sponsored by the Navy. According to the scheme, volunteers for the course would be sought from cadets of NEC, and the top eight cadets who

appear for the Common Admission Test (CAT) conducted by CUSAT, would undergo the BTech NA&SB course at CUSAT. The first batch of cadets, forming first Naval Architecture Course (NAC) were selected from the third NEC. They started their BTech course in 1987. While the cadets continued at the CUSAT campus, a need was felt to establish a setup to train these future naval constructor officers in skills that were not covered as part of the core professional syllabus at CUSAT, but were considered essential with regard to the job specifications within the Navy.

In order to bridge this gap and inculcate values and skills in leadership, physical training, seamanship and others, NCW (Kochi) was set up in 1998 inside INS *Venduruthy* as a unique centre for ab-initio training of Naval Architect Officers through the 10+2 cadet induction scheme.



Naval Constructor Wing

The broad role of NCW involves coordination of academic training of cadets at CUSAT and Naval Orientation Training of Cadets. Till date 311 officers have passed out from the unit in the thirty-one years since its inception. The NCW Cadets in the BTech 2018 Batch (Naval Architecture and Shipbuilding) at CUSAT University bagged top three ranks while competing with their civilian counterparts.

Some of the salient decadal milestones in respect of NCW are listed below.

Accommodation (2017): The cadets were initially accommodated at the CUSAT men's hostel. In October 1998, the accommodation of the trainees was shifted to Naval Base Kochi, in Shivaji Block (erstwhile Naval Academy) and the shacks of Southern Naval Command Officers (SNCO) Mess. In 2017, Parikhshith Block (capacity to accommodate forty-two cadets) was commissioned within the SNCO Mess premises for their accommodation and the shacks were surrendered to SNCO Mess.



Parikhshith Block

Messing (2016): Whilst at CUSAT, the trainees used to dine in the Hostel Mess. After shifting to Naval Base in 1998, dining commenced at SNCO Mess. In 2016, Silver Room of SNC Mess was designated as a dedicated dining hall for these cadets.

Manning:

- **Officers (2018):** The complement of three officers at NCW, last enhanced in 2006, was augmented by an additional officer in 2018, thus taking the total complement of officers at NCW to four.
- **Sailors (2016):** Initially a PTI from SNC, was nominated to undertake Physical Training and outdoor activities for the trainee cadets at the premises of CUSAT sports facilities. After shifting to INS *Venduruthy* in 1998, a PT

Instructor (PTI), Seaman and Logistics sailors were appointed at NCW. In 2016, an additional PTI was sanctioned and appointed.

Indian Naval Ship Vishwakarma (Naval Shipwright School)

This training establishment (erstwhile Shipwright School) was set up in 1941 at Lonavala (INS *Shivaji*) for training of Shipwright Artificers (now Hull Artificers). The school was later shifted to Mumbai (INS *Angre*) in 1943, with due proximity to Naval Dockyard and Mazagon Dock Ltd, to facilitate professional training. Due to the shortage of space in Mumbai, the School was permanently shifted to Visakhapatnam in August 1981. Constructors Training Office (CTO), which was set up at Naval Dockyard, Visakhapatnam (ND[V]) for training Naval Constructor Officers was also shifted to Shipwright School in 1986. The Unit thus became the 'Alma mater' for Naval Constructor Officers, Shipwright Officers, Hull Artificers, Civilian Design Officers and Staff (Construction Cadre). Proximity to ND(V), M/s Hindustan Shipyard Limited (HSL) and Naval Science and Technological Laboratory (NSTL) had added advantage.



INS *Vishwakarma*

The first Warship Design and Construction course for Special Naval Architect Entry Scheme (SNAES) was conducted in August 2014, post

change in the training pattern for SNAES entry officers. The first Naval Architect Officer Pre-Commissioning Training (PCT) course was conducted in 2014. After almost seventy-five years of its existence, the unit was commissioned as a training establishment—the INS *Vishwakarma*—on 14 November 2015.

Today, professional training is also imparted to CG personnel and those from friendly foreign navies. A total of thirty-five courses (long and short) are normally scheduled to be conducted by the Unit every year for about 625 personnel. Some salient decadal milestones in respect of INS *Vishwakarma* (Naval Shipwright School) are listed below:

Damage Control Training Facility 'AVIJIT' (2017): A state-of-the-art Damage Control Training Facility 'AVIJIT' was inaugurated at INS *Vishwakarma* on 27 April 2017. The facility has a dynamic simulator, which simulates ship motion, compartment flooding, failure of electrical power and machinery, thus providing a real-time environment to the ship's crew for carrying out urgent repairs to a damaged underwater hull and ruptured pipelines of ships at sea.



Damage Control Training Facility 'AVIJIT'

BSc Degree for Hull Artificers (2017): In December 2017, the unit concluded an MoU with Andhra University for award of BSc degrees to

Hull Artificer (HA) sailors in ‘Naval Shipbuilding and Hull Maintenance’. The degree certificate was awarded to HA sailors post qualifying their CHHA ‘Q’ Course from the unit, with effect from December 2017. A case for retrospective recognition to graduates pre-2017 was also pursued, and a fresh MoU was concluded to accommodate this change. Till date, 202 BSc degrees have been awarded, including sixty-four degrees in retrospect to eligible sailors of batches prior to 2017 and to veterans.

Award of PG Diploma to SD (HA) Officers (2020): On 30 July 2020, the unit succeeded in concluding a MoU with Andhra University for award of PG Diploma in ‘Shipbuilding Technology’ to Special Duty (Shipwright) Officers of the Indian Navy.



MoU for Award of PG Diploma in Shipbuilding Technology

Conduct of Maiden IAC-1 Hull PCT (2021): PCT for three batches of IAC-1 crew comprising one NC officer, one SD (Shipwright) officer and nineteen HA sailors was conducted at INS *Vishwakarma* in September 2019, December 2019 and June 2021. The total duration of the PCT was four weeks, and included three weeks of classroom instructions followed by one week of on-the-job training at Warship Overseeing Team, Kochi.

Conduct of Maiden PCT for HA Sailors (2021): A total of twenty-one Hull Artificer (HA) sailors underwent the Hull Artificer course at INS *Vishwakarma* from 24 June–7 July 2021. The PCT consisted of classroom instructions for a week

followed by classes of ship-specific instructions in the second week. External lectures by specialists from ND-(V), Hull Inspection and Testing Unit - HITU(V) and the Eastern Fleet were also conducted for the HA PCT course. These lectures were aimed at providing HA sailors a better overview of the Hull maintenance aspects onboard *IN* platforms.

Nuclear, Biological, Chemical and Damage Control (NBCD) School

The Atomic, Biological, Chemical and Damage Control (ABCD) School started in 1952 at Shivaji was assigned the nomenclature ‘Avinash’ in November 1953. From a modest beginning made with a few fire trays and hand-held firefighting appliances, the ABCD School progressively grew into a self-contained specialist organization for imparting training in firefighting and damage control to naval personnel and on occasions, to those of the other two Services. The first course for officers was conducted in 1954 and for sailors in 1955.



NBCD School: Providing Realistic Training

About a decade after its establishment this Institution came to be known as the Nuclear, Biological, Chemical and Damage Control (NBCD) School. Through the last nearly seven decades the School has endeavoured to retain this unique status by continuously embracing technological advancements and adapting to the transformation of the *IN*, to enable NBCD training

of world-class standards that meet the expectations and growing needs of Navy.

In the light of the growing mandate of the school over the years, and consequent to the nomination of School as Class Authority on NBCD, need was felt to streamline the administration of the school to bring the school at par with other professional schools operating under Southern Naval Command (SNC). Therefore, NBCD School was declared an independent unit operating under SNC, additional to INS *Shivaji* in Lonavla on 2 February 2016. The NBCD School hosts three of the most advanced simulators of *IN*—the DC training facility ‘Akshat’, the FF training facility ‘Ajar’ and the recently inaugurated NBC training facility ‘Abhedya’. The three simulators are the first of their kinds in the country and in the region.

Some of the salient decadal milestones in respect of NBCD School are listed below:

Commissioning of Firefighting Training Facility (2014): A Firefighting Training Facility ‘Ajar’ was commissioned on 18 September 2014. It is one of its kind in Asia that affords realistic training in firefighting in shipboard conditions, thus providing an ideal opportunity for trainees to gain hands-on experience and confidence. The FFTF comprises different modules replicating vulnerable compartments like the ship’s galley, engine room, mess decks and helo deck thus providing extensive scenario-based practical training. This facility utilizes propane gas (a clean fuel) for generating fire.

Operation of NBCD School as an Independent Unit (2016): In light of the growing mandate of the School over the years, and consequent to nomination of School as Class Authority on NBCD, a need was felt to streamline the administration of the School and to bring it at par with other professional schools operating under SNC. Consequently, NBCD School was declared an independent unit

operating under SNC, additional to INS *Shivaji* on 2 February 2016.

NBCD Acceptance Trials Protocol (2017): NBCD School, the Class Authority on NBCD aspects, is mandated with the conduct of functional trials of Firefighting, Damage Control and Nuclear Biological and Chemical equipment/systems fitted on new construction ships. During various trials undertaken by the School over a period of time, a gap was observed in the trial methodology and acceptance criteria. A need was therefore felt to streamline and standardize conduct of trials by the school. Accordingly, a document titled ‘*NBCD Acceptance Trials Protocol*’—based on various applicable standards, specifications, Books of Reference (BRs)/Indian Naval Books of Reference (INBRs), regulations and policy directives—was published in November 2017. The document outlines the acceptance criteria in respect of each NBCD equipment/system fitted onboard.

Inauguration of NBCTF (2019): A major milestone for training in *IN* was reached with the commissioning of the NBC Training Facility (NBCTF) Abhedya for hands-on training on shipboard aspects of NBC defence. The facility was constructed in a record time of nineteen months and was inaugurated in March 2019. The commissioning of NBCTF, which is first of its kind in the country and the sub-continent, also completes the ‘triad’ of NBCD training facilities at NBCD School.



NBCTF *Abhedya*

Naval School of Music (NSOM)

The Naval School of Music located at INS *Kunjali*, is the alma mater of the Musician branch of the *IN* and conducts various courses for Musicians round the year. The most significant task of the school is to train and convert new recruits into professional musicians. The recruits are trained in various subjects, viz., elements of music, harmony, instrumentation, aural perception, and their primary instruments. Syllabus of the Basic MUS 'Q' Course and the CPO MUS 'Q' Course were revised and updated. Modern music theory practices have been implemented in the syllabus.

Over the past decade, several steps have been taken towards restructuring course content to equip the trainees meet the evolving requirements of the Navy. Two of these enhancements are:

Drum Major Capsule: In the year 2011, A Drum Major capsule was conducted at NSOM in order to introduce Mace Drill in the marching band. The introduction of this Drill has significantly improved the overall outlook of the marching band at outdoor events.



Naval School of Music

Music Software: Music Notation Writing Software has been introduced for arranging and composing music scores digitally, which otherwise consumed a large amount of paper and stationary consumables.

This approach has also significantly brought down the amount of time taken for arranging/composing music, and shifts the focus of trainees solely on creativity.

First Training Squadron

First Training Squadron, also known as 1TS, is the alma mater for the *IN*'s Afloat Training. The Sea Training phase onboard 1TS ships aims to consolidate a trainee's knowledge in service subjects and expose them to the basics of life at sea so as to enable them to gain their sea legs after they finish their basic Academy training.

The afloat training of cadets onboard *IN* Ships, commenced with the 4th Naval course (1st Joint Service Wing (JSW) course). After completing three years at JSW, the cadets joined INS *Tir* (in her previous avatar of HMS *Bann*) for six months' training (continuing as cadets) followed by six months' training as Midshipmen. In 1955, the role of cadet and midshipman training was divided between two ships *Kistna* (later *Krishna*) as the Cadet Training ship, and *Tir*, as the Midshipman Training Ship. Later, with the arrival of the *Mysore* in 1958, Midshipmen's training began to be carried out exclusively on cruisers.


The beginning of modern avatar of First Training Squadron can be associated with the arrival of INS *Tir* at Kochi on 1 April 1986, wherein she joined the *Betwa* and *Beas* (both ships were later decommissioned in 1991 and 1992, respectively). In 1995, INS *Tir* was joined by INS *Krishna* (1968 vintage, British Leander-class frigate *Andromeda*) for the training of cadets at Kochi.

Currently, the squadron has seven ships, namely, *Tir*, *Sujata*, *Magar*, *Shardul*, *Tarangini*, *Sudarshini* and ICGS *Sarathi*, which undertake afloat training of 250–300 trainees every year. The squadron is headed by Senior Officer, First Training Squadron, who dons the dual hat of Senior Officer 1TS and Commanding Officer, INS *Tir*.



Ships of 1TS Charting the Oceans

The timeline of important activities in the First Training Squadron from 2011–21 is tabulated below.

Year	Event
2012	INS <i>Sudarshini</i> joined 1TS on 27 January 2012. INS <i>Sujata</i> joined 1TS post undergoing a major refit for conversion to training role.
2015	INS <i>Shardul</i> joined 1TS (with minor modifications retaining her role as an amphibious ship).
2018	INS <i>Magar</i> joined the 1TS post undergoing a major refit for conversion to training role.
2020	Official Crest and Motto of the First Training Squadron approved by IHQ MoD(N) on 6 November 2020. Crest  Motto प्रशिक्षणमज्जत्कर्षस्यमूलम्-Training is the bedrock of success.

Foreign Training

The Government of India has strived to engage friendly nations, especially in its neighbourhood, through its three policy initiatives: Look East; Act East; and Look West, as well as the maritime SAGAR initiative. The *IN*, as the natural proponent of maritime diplomacy, has been at the forefront of building, nurturing and expanding cordial relations with its maritime neighbours and beyond. Providing training assistance and cooperation has been one of the vital factors through which the *IN* seeks to build collective competence and capability. To achieve this, the *IN* has been providing training to naval personnel from FFCs over the last four decades, during which the *IN* trained more than 15,000 foreign personnel from forty-five countries.

The *IN* also conducts customized courses for a few countries to meet their specific requirements, both in India and abroad. In the current strategic scenario, wherein global security challenges are numerous and countries have shared threat perceptions, cooperation in training is vital for fostering mutual trust and interoperability. In addition, training exchanges refresh perspectives

and injects new ideas into the system. Training cooperation, therefore, has been an area of focus and one of the corner-stones of the *IN*'s initiatives. The *IN* has constantly strived to evaluate and evolve training so as to enable our friends to man contemporary, technologically advanced naval platforms and undertake varied naval operations.

Training of Foreign Naval Personnel in India

Foreign cooperation plays a pivotal role in influencing maritime strategy and shaping the maritime environment through strengthening bilateral relations. Accordingly, the *IN* has been instrumental in projecting its 'soft power' across its maritime areas of interest and beyond. Over the past few years, India has emerged as the preferred destination for training of foreign personnel, with an average of 1,000 foreign personnel undergoing training in India every year. This has been possible due to the *IN*'s sustained perseverance and constantly evolving training acumen through infrastructure augmentation and quality training faculty.

In consonance with India's foreign cooperation policies, the Ministry of External Affairs (MEA) provides assistance for training of naval personnel from a large number of countries under the Indian Technical and Economic Cooperation (ITEC) Scheme I and II. Under this scheme, the airfare, internal travel, tuition, boarding and lodging and medical expenses are fully funded by the Government of India (except in the case of ITEC II Scheme wherein the parent country bears the cost of airfare).

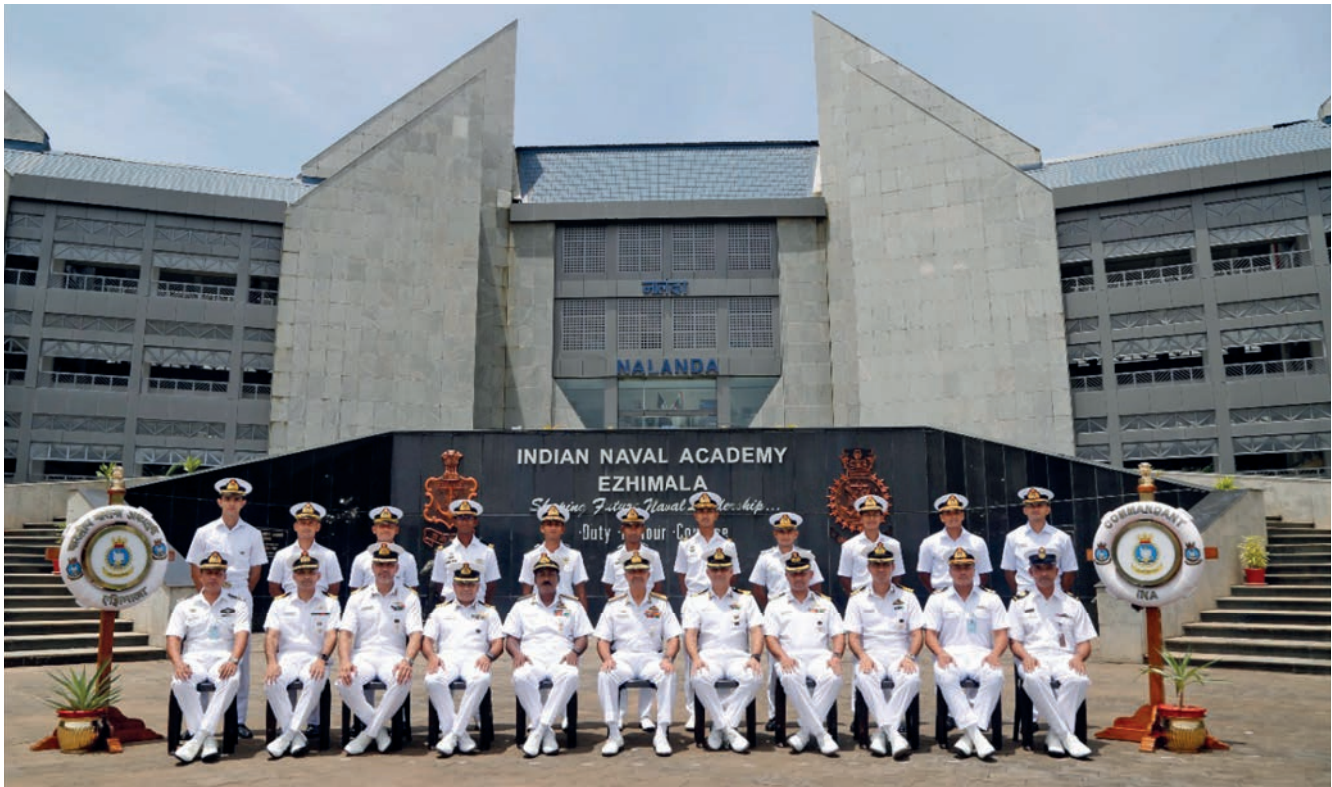
In cases where ITEC funding is unavailable, the Self-Financing Scheme (SFS) option is availed of, wherein the entire cost of training is borne by the trainee's own Government. Under the ITEC Scheme additionally, international trainees are also paid 'Living Allowance' to meet their daily sundry expenditures on a monthly basis by the respective

training units. Living allowance was revised from Training Year (TY) 2019–20 (irrespective of rank) as follows:

- Rs 1,500/- per day per trainee, for courses of total duration up to twelve weeks.
- Rs 1,200/- per day per trainee, for courses of total duration more than twelve weeks.

Any type of training conducted for FFCs, mandates approval by the MEA in the form of allotment/sanction letter. The Training Year is from 1 July to 30 June of the next year. To synchronize the organizational process, an Annual Training Programme is promulgated. In most cases, international students are accommodated with *IN* trainees. However, should any trainee wish to stay under his own arrangements, this is also facilitated by the Indian Navy. The last few years have witnessed a steady flow of foreign-trainee throughput. The number of training slots allocated to foreign trainees since 2010 is tabulated below.

Year	Training Slots Allocated to Foreign Trainees
2010–11	792
2011–12	853
2012–13	653
2013–14	917
2014–15	858
2015–16	857
2016–17	1013
2017–18	957
2018–19	1126
2019–20	1016
2020–21	717
2021–22	995



Bangladesh Navy Training Delegation (Cadet Exchange Programme) at INA

Training at INA: INAC (BTech) and Naval Orientation Course (NOC) at INA for FFCs commenced in December 2014 with the maiden induction of four international trainees—two Mauritian and two Sri Lankan cadets. Till date personnel from Myanmar, Mauritius, the Maldives, Tanzania, Namibia, Benin, Vietnam and the Seychelles have undergone NOC courses as part of Comprehensive Training Programme (CTP). Towards capacity building of FFCs, vacancies at INA were increased from February 2018 onwards and the number reached a cumulative strength of fifty international trainees in 2021. Considering the tremendous interest among the FFCs to seek vacancies for their trainees and with augmentation of infrastructure at INA, in July 2020 it was proposed that the cumulative strength of international trainees at INA would be 110 by 2024.

Training at Naval Dockyard (Visakhapatnam): Based on the working protocol and MoD directives,

the *IN* promulgated a three-year Comprehensive Training Plan (CTP) for personnel from Vietnam. As per the CTP, 120 personnel were to be trained at ND(V), INS *Eksila*, INS *Kalinga* and Naval Armament Depot, Visakhapatnam, between 2014 and 2018. Eighty-four of these personnel had undergone training at ND(V) in four Groups as per detail tabulated below.

Course	Duration	No. of Trainees
Weapons & Electrical	September 2014–July 2015	21
Dockyard Processes	August–October 2015	16
Submarine Technical	December 2015–March 2016	23
Submarine Electrical & Mechanical Repairs	November 2017–May 2018	24

Training at INS *Eksila*: A team of forty-nine Vietnam People’s Navy trainees, including seven officers and forty-two NCOs commenced training on the M15 Gas Turbine at INS *Eksila*

in September 2014. The training comprised an orientation capsule on *Eksila* followed by presentations on the major overhaul procedure of the M15 Gas Turbine. Spoken English classes and basic GT classes were also conducted. Valedictory function for the VPN trainees was held on 15 December 2015 on successful completion of the course.

Training at NIETT: Training Technology Courses for FFCs, namely, the Bangladesh Navy and the Maldives Navy were conducted in August/September 2020.

Deputation of Indian Navy Mobile Training Teams

The *IN*, in order to address the growing training load of international training, is conducting customized training courses overseas to meet country-specific requirements. These are undertaken by specially constituted Mobile Training Teams (MTTs).

So far, the *IN* has deputed MTTs to Sri Lanka, Oman, Myanmar, Kenya, Vietnam, Mauritius, Bangladesh and Nigeria. Requests from certain other FFCs are under consideration. This endeavour will not only reduce the burden on our own training infrastructure but also effectively increase our training footprint across the world. Further, by deputing MTTs to other nations, the *IN* is able to train more personnel at a much lower cost. Some of the salient deputations of the MMTs are listed below.

Diving School:

- **Training of Seychelles Special Force ‘Tazar’:** The School conducted a customized combat diving capsule course of three weeks duration commencing 12 March 2012, for six personnel from the Seychelles Special Force ‘Tazar’.
- **Training of National Coast Guard, Mauritius:** An MTT was deputed to Port Louis, Mauritius

in September 2013 and October 2015 for conduct of diver refresher training for Mauritius National Coast Guard divers.

- **Asymmetric Warfare Training for Maldives (Exercise Ekatha):** Mobile Training Teams were deputed annually to the Maldives since 2017 to impart asymmetric warfare and diving training to The Maldives National Defence Force (MNDF). Twenty Close Circuit Diving sets along with five-year spares were gifted to MNDF in 2019. The last Exercise was conducted from 9 June to 6 July 2021, wherein thirty MNDF personnel were trained.
- **MTT Madagascar:** A maiden MTT was deputed to Madagascar in March 2021 to train the Malagasy Armed Forces personnel in tactical weapon handling and Explosive Ordnance Disposal (EOD) drills.

NSWTTC:

- **National Coast Guard (NCG), Mauritius:** The unit conducts training of NCG, Mauritius at Mauritius annually through an MTT. The four-week training focuses on Special Operations. Training has been conducted every year since 2016. Additionally, similar training was also conducted at NSWTTC in December 2021 for NCG personnel.
- **Maldives National Defense Force (MNDF):** The unit conducts training of MNDF in the Maldives in Asymmetric Warfare through a MTT. Additionally, since 2017 India and the Maldives have commenced Exercise Ekatha, with a focus on capacity building of the MNDF, as well as enhancing interoperability between the two forces.

Training of IN Personnel Abroad

In order to imbibe established best practices, expose our personnel to niche technologies/latest

procedures, enhance capacity building and develop intellectual infrastructure by inculcating new ideas into the system, the *IN* is deputing personnel to avail niche, technical and domain-specific courses in developed countries, in addition to doctrinal courses. Moreover, participation in courses in IOR countries, enables fostering of better relations between personnel and gives an insight into the thought process and operating philosophy of their Armed Forces and also increases our understanding of the country.

Primarily, *IN* subscribes to different professional military courses in the Indo-Pacific region and beyond. These courses vary from specialized short-duration courses (some less than a week), and long-duration courses (Staff, Higher Command and National Defence College equivalent courses, of about a year). Every year about sixty *IN* personnel (officers and sailors), are deputed to attend training courses abroad. These courses include both doctrinal as well as niche/domain-specific courses in developed countries.

Requirement of Approval from Empowered Committee (2017): All training courses abroad (other than invites/requests for courses with vacancies for more than one Service), did not require approval of the Empowered Committee (consisting of three Additional Secretaries) of MoD (Trg), prior to 2017. Since 2017, all training courses/visits abroad require the approval of Empowered Committee. Some of the categories under which training courses are availed of by the *IN* abroad are listed below:

Navy-Specific Courses: These courses are offered directly to *IN* through Staff Channels. All such courses are processed through the Department of Military Affairs (DMA)/Department of Defence (DoD) by the Navy.

Tri-Services Courses: These courses are sub-allocated by HQIDS on 2:1:1 ratio (Army:

Navy: Air Force) in rotation. All such courses are processed through HQIDS.

Courses on ‘Reciprocal’/‘Gratis’ Basis: Certain courses are offered on ‘reciprocal’/‘gratis’ basis, as is being availed of, by *IN* officers at the National Defence College (NDC), Bangladesh.

Cadet Exchange Programmes: The Ministry of Defence approved to undertake two Cadet Exchange Programmes (CEPs), i.e., two each ‘In’/‘Out’, per institution every year. The criterion for the exchange programme mandates the selection of one country from immediate/extended neighbourhood and the other from countries of interest.

Channelizing Research Output (2020): *IN* officers undergoing overseas courses submit their research work as part of the course curriculum, which is considered an intrinsic element of *IN*’s overall strategic communication. Officers authoring articles in foreign journals further facilitate a robust platform to reach out to FFCs and put across *IN*’s thought process/view-points on regional and global maritime issues, including geopolitical environment, maritime challenges, and R&D. Similarly, articles written by personnel from FFCs published in *IN* journals would assist us in garnering valuable first-hand information on relevant strategic and operational aspects pertaining to FFCs and other countries of interest. Accordingly, a detailed mechanism and methodology was promulgated in October 2020 towards exchange of articles/journals between the *IN* and FFCs.

Policy Initiatives

A few policy actions implemented in the previous decade that have helped in improving training standards included:

Extension of Watch-Keeping Tenure: Based on inputs from fleets, and to improve the proficiency

of young officers, from 2015 onwards, the watch-keeping tenure onboard ship was extended to a minimum of six months. This extension gives the young trainee watch-keeping officers an extra opportunity to hone their professional skills in preparation for forthcoming challenging afloat appointments. A watch-keeping log book was also promulgated, which stipulates the logging of various mandatory evolutions, exercises and activities for the award of a watch-keeping certificate.

Allowances Enhanced: In order to incentivize qualified instructors, the Seventh Central Pay Commission (CPC) enhanced the training allowance (24 per cent and 12 per cent of basic pay for different establishments). The recommendations of the Seventh CPC for enhanced allowances, was implemented with effect from 1 January 2016.

Conclusion

Personnel inducted into the complex network of warfighting must be taught and exercised appropriately to overcome the rigours that accompany the job profile. ‘Train as you will fight for you will fight as you train’ is the central theme of training in the Indian Navy. The revolutionized pace of the development of advanced military technologies and concepts demand a higher degree of professionalism than ever before. While conventional classroom instructions are necessary to achieve this, complementing these with training and exercises at sea is indispensable. This imperative stems from the fact that the operational complexities, the effect of weather on operations, and the high stress levels in the maritime environs can only be appreciated through experience at sea. The *IN*, therefore, places very high emphasis on

appointments and experience at sea, which is duly supported by focused training ashore.

In November 2017 Admiral Sunil Lanba (Retd), who was then Chairman Chiefs of Staff noted at the release Joint Training Doctrine that: the Wars of tomorrow would be increasingly joint and integrated in land, air, maritime, space and cyber domains. Whilst ‘individual Service Training’ will continue to play an important role, our emphasis needs to shift to a ‘Collective and Integrated Approach’ by developing joint operational ethos. Joint training will result in optimum utilization of resources and also lead to innovation in Doctrinal and Operational concepts through cross-pollination of ideas.

The *IN* has added new specialization verticals, skill sets and training infrastructure, and also adopted new training methodologies to match the needs of a future-ready technology enabled work force. While through this decade, the *IN* has primarily focused on ‘individual Service Training’ as a Navy that sails farther and remains deployed for durations longer than ever before, it has also increasingly along with the other two sister Services (the Army and the IAF) focused on jointness in training. Additionally, the *IN* as the ‘Preferred Security Partner’ in the IOR has also leveraged training as a medium for cementing its ties further with FFCs and establish itself as a responsible and stabilizing the military power of the region.

Note

- 1 Australian Government, Department of Defence webpage on Operations Analysis. <https://www.dst.defence.gov.au/research-area/operations-analysis#:~:text=For%20the%20defence%20context%2C%20this,of%20alternative%20strategies%20and%20decisions.>



21 | Maritime Warfare Centres and Wargaming

The Royal Indian Navy (RIN) Tactical Unit was established in 1942 at Churchgate, Bombay, and was the forerunner of the present-day Maritime Warfare Centres (MWCs). Today the *IN* has three MWCs (in Mumbai, Kochi and Visakhapatnam). The MWC in Kochi, in particular, has its origins in a Tactical Unit formed at Kochi in June 1951, which on 2 October 1954, was commissioned as a ‘Tactical School’ by Pandit Jawaharlal Nehru. The Action Speed Tactical Trainer (ASTT) was commissioned at this Tactical School in June 1957, as an upgradation of the existing facilities. The unit was renamed ‘School of Maritime Warfare and Tactics (SMWT)’ on 22 June 1974.

While the exact genesis regarding the setting up of MWC (Mumbai) and MWC (Visakhapatnam) is unclear, some strands of information emerged when Commodore SB Kesnur (Retd) spoke to Vice Admiral MP Awati, in July 2017. The Admiral said that during his visit to the United Kingdom (UK) in the late 1970s, he had come across a tactical trainer being extensively used by the Royal Navy and had pushed for something similar for our Navy. While the case for a simulator was progressed at Naval Headquarters, the Naval Dockyard (ND) was directed to make cubicles at the building earmarked as MWC. The Admiral also recollected that the cubicles were to be connected using telecom, a feature he had seen during his

tenure as Officer-in-Charge Signal School. This obviated the need for personnel movement among cubicles and brought the tactical training closer to reality.

The MWC in Mumbai was initially commissioned as ‘Tactical Trainer (TACT [B])’, under the stewardship of Captain RG Kumar on 9 May 1981, by Admiral Awati. Consequently, a ‘Tactical Trainer’ was also commissioned at Visakhapatnam on 10 September 1993.

In June 1998, Naval Headquarters awarded the contract for development and installation of the Action Speed Tactical Trainer (ASTT) system to M/s Macmet at a cost of Rs 20 crore. It was a sixteen-month, time-bound project, with delivery scheduled in March 2000. However, it was delayed by two-and-a-half years because CAMBER Corp of the US, which was a partner in the project, withdrew support in December 1999 consequent to sanctions by the US. This led to reworked arrangement of Commercial off-the-shelf (COTS) software brought up to the naval requirement by M/s Macmet. The system was finally commissioned at MWC (Mbi) on 16 September 2002. In October 2000, Tactical Trainers in Mumbai and Visakhapatnam and the SMWT at Kochi, were rechristened as MWCs. It was also recognized that MWCs would be

involved in other operational exercises/activities of the *IN*/respective Command Headquarters. Thus, implicitly or intuitively, the ambit of this unit was expanded.

In the last decade, with the increasing adoption of technology and maturation of new secure communication systems in the *IN*, a need was felt to develop a web-based wargaming software that could overcome the limitations of geography and scale. A growing Navy needed a scalable tactical trainer. The IHQ MoD(N) directed MWC (Vizag) to take up co-development of a new wargaming software in collaboration with the Institute for System Studies and Analyses (ISSA), an arm of Defence Research Development Organization (DRDO) in May 2017. The pursuit of the development of new software—Architecturally Refined Naval Wargame Software (ARNAV)—had thus begun. The deployment of ARNAV has been an extraordinary decadal milestone with respect to wargaming and tactical training at the

three Maritime Warfare Centres. Details with regard to the software are enumerated in the subsequent paragraphs.

⚓ ARNAV

Development and Deployment: Concerted efforts by ISSA and MWC (Vizag) resulted in achieving full functionality of the wargaming software ARNAV and the major aims of Project Technology Demonstrator (TD) were able to be achieved by July 2018. The software was formally handed over to the *IN* on 16 September 2019, in the presence of the then Vice Chief of Naval Staff and the Chairman, DRDO, at New Delhi. The systems were subsequently deployed at MWC (Mbi) in October 2020 and at MWC (Kochi) in November 2020. Post-deployment training programmes were also conducted by ISSA/DRDO Scientists at the three MWCs.

Key features of the software:



ARNAV Wargaming Software Handed Over to the Indian Navy

Source: Press Information Bureau

- It is a browser-based game and not restricted by number of cubicles and nodes with WAN-based architecture, allowing gaming between geographically dispersed locations with secure exchange of information.
- The sensor modelling is highly realistic and can be tweaked to achieve actual ranges, or increase and decrease pick-up ranges depending on requirements of the game.
- Weapon engagements model gives realistic damage assessment to the game control, based on INTEG-developed Decision Support Tools.
- The system allows for near-realistic presence of neutrals with the creation of MNF forces, merchant and civil air traffic.

ARNAV has versatile and user-friendly features, which enable globally playable wargaming scenarios between multiple forces and can be scaled from procedural to theatre-level games in real-time as well as high speed. Functionally, ARNAV integrates all facets of naval operations including surface warfare, undersea warfare, air warfare, coastal security, littoral warfare, electronic warfare, mine warfare and other real-world maritime security threat scenarios.

Network Trials: Extensive network trials of ARNAV wargaming software were conducted between January to August 2019 over Navy Enterprise-Wide Network (NEWN)/Virtual Local Area Network (VLAN) with an objective to ascertain the feasibility of playing major wargames between MWCs and other operational remote

locations. This was carried out with dummy data to check the data flow, game speed, end-to-end encryption and data-latency rates.

Demonstrations of ARNAV Software: A team of key officers and sailors, along with scientists from ISSA/DRDO, also carried out the demonstration of the software at various locations to exhibit capabilities and get critical feedback. The locations included the College of Defence Management (Secunderabad), Defence Services Staff College (Wellington), Professional Schools at Southern Naval Command, CG Headquarters, Visakhapatnam, and Western Fleet in Mumbai.

A gamut of activities, trials and training of personnel were undertaken. The first Navy-wide Wargame was conducted over NEWN on 16–18 December 2020. The second Navy-wide Wargame was conducted over NEWN from 31 December 2020 to 3 January 2021. The final Navy-wide Wargame was conducted over NEWN on 2–4 February 2021.

TROPEX-21 on ARNAV: TROPEX-21 was the maiden pan-Navy networked Wargame on ARNAV played between Blue and Red Forces from MWC (Visakhapatnam) and MWC (Mumbai), with MWC (Kochi) as Game Control and with IHQMoD(N) overseeing the progress of the game.

The ARNAV system in its current form is a Technology Demonstrator version. A full mission-mode project, 'Nauran', is currently under development and is slated to be installed at all three MWCs in the near future.



22 | Education Branch

Transforming Training Technologies

⚓ Introduction

The Education Branch has come a long way since 1928, when it was first established as ‘School Master’. Later rechristened the ‘Instructor Cadre’, and then as the ‘Education Cadre’ in 1971, its primary mandate was to raise the standard of education of the Boy’s Entry scheme (intake of boys aged between thirteen and eighteen, as Sailors). In 1948, increased intake, dynamic technological and overall institutional growth of the Indian Navy (*IN*) led to a steep upward growth curve for the Education Branch, especially with the establishment of the Directorate of Naval Education (DNE). The first ‘Direct Entry’ officers for this cadre were absorbed in 1963, with a career pattern at par with that of officers in other branches of the Navy. With the advent of the Naval Air Arm (1951), the Education Branch took on the additional responsibility of providing meteorological support services, as was mandated by the International Civil Aviation Organization (ICAO). With the raising of the Directorate of Naval Oceanology and Meteorology (DNOM) in 1982, the Education Branch gathered further traction.

Education Branch officers are primarily mandated for management of niche training technology used to impart scientific-technical instructions to all branches/cadres, officers and sailors, including personnel from Friendly Foreign

Countries (FFCs). In addition, Meteorological and Oceanographic (METOC) duties are also performed by qualified Education Officers for effective weather forecasting, oceanographic studies and to support Naval Air/Submarine operations at sea.

Today, the Education Branch mandate involves a plethora of roles. Some of these that merit attention include formulating policy and advising on all matters related to educational activities; conduct of examinations; training of instructors; foreign language training; administration of important grants; Navy-wide upskilling in areas of training technology; inter-institutional liaising with the National Council of Educational Research and Training (NCERT), the University Grants Commission (UGC), the All India Council for Technical Education (AICTE) and other institutions/Boards dealing with educational matters; administrative and intellectual support towards the running of Navy Children’s Schools as well as institutional interaction with the Central Board of Secondary Education (CBSE) and the Kendriya Vidyalaya Sangathan (KVS).

⚓ Developing Human Resource Capital

The Education Branch—because of its very role as the provider of institution-level knowledge managers and skill-development professionals—has been positioned at the forefront of training trainers as well as trainees. For instance, one such

milestone was the successful conduct of the first Convocation Ceremony for award of Bachelor of Technology (BTech) degree from Jawaharlal Nehru University (New Delhi) to sixty Officer cadets of the 84th Indian Naval Academy Course (84 INAC) in May 2013. These sixty cadets formed the first BTech batch, which commenced its training post commissioning of the Indian Naval Academy (INA), Ezhimala, in January 2009.

Likewise, in 2018, the Naval Institute of Educational and Training Technology (NIETT), the parent training school of the Education Branch, conducted a three-week, first-of-its-kind course in the *IN*, a Massive Open Online Course (MOOC) for its Sub Lieutenants via collaboration with the Indian Institute of Technology (IIT) Bombay. There were inbuilt modules in the programme. The entire MOOC was monitored jointly by the course officer at NIETT and a resource faculty from IIT Bombay. Over the last few years, the NIETT has configured the Moodle Software on the Southern Naval Command (SNC) Cloud Network for its gainful utilization. Moodle is a Learning Management System (LMS), where courses can be designed and contents structured and uploaded as per the Lesson Plans being followed in the Navy.

Indian Naval Examinations

The DNE is responsible for the conduct of In-Service Educational and Promotional Examinations for officers and sailors. Major examinations handled by the DNE are given below.

Educational Examinations:

- Navy Entry Artificer Scheme (NEAS) for sailors change of branch to Artificer entry.
- Leading Patrol Man (LPM) for sailor's change of branch to Provost Cadre.
- Prarambhik Hindi Pariksha, Madhyamik Hindi Pariksha and Uchcha Hindi Pariksha for award of proficiency in Hindi language.

- IT Specialization Examination for selection of officers and sailors for IT cadre.

Promotion Examinations:

- Command Examination (CDE) for selection of officers for command at sea;
- Professional Management Examination (PME) for promotion of officers to the rank of Commander;
- Commission Worthy (CW)—Artificer/ Non-Artificer for screening of sailors for consideration for promotion to officer rank under CW scheme;
- Education Test 1 (ET1) and Educational Test 1 (Modified) for promotion of domestic branch sailors to the next higher rank;
- Higher Education Test (HET) for screening of sailors for consideration for promotion to officer rank under Special Duty (SD) List;
- Leading Medical Assistant Qualifying Board exam for promotion of medical branch sailors (MA1) to the next higher rank; and
- Higher Rank Examinations (HRE) for promotion of eligible technical sailors to higher ranks.

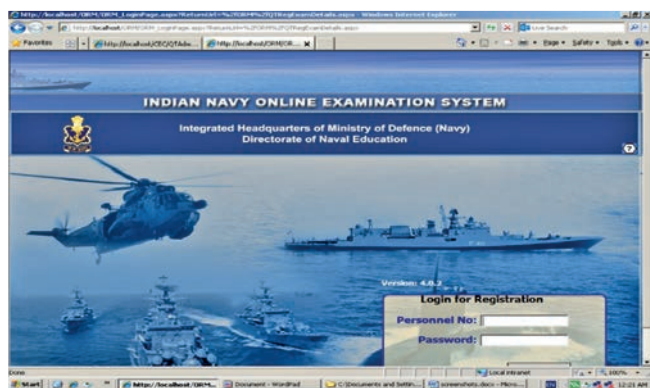
All examinations were conducted in conventional 'pen and paper' mode till 2010. Question papers were set by subject experts and were printed through the Government Printing Press and forwarded to Designated Examination Centres (DECs) through naval couriers for conduct of the examinations. On completion of examinations, evaluation of answer books were carried out centrally and the results published by the DNE.

Indian Navy Online Examination System

Leveraging the advent and proliferation of Educational Technology, the *IN* successfully implemented the Indian Navy Online Examination

System (INOES), an enterprise-level examination system for conduct of online in-service examinations in 2010. The INOES was commissioned with a Central Examination Centre (CEC) at DNE and nineteen online Designated Examination Centres (DECs) at various naval units for conduct of online examinations. On average, over 2,800 naval personnel appear in these examinations every year using INOES. The key benefits accrued from the system are as follows:

- With multiple examination centres at dispersed geographical locations, the requirement of personnel travelling to the nearest Command/Area Headquarters to appear in examinations has reduced, resulting in substantial man-hour and financial savings.
- INOES has automated the complete conduct of examination process reducing man-hours spent on setting question papers, invigilation and evaluation of papers.
- With automation, results are known instantaneously thus speeding-up post examination procedures and ensuring transparency. This has enabled motivation of personnel.



INOES Webpage

INOES 2.0: The next-generation INOES—the INOES 2.0—is in the process of development and is expected to be commissioned by mid-2022. INOES 2.0 encompasses 23 naval stations with 400 nodes for appearing in these examinations. Professional Management Examination (PME)

and Higher Rank Examinations (HRE) would also be migrated to online mode in a phased manner.

⚓ Professional Examinations

Clearing the PME is not only a mandatory requirement for an officer for promotion to the rank of Commander, but also serves as an important milestone in the career progression of an officer. Executive Officers become eligible to appear for the CDE only after passing the PME. The PME syllabus is revised once every three to five years to keep it relevant and current. Some of the major changes in PME in this decade are mentioned below.

PME for Special Duties (SD) List Officer:

Passing the PME was made a mandatory qualification for promotion to the rank of Commander for all officers, except Medical and Dental officers, with effect from 2009–10. A new promotion policy was implemented for SD List officers with effect from 1 July 2011, mandating this. The seniority of officers due for promotion, between 1 July 2011 and 30 June 2014, was protected to afford them three attempts to pass the PME. A separate syllabus with only three papers was approved for SD List officers.

Grouping of PME Papers: Analyses of CDE/PME results, and feedback obtained from the field, necessitated changes in a few regulations governing the qualifying criteria of the examination with effect from 2014. Officers had to mandatorily appear and attempt to qualify all PME papers (divided into Group 1 and 2) in the first attempt. Group 1 comprised: PME Paper I (Military/Naval History, Maritime/Current Affairs and General Knowledge), Paper II (Staff Duties, Administration, Law, Logistics and Leadership), and Paper III (Computer Applications and Nuclear Biological and Chemical Defence). Group 2 comprised professional papers IV, V, VI.

It was mandatory for officers to pass in all papers in a group in the same attempt. The qualifying marks and grading methodology were also revised. However, administrative constraints, the load on ships and establishments to spare officers repetitively, led to the grouping of papers being abolished in 2016; officers now have to attempt all papers the first time they take the PME; thereafter they are given unlimited attempts to resit those they did not pass, until they succeed.

PME for SSC O/P Officers: Short Service Commission (SSC) Observer/Pilot (O/P) officers had the same PME syllabus as that of Permanent Commission (PC) O/P officers, and this put them (SSC O/P officers) at a disadvantage due to limited ship tenure/exposure. The syllabus of Professional Papers for SSC O/P officers was, therefore, revised to cover only basic knowledge and was promulgated in 2020. However, if any officer was granted a PC, the officer had to reappear in the exam and qualify all Professional Papers as per the PC O/P syllabus. These officers would also be eligible for appearing in the CDE, subject to qualifying the PME with PC O/P officer syllabus.

Higher Rank Examinations: The HREs are conducted in March and September every year for eligible technical sailors for promotion to higher ranks. The DNE coordinates with the Professional Schools for obtaining Question Papers and conducts the examinations onboard ships and establishments. The frequency of HRE conducted for Engine Room sailors—for the Unit Watch-keeping Certificate (UWKC) and Engine Room Artificers (ERA 4) confirmation boards—was made quarterly with effect from June 2018 to ensure adequate availability of qualified ERAs, improving availability of throttle watch-keepers and providing enhanced shore rotation avenues.

Increase in Examination Centres: In-service professional and promotional written examinations were conducted at seven DEC's. In order to minimize movement of personnel in Gujarat area on temporary duties to the nearest exam centre for appearing in various in-service examinations, Porbandar was made a DEC in 2018. Similarly, the DEC at Visakhapatnam was the sole examination centre for all written in-service examinations on the eastern seaboard. To cater for personnel appearing in these examinations from Tamil Nadu area (HQTN&P, Indian Navy Ships *Parandu*, *Adyar* and *Rajali*), Arakkonam was designated as a DEC in 2019. With the addition of these two exam centres, in-service written examinations are now conducted at nine DEC's.

Qualified Special Duty (Graduate) Scheme

In the year 2000, it was observed that most Metric Entry Recruits (MERs) joining the Service were already 10+2 qualified and continued to pursue higher education through correspondence courses. Initially, the educational qualification required for commission in the Special Duty List (SD List) was qualifying the Higher Education Test (HET). Later, to motivate the sailors to acquire/pursue higher studies, it was decided to make a Bachelor's Degree an alternative eligibility criterion for selection to the SD List. From 2000, a Graduation Degree, viz., BA/BSc/BCom/BCA/BE was made admissible for sailors of all branches as the educational qualification for selection to the SD list. This scheme was known QSD (Graduate) Scheme. Later on, any graduation degree with Mathematics as a subject, was made mandatory to be considered for inclusion in QSD-(G) list. Those who had not studied Mathematics as a subject during graduation had to clear the HET Mathematics papers. Accordingly, NO 36/2014 was issued for conduct of QSD (Graduate) Scheme.

The list of sailors eligible for QSD-(G) is published twice a year in November and June, post scrutiny of applications received through respective Commands. Approximately 150 candidates qualify for SD List Selection under QSD(G) Scheme every year.

Indian Naval Entrance Test

The Indian Navy Entrance Test (INET) conducted twice a year, is the sailor's entry under the control of IHQ MoD(N)/Directorate of Manpower Planning & Recruitment. The INET is a two-hour long computer-based written examination. There are four sections, and the candidate is required to pass each of the four sections (English; Reasoning and Numerical Ability; General Knowledge; and, General Science and Mathematical Aptitude) with minimum 40 per cent marks. The DNE prepares Question Papers (QPs) for conduct of the INET sailor recruitment examination.

With the introduction of INET in February 2018, *IN* became the pioneer among the three Services to shift its recruitment examinations from the conventional 'pen and paper' mode to computer-based examinations. The first two cycles of INET were conducted on a pilot basis in February 2018 for recruitment of Artificer Apprentice (AA) entry only. The scope of INET was expanded to include all sailor entries and non-UPSC officer entries, resulting in a voluminous jump in the QP requirement. A typical INET cycle involved preparation of thirty-five to forty sets of QPs for various entries and maintaining of entry-wise separate bilingual Question Banks in both Hindi and English.

Libraries in the Indian Navy

There are sixty-four Naval Reference Libraries (NRLs) set up in Commands and major Establishments/Units/Ships/Directorates with

a view to promoting professional reading and inculcation of healthy reading habits among personnel. The libraries are run by qualified librarians at Command level and by naval personnel at Unit level.

Command	No. of NRLs
HQ WNC	20
HQ ENC	17
HQ SNC	19
HQ ANC	03
IHQ MoD(N)/Delhi Area	05

The libraries are allocated a Reference Library Grant (RLG) based on the requirement projected on an annual basis.

Financial Year	Amount (in Cr)
2015-16	2.95
2016-17	3.31
2017-18	12.33
2018-19	5.13
2019-20	2.63

e-Granthalaya: A Library Management Software (LMS) developed by the National Informatics Center (NIC), Ministry of Electronics and Information Technology, Government of India, e-Granthalaya is presently being used by NRLs across *IN* for carrying out the following functions:

- Maintaining catalogues
- Retrieval system
- Individual issue/return/renewal/reservation of books
- Accession register
- Networking of reference libraries
- Maintaining catalogues of items on display and in bindery
- Returns
- Maintaining of stock/loan register

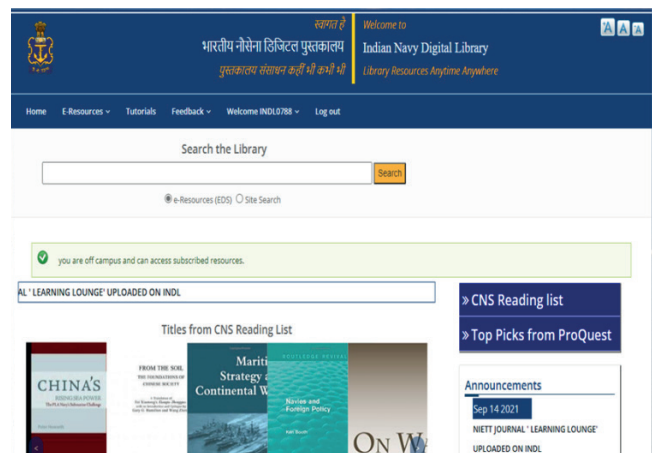


e-Granthalaya Homepage

Indian Navy Digital Library (INDL 1.0 and INDL 2.0): Emergence of digital resources, namely, e-books, e-journals etc., coupled with the development of IT infrastructure and services, cloud-hosted technologies and better network connectivity has created a favourable environment to enhance accessibility to digital contents irrespective of time and geographical location.

Libraries have redesigned content and information to add value and to satisfy changing information needs. The *IN* also decided to set up an internet-based *IN* Digital Library (INDL) hosting digital resources and launched INDL in May 2018. To ensure the availability of e-resources for INDL, the Reference Library Grant (RLG) allocation to NRLs and INDL was revisited. The vision was to sustain a hybrid approach wherein extensive use of traditional libraries (NRLs) and Digital Library (DL) augment each other.

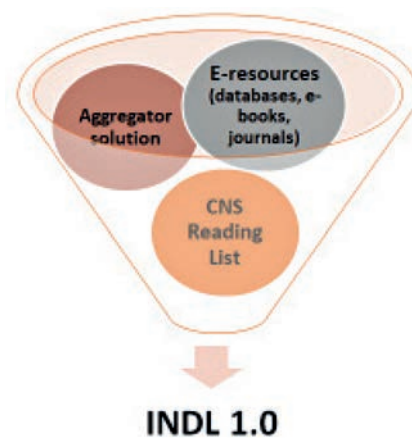
■ **INDL 1.0:** This version came into existence as an online central repository of subscribed and open source e-resources for the Navy. It aggregates e-books/e-journals/databases on a single portal for reading anytime, anywhere. Digital resources can be accessed through internet-enabled mobile phones, laptops, tablets, desktop PCs, etc. The facility was centrally operated and maintained by DNE. The INDL is the first of its kind among the Armed Forces



INDL Homepage

and has been a model for other services to emulate. Over the years, more than 50,000 naval personnel have registered on the platform. It was populated with e-resources catering to a variety of genres such as military, science, engineering, history and vocational. Prior to INDL, these expensive resources were only subscribed by Command Reference Libraries (CRLs) and the readership was limited. INDL ensures that these journals are within reach of all naval readers, including cadets at INA, Ezhimala.

Publisher
Proquest's Military Database
Proquest's Library Central
IHS Jane's Journals
EBSCO Database
World EBook Library



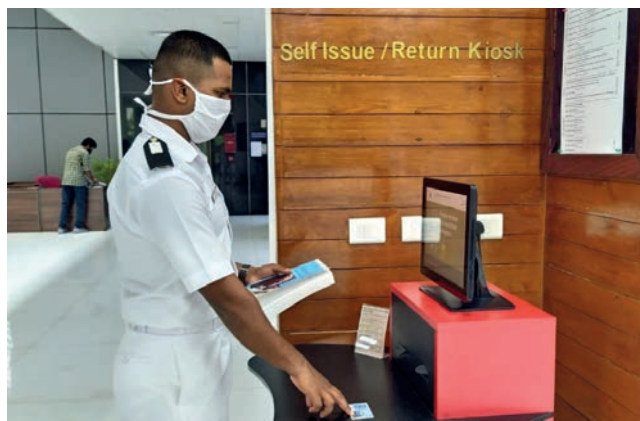
The benefits accrued due to INDL 1.0 are:

- Facilitation of anywhere/anytime library access;
 - Exploitation by training units and professional schools to keep up with technological advancements, new innovations and developments in various domains;
 - Fastest means of updated content availability, as and when the publications are available in the market; and
 - Aligned with the nation's Digital India vision and supports the 'Green Initiative', thereby reducing carbon footprint.
- **INDL 2.0:** INDL 2.0 launched by the Chief of Naval Staff on 18 May 2022 has an exhaustive collection of e-resources of various genres. It also includes, subscription for all 100 e-book titles from the Chief of Naval Staff (CNS) Reading List. In addition, it also provisions a revamped INDL web portal,

as well as a mobile application for enhanced user experience.

Naval Reference Library, INA: The INA is the premier training establishment for officers of the *IN* and is located at Ezhimala in Kerala. 'Panini', the new library facility at INA was inaugurated on 25 May 2013. This state-of-the-art library building caters to the needs of about 1,300 trainees and 400 personnel. It is a fully air-conditioned facility with five levels. The library is equipped with the latest library facilities like self-issue/return kiosk, radio-frequency identification (RFID) gates for access control, dedicated internet bays for accessing INDL. In addition, books have been barcoded/integrated with RFID for easy access and retrieval.

In financial year (FY) 2017–18, a one-time grant of Rs 10 crore was allocated to Panini, INA for enhancing the knowledge resources available at INA. The library has been well stocked with resources catering to the requirement of cadets and instructors.



INA Library

⚓ Higher Education for Naval Personnel

The focus of higher education in the *IN* is to enhance the professional advancement of naval personnel by collaborating with higher educational universities, colleges, institutes and signing memoranda of understanding (MoUs) with Government and private universities, colleges and institutions in India. The functions of higher education can be broadly divided into:

- Academic advancement for career progression of naval personnel;
- Academic advancement/Professional Education of Naval dependents and Defence Civilians;
- Academic advancement under Lateral Entry Scheme for medically boarded-out cadets of INA and NDA;
- Assured admission/concession in fee in top-ranked Higher Educational institutes for wards of naval personnel;
- Administration of IGNOU Navy Education Project (INEP); and
- Administration of Jamia-Navy Study Centre (JNSC) Delhi.

These activities are carried out with active involvement of the concerned academic

centre/university, either through an MoU or a collaboration. The following MoUs have been signed over the years:

IGNOU Navy Education Project (2000): The *IN* had signed an MoU for educational advancement of Naval personnel with IGNOU—the IGNOU-Navy Educational Project (INEP)—on 23 September 2000. The Project was aimed at helping naval personnel to acquire a graduate degree, facilitating appearance in exam for SD List. It was also aimed at the dependents to enhance their academic qualification as a welfare measure. The INEP is administered through four Naval Regional Centres functioning in New Delhi, Mumbai, Visakhapatnam and Kochi. Initially six courses were provided through INEP, presently thirty courses are being offered through INEP. As on 31 December 2021, 28,575 naval personnel and their dependants had benefitted from this MoU.

An MoU with Jamia Millia Islamia University (2015): An MoU was signed between the *IN* and Jamia Millia Islamia University (JMIU) on 8 October 2015 for career progression of naval personnel. JMIU has recognized the in-Service training of naval personnel and awarded suitable credits based on the credit value system



Renewal of INEP MoU in 2020



MoU Signed with Jamia Millia Islamia University

in accordance with the syllabi of JMIU courses. Eligible naval personnel underwent a final (one) year of study through distance learning. The JMIU offered MA (HRM) and MA (Education) for officers and BA/BBA and BCom for SD officers and sailors. In all, 4,990 naval personnel benefitted through this Jamia-Navy scheme till the MoU was in force upto 2021.

An MoU with DIAT (2019): An MoU was signed with Defence Institute of Advanced Technology (DIAT), Pune on 5 September 2019 for professional development of naval personnel and Defence civilians. The DIAT offers customized short-duration courses, diplomas, graduation, post-graduation) PG) and a part-time PhD programme for serving naval personnel and defence civilians.



Signing of MoU between Indian Navy and DIAT Pune

An MoU with Andhra University (2019): An MoU was signed on 20 February 2019, with Andhra University (AU) for academic enhancement of naval personnel and their dependants. The university offers PhD, MTech programmes for

naval personnel. It also provides lateral admission for medically boarded out naval cadets of NDA and INA, at the AU College of Engineering.

An MoU with ASIET (2019): The *IN* also signed an MoU with the Adi Shankara Institute of Engineering and Technology, Kochi on 27 June 2019 for academic enhancements of naval personnel/dependents and lateral admission for medically boarded out cadets of INA and NDA.

Collaboration with Universities: The *IN* has also collaborated with Universities/colleges/institutes to provide higher education facilities at concessional fee rates to wards of Naval personnel. Approximately thirty academic institutions have confirmed priority admissions to the wards of naval personnel at concessional rates.

Administration of INEP Regional Centres: The *IN* has four INEP Regional Centres (RCs) in Delhi, Mumbai, Visakhapatnam and Kochi. The RCs carry out the following responsibilities:

- Function as a Distance Education learning centre;
- Coordinate publication of admission notification to the issuance of degree;
- Organize counselling and practical classes in the recognized labs of IGNOU; and
- Function as a single point of contact in the acquiring of a degree by naval personnel and their families.

Professional Upgradation of Education Officers: To cater to the professional upgradation of Education Branch officers, the *IN* commenced collaboration with National Institute of Educational Planning and Administration (NIEPA), New Delhi in 2019. A premier training institute under the Ministry of Education for upskilling personnel handling educational duties, NIEPA offers training on the entire gamut of education administration, policies and implementation of curriculum. It is

also involved in conduct of Faculty Development Programme for Principals and Staff managing the Navy Children Schools.

Jamia-Navy Study Centre (JNSC) New Delhi:

Similar to the INEP RCs, the Navy has set up four Jamia-Navy Study Centres (JNSCs) in Delhi, Mumbai, Visakhapatnam and Kochi. In addition to all the activities carried out by Regional Centre for INEP, the JNSC prepares the mark-sheet depending upon the in-service course marks and provides credit as per guidelines of JMI Equivalence Committee, as per MoU prior enrolment in the JMI.

⚓ Navy Education Society and School Administration

The Navy Education Society (NES) was set up and registered with Registrar of Societies, Delhi, on 13 April 1987 under the Societies Registration Act XXI of 1860. The Patron-in-Chief of the society is the Chief of Naval Staff (CNS). The primary aim of NES is to provide quality education to the children of naval personnel. It lays down general policy and guidelines for the functioning of Navy Children Schools (NCSs), Naval Kindergartens (NKGs) and Little Angel Schools located at various naval stations across India.

Year of Naval Schools: One of the objectives of NES was bringing commonality in the functioning of naval schools while endeavouring towards a higher standard of education. To achieve the desired goals, a major overhaul strategy was adopted in 2015 as a five-year plan and was declared as 'Year of Naval Schools'. The plan envisaged improvements over a five-year period in school infrastructure, security and administration, academic performance, sports, extra/co-curricular activities in addition to the professional growth of teachers among other initiatives.

NES Inspection: The NCS' located at different naval stations spread across the country follow the respective State Government educational policies

and guidelines in addition to CBSE and NES guidelines. The NCS' at Coimbatore, Ezhimala, Porbandar, Karwar, Karanja are relatively new (set up during 2010–20), whereas, other NCS' have evolved over three to four decades. Over the years, variations in administrative and academic procedures were observed among the NCS'. To bring uniformity, Annual Academic Inspection of NCS' was instituted with effect from Academic Year (AY) 2017–18.

The NES representatives were tasked to evaluate NCS' on laid down parameters with respect to academic performance, financial health, educational infrastructure, human resource, etc. This initiative helped in standardizing the schooling facilities and adherence to the norms of regulatory bodies in the country.

School Enterprise Resource Planning: In addition, the attempt to standardize school administration resulted in developing a common school Enterprise Resource Planning (sERP) software. This software brought commonality among all the NCS' and eased day-to-day school administration in terms of online processing of admission, payment of fees, processing of salary, scheduling of classes and examinations, processing of academic results, online transfer of students' profile between NCS' etc.

Human Resource and Development: Induction, motivation and retention of best available human resources has been a priority for NES. A bi-annual teacher recruitment drive named Common Written Test (CWT) was commenced in 2017–18. The setting of question papers for CWT is centrally coordinated by NES.

Faculty Development Programmes (FDPs) to nurture the potential of teaching as well as non-teaching staff of NCS', NKGs and Little Angels were made a regular feature. A Centre for Faculty Development (CFD), was established at Kochi on 12 March 2019, funded and monitored centrally through

NES. To boost this initiative and increase professional interaction amongst schools, a High Definition Video Conferencing (HDVC) facility for all the NCS' was set up in 2019. Online workshops/Seminar and FDPs are regularly conducted. In addition to academic impetus, NES coordinated various other drives aimed at mentoring and guiding children.

To encourage the NCS staff to serve longer and deliver high standards of teaching-learning outcome, Long Service Awards and Outstanding Teachers Awards were instituted in AY 2017-18. Those NCS Staff who served for a duration of ten, twenty and thirty years in NCS, were awarded with Cash Awards, a Letter of Appreciation and an appropriate salver.

Focus on Overall Development of Students: To ensure all-round development of students despite changing schools often, a Common Curriculum for classes XI and XII was introduced across the Senior Secondary level. Accordingly, the maximum possible subject combinations for all three streams across all schools were implemented in AY 2017-18. Common Final Examinations (CFE) started in the same AY to help students prepare for board examinations while relieving the fear factor due to external assessment schemes. The NES Academic Award was introduced in AY 2017-18 to encourage meritorious students and recognize their academic excellence.

Career Guidance: Career Counselling for students of classes IX-XII to align their capability on possible career options, and choice of courses post completion of school education, commenced with effect from AY 2018-19. Towards this, NES concluded an agreement with I-Dream Careers (IDC) in AY 2018-19 to provide guidance to students of classes IX-XII of major NCS' located in Delhi, Port Blair, Mumbai, Visakhapatnam, Kochi and Goa. The IDC conducts Aptitude and Psychometric Assessment and gives a detailed analysis to every student.

Awakened Citizen Programme: An Awakened Citizen Programme (ACP) was introduced to provide Value Education at NCS Delhi in association with Ramakrishna Mission in AY 2018-19. The idea was well received and implemented at all NCS'. Selected teachers were trained by experts from Ramakrishna Mission; continuity in this programme has been maintained.

Extra-Mile Programme: In order to nurture high performers in classes X and XII the Programme was implemented with effect at NCS' from AY 2019-20. Since then, meritorious students are provided guidance by teachers to enhance the visibility of NCS' at the national level in academics.

School Uniform: Uniforms for NCS' and NKGs have been redesigned through the GD Goenka School of Fashion Design, Gurugram for the first time in 2019 to provide aesthetic appeal and better fabric. The uniforms came into effect on 1 April 2020.



Old Pattern Uniform



New Pattern Uniform

The Higher Order Thinking Skill (THOTS): The THOTS programme was introduced in NCS in July 2019. It is a unique method of developing and nurturing Higher-Order Thinking Skills in children of classes I–VI. Children gain hands-on experiences through innovative physical thinking tools.

Fitness 365: Fitness 365, a structured physical education programme, was implemented at NCS Delhi, Goa, and Visakhapatnam for students through an agreement with the firm ‘Fitness 365’. Other NCS’ have their own local arrangements on physical fitness aspects of the students.

COVID-19 Disruptions: The onset of COVID-19 pandemic and subsequent nationwide lockdown led to suspension of regular classes. The NCS’ adapted quickly and were amongst the leading schools in the country to conduct online classes from 29 March 2020. The following measures were undertaken to assure uninterrupted conduct of online classes at schools:

- Teaching-Learning process through online, offline and hybrid modes by training the teachers;
- Conduct of online examinations through Microsoft Teams, through combination of online and offline mode;
- Frequent online and offline interaction of teachers with parents;
- Workshops conducted on use of various open-source content, experimental learning and competency-based education;
- Live demonstrations of Science, Maths and Geography practicals from Labs to aid student learning and better assimilation of concepts;
- Uploading assignments and worksheets on Google platform, Microsoft platform and School Campus Care; and
- Extensive use of virtual lab platform ‘Olabs’; and
- Conducted and participated in inter- and intra-school CBSE and Directorate of Education online competitions.

The school ERP software was extensively used in conduct of online classes, scheduling of classes and weekly programmes as follows:

- Scheduling a time-table;
- Timely upload of datasheets and syllabus;
- Generating report cards;
- Generating Transfer Certificates;
- School-Bus tracking facility;
- Two-way communication with parents;
- Magazine, calendars, circulars, notices, other dissemination of important information; and
- Proviso for online admission during pandemic.

NES Conference: In order to chart a course of holistic development and evolve broader policies for naval schools, an NES Conference is held every year generally during October/November. The details of Annual NES Conferences held over last ten years and their locations are tabulated below.

Year	Location	Dates
2020	Maiden Online Conference via HD Video Conference facility at NCSs	17–18 December 20
2019	Mumbai	4–7 November 2019
2018	Visakhapatnam	14–16 November 2018
2017	Kochi	7–9 November 2017
2016	Karwar	3–4 November 2016
2015	Delhi	5–6 November 2015
2014	Delhi	13–14 November 2014
2013	Visakhapatnam	19–20 December 2013
2012	Kochi	21–22 November 2012
2011	Visakhapatnam	8–9 November 2011

Navy Children Schools: The number of NCS’ have grown with the expansion of the Indian Navy. Historical details and present status of the schools are tabulated below.

Name of NCS	Year Established	Classes (as on Year of Establishment)	Present Status (Classes up to 2020)
Delhi	1965	NKG	XII
Visakhapatnam	1965	NKG	XII
Kochi	1986	I	XII

Name of NCS	Year Established	Classes (as on Year of Establishment)	Present Status (Classes up to 2020)
Goa	1987	II	XII
Mumbai	1989	VI	XII
Arakkonam	1992	NKG	X
Port Blair	1996	V	XII
Okha	1999	NKG	II
Karwar	2011	V	X
Karanja	2011	II	X
Ezhimala	2015	III	VIII
Porbandar	2016	III	X
Coimbatore	2016	III	IX

Revision of NES Guidebook: The *NES Guidebook* was first published on 24 August 2004 and revised in 2013. The third edition of the *NES Guidebook* was published on 14 October 2019. The latest edition is comprehensive and covers all aspects related to setting-up of schools, day-to-day functioning, recruitment of staff and other major issues.

Naval Sector Kendriya Vidyalayas: The DNE provides cover to thirty-one naval sector KVs located at various naval stations. Though these KVs are directly administered by KV Sangathan through regional offices, the Directorate keeps a watch on broader concerns such as appointment of teachers, opening of new KVs in naval stations, maintenance/upgradation of existing KVs, requirement of admission of children of naval personnel in KVs. It also coordinates issues with KV Sangathan, New Delhi. Commodore (NE) represents IHQ MoD(N) at the KV Board of Governors meeting chaired by Hon'ble Minister of Education as Chairman.

A scheme of additional allocation of six seats for admission in KV, under the discretionary power of Commodore (NE) (then Principal Director Naval Education)—in addition to 100 seats distributed in the ratio of 5:2:3 among Army, Navy and Air Force respectively under Hon'ble Human Resource Development Minister's quota for children of military personnel—was introduced in March

2015. A special provision for the allocation of five additional seats in each section of all classes, at the naval-sector KVs for the children of naval personnel, was also introduced in KV Admission Guidelines from AY 2019–20. This provision catered exclusively for naval personnel who move on transfer after the admission deadlines in KVs are over, and are unable to secure admission through usual admission procedure.

Hard Stations KVs: A case for declaration of KV Chilka and KV Ezhimala as Hard Stations due to remote location and non-availability of facilities was taken up in the 107th KV Sangathan (KVS), Board of Governors meeting in 2018. Both the KVs were declared as Hard Stations on 27 January 2020, at the meeting chaired by Hon'ble Education Minister (previously HRD Minister) and Chairman, Board of Governors, KVS. Declaration of these KVs as Hard Stations facilitated faster filling up of vacancies in these schools as KVS accords priority for appointing teachers to these schools.

⚓ Naval Institute of Educational and Training Technology

Importance of Training: Training has been and will remain the foremost peacetime activity of any developed/developing nation's Armed Forces. In this ever-evolving landscape of Training and Educational Technology, constant vigil is necessary to tap new technology, for better training efficacy in the Navy. As the focus shifts to training, the role of trainer becomes important. The Naval Instructor has an all-encompassing responsibility of being a role-model, mentor, counsellor, coach, etc., besides imparting instruction in professional subjects. Hence, moulding naval personnel into quality instructors with acceptable Instructor-like Qualities (ILQs) is vital for maintaining high training standards in the over thirty-three training schools/establishments of the IN.

Genesis: With the growth of the *IN* and naval training, concepts of instructional technique and teaching methods gained prominence in the Navy by 1960s. The *IN* realized the importance of every Instructor achieving the laid-down training objectives. Since, there was no formal training in these areas, Senior Education Officer (SEdO), INS *Venduruthy* was designing and conducting short capsules/workshops for officers and sailors undertaking instructional responsibilities at various major training units under SNC. In addition, all Officers joining the *IN* as Education Officers, post completion of their Basic and Divisional (B&D) School phase, were attached to INS *Venduruthy* for five weeks to be trained by the SEdO.

Naval Institute of Education (NIE)

With the efforts of SEdO, INS *Venduruthy*, a short capsule on Instructional Technique (IT) was added to the syllabus of officers and sailors undergoing professional courses at Kochi. Soon, it was realized that sound understanding of Instructional Techniques and Teaching Methodology was essential for naval instructors. Consequently, a dedicated training Unit called Naval Institute of Education (NIE) was set up on 25 April 1971 and started functioning at Cochin on the lines of Royal Naval School of Education and Training Technology (RNSETT), United Kingdom.

Growth of NIE to NIET: As the Institute's role took shape and the naval training requirements grew, a need was felt to institute proper short-duration courses in Instructional Techniques and Methodologies. Accordingly, the *IN* deputed few Education Officers for an eight-week course at the Technical Teachers Training Institute, Madras (now the National Institute of Technical Teachers' Training and Research, Chennai). The course covered aspects related to Teaching Techniques and Methodologies, Training Design, Training

Evaluation, Teaching Aids and Audio-Video Aids, etc. On completion of the course, few of these trained officers were appointed to NIE as staff. These officers under the guidance of the Officer-in-Charge, got on with the task of designing new short courses for naval personnel posted to training Units as Instructors. These courses were broadly called the Methods Course. With the conduct of regular courses on a periodic basis, NIE evolved into Naval Institute of Education and Training (NIET).

Evolution of NIET: Teams from NIET started visiting major training units to familiarize on training management and training design.



Present-day Printing Press

Though the Institute was making steady progress, it lacked requisite manpower. In mid-1982, with lot of persuasion, Naval Headquarters posted more officers with technical background. The NIET started focusing on the technology aspects in design and conduct of training.

NIETT Today: NIETT grew in leaps and bounds over the years with the expertise gained in Training Technology. The training needs of the growing and expanding *IN* and the change in focus of naval training were adequately met by NIETT. It is also mandated to provide specialist training to the Coast Guard (CG), the Army, the IAF and international participants. The year 2020 saw interactions with IIT Bombay for evaluation and revision of SLT

(Edn) syllabus; M/s Neo Film School for revamp of photo course syllabus; M/s Manorama School of Communications for revamp of Media capsule; and nomination of an Education Officer for M.Tech in Education Technology at IIT Bombay in 2020.

⚓ **Conclusion**

Over the decade, the Education branch has ensured that educational resources are standardized, digitized and made available to naval personnel, in alignment with the nation's digital India vision and keeping pace with the advancements in teaching technologies. Promotional exams have migrated to the online mode, launch of Indian Naval Digital Library has given access to an exhaustive collection of e-resources which is independent of both time and geographic location. This has led to the promotion of professional reading and inculcation of healthy reading habits among naval personnel and their families. The signing/renewal

of Memorandum of Understandings with Institutes of repute have ensured the professional educational advancement of naval personnel. To provide quality education to naval children, five Navy Children Schools (NCS') were set up in the previous decade, in addition to the existing eight NCS'. The Navy Education Society got activated commencing 2017-18 with a myriad of new concepts/ projects getting implemented for the betterment of education being imparted in the NCS'. The NCS' continue to be well subscribed for their standards and quality.

With increasing demands in the educational standards and qualifications of personnel from recruitment and through their careers, the Education Branch had to unlearn and learn new methodologies to meet the aspirations of the current generation of the *IN*. It wouldn't be amiss to mention that in totality over the decade, the Education Branch has brought about a relevant changes in the academic character of the naval fraternity.



23 | Strategic Research and Knowledge Management

In October 2015, at the release of the Indian Maritime Security Strategy¹, the then Chief of Naval Staff Admiral RK Dhowan noted:

The last decade has witnessed India's dependence on her maritime environment expanding substantially as her economic, military and technological strength grew, her global interactions widened and her national security imperatives and political interests stretched gradually beyond the Indian Ocean Region. There seems little doubt today that the 21st century will be the 'Century of the Seas' for India and that the seas will remain a key enabler in her global resurgence. The Indian Navy today remains the principal manifestation of India's maritime power and plays a central role in safeguarding and promoting her security and national interests in the maritime domain. The Navy's roles and responsibilities have also expanded significantly over the years in response to changing geo-economic and geo-strategic circumstances.

The growth of the Indian Navy (*IN*) through the last decade, be it in terms of asset induction, technology absorption, capability and capacity additions has been reflected in the previous chapters, however, an equally important aspect critical to the *IN*'s current and future growth trajectory has been its institutionalized impetus on strategic research through institutionalized knowledge management.

Internal Strategic Research and Knowledge Management Frameworks

The Indian Naval Strategic and Operational Council (INSOC) was created in 2006 as the *IN*'s apex body dealing with strategic and operational level issues. It is presided over by the Chief of Naval Staff (CNS) and comprises designation-based members as well as members chosen on the basis of their aptitude for research, strategic thinking and subject-matter expertise. The research focus of the INSOC members and other dedicated organizations within the *IN* is largely guided by the 'INSOC Tasking Orders' or ITOs. A total of sixteen ITOs have been promulgated by INSOC since its inception and include research on a wide range of issues, such as 'Force Structuring', 'Manpower for the *IN* 2030', 'Indian Navy as a three Carrier Force – Analysis of Imperatives', and others. Some prominent organizations largely responsible for organizational strategic research and knowledge management include the Directorate of Strategy, Concepts, and Transformation (DSCT) in Delhi, Maritime Doctrines and Concepts Centre (MDCC) in Mumbai and the Naval War College (NWC) at Goa. Both MDCC and NWC operate under the Flag Officer Doctrine and Concepts (FODC), and the DSCT reports directly to the Chief of Naval Staff (CNS). The research areas and activities

conducted by the three organizations are described in the succeeding paragraphs.

Directorate of Strategy, Concepts and Transformation (DSCT)

DSCT was established as a captive ‘Think Tank’ in 2005, and has acted as a driver for concept and strategy formulation for the Navy. While the charter of DSCT is quite large, the organization undertakes analysis on contemporary issues, impinging on maritime matters in order to leverage opportunities that may present themselves, and also pre-empt challenges that may arise. The DSCT has been responsible for conduct of multiple studies and subsequent framing of publications for pan-*IN* strategic guidance. Some of the most prominent studies conducted by DSCT in the last decade are tabulated below.

Document	Year	Summary
Indian Navy Vision Document	2014	Concrete ‘Vision Statement’ of the <i>IN</i> with broad implementation ‘Way Points’.
Indian Navy in the 21 st Century – Maritime Security for National Prosperity	2014	A pictorial narration of the <i>IN</i> ’s multifarious endeavours, versatile platforms, fine personnel and unique contributions to national security and development.
Ensuring Secure Seas – Indian Maritime Security Strategy	2015	Provides guidance for deployment, growth, and development of the <i>IN</i> and the measures thereof to achieve India’s maritime security objectives.

Maritime Doctrines and Concepts Centre (MDCC)

The FODC was established in 2006 as a single-point coordinator to synergize naval and Services doctrines, concept development process, as well as issues linked with strategic thinking within the

Navy. MDCC, an operational arm of the FODC, was also set up in the same year. MDCC has been responsible for framing and publication of doctrines and concepts for pan-Navy, and is also tasked to undertake studies related to the changing nature of maritime operations and war fighting.

Naval War College

In 1986, to upgrade and evolve the training profile of officers to match requirements of modern warfare, an inter-service committee of the three Vice Chiefs was constituted by the Chiefs of Staff Committee.

Inception of the ‘College of Naval Warfare’ and relocation from Karanja to Goa: The CNW was established in 1987 at Karanja to impart mid-career professional courses. A twenty-four-week Naval Higher Command Course (NHCC) commenced from 1988 for Executive, and Technical Branch officers of the rank of Captain/Commander. In its initial years CNW also established linkages with Mumbai University and started accommodating Army, IAF and CG officers as well, increasing throughput. Simultaneously, there was an enhancement of course curriculum, which increased the course duration.

While the CNW at Karanja had been a success, there were many challenges presented especially due to limited estate and its geographical separation from Mumbai city. Other limitations included restrictions on visits by foreign personnel, restrictions on transport to the island, and limited accommodation (given the increasing numbers of course participants). In light of these challenges, the *IN* sought to relocate CNW from Karanja (Mbi) to Goa.

Following the Government of India’s sanction, CNW was rechristened as the Naval War College (NWC) in 2010 and plans to shift it to Goa gathered momentum. This decision was preceded by the shift of the Indian Naval Academy (INA)

to Ezhimala in May 2009. On 13 April 2011 orders were received to shift NWC by August. The procedure commenced in June and was completed by September 2011. Courses began on schedule in the new location at Goa.

Today, the NWC conducts a wide-array of courses/programmes such as the national and maritime security programmes for Flag Officers/equivalent, Combined Operational Review and Evaluation (CORE) programmes; Naval Higher Command Courses (NHCCs), Technical Management Courses (TMC) and the Regional Maritime Security Courses (RMSCs). Additionally, an initiative has been taken by NWC has helped establish ties with Naval War Colleges in the US, Japan and Myanmar. Some of the decadal milestones in respect of NWC are listed below.

Maritime Security Course Introduced (2016): With an aim to provide a forum for developing common understanding of regional maritime security issues, enhancing regional maritime cooperation and disseminating the *IN*'s perspective on the subject, the *IN* introduced the Maritime Security Course (MSC) at NWC, Goa, for participants from nations of the IOR and beyond since 2016. For the participants, the aim is preparation for leadership at the strategic and operational levels by developing critical thinking, analytical ability and proficiency in Operational Art.

The MSC is conducted for a duration of eight weeks with a three-week familiarization phase followed by five weeks of training conjoined with the NHCC. The module includes International Relations Theory, International Maritime Law, United Nations Convention on the Laws of the Sea (UNCLOS), Energy and Natural Resources Security, Information Sharing, MDA, International Political Economy, Indian Ocean Studies as well as table-top Humanitarian Aid and Disaster Relief (HADR)/Out of

Area Contingency (OOAC) exercises. Five international students attended the maiden course in 2016–17. From 2019–20 the number of vacancies has been increased to accommodate candidates from twelve countries.

Goa Maritime Symposium (2016) and Goa Maritime Conclave (2017): Since 2016, the NWC has been conducting the GMS and GMC in alternate years, as an annual diplomatic and regional cooperation forum on maritime matters under the overall MEA/MoD framework. The GMC is conducted every odd year towards achieving better synergy among friendly littoral navies and sees the participation of Service Chiefs of the regional navies.

The GMS, represented by heads of Naval War Colleges of regional navies, is conducted every even year at NWC, Goa, and facilitates working-level discussions between the participants. The outcomes are presented at the next GMC to the Chiefs of participating navies for further deliberations.

Doctorate Programme Introduced: The *IN* initially did not have an institutionalized PhD programme. Interested officers would pursue a doctorate by availing study leave or other formal leave of absence instruments. The majority of the doctorates being pursued were in technological fields, with minimal PhDs in the humanities. Also, since taking leave was the only option, the *IN* found that career officers did not pursue PhDs.

Subsequently, in 2012, the *IN* promulgated a policy to offer PhDs in the humanities through the NWC. The NWC thereafter approached Mumbai University (MU) to obtain recognition for itself as an institution authorized to grant a PhD. Though MU indicated approval, it first required NWC to have qualified guides. As an interim measure, NWC engaged civilian and retired service personnel who had completed a doctorate in corresponding fields as visiting faculty.

Five officers enrolled for a PhD and this marked the beginning of an institutional push for making a PhD accessible for interested naval officers. Between 2012 and 2020 a few naval officers completed a PhD. A case was subsequently taken up with MU to recognize those in-service officers who had completed their PhD, as guides/faculty at NWC. The MU gave its approval for this in 2021, and this has provided a major boost to NWC's PhD programme. With increasing demand, a case was taken up with the MU in February 2020 to increase the vacancies by an additional ten seats and the NWC now has thirty-four vacancies.

Combined Operational Review and Evaluation (CORE) Programme: The CORE programme is an annual event for select officers of the rank of Rear Admiral and equivalent from the three Services and their civilian counterparts working in the ministries of External Affairs, Home Affairs and Defence. It is a week-long refresher course covering important aspects of national policy and current affairs, while also deliberating on the future outlook on all geopolitical issues.

The CORE programme has been conducted in rotation by the three services, and in 2019, it was conducted by the *IN* at NWC, Goa. Subsequently, HQ IDS has decided to hold this programme at New Delhi to enable greater participation of the civilian Government functionaries.

Duration and Format of the Naval Higher Command Course: The flagship course of NWC, the NHCC is designed for officers in the rank of Captain (*IN*)/equivalent in the Army, IAF and the CG. To sustain the higher aim of fostering inter-service integration, officers from the Army and IAF are nominated by their respective services to undergo the NHCC. Since NHCC 2015, the course has been extended to the CG as well. Additionally, a five-week Joint Operations Capsule 'JOCAP' is undertaken at Army War

College, Mhow, by officers enrolled in Higher Command Courses at their respective Service War Colleges.

In 2016, the NHCC format was modified to commence in April/May, with a one-week Familiarization Phase, followed by fourteen weeks of non-contact phase and forty weeks of contact phase.

The NHCC provides knowledge on international and maritime law, strategy and policy issues, and exposure to higher staff coordination aspects in the planning and conduct of Naval and Joint Forces for major operations. The course includes education visits to major civil and military establishments around the country and an educational tour to a foreign country.

Operational-Level Wargaming Centre (2017): Integrating technological methods in training is best reflected in the Operational Level Wargame, which was commissioned and operationalized at NWC, in March 2017. The OLVGC is a landmark achievement, as it deals with logistics issues and also provides hands-on training on computer-based wargaming at the operational level.

Preliminary training by Weapons and Electronics Systems Engineering Establishment (WESEE) team, on Sprint I software, was completed in August 2017; and subsequently the software was upgraded to Sprint II version in December 2017. A full-fledged maiden operational-level wargame was conducted for the thirtieth NHCC in January 2018.

⚓ **Civil–Military Partnership for Strategy Incubation**

In cognizance of this growing role of the *IN* in the 'Century of the Seas', not only in the maritime domain but also as one of the vital levers of international diplomacy, the *IN* has made particular efforts through the decade to increase

the pool and deepen the extent of exposure of officers. The officers are exposed not only to institutional strategic thinking through domestic and international courses at military institutions, but also by being deputed to reputed think-tanks across the country. These deputations have served as a bridge to connect military and academic thinkers, and have also resulted in increased two-way diffusion of ideas and concepts.

All of this has contributed positively to the growth and democratization of strategic thinking beyond the confines of military institutions whilst also providing a maritime perspective to civilian strategic thinkers. It thus takes a significant step in overcoming the perceived sea-blinded outlook. In addition to serving officers, many retired *IN* officers have also joined prominent think-tanks, which has aided in research and publications with tangible outcomes, pivotal to the maritime domain. Some of the salient interactions of the *IN* with prominent think-tanks in the previous decade are outlined in the succeeding paragraphs.

National Maritime Foundation

The NMF, a Navy-supported think tank, was established in New Delhi in February 2005 as the nation's first maritime think-tank for conducting independent and policy-relevant research. The NMF was the brainchild of Late Vice Admiral KK Nayyar, and he imbued it with a single-minded focus of being a bright and enduring beacon that would seek to dispel India's maritime blindness. As the founder-chairman, he helmed the NMF in its formative years and established it as a leading voice that would guide India's maritime discussions and policy. The NMF is supported by the *IN* and the Ministry of Defence (MoD) and its research encompasses a wide range of important economic, socio-economic, socio-cultural, scientific, legal and historical issues, all of which are critical to 'maritime India'. These include among others, drawing out the

operational framework of Security and Growth for All in the Region (SAGAR), providing specificity to the Indo-Pacific Oceans Initiative (IPOI) and Blue Economy. Major activities undertaken by NMF and of relevance to the *IN* are listed in the following paragraphs.

Seminar and Conferences: First conducted in 2018, the Indo-Pacific Regional Dialogue (IPRD) is the apex international annual strategic conference of the *IN* and is the principal manifestation of the *IN*'s engagement at the strategic level. The NMF is the *IN*'s knowledge partner and the organizer of each of these events. The IPRD aims to generate tangible policy options and policy-relevant recommendations. The themes of the IPRD since its inception are tabulated below.

Year	Theme/Topics of Discussion
2018	Maritime trade, regional connectivity, pan-regional challenges (such as persistent maritime surveillance, the increasing digitization of maritime space and cyber-malevolence within the maritime domain), and the role of industry in enhancing holistic maritime security.
2019	Practical solutions for achieving cohesion in the region through maritime connectivity, measures to attain and maintain a 'Free and Open' Indo-Pacific, examining a regional approach to Blue Economy, and opportunities from Maritime Industry 4.0 and regional opportunities arising from SAGAR and <i>Sagarmala</i> .
2021	Evolution in Maritime Strategy during the 21 st Century: Imperatives, Challenges, and Way Ahead.



IPRD 2019

Source: National Maritime Foundation

Fellowships: With an aim to advance policy-relevant maritime scholarships and research at NMF, the following fellowships were instituted.

- Admiral AK Chatterji Fellowship: Instituted in 2011 by his family and offered to serving naval officers and civilian researchers alike, to encourage research projects on issues pertaining to relevance to India's maritime development.
- Vice Admiral KK Nayyar Fellowship: Established in May 2020 by the family of Vice Admiral Nayyar.

Interaction with IFC-IOR: NMF researchers also actively participate in events conducted by the Information Fusion Center–Indian Ocean Region (IFC-IOR) and officers of the IFC-IOR are invited to participate/attend relevant NMF-organized events. The NMF is the preferred agency to construct and sustain intellectual bridges between the IFC-IOR and organizations, such as the European Union's (EU) Project Critical Maritime Routes Indian Ocean (CRIMARIO-II), as also information sharing and/or fusion centres set up under the aegis of the Indian Ocean Commission (IOC) in countries such as Madagascar, Mauritius the Seychelles and Comoros, and also those governed by the Djibouti Code of Conduct (DCoC).

Events on Maritime Law: The *IN*, in partnership with the NMF, conducted the following:

- An interaction on the 'Risk of Maritime Confrontations Emanating from Conflicting Viewpoints (different interpretations) of the United Nations Convention on the Law of the Sea (UNCLOS)' on 27 August 2021.
- A two-day interaction—on UNCLOS Law of Armed Conflict, the *San Remo Manual*, and maritime crime—on 8–9 September 2021, with officers on a Long Course.

Diplomatic Interactions: The *IN* and NMF also conduct significant interactions with foreign naval

delegations for discussions at conceptual levels for furthering service-to-service dialogues involving the academia. Most visiting naval chiefs are accorded invitations to discuss current geopolitics and exchange of ideas in a congenial environment with the NMF faculty.

United Service Institution of India

The USI of India is India's oldest tri-Service think-tank founded in 1870, by Colonel (later Major General) Sir Charles MacGregor, for furtherance of knowledge in the art, science and literature of national security, in general, and of the Defence Services, in particular, and was registered as an institution on 2 January 1874. The USI has about 15,000 members, comprising officers of the security forces, diplomats, bureaucrats, academicians and scholars. It has niche expertise in the field of national security, geopolitics, military heritage, UN Peacekeeping operations, professional skill developments of policy-makers and Revolution in Military Affairs.

The USI and the *IN* enjoy a very close collaboration. Naval officers have been holding senior positions in the USI Management such as the President/Vice President of the USI Council and/or the Chairman of the Executive Committee of the USI. A number of *IN* officers are deputed at the USI to undertake guided research projects on strategic affairs with focus on maritime issues. The USI also runs a Chair of Excellence, the Admiral RD Katari Chair. A number of books have been published by USI written by research scholars under this Chair as also by serving naval officers deputed to USI. The USI's Centre for Military History and Conflict Studies (CMHCS) has also been engaging with the *IN*, on matters related to military and naval history.

Observer Research Foundation

The ORF began its journey in 1990, during the period of India's transition to a new engagement

with the international economic order, followed by the emergence of several geopolitical challenges. Since its inception, ORF has emerged as one of the major think-tanks participating in the broader dialogue on Indian foreign policy and its role at a global level. With the aim to globalize the Indian diplomatic outreach, narrative and exchange with foreign scholars engaged in foreign policy, an annual event—the Raisina Dialogue—has been conducted by ORF since 2016, with the *IN* commencing its participation at this event since 2017. The conference is hosted by ORF in partnership with the Ministry of External Affairs (MEA), Government of India. The *IN* has involved its participation by sending CNS/C-in-C level distinguished officers for the conferences to present views over a wide range of maritime subjects with current relevance. Since its inception, subjects have encompassed the politics of the Asia-Pacific, the various issues of concern in the Indo-Pacific and themes on twenty-first-century global risk factors among others.



Raisina Dialogue 2018

Source: Observer Research Foundation



Raisina Dialogue 2020

Source: Observer Research Foundation

Apart from participation at the Raisina Dialogue, a closed-door workshop on the topic, ‘Debating Sea Power Conundrums: Preparing for a New Era of Warfare’, was organized with participation from the *IN* on 30 July 2019.

⚓ Conclusion

The proliferation of technology in war-fighting, the growing geopolitical churn, the rise of non-state actors, and many other dynamic factors have shaped military strategic planning in the last decade. The increasing complexities that need to be factored by military planners into their tactics and strategies now require cross-domain expertise to identify constraints and opportunities to formulate or recalibrate doctrines. Considerable exposure is provided to *IN* officers on ‘Strategic Thinking’ through courses at Defence Services Staff College, Higher Command Courses, at Naval War College, Goa, Higher Defence Management Course, at College of Defence Management, Secunderabad and many other such courses at various stages of their careers. Additionally, the *IN* also has its own think tanks—DSCT in Delhi and MDCC in Mumbai. Despite institutional mechanisms, the *IN* has identified that overcoming the complex challenges mentioned earlier would require diffusion of expertise across domains. Think tanks have enabled the creation of a knowledge bridge between the non-uniformed domain specialists with military planners and strategists.

Think tanks, both within the military and outside, focus on matters of security and defence, observe and study changes in the global landscape across various verticals that affect force preparedness and war-fighting. In the last decade, the *IN* has increased its footprint across various think tanks by either positioning officers or through active participation at events conducted by prominent think tanks, both at the national and international

level. Officers deputed at various think tanks are assigned topics of research that are relevant to the Navy. This increased impetus has been largely aimed at democratizing strategic thinking across the vast pool of experts beyond military. The *IN*, as a result of such interactions, is today not only more engaged, but has also emerged more agile in its policy planning, especially in the face of new and

emerging challenges as well as opportunities in the maritime domain.

Note

- 1 Indian Navy (2015). *Ensuring Secure Seas: Indian Maritime Security Strategy*. Indian Navy Naval Strategic Publication (NSP) 1.2. New Delhi: Ministry of Defence (Navy), Government of India. https://www.indiannavy.nic.in/sites/default/files/Indian_Maritime_Security_Strategy_Document_25Jan16.pdf w



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Organizational Changes in Higher Defence Architecture and National Security

In a historically transformative reform, the Hon'ble Prime Minister Narendra Modi announced the creation of the post of Chief of Defence Staff (CDS) on 15 August 2019. As a follow-on to this, the Government of India created the Department of Military Affairs (DMA), headed by the CDS, on 1 January 2020.

The decision to create the post of CDS was based on the 1999 Kargil Review Committee recommendations. Headed by K Subrahmanyam, the Committee endorsed a comprehensive review of the national security framework for improved decision-making in defence matters. Based on this report, a Group of Ministers in 2001 suggested the creation of the post of CDS (a long-deliberated issue on reforms related to the higher defence organization), to bring more jointness and integration in the Armed Forces.

⚓ Chief of Defence Staff

On 15 August 2019, the PM, in his address to the nation, made the announcement regarding the CDS. The step was aimed at fostering expertise in defence matters for better and more informed decision-making.

The PM said:

India should not have a fragmented approach. Our entire military power will have to work in unison and move forward. All the three (services) should move simultaneously at the same pace. There should be good coordination and it should be relevant to the hope and aspirations of our people. It should be in line with the changing war and security environment with the world. After formation of this post (CDS), all the three forces will get effective leadership at the top level.

On 24 December 2019, the Government of India approved the creation of the post of CDS and of the DMA within the Ministry of Defence (MoD). The CDS was also appointed as Secretary DMA and as Permanent Chairman of the Chiefs of Staff Committee (COSC), through this notification. This was aimed at further enhancing the quality of military advice to political leadership, through integration of service inputs.

Need for CDS: Towards reforming Higher Defence Management, the creation of the post of CDS was considered essential as it was envisaged that such a reform would:

- Ensure coordinated military advice to the political hierarchy;
- Assist in better management of Joint/Tri-Services structures created to meet the demands of the full spectrum of warfare across multiple domains;
- Facilitate effective Inter-Service prioritization to ensure holistic Capability Development within the available budget, while contributing towards integrated capacity enhancements to deal with contemporary and futuristic threats;
- Facilitate seamless integration between the three Service headquarters (SHQs) and the MoD by cross-staffing of personnel, creating more functional structures, thereby increasing efficiency, reducing duplication, and ensuring faster decision-making and ease of doing business; and
- Strengthen the post of the COSC leading to faster and more effective resolution of complex Tri-Services issues.

As the 'first among equals', the four-star rank of CDS was additionally assigned to:

- Be Member of the Defence Acquisition Council, chaired by the Raksha Mantri;
- Be Member of the Defence Planning Committee, chaired by the National Security Adviser (NSA);
- Be Military Adviser to the Nuclear Command Authority; and
- Act as the Principal Military Adviser to RM on all Services matters, so as to advise the political leadership.

The notification went on to amplify that the three Service chiefs would continue to advise the RM on matters exclusively regarding their respective Services. Overall military command, including command over the three Service chiefs,

was kept out of the purview of the CDS, to allow him to provide impartial advice to the political apex.

The CDS' charter of duties is as follows:

- Administer the Tri-Services organization, and Organizations and Commands related to Cyber and Space;
- Bring jointness in operations, logistics, transport, training, support services, communications, repairs, and maintenance of the three Services;
- Ensure optimal utilization of infrastructure and rationalize it through jointness among the Services;
- Implement the Five-Year Defence Capital Acquisition Plan (DCAP) and the Two-Year roll-on Annual Acquisition Plans (AAP) as a follow-up of Integrated Capability Development Plan (ICDP);
- Assign inter-Services prioritization to capital acquisition proposals based on anticipated budget; and
- Bring reforms in the functioning of three Services, aimed at augmenting combat capabilities of the Armed Forces by reducing wasteful expenditure.



India Gets Its First Chief of Defence Staff

Source: Press Information Bureau

Former Chief of Army Staff General Bipin Rawat was appointed the country's first CDS on

31 December 2019. He passed away in a helicopter crash, near Defence Services Staff College, Wellington, on 8 December 2021.

⚓ Department of Military Affairs

The CCS approved the creation of the DMA on 1 January 2020. The DMA was assigned the responsibility of spearheading several reforms within the military establishment towards optimum utilization of national resources, enhancing inter-Services synergy and jointness, and steering the modernization of the military to face the challenges of modern warfare.

The overarching principle being, whilst the Department of Defence (DoD) deals with the defence policies of the country, the DMA is entrusted with work related to military affairs.

The DMA's Scope: The DMA has been allocated the following subjects to avoid duplication of functions with other defence-related ministries:

- The Indian Armed Forces (the Army, Navy and Air Force);
- The MoD's Integrated headquarters comprising Army, Navy, Air and Defence Staff;
- The Territorial Army;
- Works related to the Army, Navy and Air Force;
- Procurement exclusive to the Services, except capital acquisitions, as per relevant rules and procedures;
- Promoting jointness in procurement, training and staffing for the Services, through joint planning and integration of their requirements;
- Facilitating the restructuring of military commands for optimal utilization of resources by bringing about jointness in operations, including through establishment of joint/theatre commands; and
- Promoting use of indigenous equipment by the Services.

The DMA's Organizational Structure: Organizationally, the DMA was allocated 159 civilian officers from the Department of Defence. For subject matter expertise, serving officers from the three Armed Forces with ranks equivalent to Additional Secretary (one officer), Joint Secretaries (three officers—one from each Service) and several directors and deputy secretaries, were appointed.

Outcomes So Far

Joint Services Study Group: The JSSG is developing common logistics policies such as planning, procurement, inventory-maintenance, distribution, disposal and documentation. A pilot project, based on the establishment of three Joint Logistic Nodes (JLN) in Mumbai, Guwahati and Port Blair, was initiated. The last JLN was inaugurated on 1 April 2021 at the naval Material Organization, Mumbai.

Joint Doctrines: As a move forward from a Single Service Approach to integrated planning and execution, three Joint Doctrines were formulated in 2020, while new Joint Doctrines on Space, Cyber and Intelligence Surveillance and Reconnaissance have also been promulgated.

Scaling Down: More than 270 logistic installations of the Indian Army have been either scaled down or closed down, to enhance the 'Teeth-to-tail' ratio to enhance combat capability and balance defence expenditure.

Review of Training Methodology: A holistic review is underway to modernize, integrate and rationalize training, to ensure optimal utilization of infrastructure and resources. Ten subject areas have been fixed and will be covered during joint training of the three services. Joint training has already started in five areas.

Positive Indigenization Lists: Aligning with the goal of 'Aatmanirbhar Bharat', the DMA released

the First Positive Indigenization List in August 2020, comprising 108 items to be procured from indigenous industries. This was followed by a Second List in May 2021 and a Third List in December 2021. The lists include major combat platforms, advanced weapon systems, armament and ammunition. The DMA has been aiming at issuing new lists at regular intervals to foster a robust defence industrial ecosystem in the country.

Other initiatives, such as establishing Theatre/Joint Commands and a Tri-Services Joint Working Group on integrating communication networks, have also progressed considerably.

⚓ **National Maritime Security Coordinator (NMSC)**

Background: The focus towards the maritime domain under the national vision of SAGAR, Sagarmala, Blue Economy and Mission Deep Ocean and so on, are indicative of India's aspiration to make the Exclusive Economic Zone (EEZ) a hub of economic activities. The Group of Ministers Report on National Security 2001 recommended an apex body for the management of maritime efforts for institutionalized linkages between the Indian Navy (*IN*), the Coast Guard (CG) and concerned Central and state ministries.

Formation: Between 2001 and 2004, an apex body for the management of maritime affairs was proposed as a three-tier structure—comprising Cabinet Committee on Maritime Affairs with the PM as Chairperson, followed by National Maritime Commission with the NSA as Chairperson, and then the State Maritime Commissions in the nine coastal states and four union territories (UTs).

In 2007, came the proposal for establishing the post of Maritime Security Adviser and an advisory board. However, the terror attacks on Mumbai on 26 November 2008 again led to the recommendation for the establishment of a National Committee

on Strengthening Maritime and Coastal Security (NCSMCS) against threats from the sea.

On 7 August 2009, the NCSMCS—headed by the Cabinet Secretary with representatives of Central ministries, the Armed Forces, and the Intelligence agencies including several state security agencies—was established to ensure timely implementation of these measures.

In 2015, MoD proposed the setting up of National Maritime Authority headed by a Maritime Security Adviser, and in 2016 the Ministry of Home Affairs (MHA) proposed the setting up of a National Coastal Security Authority. In 2018, the CCS approved the reorganization of the National Security Council Secretariat (NSCS) leading to the integration of all aspects of national security, including maritime security.

On 17 December 2020, a Strategic Policy Group Meeting headed by the National Security Adviser—and including participants from other crucial offices such as the CDS, CNS, and from ministries such as Defence; External Affairs; Ports, Shipping and Waterways; and Home Affairs; and security agencies—agreed to the creation of the post of a National Maritime Security Coordinator (NMSC). Consequently, the CCS approved it on 10 November 2021. The NMSC would:

- Be equivalent in rank to a Secretary to the Government of India;
- Work under the National Security Adviser;
- Work within the structure of the NSCS; and
- Preferably be a retired Indian Naval Officer with domain expertise.

Vice Admiral G Ashok Kumar (Retd) assumed responsibility as the first NMSC of India on 16 February 2022.

Scope and Function of NMSC: Substantial investments have been made by the Government both at Centre and state levels to augment coastal



India's first NMSC at IFC IOR

and maritime security infrastructure to fully realize the potential of the maritime domain. However, several aspects such as financial, scientific, environmental, and security (currently dealt by various ministries and departments), require better coordination. The constitution of an NMSC under the NSA is a 'Whole of Government' approach to enable multi-agency coordination to evaluate such issues and facilitate development and implementation of maritime-related policy inputs.

The NMSC, supported by a multi-disciplinary Maritime Security Division, will:

- Address the maritime domain as a seamless space from the point of view of national security;
- Coordinate matters related to maritime security among Central ministries and agencies, and between Central and State security authorities; and
- Be a member of all existing coordination mechanisms for maritime security, including coastal and offshore security.

The NMSC's charter of duties covers a wide range of functions at the strategic and

policy levels as well as coordinating response during contingencies.

State Maritime Security Coordinators: The SMSCs, who will work under the NMSC in the nine coastal states and four coastal UTs, were formerly Nodal Officers for Coastal Security. Their redesignation as SMSCs was approved by the Union Cabinet, since coastal states and UTs play a predominant role in the coastal security framework—especially in maintaining law and order within territorial waters, management of marine fisheries and non-major ports.

The SMSCs are nominated by respective State Governments/UT administrations and will interact regularly with the NMSC at the Centre through institutionalized mechanisms for effective coordination.

The evolving nature of security threats that the nation faces mandates that the structures and verticals of security constantly metamorphose to meet new challenges. With a large area on land and at sea, it is but imperative that the ambit of security overarchingly encompasses land, sea and air jointly in its processes rather than single entities. Thus the creation of the CDS for the defence forces—and more importantly, the creation of the DMA to support the CDS as a part of the MoD—are both watershed moments. Similarly, with the global outlook going maritime for the prosperity of any nation, the creation of the NMSC to oversee all matters maritime will go a long way in streamlining procedural activities and improve control and coordination between multiple stakeholders. The nation is poised for momentous changes in its security domain.



25

Medical Branch

Health Management for a Sound Mind and a Fit Body

⚓ Introduction

Over the years, the Indian Navy (*IN*) has evolved into a fighting force with multi-dimensional combat capabilities. Given the unique domains in which the *IN* operates and its personnel and assets being away from land for prolonged times, the Medical Services in the *IN* have kept pace in terms of ability to provide prompt and optimal medical support in an operational role. They have also made pathbreaking contributions in fields as diverse as underwater medicine, Hyperbaric Oxygen Therapy and Aerospace Medicine among others, and have kept stride with cutting-edge growth in the medical field. In addition to Medical Services, the *IN* also has Dental and Nursing Services and paramedical staff to provide holistic health care to personnel and their families.

This chapter encapsulates the events and milestones of the Medical Branch during the decade 2011–21. The enhancement and upgradation of medical infrastructure facilities and technologies have been an ongoing effort to help it play its onerous role of being the primary enabler of medical support to the naval fraternity. Policy-based interventions have also helped it keep apace with ongoing developments.

In addition to providing its services to naval personnel and their families, the *IN*'s Medical



Responding to the COVID-19 Pandemic

Branch has employed its manpower, facilities and resources in Humanitarian Aid and Disaster Relief (HADR) and Search and Rescue (SAR) operations during eventualities within the country as well as the extended neighbourhood in and around the Indian Ocean Region (IOR). Indian Naval Medical teams have also been a constant in the *IN*'s expeditions to the North Pole, Antarctica and the South Pole, and Mount Everest over the past decades.

⚓ Background

After India attained Independence in 1947, the existing medical healthcare establishment within the country under the Royal Navy was taken over by the Army. In 1949, the Indian Armed Forces Medical Services was formed as an amalgamated service to look after the medical needs of all three

Services. Over the next few years, some of these shore establishments were transferred to the *IN*, the first hospital being Military Hospital, Colaba, which was commissioned as the Indian Naval Hospital Ship (INHS) *Asvini* on 18 September 1951.

Over the last seven decades, the *IN*'s medical services have seen tremendous expansion and the *IN* now boasts ten commissioned Indian Naval Hospitals, of which two were commissioned in the last decade. All the *IN*'s major hospitals are commissioned naval units and are traditionally designated as Indian Naval Hospital Ships (INHS). Each hospital is allotted a mythological or historical name related to the field of medicine and each hospital, like any other naval unit, has its own crest symbolizing its unique character.

⚓ Expansion/Upgradation of Medical Infrastructure

The section below highlights the units commissioned, as well as upgradation of the existing facilities as part of the capital expansion that was undertaken in the last decade.

Commissioning of Hospitals: The sixty-bed hospital, INHS *Navjivani* at Ezhimala, was commissioned on 12 December 2012 as the ninth Indian Naval hospital. The main role of this hospital is to provide specialist medical coverage to Officer Cadets undergoing training at Indian Naval Academy (INA), Ezhimala.



Commissioning of INHS *Navjivani*

Naval Hospital Karanja was commissioned as INHS *Sandhani* on 24 December 2018. It provides medical cover in all basic specialities to all entitled personnel, including Defence civilians at Karanja. With this commissioning, INHS *Sandhani* became the tenth Naval Hospital to be accorded the status of a commissioned hospital. INHS *Sandhani* is presently undergoing expansion from a sixteen to a thirty-bed hospital as approved by the Ministry of Defence (Navy) in January 2016.



Commissioning of INHS *Sandhani*

The commissioning of Naval Institute of Dental Sciences (NIDS) as the first Indian Naval Dental Center *Danteshwari* took place on 12 December 2018. It provides multi-specialty dental cover to all entitled personnel in the naval station of Mumbai.



Commissioning of INDC *Danteshwari*

Miscellaneous Infrastructure

Creation of Special Psychiatric Rapid Intervention Team (SPRINT) for Mental Well-Being: In addition to the physical well-being, the *IN* places

emphasis on the mental well-being of its personnel both at sea and shore establishments. Keeping this objective in view, the Special Psychiatric Rapid Intervention Team (SPRINT) was established at Visakhapatnam and Mumbai to provide preventive and interventional psychiatric care primarily to personnel. The staff includes a Psychiatrist and Psychiatric Nursing-qualified Nursing Medical Assistants.

Medical Facilities at Advanced Operational Base (AOB), Rambilli: In 2017, Government sanction was accorded for a forty-bed hospital to be built at AOB Rambilli. As part of Phase I of Project Varsha, a case for upgradation of this hospital to a 299-bed multi-specialty hospital, along with a Class I SHO, Type 'C' Dental Centre, Radiation Emergency Medical Centre (REMC), Dockyard Dispensary and peripheral MI Rooms was made.

Fleet Medical Store Depot (FMSD), Port Blair: The *IN*'s first FMSD, received the Government's sanction on 28 April 2015. This FMSD caters to the crucial medical store requirements of the Andaman and Nicobar islands. It was inaugurated by Director General Medical Services (Navy) on 27 February 2017.

Sanction for Manpower Complement of Single-Chair Dental Centres: The *IN* has nine ashore and four afloat units of single-chair Dental Centres. To meet the needs of additional manpower for these units, the Government of India approved accretion of thirteen Dental Officers and forty sailors in March 2019 to the equivalent of Type 'C' Military Dental Centers of the Indian Army.

Establishment of Class III Station Health Office (SHO) at Chilka: In January 2020, a Government sanction was accorded for the establishment of a Class III SHO at Naval Station *Chilka* with accretion of manpower, by creation of nineteen posts along with authorization of transport for three vehicles.

Personnel and Services: In March 2018, the *IN* received fifteen Medium Ambulance Vehicles from M/s Ashok Leyland. These were delivered to various hospitals and other units in March 2018, thus, augmenting the casualty evacuation and patient carriage capability at various naval stations.

Ongoing/Future Upgradation Projects

As part of capital expansion, various *IN* hospitals are undergoing infrastructure expansion. Details are mentioned below:

Upgradation of INHS *Kalyani* from 206 Beds to a 604-bedded Command Hospital: The upgradation of INHS *Kalyani* at Visakhapatnam from 206 beds to 604 beds, received its initial approval in December 2014. The file was thereafter submitted to MoD/DMA to obtain administrative approval in November 2021.

Upgradation of INHS *Sanjivani* from 275 Beds to a 439-bedded Super-Speciality Hospital: Similarly, the upgradation of INHS *Sanjivani* at Kochi from 275 beds to 439 beds was approved by the MoD on 22 July 2016. Presently, the Project is awaiting its final submission for approval.

Upgradation of INHS *Patanjali* from 141 Beds to a 409-bedded Hospital: To augment infrastructure and other facilities at Naval Base Karwar under Phase-IIA, upgrading INHS *Patanjali* at Karwar from 141 beds to 409 beds was proposed based on approval from the Cabinet Committee of Security (CCS), in December 2012. Government sanction for accretion of 751 posts—39 officers, 43 Military Nursing Service (MNS) officers, 425 sailors, and 244 civilians—for the upgradation of the hospital was obtained on 13 December 2021.

Naval Medical Branch Operations (2011–21)

The *IN*'s Medical Branch has remained in the forefront with regard to providing services during

calamities. Some of the more noteworthy operations are elucidated below:

Cyclone Hudhud (2014): A massive cyclone, Hudhud, hit Visakhapatnam on 14 October 2014 causing widespread damage in the city and its residential areas. The *IN* conducted a medical camp at Naval Advanced Operating Base (NAOB) Rambilli, Wada Narasapuram Village, with a team of five medical officers and eight medical sailors. The camp provided free medicines and laboratory facilities to over 700 patients, including women and children affected during the cyclone.

Op Megh Rahat (2014): As part of the Op Megh Rahat during the flood relief operations in the erstwhile state of Jammu and Kashmir,¹ an *IN* medical team comprising a specialist medical officer in anesthesiology and two OR-trained medical assistants were deputed to augment efforts at 92 Base Hospital, Srinagar on 15 September 2014 for ten days.

Op Rahat (2015): The *IN* played a crucial role in Operation Rahat by evacuating Indian citizens and foreign nationals from Yemen during the 2015 military conflict between Saudi Arabia and its allies, with Yemen. The evacuation by sea began on 1 April 2015 from the Port of Aden. Yemen became inaccessible by air due to a no-fly zone and therefore India chose Djibouti as a centre for initial evacuation by sea.

Indian Naval Ship *Sumitra* was deployed for evacuation of Indians and other nationals from Yemen. The ship undertook five evacuation operations—one each at Aden (31 March 2015), and Ash Shihr terminal (5 April 2015), and three at Al Hodeidah (2 April, 9 April and 15 April 2015). During the evacuation process, a number of medical contingencies were encountered such as pregnant women, diabetic patients, heart patients, people with injuries and sick infants, among others. A total of 794 evacuees were given medical aid

during the passage from Yemeni ports to Djibouti, with only one medical officer and three medical assistants onboard.

Kollam Temple Fire-Rescue Mission (2016): A team of three medical officers and six medical assistants from INHS *Sanjivani* were rushed to Kollam for providing medical relief to the victims of a temple fire incident. The team established a medical detachment at the helipad with the help of local resources. At the end of the camp, additional relief material and medicines were distributed among the local hospitals involved in treating the victims of the fire.

Sri Lanka Flood Relief (2017): INS *Jalashwra* and INS *Kirch* from Visakhapatnam and INS *Shardul* from Kochi were tasked to embark Medical Disaster bricks and HADR Stores, and to deploy medical and diving teams to flood-affected areas of Southern and South-Western region of Sri Lanka. Three medical teams consisting of four medical officers and ten medical sailors were embarked for the mission.

Medical campsites were established as per the directions of local administration and a total of 1212 patients were managed for various medical conditions. The medical teams were praised for their efforts by His Excellency, the High Commissioner of India, the Foreign Minister of Sri Lanka, and the Commander of the Sri Lankan Navy. The then Sri Lankan Foreign Minister, Ravi Karunanayake, who was present to receive the ship said, 'We are grateful to India for sending relief at such short notice, so quickly.' He added, 'India's move to send relief materials demonstrated Indo-Lanka relations which are at excellent level.'

Cyclone Ockhi (2017): During Cyclone Ockhi that struck southern India from 28 November to 4 December 2017, several *IN* Ships with medical teams and stores were deployed for HADR and

SAR Operations. Thirteen survivors were rescued from the sea off Kochi and were brought to INS *Garuda*, where they were given primary care and medically stabilized.

Flood Relief Operations at Kerala, ‘Op Madad’ (2018): Op Madad was another domestic HADR Operation conducted by the *IN* during Kerala floods in August 2018. Six medical teams from the *IN* comprising ten medical officers, two nursing officers and twelve medical assistants were deployed. Medical stores, hygiene chemicals and rations were provided by INHS *Sanjivani* and INHS *Navjivani* for medical support during Op Madad.

37th Indian Scientific Expedition to Antarctica, (2017–18): The first Indian to set foot on Antarctica, during India’s first expedition to the frozen continent in 1981 was an Indian Naval Officer Lt Ram Charan. Surgeon Lieutenant Commander Salim J Thomas was part of this twenty-one-member team to provide medical cover. As a continuing practice, the *IN* medical team members formed part of the 37th Scientific Expedition to Antarctica conducted by the Ministry of Earth Sciences.

The medical teams at Maitri provide round-the-clock medical services throughout the year and conduct fortnightly mandatory medical examinations of all expedition members to monitor general health and pick-up abnormalities early, if any. The medical team also monitors the medical stock and undertakes maintenance of medical and surgical equipment. Medical support is provided to the convoy team, along with preventive services.

Surgeon Lieutenant Commander S Karthikeyan served for more than 500 continuous days in Antarctica. This, as per the available records, has been the longest period that any medical doctor among the three Services has served in Antarctica till date.

Quarantine Camps for Civilians During COVID-19 (2020): Forty-four civilians from the erstwhile state of J&K who were paying a pilgrimage visit to Iran were repatriated to India due to the COVID-19 pandemic and were quarantined at Material Organization (Mbi) March 2020. This was the first quarantine centre set up by the Navy. The repatriates were transported back to J&K after testing negative for COVID-19 after a duration of four weeks. The detailed actions, innovations and efforts of the medical fraternity in handling the pandemic is written separately in the chapter on COVID-19.



Quarantine Camp at MO(Mbi)

⚓ Women Officers in the Medical Branch

The *IN*’s first woman officer was Surgeon Lieutenant Daisy Pereira, who was commissioned on 4 September 1944. Since then, many more women have donned the naval uniform. In a first, two consequent Commanding Officers of INHS *Asvini* were women officers—Surgeon Rear Admiral Sheila S Mathai handed over the baton of INHS *Asvini* to Surgeon Rear Admiral Arti Sarin in February 2021.

Also, after a hiatus since 2004–05, a number of women officers have been posted on board ships of the Western and Eastern Fleets in 2021. Surgeon Rear Admiral Arti Sarin was the first Flag Officer to participate in an ocean sailing event, covering a distance of over 4,500 nautical miles onboard Indian Navy Sailing Vessel (INSV) *Bulbul*, based at Kochi, from 23–28 December 2020.



Surgeon Rear Admiral Sheila S Mathai Hands Over to Surgeon Rear Admiral Arti Sarin

⚓ Changes in Policies

Revision of Navy Order (2019): The importance of Combat Casualty Care has mandated compulsory training of all naval personnel in basic life-saving measures and Advanced Trauma Life Support (ATLS) for medical personnel. To achieve this objective and to train *IN* personnel, the *IN* revised its order in February 2019 pertaining to medical organization in support of Naval Operations at Sea during war, including planning, preparation and execution.

Foreign Deputation—Specialist Medical Officers at Male and the UN: An *IN* medical team of specialists is deputed every year at Military Hospital, Male (the Maldives) to provide medical assistance to the Armed Forces population of the country. Additionally, specialist medical officers are being deputed for the United Nations Organization Stabilization Mission in the Democratic Republic of the Congo or MONUSCO, an acronym based on its French name Mission de l'Organisation des Nations Unies pour la stabilisation en République démocratique du Congo, since 2021.

⚓ Advancements in the Navy's Medical Services

Portable Containerized Medical Facility (PCMF) onboard INS *Gbarial*: The need for an HADR ship to render medical aid during disasters was considered inescapable. Accordingly, in the interim, a Portable Containerized Medical Facility

was created as a standalone medical facility that could be integrated onboard LST(L) class of ships to convert it into a 120-bedded hospital with twelve isolation and three intensive-care unit (ICU) beds. The PCMF also has the capacity to provide for an operation theatre, laboratory and radiology services at short notice. The PCMF, with its integral back-up power supply, the fitment of medical equipment in containers and the integration with the LST(L), was completed in time and successful sea trials were undertaken in December 2021. The PCMF is a unique facility and enhances the *IN's* capacity to respond to HADR-related medical requirements.

Organ Donation and Transplantation (2018): A fifty-six-year-old veteran was admitted to INHS *Asvini* after suffering a severe head injury in a road accident in January 2018. Sadly, the veteran's life could not be saved. After due consent, the heart, liver and kidneys from the patient were successfully retrieved, harvested and transported to Fortis Hospital, Mulund and Global Hospital, Lower Parel, by forming a Green Corridor. This was the first time in the *IN's* history that three organs were harvested for transplantation. The surgical team at INHS *Asvini* was headed by Surgeon Commodore CS Naidu, the then Assistant Command Medical Officer at Headquarters Western Naval Command (HQWNC).

Medical Emergencies at Sea of Significance: The *IN's* Medical Services deal with a wide range of medical emergencies while at sea. Three instances of successful medical assistance are mentioned below:

- On 8 May 2020, Surgeon Lieutenant Commander Manivaram M found a sailor lying unconscious onboard a submarine at sea off the coast of Visakhapatnam. The medical officer resuscitated the sailor via CPR and successfully evacuated him to INHS *Kalyani*, where he made a full recovery.
- In September 2020 a forty-five-year-old civilian, a survivor of Cyclone Tauktae had been swept

out to sea and had suffered hypothermia. He was rescued and brought onboard INS *Kolkata*, where he recovered due to prompt medical treatment.

- A thirty-two-year-old sailor, diagnosed with severe COVID-19 pneumonia onboard INS *Beas* was successfully stabilized at sea and later transferred to INHS *Asvini* by air in April 2021.

e-Annual Medical Examination (e-AME)

Module: The *IN*'s efforts to digitize its processes, include the development of an e-AME module by the Medical Directorate at Naval Headquarters in consultation with the Directorate of IT. The e-AME format, when ready, will replace physical paper copies to enable:

- The smooth conduct of AME;
- Effective monitoring of AMEs; and
- Creation of a digital repository of individual medical records.

The Journal of Marine Medical Society: The Journal, published by the Marine Medical Society, is a biennial, multi-specialty medical academic read, indexed with the Directory of Open Access Journal (DOAJ) and Web of Science (Extended Science Citation Index). The JMMS was hosted online in 2017 by MedKnow, a division of Wolters Kluwer.

⚓ Training Initiatives

Diploma Courses at SOMA (2011): Diploma courses for the *IN*'s medical sailors commenced at the School of Medical Assistants (SOMA) in 2011. The Diploma courses were duly recognized by the Maharashtra Institute of Health Sciences (MUHS), Nasik, and were aimed at giving a major impetus to the *IN*'s paramedical training.

Accredited Courses in BLS/ACLS/ITLS (2018): With effect from 2018, accredited courses in Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS) and Intermediate Trauma Life Support (ITLS) were included in the curriculum for all courses being conducted at SOMA. These

courses were duly certified by the American Heart Association.

Indian Naval Paramedical Skill Competition

(2018): In order to upgrade the skills of the *IN*'s paramedical personnel in clinical and life-saving measures, the Indian Navy Paramedical Skill Competition was instituted. The first competition was held at SOMA on 24–25 September 2018 and the team from Headquarters Eastern Naval Command (HQENC) was declared the winner.

MD Marine Medicine: Approval of the National Medical Commission (NMC) was accorded to Institute of Naval Medicine for commencement of three-year MD course in Marine Medicine as a replacement for the Diploma in Marine Medicine (DMM). The approval was a result of the *IN*'s decade-long efforts. With the grant of this approval, the Institute of Naval Medicine has become the only institute in the country to offer this course.

⚓ Telemedicine in the Indian Navy

Specialists, super-specialists and the material/infrastructure support required by them often cannot be deployed on sea-going vessels and made available at remote locations. To address this issue, in early 2011 the *IN* initiated a project to develop a vibrant and functional telemedicine system that would provide personnel with specialist and super-specialist consultation both at sea and ashore.

A limited trial over INMARSAT network was conducted at Eastern Naval Command using equipment provided by M/s Cisco India Pvt Ltd and Defence Bioengineering & Electromedical Laboratory (DEBEL). The trials were satisfactory, but equipment and connectivity between ships and shore establishments, needed improvement. Further, the equipment used by both agencies was primarily terrestrial in nature, and hence was bulky. It had not been specifically designed for the maritime environment in terms of ruggedness, portability and

performance. However, in light of the possibilities opened up by such technology, the CNS declared telemedicine as a ‘Naval Thrust Area’.

Subsequently, in 2012, DEBEL conducted a trial of their equipment utilizing the experimental Rukmani Band satellite link, which afforded more bandwidth to telemedicine equipment. Encouraging results led the *IN* to conceptualize plans to develop, install and operationalize a Navy-wide telemedicine project.

The telemedicine equipment was modified by DEBEL, as per the *IN*’s requirements—for use onboard ships, submarines, and remote naval locations—on the basis of (among other factors) ruggedness, portability and ease of deployment. Concurrently, the Service Qualitative Requirements (SQRs) were also conceptualized at Naval Headquarters with specific requirements of the maritime environment.

Commencing January 2013, DEBEL and Western Naval Command conducted a year-long trial onboard three warships and INHS *Asvini*. Based on the experience of these prolonged trials, DEBEL undertook further development of the equipment and SQRs were also refined. Consequent to successful trials and meeting the SQRs, DEBEL transferred the technology for the system developed by them to M/s Maestros Electronics and Telecommunications Systems Ltd., Mumbai.

Thereafter, a case for capital procurement and implementation of telemedicine was initiated, taking approval from the Defence Acquisition Committee (DAC). Finally, on 22 April 2019 an agreement was signed between the *IN* and M/s Maestros Electronics and Telecommunications Systems Ltd. for the operationalization of telemedicine. Presently, sea trials and harbour trials for operationalization of telemedicine onboard ships and submarines are in progress.

The chronology of the sequence of landmark events leading to the implementation of telemedicine is tabulated below.

Events	Date
Contract Agreement Signed	22 April 2019
Equipment Delivered	2 September 2020
Telemedicine Specialist Console (TSC) at INHS <i>Asvini</i> made operational	20 February 2021
Live demo given to CNS	20 February 2021
Project named: SWASTH	5 March 2021
Implementation plan formulated	3 August 2021
Live demo to the DGMS(N)	27 September 2021
Telemedicine Specialist Console (TSC) at INHS <i>Sanjivani</i> operationalized	7 March 2022
Most Telemedicine Consultation Consoles (TCCs) and Telemedicine Specialist Consoles (TSCs) made operational	March 2022
EDC of the Project	2022

The medical profession is undoubtedly one of the most respected professions in the world. Achieving the highest objective of saving lives in the most challenging situations presented by the maritime domain adds to the challenges faced by the *IN*’s Medical Branch. Nevertheless, the Services have kept pace with the evolving times, both organizationally and operationally to provide the most modern medical healthcare to *IN* personnel, both at sea and shore, and also to their families. Additionally, the Medical Branch has been proactive in extending its assistance in the nation’s cause for the greater welfare of humanity.

Note

- 1 Now the Union Territory of Jammu and Kashmir, and the Union Territory of Ladakh.



26 | Meteorology and Naval Oceanology

Forecasting the Maritime Environment

⚓ Introduction

The field of Meteorology and Oceanology (METOC) has been witness to significant technological advancement in the past decade. Keeping in sync with these trends, the Indian Navy (*IN*) METOC organization has evolved rapidly in the last decade. The modernization of meteorological observational facilities, induction of automated data reception, analysis and process facilities, upgradation of infrastructure and development of numerical modelling and also data assimilation capabilities in both the atmosphere and ocean domains—were all achieved in the last decade. The modernization programme has led to a paradigm shift in the manner in which METOC information and forecasts are delivered to User Units operating across the globe. The METOC organization now provides support services across all three dimensions and across all time domains, with increasing accuracy and greater efficiency. The weather forecast and services provided for operational tasking across the global waters, and for events as diverse as the various sailboat circumnavigation voyages, including Navika Sagar Parikrama, and the Mt. Everest Expedition bear testimony to the capability of the *IN* METOC organization.

This chapter describes the various historic achievements and milestones of the Naval METOC organization during the past decade.

⚓ Landmark Events

The National-level METOC Seminar on the theme ‘METOC Forecasting for Naval Warfare: Need, Capabilities and Challenges’ was conducted by the School of Naval Oceanology and Meteorology, Kochi, under the aegis of the Southern Naval Command (SNC) in October 2014. The Seminar saw wide participation from operational forecasters from the Services, besides academia and researchers from various National/State Organizations/Universities such as the India Meteorological Department (IMD), National Centre for Medium Range Weather Forecasting (NCMRWF), National Institute of Ocean Technology (NIOT), Indian National Centre for Ocean Information Services (INCOIS), Indian Institute of Tropical Meteorology (IITM), National Remote Sensing Centre (NRSC), Space Applications Centre (SAC), Cochin University of Science and Technology (CUSAT) and Andhra University (AU). The Seminar was aimed at providing a common platform for forecasters, researchers and academia to interact and engage with each other for greater synergy. The Command Met Office/HQWNC, Mumbai, conducted the maiden METOC.

Symposium ‘Meghayan’ was conducted by the Western Naval Command (WNC) to commemorate the World Meteorological Day on 23 March 2017. Eminent personalities from

National Organizations like INCOIS, IMD and Indian Space Research Organization (ISRO) participated in the event.

Milestones Achieved and Rare Accomplishments

MoU with Space Applications Centre: The complex sciences of Meteorology and Oceanology necessitate a constant interface with civilian agencies engaged in operations, research and training in the field, to ensure that the Naval METOC organization stays abreast of the cutting-edge developments. Strengthening of institutional linkages with national weather and ocean agencies pays rich dividends for *IN* METOC in capability development. The same is achieved through reciprocal visits, training programmes, data sharing, collaborative projects, participation in National Scientific programmes/endeavours, National-level meetings, and formalized frameworks like memoranda of understanding (MoUs). An MoU meeting the above criterion was signed with the Space Applications Centre, Ahmedabad in May 2017.

Handing Over Cyclone Detection Radar Building at Kochi to Navy: The Cyclone Detection Radar (CDR) building was operated by IMD inside the Naval Base to provide weather support for civil aviation in 1987, when INS *Garuda* used to meet the requirements of Kochi Airport. Post-civil flights operating from Cochin Airport, the building was no longer used by the IMD. In 2017, IMD started operating the Doppler Weather Radar (DWR) located at Mundamveli, Kochi, which further reduced the operability of the CDR building with restricted manpower. Following active liaison by Directorate of Naval Oceanology and Meteorology (DNOM), the IMD handed over the CDR building to the *IN*.

Handbook on Climatology of Naval Air Stations: *A Handbook on the Climatology of Naval Air Stations* was prepared by the DNOM Directorate and made

available as a ready reference for all *IN* air stations. The publication was released by then Chief of Naval Staff Admiral Sunil Lanba on 24 October 2017.

Global Ocean Atlas: A *Global Ocean Atlas* was prepared by the School of Naval Oceanology and Meteorology (SNOM) in early 2019. This atlas serves as a ready reckoner for *IN* Ships during their passage planning and undertaking various evolutions at sea. The atlas includes atmospheric parameters like Mean Sea Level Pressure, surface winds, cloud cover, humidity, rainfall, temperature distribution and probable location and track of cyclones. It also provides information about ocean parameters such as significant wave height, swell, sea state, sea surface height anomaly, barrier layer thickness and surface current over major oceans of the world.

⚓ **Organizational Changes: Creation of New Units/Sub Units/Upgradation/Changes in Industrial Establishment**

Indian Naval Meteorological Analysis Centre: The Indian Naval Meteorological Analysis Centre (INMAC) was conceptualized as the nodal data repository and processing centre to provide meteorological services to naval air stations. The contract for setting up INMAC at Kochi, as Project Turnkey was signed with M/s Wipro Ltd., OEM on 30 June 2011. The approval—for setting up INMAC as an independent unit at Kochi under the delegated powers of the CNS—was accorded on 28 June 2012. It was the first-ever Project Turnkey under the Service Headquarters' powers, across the Services and included setting up of hardware, provisioning of software, operational equipment, hardware, training and documentation, including a two-year warranty post operationalization. The INMAC was inaugurated on 6 September 2013 by (then) Deputy Chief of Naval Staff Vice Admiral Pradip Kumar Chatterjee.

It was set up with the initial objective of centralized reception, processing and analysis of meteorological data with customized software

and generation of Meteorological products, to be accessed by Naval Air Stations through NEWN connectivity. However, the mandate of the unit was rapidly expanded to provide meteorological services to ships at sea through Rukmani connectivity. Later, the Upper Air charter of the Naval Operations Data Processing and Analysis Center (NODPAC) was also handed over to INMAC in 2019 as a logical progression of INMAC's mandate. As of September 2019, the Unit's case for Government sanction together with manpower, has been taken up as a combined case as one of the critical cases of the Navy.

Rebasing of Naval Meteorological Office, Dwarka: The base of the Naval Met Office at INS *Dwarka* was shifted from Okha, to Naval Air Enclave (NAE), Porbandar. The Met Office in Porbandar was Commissioned by Rear Admiral Bimal Kumar Verma, the then Flag Officer Commanding Maharashtra and Gujarat Naval Area, on 15 May 2012. The tedious evolution of dismantling and reassembling of sophisticated Met equipment was carried out in-house by the Met personnel of the unit, without seeking assistance from the original equipment manufacturer (OEM).

⚓ Induction of Platforms and Other Assets

Integrated Automatic Aviation Meteorological System: Towards modernization of the observational and recording network at Naval Met Offices, the LAAMS Project Turnkey was centrally steered by the Integrated Headquarters (IHQ) Ministry of Defence (MoD, Navy[N])/DNOM. The Project Turnkey was aimed at upgradation through the installation of state-of-the-art equipment, sensors for automated measurement of recording meteorological parameters towards enhancing accuracy and increasing overall efficiency of Met services. The Test Bed for the Project at INS *Rajali*, Arakkonam was inaugurated by the Chief of the Naval Staff on 29 March 2017. Subsequently the installation was completed at the eight major Naval Air Stations and is being operationally exploited for all flying operations.

High Performance Computing System (HPCS) for NODPAC and INMAC: The procurement of HPCS is aimed at enhancing the computational facilities at NODPAC and INMAC, to facilitate running of atmospheric, wave, ocean and coupled models on a global scale at finer resolutions.

Indigenous Development of UASS under 'Make II' Procurement: To provide vital atmospheric parameters and enhancing the operational capability of the *IN* Ships, a contract was signed on 28 November 2011 for procurement of seven Upper Air Sounding Systems (UASS) for the ships of the Western Naval Command. The contract included procurement, installation and comprehensive AMC for a duration of ten years, post-completion of the two-year warranty period, to ensure unhindered serviceability of the equipment. The installation of the equipment was completed onboard all ships by end 2014, and the equipment has been providing critical atmospheric information, which is essential for planning and execution of various evolutions at sea.

With the aim of indigenizing the UASS, a case for development of UASS was taken up as a Make II procurement case. The case progressed rapidly through various procedural landmarks and the trials were undertaken in August 2019. On successful development of the UASS, twenty-four systems would be procured for obsolescence management and for newly inducted ships. Meanwhile upgradation of all obsolete UASS, including Digicora systems, was carried out free of cost. Several other projects aimed at the indigenization of equipment/spares and towards improving efficiency are under progress, including Procurement of Solid-State Electrolysis-Based Hydrogen Generator and Development of Data Diode for seamless exchange of real-time meteorological data and inputs.

Interaction with Foreign Navies: Professional interaction and cooperation in the field of METOC has been enhanced with Friendly Foreign Navies (FFN) over the past decade through active participation in Staff Talks, Executive Steering

Group (ESG) meetings and engaging with subject-matter experts. This has resulted in the exchange of professional knowledge and acumen through training and sharing of best practices with various FFNs, such as the Royal Australian Navy, Royal Thai Navy, United States Navy, Myanmar Navy, the Japanese Maritime Self-Defence Force (JMSDF), and the UK's Royal Navy. There has also been a significant increase in the number of FFN Officers/sailors participating in the professional training courses conducted at the School of Naval Oceanography and Meteorology (SNOM). Cooperation is also extended with regard to weather forecasts and information to FFNs such as Myanmar.

⚓ MET-T96 and MET Equipment Onboard *IN* Ships

Evolution of Recording of Met Data Onboard *IN* Ships from MET-T96 Form to TURBOWIN Software: Weather observations over sea make a highly important contribution to the study and forecasting of weather over the sea. Indian Navy ships are part of the World Meteorological Organization (WMO) Vessel Observations Ships Scheme (VOSS) and have been recording weather observations at sea. This information is then collated in the specific format and forwarded to NODPAC through the respective Command Met Offices. Earlier MET-T96 was used for recording weather observations onboard *IN* Ships.

These MET-T96 forms were submitted to respective Command Met Offices after completion of voyage. Scrutiny and storage of these forms was a cumbersome process. Therefore, TurboWin Software (as recommended by WMO) was adopted for recording and storing weather observations recorded over the sea. TurboWin software has improved the quality and accuracy of weather observations onboard ships. Training on TurboWin software is imparted at SNOM to various professional and attachment courses, viz., Basic Q Met, LDG Q Met, PO Q Met, AMTC, ND and Hydro courses. Sample screenshots of MET-T96 and Turbowin software are shown

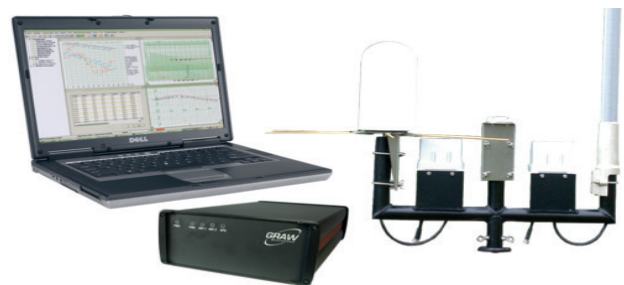
below. Refresher courses on the usage of TurboWin software are conducted at Command Met Offices on a six-monthly basis.



TurboWin Software User Interface

Evolution of Met Equipment Fitted Onboard *IN* Ships: The process and instruments used for recording weather observations onboard remains same. However, there has been a quantum leap in recording of upper atmospheric observations at sea. Currently, frontline *IN* ships are equipped with UASS for undertaking upper air ascents.

The data so collected is vital for gauging weather phenomenon over any location and is also used to calculate Radar ranges. The upper air data collected by *IN* ships at sea is regularly shared with INMAC through respective Command Met Offices. A sample image of UASS equipment is shown below.



UASS Equipment

Transformational Occurrences—Panorama: The development of a Marine Forecast Visualization-based Decision Support System, 'Panorama, was conceived at DNOM and financed through the

Naval Research Board. The system was jointly developed by a team of scientists at the Centre for Development of Advanced Computing (CDAC), Pune and Naval Met specialist officers. Panorama is a transformational development that marks a significant milestone towards delivering of multi-dimensional METOC operational support and decision support services to the User Units in the right format, well in time across the oceans. Using ocean, wave and weather model outputs generated at NODPAC and INMAC respectively, a forecast patch is generated. When this patch is ingested in the Graphical User Interface (GUI)-based module of the Panorama application, it facilitates visualization of weather forecasts, ocean state forecasts and upper air forecasts for end-users.

Conclusion

Accurate weather prediction is a challenging task, particularly for the Navy, which plans and executes operations on a wide range of spatial and temporal scales and in all the three domains. More than ever before, units at sea need timely and reliable environmental assessment. Naval meteorological and oceanographic services have come a long way since 1952 in support of the ever-increasing complexity of naval operations. The mandate encompasses in provisioning of meteorological and oceanographic information, product and services in support of Maritime Operations in all dimensions.

The *IN* operationalized INMAC at Kochi in September 2013 as the flagship unit of the DNOM. It was set up as an independent unit for centralized reception of meteorological data/ other inputs, processing of data, value additions in terms of generated products at the Main Hub

and dissemination of products pan-Navy. With the operationalization of this facility, the *IN* also achieved technological advancements as well as compatibility with the systems at IMD and the National Weather Agency.

The Directorate of Naval Oceanology and Meteorology has also engaged in capacity development through other state-of-the-art projects, to facilitate robust, responsive and enabling Op support services. Data Assimilation schemes have been implemented for Numerical Based Forecasting (Weather, Wave, Ocean Circulation) Models already running at NODPAC and INMAC, and undergoing Impact assessment trials.

Simultaneously, work is progressing apace on several projects, such as the development of a METOC Forecasting Application for integration into INCOP (Op Network), Integrated Automatic Aviation Meteorological Systems (IAAMS) Data Connectivity on NUD, Standardization of METOC equipment for each class of ship, dovetailing of forecast model outputs with equipment (SONAR/RADAR) performance models to evolve as Tactical Decision Aid tools for sensor and weapon deployments, and setting up of Doppler Weather Radar (DWRs) chain in the Andaman and Nicobar Islands to name a few.

The successful completion of these projects will further enhance the capabilities of the *INMETOC* organization, which has come a long way in terms of capability and reach to the end-user over the past decade. The fructification of envisaged plans and ongoing projects will make its role more decisive towards planning and execution of naval operations in the years to come.



27

Naval Armament Inspection Keeping the Powder Dry

⚓ Introduction and Brief History

The Naval Armament Inspection (NAI) Organization provides support for issues related to Naval Armament (NA). The organization is primarily tasked with ensuring the Quality Assurance (QA) and inspection of NA stores during design, development, production, in-service inspection, life extension and disposal. These inspections also include checks on the NA launch systems.

The organization was first established in Bombay on 11 November 1949, with Major Lancelot Priestly of the British Army appointed as the first Deputy Inspector of Naval Ordnance (DINO). In 1951, the office of the DINO was shifted to Naval Headquarters in New Delhi, and redesignated as Directorate of Naval Armament Inspection (DNAI). Post-Independence, as the role and capabilities of the Indian Navy (IN) grew, it was natural for the NAI to grow commensurately. This trend began with the creation of additional storage space for naval armament stores at Trombay, where the Naval Armament Depot (NAD) was established along with NAI in 1952.

Subsequently, in order to meet the rising inspection and Quality Assurance (QA) requirement of NA stores, several NAI units were

created in the subsequent years at Kochi (1952), Visakhapatnam (1953), Cossipore at Calcutta (1953), Jabalpur (1953), Pune (1955), Ambarnath (1956), Alwaye (1963), Kanpur (1964), Delhi (1965), Karanja (1972), Goa (1975), Sunabeda, Odisha (1983), Hyderabad (1982), Tiruchirapalli (1991), Thiruvananthapuram (1993), Nagpur (2016), Arakkonam (2016), Karwar (2018), Dollygunj (2021) and Bheemunipatnam (2022). In 1997, the post of the head of the organization, DNAI was redesignated as Director General of Naval Armament Inspection (DGNAI), and the rank of this authority was upgraded from that of Commodore to Rear Admiral in 2002.

Over the years, with the advent of advanced armament, as part of the *IN's* modernization plans, the scope and capability of NAI have also grown in tandem. The NAI units have been undertaking life extension and life assessment of a wide spectrum of NA stores, ensuring the *IN's* continued operational capability. In the last decade, the NAI has given impetus to the identification of NA equivalents in aid of indigenization and standardization, research and development (R&D) of indigenous guided weaponry and allied systems, usage of predictive modelling techniques for explosives, etc. These efforts have been suitably augmented through establishment of advanced test laboratories, proof

facilities and creation of digital networks and repositories. The decadal growth of NAI is outlined in the succeeding paragraphs.

⚓ Organizational Evolution

Safety Class Authority (SCA): Explosives and Ordnance (E&O) handling, storage, transportation, preparation, testing, proof and exploitation are inherently hazardous tasks. In order to promote safety and compliance, DGNAI was designated as SCA for E&O on 26 October 2012. As SCA, the DGNAI has been tasked with analysing incidents and accidents, reviewing safety regulations and procedure, issuing policy directives and conducting safety assessments during inspections in all matters related to E&O.

Re-Designation of Controllerates: In order to near-base the QA cover to NA stores, NAI units are geographically spread and located closer to manufacturing facilities/ordnance factories. This has led to a substantial increase in the number of NAI units. In order to facilitate better technical management of NAI field units, in 2013, three Controllerates (one each in the Western, Eastern and Southern Naval Commands) were created to exercise technical and administrative control over NAI field units as per their geographical location, and designated as CNAI West, East and South respectively.

Augmentation of Manpower: Since 1984, NAI pursued augmentation of manpower to match the increased QA/inspection workload due to induction of platforms and matching weapon arsenal. Eventually, in July 2015, the Ministry of Defence (MoD) accorded additional manpower sanction of 369 QA personnel for 14 NAI field units, which included 70 service officers, 46 sailors and 253 civilian staff.

Restructuring the Directorate: With increased focus on 'Make in India' and to provide impetus to

NA indigenization in December 2016, the DNAI was restructured into two separate directorates—DNAI and the Directorate of Armament Production and Indigenization (DAPI). Post reorganization, QA/inspection duties pertaining to the *IN*'s in-service inventory was entrusted to DNAI and functions related to armament production and indigenization, R&D was entrusted to DAPI. With the creation of DAPI, two additional Controllerates—Controllerate of Naval Armament (Ordnance Factories) or CNA (OF) at Jabalpur; and Controllerate of Naval Armament (Defence Production) or CNA (DP) at Hyderabad—were created. Consequent to this restructuring, in order to accelerate R&D activities, Centres of Excellence were established at the following facilities:

- Explosives at CNAI (West);
- Non-Explosives (Rubber, Oil, Greases and Polymers) at CNAI (East);
- Innovation Hub and training at CNAI (South);
- Proof and Radiography at CAN (OF);
- Knowledge Management at CNA (DP); and
- Metallurgy at NAI (Kol).

New Formations: Following NAI/NAD were set up in the last decade:

- **NAI (Nagpur):** Government of India sanction was accorded for conversion of NAI Cell (Nag) into an independent NAI unit under the administrative control of HQWNC and technical control of the CNAI (West) in September 2016.
- **NAI (Dollygunj):** Government of India's sanction was accorded for the setting up of NAI (Dollygunj) along with NAD (Dollygunj) in August 2016 at the A&N Islands.
- **NAI (Arakkonam):** Government of India sanction was accorded for the creation of NAI (Ark) at INS *Rajali* under the administrative control of Headquarters Eastern Naval

Command and technical control of the CNAI (East) in November 2016. Later in April 2017, NAI (Ark) was designated as an independent inspectorate for ensuring quality and reliability of conventional and guided NA stores, including armament complement of P-8I aircraft.

- **NAI (Karwar):** In February 2018, the NAI Cell at Karwar was upgraded as an independent NAI field unit. Earlier, inspection/QA coverage for Naval Armaments held at INS *Vajrakosh*/NAD (Karwar) was provided by NAI officer posted at Headquarters Karnataka Naval Area at Karwar.
- **NAI (Bheemunipatnam):** Government sanction for the creation of NAI (Bheemunipatnam) was accorded in March 2022 for providing inspection/QA coverage for armaments at INS *Kalinga*, NAD (Bheemunipatnam), local private firms, etc.

Maiden Batch of Women Officers: Consequent to accord of Permanent Commission (PC) to women officers in the NAI cadre, the maiden batch of women officers joined in June 2017.

Indigenization/Improvements: Some of the major indigenization/improvement efforts aimed at enhancing indigenous production and service-life of NA stores include development of Muzzle Velocity and Discharge Pressure (MVDP) equipment for measuring performance parameters of Balwanka, Zinc/Cadmium based anti-corrosive coating for ammunition, establishing of commonality of fuse for 76/62 SRGM indigenous rounds and 76.2 mm rounds, steel cartridge case for AK100 ammunition, and other NA stores.

⚓ **Capability and Capacity Augmentation**

Advanced Energetic Test Laboratory (AETL)/ Advanced Explosive Test Facility (AETF): In order to augment test facilities for determining parameters of High Energetic Materials, viz., stability, composition and contamination, AETL and AETF were set up at CNAI (East) in 2011 and CNAI (West) in 2017, respectively. These facilities aid in Life Extension and Life Assessment activities towards ensuring the continued safety and reliability of High Energy Materials. Test facility



Maiden Batch of Women NAI Officers

for testing non-explosive stores (viz., oils, grease, fuels etc.) have also been created at CNAI-(W) in 2015.

Basic Armament Specialization Course: In January 2015, a training facility was created at NAI (Karanja) to conduct the ‘Basic Armament Specialization Course’ for newly inducted NAI officers. The training included hands-on experience session on handling, operations and maintenance aspects of conventional armament, torpedoes, missiles and afloat inspection.

Ammunition Status Tracking Software: In order to provide real-time serviceability status of ammunition to stakeholders, status of proof tests, tracking of ammunition lots and generation of inspection requests by field units, an Ammunition Status Tracking Software (ASTS) was conceptualized and developed in-house at CNAI (South). In May 2016, this software was deployed pan-Navy.

Linear Accelerator (LINAC) based X-Ray Facility: Earlier Gamma Ray radiography was used for the purpose of non-destructive testing of warheads and ammunition, a time-consuming activity. In June 2019, a Naval Explosive Radiography Centre was established at CNA (OF) and was equipped with LINAC X-Ray system, which undertakes radiography testing of warheads within minutes as compared to days while using the Gamma Ray system.

⚓ Seminars and Workshops

International Seminar-cum-Exhibition *NAVARMS* is coordinated by DGNAI in Delhi in association

with Confederation of Indian Industries/Society of Indian Defence Manufacturers, with the aim to create awareness about opportunities and enable greater participation of Indian and foreign industries in Defence production. Additionally, *Introspection Workshops* are conducted periodically at Hyderabad and serve as a platform to interact with all stakeholders involved in design, development, manufacture and maintenance of Naval Armament Stores.



NAVARMS 2019

It enables the NAI fraternity to synergize the QA aspects with user, designer, manufacturer and maintainer. Details of these events are as follows:

Event	Year	Theme/Focus Area
Introspection	2012	–
NAVARMS	2013	Armament Indigenization through Collaborative Approach
Introspection	2014	–
Introspection	2018	–
NAVARMS	2019	Make in India – Fight Category: Opportunities and Imperatives



28

Quality Assurance Driving Quality in Defence Production

⚓ Historical Background

When India gained Independence in 1947, all ships of the Indian Navy (*IN*) were of British origin. Almost all the machinery, equipment, spares and even common user stores were imported from Britain. Meanwhile, after The Second World War, the workload of Indian Ordnance Factories reduced drastically and they had substantial idle capacity. In 1953, a small cell was created under the Captain Superintendent Naval Dockyard (Bombay), to identify items that could be produced in the Ordnance Factories or by Indian industry.

An independent Directorate of Stores Production (DSP), with cells at Bombay and Calcutta, was created in 1955 to boost the indigenization effort. The DSP functioned under Naval Headquarters (NHQ). In 1959, administrative control of the DSP was passed to the Controller General of Defence Production (CGDP). After China's attack in 1962, a Department of Defence Production & Supplies was created in the Ministry of Defence (MoD). The CGDP's functions were divided between the Director General of Inspection (DGI), the Defence Research and Development Organization (DRDO) and the Ordnance Factories. The DSP was placed under the DGI.

In 1964, the DSP was redesignated as Directorate of Development & Inspection, Marine Stores (DDI [MS]). Prior to this, the inspection of indigenous stores was conducted by the Surveyor of Stores under the Commodore Superintendent, Naval Dockyard (ND), Bombay. Indigenization of equipment and stores received a major impetus when, in the early 1970s, along with the decision to build Leander-class frigates in Mazagon Docks, the decision was also taken to progressively indigenize all equipment to be fitted on the frigates.

This rapidly increased the indigenization workload and led to the creation of a separate Directorate for the indigenization and inspection of equipment for warship production. In 1968, the DDI(MS) was bifurcated into:

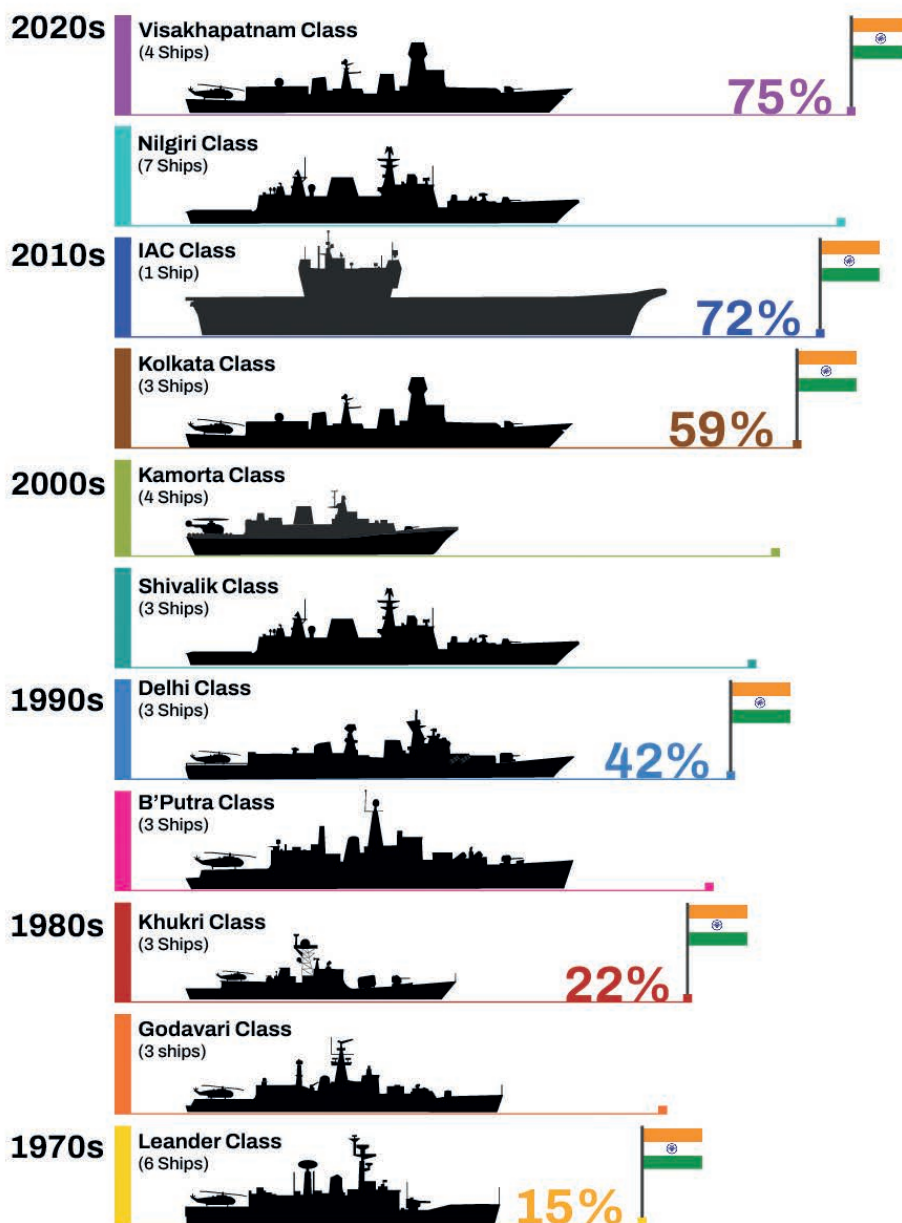
- the Directorate of Production and Inspection, Navy (DPI[N]): for existing ships; and
- the Directorate of Warship Production (DWP): for new construction ships.

It soon became evident that these two Directorates were handling similar items, resulting in the duplication of effort. In 1975, it was decided to reorganize the DWP and DPI(N) into the Engineering and Electrical disciplines.

During the first phase of this reorganization, only Western-origin equipment was taken up and the role of the two directorates was redefined as follows:

- DWP: To deal with Marine Engineering and Hull equipment, including associated electrical machinery; and
- DPI(N): To deal with Electrical/Electronic/Weapon equipment, their spares and Naval Stores.

In 1987, the DGI was redesignated as the Director General Quality Assurance (DGQA). The DPI(N) and DWP were redesignated as Directorate of Quality Assurance (Naval) or DQA(N), and Directorate of Quality Assurance (Warship Production) or DQA(WP), respectively, under the MoD. The DQA(WP) and DQA(N) are two of the thirteen Directorates functioning under the DGQA in the Department of Defence Production, MoD., Government of India.



Increase in Indigenous Content Onboard IN Warships

The number of field units of the erstwhile DPI(N) and DWP grew from eleven in 1970 to twenty-seven units in 2021. These units are located at major industrial hubs across the country in Delhi, Bengaluru, Badrapur, Chennai, Haridwar, Kochi, Kolkata, Mumbai, Cossipore and Secunderabad. The responsibility for Quality Assurance of ‘Mission Critical Equipment’ on Indian naval warships—such as Main Propulsion, Power Generation & Distribution, Shafting Line, Steering Gear & Stabilizer, Controls & Instrumentation, Water Generation, Compressors, Pumps, HV Air Conditioning & Refrigeration, Sewage Treatment Plants (STPs), Aviation equipment, Winch, Underwater Valves, Weapons/sensors, Electronic/Electrical Defence stores, Navigational Aids, etc.—has been vested with DQA by the Indian Navy.

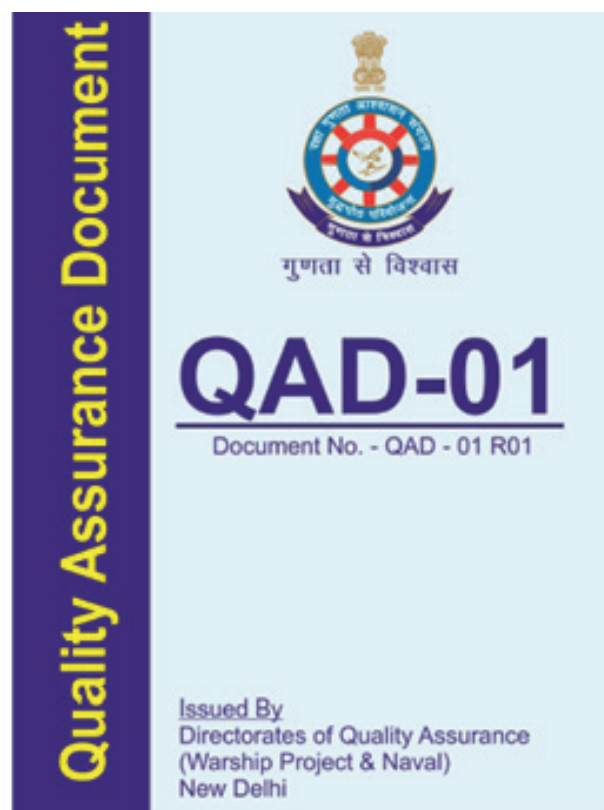
⚓ DGQA Through the Decade

Increased Demand for Quality Assurance: The *IN* has been at the forefront of indigenization since the 1970s. From a modest 15 per cent indigenous content in Leander-class ships in the 1970s, indigenous content has steadfastly increased, reaching a high of 75 per cent by the early 2020s in Project 15 B (Visakhapatnam class).

Quality Assurance Document (QAD-01): In order to enable all stakeholders involved in indigenization, including end users, and to provide common appreciation of various facets of Quality

Assurance cover provided by the Naval Directorates of DGQA, as also to enumerate quality assurance compliance requirements for the industry involved in defence manufacturing, a Quality Assurance Document (QAD) was promulgated in April 2017.

The document is applicable to all procurements, for which the QA cover is provided by DQA. The processes established in this document have been based on internationally followed norms, experience gained by the *IN* over six decades of operation, and the infrastructure available within the country.



QAD-01





4

Infrastructure for Capability Enhancement



29 | Project Seabird

Preparing for a Future-Ready Navy

⚓ Historical Background

The two major naval bases on the west coast of India, in Mumbai and Kochi, were initially located in metropolitan areas crowded with industrial and commercial infrastructure. This jeopardized security, but with no other available options, the Indian Navy (*IN*) had to contend with the adverse impact of the congested surroundings. Further, both these bases had already reached a high degree of saturation, and very little meaningful expansion was possible in their present locations.

The city of Mumbai has a significant and established mercantile history with maritime linkages. Despite this hectic commercial activity, post-Independence, the *IN*—in response to the threat perception and need for optimal force-posture to respond to national security challenges—built substantial operational infrastructure at Mumbai. This was despite the challenge of Mumbai being a tidal port, which results in excessive silting of the harbour necessitating regular dredging, which is a continuous and expensive process. Further, the set up at Mumbai did not have a dedicated airfield, as a result of which the *IN*'s operation-ready aircraft had to be stationed at Dabolim in Goa. Another issue was that submarines, a vital requirement of any Navy, had to be berthed alongside warships. As the conceptual requirement for a 'Third Naval Base' on the west coast crystallized, the following requirements became indispensable:

- Large waterfront with sufficient depth of water for anchorage;
- Sufficient contiguous back-up area inland for operational, technical, administrative and logistic facilities;
- Exclusiveness for integrated development and security considerations; and
- Rail, road and sea communications.

Therefore, it was essential that new facilities be established at a separate location in a planned and integrated manner, with adequate space and flexibility for expansion and in tune with the anticipated changes in strategic and technological requirements. The need for the third naval base on the west coast was under consideration for a number of years in the late 1970s/early 1980s, and it was decided to include the proposal in the 1980–85 Defence Plan.

The Chiefs of the three Commands were tasked with examining the facilities available within their jurisdictions and recommend suitable places where the naval base could be set up. Ratnagiri, Pawas Bay, Goa, Karwar, Tadri, Mangalore, Kannur, Thiruvananthapuram and Tuticorin were considered, and Mangalore, Tuticorin and Karwar were shortlisted. Finally, Karwar, 80 kilometres (km) south of Goa, was chosen. Further detailed analysis by the Central Water and Power Research Station (CPWRS), Pune, and the National Institute of Oceanography, Goa (NIO), concurred that Karwar was the only site that could fulfil the

scope and objectives of a new naval base on the west coast.

Some of the advantages offered by Karwar included its proximity to Goa (80 km north) and Mangalore (320 km south). Additionally, its location and historical data of being free from cyclonic disturbances made it an ideal choice. Many small islands, including Anjadip, offered protection against natural elements from the north, west and southwest. It had deep waters. The four-fathom line (24 feet) ran extremely close to the shore all along the coast. National Highway 17 was being widened and strengthened to take 20-ton cargo trucks. The west coast north-south Konkan Railway was to pass through Karwar. The choice of Karwar for Project Seabird was therefore finalized.

Project Seabird remains one of the largest military projects of national prominence. It was conceived by the *IN* to develop infrastructure to support its expansion plans and to acquire strategic depth. It was first envisioned by Admiral Oscar Stanley Dawson, Chief of Naval Staff during the 1980s. Admiral Dawson's opportunity to influence naval thinking in this matter came in 1979 when he was appointed Flag Officer Commanding-in-Chief, Southern Naval Command. Using his own operational experience, he set up a small team based in Kochi to examine the feasibility of establishing a base in Karwar. In mid-1984, Prime Minister Indira Gandhi gave her Approval in Principle (AIP) for setting up of what would emerge as the largest and most sophisticated naval base of Asia.

The Project Seabird Detachment in Karwar, also known as Det (K), was set up on 31 July 1986 to oversee and coordinate progress with the Project head-office in Delhi. Initially, the Detachment functioned from hired accommodation at Karwar town from 1986 to 1998. Subsequently, 33 acres of port land were acquired at Baithkol Bay, and Detachment personnel shifted to the new location in 1998.

Spread over 11,334 acres, the site encompasses a 26-km stretch along the high-water line of the seafront from Karwar Head in the north, through a series of bays such as Baithkol, Kamat, Binaga, Kwada and Belekeri. Offering natural protection from the wave action is Binaga Bay, stretching out into the open sea from Karwar Head, a rocky promontory in the north and the Tadri river in the south. Providing cover to the Bay are offshore islands such as Anjadip, Oyster and Round Islands, which serve as forward posts. Crucially, the extent of land available would not only enable the *IN* to disperse the forces; a necessity in challenging times, but also enable any expansion of the base.

The Formative Years

The wheels of bureaucracy had already been set in motion when, in 1985, the Government of India gave its approval for Project Seabird. A Framework Paper readied in September 1984, called for initiating work on the Project by completing an assessment of allied aspects such as land availability, cognisance of the State Government's position vis-à-vis the Project, obtaining the Prime Minister's approval and making a presentation to the Cabinet Committee of Parliamentary Affairs (CCPA). The Cabinet Committee gave its approval in October 1985 with a financial sanction for the first phase, spread over ten years. The Hon'ble President of India gave the go-ahead to set up a three-tiered management structure for Project Seabird on 13 May 1986. (Then) Prime Minister Rajiv Gandhi laid the foundation stone for the Project on 24 October 1986.

A Committee of Secretaries was constituted to select an Indian firm as the primary consultant. From among the various firms that were pre-qualified, the Committee recommended Engineers India Limited (EIL) as the Prime Consultant and this was approved by the Government of India. Since it was the first time that the *IN* had

envisaged a completely greenfield naval base much larger than Mumbai, Vizag and Kochi Naval Bases (which were the legacy of the Royal Navy), a global tender was floated for foreign consultants as well as for planning and designing Phase I of the base. In consultations with EIL, a Consortium of M/s. REDECON, Australia, and NEDECO, the Netherlands (Netherlands Engineering Consultants), known jointly as the REDECON NEDECO Consortium, were selected in February 1990 by the Government of India. The *IN*'s charter to the Consultant was to prepare a Master Plan for a modern and cost-effective facility incorporating state-of-the-art technologies, layout and management systems to accommodate the fleet through the twenty-first century.

The Project was divided into two phases:

- Phase I (to be completed by 1995): Twenty-two ships and twenty-seven support/yardcraft, later curtailed to ten ships and ten yardcraft due to the 1991 financial crisis and shortage of resources.
- Phase II (later renamed as Phase IIA): This phase was planned to be completed by 2000 and capable of supporting fifty ships and about forty support/yardcraft, later truncated to thirty-two ships, submarines and twenty-three yardcraft.

Activities under Phase I for the first ten years were divided into two segments (Detailed description provided in the last history book *Blue Waters Ahoy!*)¹:

- **Phase IA:** Comprised Marine works such as dredging, land reclamation for construction of jetties/wharves, and construction of breakwaters at the Naval Harbour.
- **Phase IB:** Comprised construction of onshore infrastructure facilities. Onshore facilities were to be planned in such a manner that they could eventually be expanded in future phases to

allow for basing more warships and yardcraft, creation of a full-fledged dockyard and a futuristic shipyard.

Challenges Due to Rehabilitation of Project-Affected Families

The rehabilitation of the Project-Affected Families (PAFs) turned out to be a major task. The Karnataka Government had given the *IN* the forest and revenue lands free of cost. The Central Government had to provide the funds for the rehabilitation of the villagers as compensation for private land, and the creation of suitable 'rehabilitation centres'. The *IN* needed about 11,334 acres for the Project. Vacating the land was the responsibility of the Karwar District authorities. Initially, it was planned to vacate thirteen villages with about 2,900 families.

In early 1997, the Karnataka Government was requested to vacate these villages, but the resource crunch caused by the economic slowdown resulted in serious resistance on the part of the villagers who opposed the inadequate rehabilitation package. The Karnataka Government discussed the rehabilitation package with the PAF afresh, and in June 1997, suggested additional compensation, which was also not accepted. Eventually, after continued high-level deliberations, the rehabilitation package was further revised in August 1998 to enable eligible students to pursue vocational training for a period of two years at the Industrial Technical Institute (ITI). It was hoped that this training would make these young men employable in the new dockyard's workshops.

The process of vacating the villages and rehabilitating the villagers began in March 1999. At this stage, the PAFs moved the High Court of Karnataka and also petitioned the National Human Rights Commission (NHRC). These institutions carried out field investigations and suggested additional facilities and provisions at the rehabilitation centres. During this time, the total

number of PAFs had risen to over 5,500, which included about 1,000 families who had returned to their villages during the negotiations. The final rehabilitation package was agreed upon in April 2000. The thirteen villages were resettled in seven rehabilitation centres, three of which were located along the coast for the benefit of fishermen, and the remaining four were located inland for agriculturists and others.

The process began in 1999, and by September 2000, all villages, including the three villages in the core area, were completely vacated. Thus, actual construction on ground could only begin in 2000 (almost fifteen years after accord of financial sanction for the project in 1985) after the relief and rehabilitation package (comprising the construction of relief centres with housing, schools, public health centres, community centres and a fishing harbour) had been executed.

Execution of Phase I (2000–10)

Design of Phase I:

The design of Phase I had two major components:

- **Offshore Works and Other Marine Infrastructure:** This included creation of a naval harbour, berthing facilities, and construction of a shiplift with dry berth.
- **Onshore Works:** This comprised all support facilities (technical, logistics and administrative infrastructure, including residential accommodation and hospital). M/s. MECON (a Public Sector Undertaking) was appointed as the Consultant for the onshore work packages, and the contract was signed on 30 March 2000.

Selection of Contractor: At the time, India had expertise only in quarrying. In the case of dredging, the Dredging Corporation of India (DCI) was capable but lacked the capacity to undertake the quantum of works envisaged for Phase I. As to the construction of breakwaters, Indian companies

neither had the technology nor prior experience to undertake the work, nor willingly indicated their preference for collaborating with a reputed foreign firm. The shortlisted bidders from the thirty-nine companies who had bid, were given the option to form a Consortium to bid for the tender, in view of the diverse range and scope of works. This was the preferred option, and in March 1997, the Request for Proposal (RFP) was issued to five group entities/consortia, and to two individual bidders (both foreign firms). The Project Management Board (PMB), during its fifteenth meeting on 13 August 1997, approved the validity of the bids from following four of the seven bidders to whom the tender had been issued. At its sixteenth meeting on 23 April 1998, the Project Management Board approved the lowest offer from the Consortium of Hochtief/Ballast Nedam/L&T.

Delay in Execution of Phase I: The original plan for the execution and completion of the works was 5 October 2004. However, for various reasons, such as site conditions and changes in scope of work as it progressed, the programme suffered delays. The marine works took almost six years, and were handed over by the contractor in April 2005.

Shiplift Facility: Phase I also envisaged the construction of a Shiplift system to hoist warships for underwater maintenance. This was being done for the very first time in the country. Two shiplift manufacturers—Hydradyne Systems and Engineering BV, the Netherlands; and Syncrolift INC, USA—were shortlisted and were approved by the Ministry of Defence (MoD). Following World Bank procedures for evaluating tender bids, the Tender document for Shiplift and transfer system was floated on 27 March 2000. M/s. Syncrolift INC, USA emerged as the lowest bidder and was awarded the contract. The Shiplift facility was handed over by the contractor in September 2006 after trials on 27 May 2006.



Shiplift Facility at Karwar

Onshore Works: The onshore works in Phase I comprised the entire gamut of infrastructure needed for a fully functional naval base capable of supporting ten ships and ten yardcraft. As with offshore infrastructure, it was again for the first time that the *IN* was creating infrastructure on such a large scale in a greenfield site. Because of the varied nature of the facilities that were envisaged, it was decided to appoint a consultant for design of the facilities, processing of tenders and supervision of the work contracts. Accordingly, the contract was signed with M/s. MECON on 30 March 2000. The onshore facilities would comprise the operational, technical, logistics and township infrastructure. Another major landmark was the commissioning of *INS Kadamba*, the Base Depot Ship, on 31 May 2005.

After *INS Kadamba*, other infrastructure and facilities such as Naval Ship Repair Yard (NSRY), *INHS Patanjali* (a hospital facility), Flag Officer Karwar building, single and married accommodation for officers, Logistics Support Complex (Material Organization [MO], Weapon Equipment Depot [WED], Base Victualling Yard [BVY] and Naval Transport Pool [NTP]), Naval Armament Depot (NAD), Missile Technical Position (MTP) and the civilian township at Amdhalli were commissioned between 2005 and

2011. All the works envisaged for Phase I were completed and handed over to the base by 2011. It had taken twenty-six years (since 1985, when the first CCPA sanction had been accorded) for the vision of Project Seabird to materialize on ground.



INHS Patanjali

Headquarters Karnataka Naval Area (HQKNA): HQKNA came into HQKNA being in 2005 with Commodore KP Ramachandran taking over as the first Commodore in Charge, Karwar (COMINKAR). COMINKAR, at that time, was also discharging duties of NOIC (Karnataka) and CO Kadamba. On 3 October 2011, the billet of the head of Karnataka Naval Area was upgraded to Rear Admiral and Rear Admiral Atul Kumar Jain became the first Flag Officer of the Karnataka (FOK) Naval Area. Meanwhile, at the Naval Ship Repair Yard (Karwar), Commodore HS Ishar was appointed as the first Commodore Superintendent of Yard and took charge on 29 April 2013. This position was later upgraded to a ‘two-star’ flag rank and Rear Admiral Ashish P Kulkarni took over as the first ASY of the Yard on 24 September 2018.

Year	Summary of Important Landmarks: Phase I
1985	Cabinet Committee on Parliamentary Affairs accepted the necessity of a third naval base at Karwar and accorded financial sanction.
1986	Foundation stone laid.
1989	Consultancy contract awarded to M/s REDECON NEDECO Consortium with Engineers India Ltd, as the Indian prime consultant.

Year	Summary of Important Landmarks: Phase I
1990	Master Plan and Detailed Project Report for Phase I approved by the Government of India.
1995	Review undertaken and scope of Phase I scaled down.
1998	Offer from the Consortium of Hochtief/Ballast Nedam/L&T for offshore work package accepted.
2000	M/s MECON (a Public Sector Undertaking) was appointed as the Consultant for the onshore works packages.
2000	Land acquisition and PAF rehabilitation formalized.
2005	INS <i>Kadamba</i> commissioned.
2006	Shiplift facility by M/s Syncrolift INC, USA handed over.
2011	All the works envisaged for Phase I completed.

Planning for Phase IIA

Phase IIA of Project Seabird has been conceived as a whole rather than piecemeal, based on the initial Detailed Project Report (DPR). M/s SKM, M/s REDECON's parent company, was nominated by Project Seabird in November 2009 as the Consultant for preparing the DPR for Phase IIA. Inputs from all stakeholders—WNC, HQKNA and Professional Directorates at IHQ MoD (N)—were sought, analysed and recommended for incorporation in the Scope of Work (SoW)/DPRs for Phase IIA.

The DPR recommended the appointment of a Project Management Consultant (PMC) at the start of Phase IIA. The PMC would run the complete programme from beginning to end, engage big contractors, minimize the number of packages/contracts, employ separate Design Consultants for the Naval Air Station (NAS), Naval Dockyard and Naval Armament Depot (NAD), and undertake township construction on a Design and Build (DB) basis.

A global Expression of Interest (EoI) was issued in February 2012 to shortlist a Project Management Consultant-cum-Marine Works Consultant (PMC-cum-MWC). Fourteen firms participated, and five firms/consortia were prequalified

in September 2013. The Request for Proposals (RFPs) approved by the MoD were issued to the firms, of which only two firms submitted proposals in January 2014. A Letter of Acceptance (LoA) was issued to M/s AECOM in November 2014 for the role of PMC-cum-MWC to manage Phase IIA from start to finish, for the duration of ten years. This marked the beginning of the second phase of the Project.

Scope of Work: Sanction by the Cabinet Committee on Security (CCS) for Phase IIA was accorded on 16 December 2012. To accelerate and speed up the process, Seabird simultaneously issued an Expression of Interest (EOI) for the selection of a PMC in February 2012 and began the process for approval of RFP from the MoD.

Progress: Phase II A was conceived to be completed following a 'Packaging and Contracting Strategy' comprising thirteen work packages, which include eight work packages, three design consultancies and two contracts for other works. The work on these packages are at various stages of completion, and are expected to be put into service in the next few years. Details of major landmarks in respect of Phase II are tabulated below.

Year	Landmark
2009	M/s SKM appointed as consultant for Phase IIA.
2010	DPRs, cost estimates and contract strategy submitted by M/s SKM.
2012	CCS approval for Phase IIA accorded.
2014	Environmental clearance for Phase IIA accorded by the Ministry of Environment.
2014	M/s AECOM appointed as PMC-cum-MWC.
2015	Administrative approval accorded by MoD for the first major work package that entailed dredging, reclamation, revetment and navigation aids.
2017	Contract commencement for dredging, reclamation, and associated work with joint venture of M/s. L&T, International Seaport Dredging Pvt. Ltd. (ISDPL) and Dredging International (DI).

Year	Landmark
2019	Contract commencement for construction of Piers, jetty services and procurement of cranes. This was signed with M/s Navayuga Engg. Co. Ltd.
2019	Contract commencement for construction of 3,168 dwelling units with township facilities for Defence civilians with M/s NCC Limited.
2019	Enabling Works contract for Naval Armament Depot concluded with M/s PL Raju Constructions.

⚓ Growth of Karwar Naval Base

Basing of Ships at Karwar

Prior to 2011, Karwar was home to only three major platforms, *IN Ships Aditya, Subhadra* and *Suvarna*. Basing of *INS Vikramaditya* at Karwar on 8 January 2014 was a watershed moment in the *IN's* history. The *Vikramaditya* was placed under the operational control of Fleet Commander, Western Fleet. However, all administrative and logistics support to the ship is provided by KNA.

Between 2011 and 2017, the following ships were based at Karwar and placed under the Operational/Administrative control of FOK:

Date and Year	Ship
2 October 2011	<i>INS Koswari</i>
21 September 2012	<i>INS Makar</i>
9 March 2017	<i>INS Tillanchang</i>



A New Home for a Growing Navy

Indian Naval Ship Vajrakosh

The Missile Technical Position (Kawar) was sanctioned as part of Project Seabird Phase I and setup in 2005 as part of *INS Kadamba*. In the initial days, the unit was co-located with Weapons Equipment Depot (Karwar). The unit was named *Vajrakosh* in 2009 and operationalized in 2011. The unit was formally commissioned as *INS Vajrakosh* under the command of Captain Arvind Chari on 9 September 2015.



Commissioning Ceremony of *INS Vajrakosh*

⚓ Conclusion

In 2020, the then Director General of Project Seabird, Vice Admiral Srikant noted: 'In the prevailing security situation where India faces a multitude of challenges and security threats, our Navy needs to emerge as a combat-ready, credible and cohesive force, ready to respond to any eventuality that may be posed in the maritime domain. Providing a stable and peaceful environment at sea is crucial, so that the nation's economic and social development can progress unhindered. This calls for the development of world-class infrastructure, which would provide the necessary stable support to our naval forces to enable them to perform their tasks at sea effectively and in tandem with the nation's clarion call. Unique in its concept and design, the prestigious Project Seabird has shaped the Indian Navy's maritime ambitions of developing

and operationalizing a Greenfield, Smart, State-of-the-Art 21st Century Naval Base, with a tranquil Harbour, Berthing Facilities for both Surface and Sub-Surface Assets, Dockyard and Fleet Support Facilities, a fully functional Naval Air Station, Naval Armament Depot, and above all, townships for both the uniformed personnel and defence civilians. Phase I of the Project, having been handed over to the Navy

progressively from 2005 to 2011, brought in greater visibility to the Project. Consequent commencement of Phase IIA in 2014 and its anticipated completion during the next few years, I believe, would meet the ever-expanding needs of our Navy.’

Note

1. Singh, A. (2018). *Blue Waters Abov! The Indian Navy 2001–2010*. New Delhi: Ministry of Defence (N), Government of India.



30 Married Accommodation Project

Enabling Better Living

⚓ Introduction

The Military Engineer Services (MES) raised in 1923, is one of the largest construction and maintenance agencies in India. The MES is entrusted with 'Works Projects' for the three defence Services, as well as the Coast Guard (CG), erstwhile Ordnance Factories, Kendriya Vidyalaya Sangathan (KVS), Border Road Organization (BRO) and the Defence Research and Development Organization (DRDO). The MES, though a military organization, has both Army and Civilian components. It has a large number of units and sub-units spread across the entire country to provide engineering services, such as design, construction and maintenance of buildings, and office spaces, laboratories, hospitals, workshops, and accommodation and such like, airfields, dock installations, military roads, bulk water and electric supply, drainage, and refrigeration, among other critical support. The MES functions under the overall control of the Engineer-in-Chief and is guided by the Defence Works Procedure 1986.

Creation of new accommodation infrastructure for military and other government personnel is one of the major responsibilities entrusted to the MES, and has a direct bearing on the morale and welfare of personnel. In September 2002, based on the assessment by the Service Headquarters,

the requirement of 198,881 Dwelling Units (DUs) accommodation was approved by Cabinet Committee on Security (CCS). In May 2002, the construction of DUs in Married Accommodation Project (MAP) was planned in four phases, with each phase set to be completed in four years. Anticipating the sheer complexity and magnitude of the task at hand, it was envisaged that the existing resources of MES were limited and not adequate to achieve time-bound completion of the project.

In order to overcome this challenge, in May 2002, the Directorate General of Married Accommodation Project (DG MAP) was set up to specifically undertake the construction of DUs for the Armed Forces. The DG MAP organization was created through relocation, re-alignment and re-distribution of MES resources. Headquartered in Delhi and as a part of Engineer-in-Chief's branch (E-in-C's) in Army HQ, DG MAP was headed by an Additional Director General of Works. Technical officers were provided by making internal adjustments with the E-in-C's branch/MES. In order to establish a common framework for execution of this project a detailed MAP procedure was promulgated in 2003, which outlined the procedures for projection, planning, sanction, contraction, execution, material and

financial management of work services as a decentralized system of decision-making.

The MAP procedure of 2003 permitted DG MAP to engage Project Consultancy with the approval of the Apex Steering Committee (ASC) after open competitive tendering with pre-qualification criteria. The project consultant was to carry out the survey, site investigation, and preparation of design, structural/architectural drawings, and preparation of bill of quantities, cost estimates, tender documents and evaluation of quoted bids. Additionally, DG MAP was also authorized to engage engineers/architects and other specialists to review important projects designs and schemes to incorporate latest technical improvements and trends in construction.

The MAP DUs accorded sanction in 2002 were to be completed in four phases, with each phase lasting four years. Phase I of the project was , therefore, to be completed by March 2006. Phase II of the project, which was to be initiated within four years of Phase I, was delayed by two years and sanctioned in 2008. Phase II was to completed by March 2012. With the completion of the first two phases by March 2012, it was envisaged that 127,851 DUs would be ready for use by the Services. CAG Audit Report No.15 of 2017 noted:

As of March 2016, even after four years of the scheduled completion date of Phase II, only 80692 DUs (63 per cent) had been completed under the two phases. The balance 47,159 DUs, were still under various stages of construction, as of March 2016. The combined Phase III and IV of the project, which should have ideally been sanctioned by 2010, is still under planning. Hence, against the target of 1,98,881 DUs, which were to be constructed in four phases of four years each from 2002 onwards, only 80,692 DUs (41 per cent) were actually constructed under the project MAP, during the 13 years so far.

Post combination of Phase III and IV into what is now known as Phase III, a total of 71,102 DUs are to be constructed of which the Army has a major share (70,432 DUs), the Air Force (IAF) has 670 DUs, while no DUs were earmarked for the Navy. While 6,153 DUs were initially planned for the *IN*, the *IN* has decided to progress these through the AMWP route post sanction of the Government. The financial outlay for the MAP for the three Services since 2011 is tabulated below.

Year	Budget in Rupee Crore			
	Army	Navy	Air Force	Total
2010–11	779.66	260.98	172.83	1,213.47
2011–12	961.27	145.73	175.53	1,282.52
2012–13	980.00	116.35	228.56	1,324.91
2013–14	1,071.94	150.00	150.25	1,372.19
2014–15	1,641.56	198.00	129.37	1,968.92
2015–16	2,374.19	190.00	180.00	2,744.19
2016–17	1,675.00	110.00	180.00	1,965.00
2017–18	1,120.00	68.00	175.00	1,363.00
2018–19	771.76	27.98	89.80	889.54
2019–20	373.47	37.48	54.96	465.91
2020–21	191.76	20.32	30.07	242.15
2021–22	167.00	20.00	45.50	232.50

MAP and Indian Navy

The *IN* is built around the ability of its workforce. Proper accommodation for the families of the naval forces can be regarded as an important factor in enhancing the morale, job satisfaction and a sense of security. The aspiration to provide adequate and safe accommodation to the naval service personnel was a chief premise of the Human Capital Strategy 2018 (HCS 2018), which noted that the non-availability

of suitable accommodation, and inadequate numbers were the biggest negative influence on the motivation of personnel. The availability of adequate accommodation was therefore deemed critical not only to match up with the planned growth of the *IN*, but also rising aspirations of *IN* personnel for better quality and comfort for their families.

The 2002 approval (at the time DG MAP was set up) included 6,332 DUs for the *IN*, with 3,225 DUs approved in Phase I and 3,107 DUs in Phase II. However, due to cost escalation only, 2,687 DUs could be constructed in Phase I. Subsequently, in September 2010, the Government of India approved construction of 3,967 DUs in Phase II for the *IN* (the 538 unfinished DUs of Phase I and an additional 322 DUs).



Phase II of the Married Accommodation Project at Karwar Naval Base

MAP Phase I

2687 DUs were constructed and handed over to the Navy.

MAP Phase II

3,107 DUs were initially approved for the *IN* for MAP Phase II. To this were added 860 more DUs (the 538 DUs not constructed in Phase I, plus an additional 322 DUs), and a total of 3,967 DUs were subsequently approved by the Cabinet Committee on Security (CCS) in September 2010.

While DG MAP was created to enhance the speed of the construction of accommodation projects for Armed Services personnel, the works have been stalled at many stations, due to the slow progress made by the contractors, necessitating re-tendering, resulting in further delays. Goa, Mumbai and Lonavla are examples of such stations, where the projects were delayed on account of contractor-delays, re-tendering of contracts, and delays in crucial Coastal Regulation Zone (CRZ) clearances:

Goa: The project was inordinately delayed due to slow progress made by the contractor. Much-needed impetus to the project was provided through regular reviews by the Vice Chief of Naval Staff (VCNS) at Delhi. In February 2020, the completion of 208 new DUs for junior sailors aided in the reduction of waiting period for allotment of accommodation to Junior Sailors.

Mumbai:

■ **Officers:** A single building comprising forty-four DUs for Army and Navy officers was planned to be constructed in Mumbai. However, Coastal Regulation Zone (CRZ) clearance could not be obtained for the plot where the building was initially planned, causing delays at the very onset. Subsequently, the building was planned on an alternate site. Though the construction began at the alternate site, this too has suffered, as only 20 per cent progress was made by the contractor as on 31 December 2021.

■ **Sailors:** The construction of 200 DUs at Mumbai as part of MAP Phase II was also delayed due to slow progress by the contractor. A decision was taken to cancel the contract and progress the re-tendering of this project. Subsequently, the contractor obtained a stay on re-tendering. The stay was lifted, and the re-tendering for the project commenced.

Lonavla: The project at Lonavla was cancelled due to slow progress made by the contractor in July 2013. The contract was subsequently contracted at Risk and Cost in February 2014. However, the new contractor also could not complete the construction leading to the cancellation of the contract in February 2019. Currently, re-tendering of the contract is being pursued by DGMAP.

The *IN* has actively pursued alternate means to minimize shortfalls through hiring of multi-storied buildings and the creation of accommodation infrastructure through non-public funds.¹ A new policy promulgated by the Ministry of Defence (MoD) in 2016 permitted the demolition of dilapidated low-rise structures and construction of high-rises, to make optimum use of the land. Subsequent to the implementation of this policy, sanction was received for the construction of 1,960 DUs against the demolition of 1,086 DUs, with a net increase of 874 DUs.

In order to overcome the challenges and delays of projects executed through DG MAP, the *IN* also pursued augmentation of accommodation/DUs through the Annual Major Works Programme (AMWP).

High-Rise Buildings

Due to limited land availability in various stations, a decision was taken to construct buildings in high-rise configurations only where feasible, subject to restrictions under the Aircraft Act. A maximum of fourteen storeys were permitted to be constructed till 2010. Cases were progressed for the construction of buildings with twenty storeys in 2010, twenty-two storeys in 2017, thirty-two to thirty-four storeys in 2019, and forty-two storeys in 2020 in Mumbai. The concept of multi-storeyed parking was also implemented within these buildings.

However high-rise buildings were not found to be feasible in Visakhapatnam and Kochi, due to various restrictions of the Aircraft Act.



Inauguration of Civilian Married Accommodation at NCHC Powai

Conclusion

Unlike the Army and the IAF, most naval stations are located in Tier 1 and Tier 2 cities. Availability of land and labour at these locations is at a premium, and thus expanding the accommodation infrastructure has been a challenging task for the Navy. Over the years, the unavailability of Married Accommodation, especially for the sailors, and the resultant sharing of accommodation has been a cause of concern. In the last decade, the *IN* through concerted efforts achieved 80 per cent completion of Phase II MAP projects in the Sailors category. This was made possible through sustained overseeing, monitoring and mitigation of financial as well as administrative hurdles. The addition of the new DUs in the accommodation pool has helped cut down waiting periods for house allotment at many stations, however, sustained impetus in the coming years is considered critical to bridging the accommodation shortfalls, albeit at a faster pace.

Note

1. Public Funds include all funds which are financed entirely from public money, the unexpended balances of which are refundable to Government in the event of not being devoted to the objects for which granted. Funds not falling under the definition of Public Funds are classified as non-public.



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Works and Infrastructure Enhancing Capacities

⚓ Historical Background

Until 1941, the Royal Indian Navy (RIN) was responsible for planning and executing its own civil works. After the Japanese Navy's attack on the US Navy in Pearl Harbour in December 1941, the scope and quantum of naval works increased rapidly, and the Corps of Engineers—the Sappers—were made completely responsible for planning and execution of civil works. All wartime construction at the major naval bases was made by the Military Engineer Services (MES). At the time of Partition in 1947, the buildings and roads assets apportioned to the RIN were only about Rs 2 crore. After the Partition and until 1962, there was limited development of naval assets, despite the works in Bombay and in Cochin. It was only after the Chinese aggression in 1962 and thereafter that the momentum of civil works started building up.

The Government accepted the fact that the Indian Navy (*IN*) was an equipment-oriented Service rather than a manpower-oriented Service, and that made it an expensive one. The *IN*'s capital budget, for hardware for combat, and maintenance and training involved heavy expenditure, much of it in foreign exchange. Left with no permanent training establishments after Partition, a heavy civil works budget was necessary for setting up new facilities. The fact that the *IN* had switched from acquiring second-hand to buying new ships of

the latest design, also meant a whole new range of maintenance and support infrastructure was needed. By the end 1980s, the volume of the *IN*'s civil works had become so large, the need for them so urgent, and the delays so frustrating that scepticism grew about the MES' capability to cope.

As part of its natural evolution in 1989, to 'professionalize' naval logistics, a 'Logistics Cadre' was created. The office of the Controller of Logistic Services (CLS) was created at Naval Headquarters (NHQ) to function under the Chief of Materiel (COM). The Cadre was to have four sub-specializations focused on 'Materiel Management' and 'Financial Management', and were fairly close to what the Supply and Secretariat Branch had been doing earlier. In order to provide impetus and execution urgency to the growing needs of the *IN*, 'Management Information System/Electronic Data Processing (MIS/EDP)' and 'Works Management' functions were also added to the charter of the newly created Controller of Logistic Services. Despite these changes, many infrastructure projects could not gather pace and their much-needed availability was delayed. It was felt that the situation would improve if the Chief Engineers of MES in each Command were brought under the respective Flag Officers Commanding-in-Chiefs (FOC-in-Cs) at Bombay, Visakhapatnam and Cochin instead of under the Engineer-in-Chief at Delhi. These

issues were examined at length and subsequently, Zonal Chief Engineers (Navy) were placed under the respective FOC-in-Cs.

In July 1996, the Directorate of Work (DW) was bifurcated into Directorate of Works (Planning & Infrastructure) under Assistant Chief of Naval Staff (ACNS, Policy & Plans) in Staff Branch I; and the Directorate of Works (Quartermen & Maintenance) under the Assistant Controller of Logistics (ACOL) in the Controllerate of Logistics under Materiel Branch. However, in February 1998, they were re-merged into Directorate of Works with DW (Planning & Infrastructure) as Director Works, and DW (Quartermen & Maintenance) as Joint Director Works. The same continues to date.

The *IN* has continued to provide impetus to the development of infrastructure for operational requirements, training, security and single/married accommodation during the decade. Priority was accorded for infrastructure creation for new inductions. Mitigation of shortages, both in single and married accommodation, also received the required momentum, and a number of projects were sanctioned. Various cases for land acquisitions also saw fruition during the decade, thereby increasing the land bank available with the Navy.

Decadal History

Raising Annual Major Works Programme Ceilings

A constant dialogue was maintained with the Ministry of Defence (MoD) during the period, to increase the AMWP ceilings to accommodate *IN* requirements for the creation of new infrastructure and the upgradation of existing infrastructure to meet the needs of the growing Navy. An increase of approximately Rs 650 crore was accorded by MoD, to cater to various accommodation cases for

Training Establishments. The sanctions ceilings were, however, restricted in 2018–19 and 2019–20 due to high carry-over liabilities. A significant achievement has been the utilization of the allotted sanction ceilings throughout the decade.

Operational Infrastructure

New Inductions: A large number of new inductions were progressed during the decade, and the required support infrastructure was progressed under various projects. Most of this infrastructure was progressed through the AMWP route.



Naval Air Enclave (NAE) at the Cochin International Airport (CIAL), Nedumbassery

Runway Works: Major emphasis was laid on maintaining operational status of runways. A resurfacing plan was prepared and work was accordingly sanctioned and progressed through the decade.

Policy Issues Related to Defence Land

Guidelines for Issuance of No Objection Certificate: In May 2011, the MoD promulgated guidelines and procedure for issue of NOC for civil constructions in the vicinity of Defence land.

Transfer of Defence Land for Public Utilities and Public Infrastructure Projects: In March 2015, the MoD promulgated guiding principles and procedure to be adapted when Defence

lands are required for any public utility or public infrastructure project. The last amendment to this procedure in October 2020, authorized transfer of Defence land against Equal Value Infrastructure (EVI) constructed by the Indenting Agency.

Notification of Naval Lands under WoDA, 1903:

In February 2018, in order to ensure security of certain sensitive units, a total of fifteen Naval units/establishments were notified under Works of Defence Act (WoDA), 1903, to keep an area of 25 m from the boundary free of vegetation.

Communication/Mobile Towers on Defence Land:

Detailed policy on erecting of communication (cell phone) towers on Defence lands, and on rooftops of Defence buildings was promulgated by the MoD in February 2018.

Provision of Piped Natural Gas (PNG)

Infrastructure: A policy on provision of PNG infrastructure in all residential areas/unit lines of Defence establishments was promulgated by the MoD in March 2017. The facility has been extended to include clubs, messes and langars, running on Defence lands as Non-Domestic Exempt Category (NDEC) vide amendment issued in December 2018.

Guidelines for Regimental Shops: Guidelines for allotment of Shops, collection and disposal of rebate, rent and allied charges with respect to Regimental Shops, as approved by MoD, was promulgated in February 2019.

Monitoring of Encroachments: Multiple guidelines/directives have been issued by NHQ to lower formations on the requirement of, and the procedure to be followed for, monitoring encroachments. In order to clarify the specific responsibilities, a set of Guidelines on Management of Defence lands in Naval Stations, with co-located Station Commander/Land Management Authority and Naval Project Authority, was promulgated by Naval Headquarters in May 2019.

Resolution of Issues with Port Trusts: A long-pending conflict on accord of concessional rates to the *IN* for the lease of lands from various port trusts was resolved through an inter-ministerial discussion. The decision by the Ministry of Shipping (MoS) to accord 25 per cent concession on lease rentals and waiving outstanding penal charges for the *IN* was accorded in October 2019, and for exemption of security deposit for land leased from Port Trusts in July 2020.

Credit of Revenue Receipts of Naval Lands Leased to other Organizations: Updated credit of receipts of rentals in respect of land under management of *IN*, but leased to other organizations, was carried in March 2020.

⚓ Lease and Transfer of Land

Lease of Land to Kendriya Vidyalayas: Details of lease of land to KVs during the period are tabulated below.

Year	Location	Lessor, Area & Duration	Purpose
2011	Ezhimala, Kerala	10 acres, 30 years	KV at Indian Naval Academy (INA)
2013	Karanja, Mumbai	4.21 acres, 30 years	KV at Karanja

● **Transfer of Land to Other Organizations:** Details of transfer of land to other organizations is as follows:

Year	Location	Organization & Area	Purpose
2012	Visakhapatnam	Defence Estate Officer: 0.71 acres	Accommodation
2013	Visakhapatnam	Defence Accounts Department: 1,170 sq. m	Accommodation
2015	Kochi	Defence Estate Officer: 0.6 acres	Accommodation
2017	Karwar	Defence Accounts Department: 3 acres	Office-cum-residential accommodation

Year	Location	Organization & Area	Purpose
2017	Ulhasnagar, Mumbai	Ulhasnagar Municipal Corporation	NOC for construction of road on Defence land at Naval Civilian Housing Colony
2019	Kapparada, Visakhapatnam	Director General Defence Estates (DGDE): 0.58 acres	NOC for Transfer of management of 0.58 acres Defence land

Conclusion

By the end of the decade 2011–21, budget allocation to AMWP witnessed a sharp increase

of over 350 per cent as compared to the end of last decade. This increase was in line with substantial growth of the *IN*'s operational footprint over this period. As the *IN*'s reach extended further outwards beyond the IOR, infrastructure aimed at supporting and sustaining such missions saw considerable growth across various domains such as operations, maintenance, support and training. Provisioning of dedicated infrastructure for new induction platforms such as the P-8I aircraft and Deep Submergence Rescue Vehicles (DSRVs), each on the western and eastern seaboard has been instrumental in the early operationalization of these inductions and their sustenance.





An aerial photograph of a coastal area. In the foreground, a large blue and white ship is docked at a pier. The middle ground shows a residential area with many small houses and buildings, interspersed with greenery. In the background, there are several large industrial structures, including two prominent cylindrical tanks. The sky is blue with some light clouds. A large white number '5' is overlaid on the image, partially covering the residential area and the water.

5

Technology:
Upscaling
Defence Production
and Maintenance

32

Technology A Strategic Imperative for the Indian Navy

The Indian Maritime Security Strategy of 2015 (IMSS 2015), ‘aims to maintain and further develop the Indian Navy (*IN*) as a combat-ready, technology-driven networked force, which will remain capable of safeguarding India’s evolving national maritime interests’.¹

⚓ External Technology Canvas

From a broader perspective, rapid and profound technological change is one of the most potent factors shaping the modern world. It creates significant opportunities, but drives increasingly complex, ambiguous and destabilizing global threats and catalyses profound societal, economic and political shifts. Technology is a strategic force; the nations that are best able to anticipate and exploit technological opportunities may have a decisive edge in future conflicts. In a resource-constrained environment and given the breadth and relentless pace of technological change, focusing of efforts is essential. The *IN* needs access to the right capability base (people, knowledge, facilities, industrial capacity, etc.) to understand and develop technologies that offer the most promising cross-cutting applications, so that it can exploit these technologies at a speed of relevance for transformative real-world impact.

⚓ Internal Technology Posture

The IMSS 2015 acknowledges that the *IN* possesses mature and robust force-maintenance structures

to undertake effective materiel management and technical maintenance of operational platforms. Ship design and modelling capabilities are also integral to the *IN*’s growing indigenous framework. The IMSS 2015 also goes on to add that the *IN* will constantly endeavour to reinvigorate existing maintenance mechanisms, by harnessing modern technology and incorporating total quality management. A strategic approach to force maintenance should take into account modern trends in design, production, logistics and refitting of naval platforms, in order to optimize operational cycles, enhance self-reliance and minimize cost and time overruns. The IMSS 2015 also envisions focus towards modernization of dockyards and upgradation of facilities therein, to meet the growing requirements of force maintenance.

Fundamental technology developments will largely take place outside the Government sector, and effective defence modernization must occur in partnership with the Defence Research Development Organization (DRDO), industry and academia. The *IN* has laid out a roadmap to engage with them in pursuit of better and quicker capability outcomes. Some of the technology milestones identified include Advanced Electronics and Computation; Integrated Platform Management Systems; Sensor Technologies; Weapon Systems, including missile defence systems and autonomous systems; systems for Command,

Control, Communication, Computers, Intelligence, Information, Surveillance, Reconnaissance (C⁴I²SR); Network-Centric Operations; Air Independent Propulsion Fuel Cells; Stealth and Acoustic Technologies; Advanced Material Technologies; and Artificial Intelligence.

⚓ Technology Strategy

The IMSS 2015 continues to guide the *IN*'s broader strategy towards technology innovation and adoption. The strategy emphasizes the need for the *IN* to opt for 'leapfrogging' technologies, to ensure that a high percentage of assets with contemporary equipment remain capable of combating emergent threats. This would be pursued by building partnerships with suitable organizations, both national and foreign, and supporting focused investments in research and development (R&D) of new technologies, preferably with a compatible market interface for product support.



India-Made Stealth Guided Missile Destroyer in Action

The *IN* today operates a mix of cutting-edge, newage platforms and some old platforms that have been upgraded through periodic equipment upgrades to keep them abreast of the latest technologies. These platforms (i.e., ships) are increasingly deployed for even longer durations, and at locations far from their base ports. This increased deployment tempo has

required ships to sustain for longer durations with minimal support, and where support was required, setting up robust maintenance support chains was accorded priority in the decade under review (2011–21). The role played by shipyards, repair yards, formations handling indigenization, training establishments and others have all worked towards achieving the goal of combat-ready platforms and personnel.

This chapter dwells on the growth and role played by various organizations within the *IN*, that have aided in the growth of the *IN* as a 'credible, combat-ready, technology-driven and networked force' over the last decade. This section will focus on the following aspects:

- Technology and capability needs;
- Repair yards;
- Naval Indigenization: Fostering Aatmanirbhar Bharat;
- Shipbuilding;
- Policy initiatives; and
- A decade of technological advancements.

⚓ Technology and Capability Needs

Development of superior or even contemporary technologies, requires a massive trust in research and development (R&D). The Technology Perspective and Capability Roadmap (TPCR) released by the Ministry of Defence (MoD) provides a glimpse of the technologies and capabilities that the Armed Forces would be looking for in the near future. The expectation is that R&D agencies in both public and private sectors would work out a detailed plan to develop such technologies and also to fund such projects, by tapping all available national resources, including civilian industry, Government enterprises and academia.

The MoD published TPCRs in 2013 and 2018.^{2,3} The objective of the TPCR 2018 was to 'give an opportunity to the Indian industry to draw up business plans for developing technologies that

are envisaged to be inducted into the Indian Armed Forces up to the late 2020s'. The MoD expects the industry to interact with it on a regular basis and strike a partnership for developing contemporary and future technologies, and manufacturing requisite equipment.⁴

Some of the major technologies/capabilities/capacities identified by the *IN* in TPCR 2018,⁵ are tabulated below.

Platform/Capability
Aircraft Carrier
Next-generation Destroyers (NGD)/Next-generation Frigates (NGF)
Next-generation Offshore Patrol Vehicle (NGOPV)
Next-generation Corvettes (NGC)
Missile Boats/Next-generation Missile Vessel (NGMV)
Mine Counter-Measures Vessel (MCMV)
Fleet Support Ship (FSS)
Fast Attack Craft, Extra Fast Attack Craft Fast Patrol Vessel (FAC/XFAC/FPV)
Multi-Purpose Vessel (MPV)
Diving Support Craft
Medium Altitude Long Endurance (MALE) Remotely Piloted Aircraft (RPA)

General Systems
Replenishment at Sea (RAS)/Fuelling at Sea (FAS) System
Ship Installed Chemical Agent Detection System (SICADS)
Impressed Current Cathodic Protection (ICCP) System
Addressable Flood Alarm System (AFAS)
Magazine Firefighting System (MFFS)
High Pressure (HP) Water Mist/CO2 System
Towed Wire Antenna System
Rail-less Helo Traversing System
Indigenous SATCOM Systems (Various Bands)

Weapon Systems
Surface-to-Surface Missiles (SSMs)
Shore-Based Missile for Mobile Missile Coastal Battery (MMCBs)
Long-Range High-Speed Torpedo
Extended-Range Anti-Submarine Warfare (ASW) Rocket

Weapon Systems
Close-in Weapon System
Supersonic Aerial Targets

Sensor Systems
Multi-Functional Dual Band Radar
Doppler Weather Radar 'X' band
Submarine Sonar Suite
5 kilowatt (kW) High Frequency (HF) Transmitter

Equipment
Gas Turbines
Main Diesel Engine
Gas Turbine/Diesel Generator Set
Gear Box
Controllable Pitch Propeller (CPP) & Shafting
Submarine Diesel Generators
Submarine Main Propulsion Motors
Submarine System Controls
Lithium-Ion Batteries for Submarines
Electro-Hydraulic Davit
Sewage Treatment Plants (STP) with Vacuum Toilet System (VTS)
Capstans (Anchoring & Mooring)
Air Conditioning Plant
Steering Gear
Stabilizer
High-Pressure Air Compressors (HPAC)
RO Plant
Canned Motor Pump
Advanced Induction Motors, Propulsion Converters, High Voltage (HV) Switchboards and Variable Frequency Drives
Centrifuges
Oxygen Generation Plant
Nitrogen Generation Plants
Arresting Gear
Restraining Gear
INMARSAT Maritime Voice-cum-High-Speed Data Terminal (FBB 500)

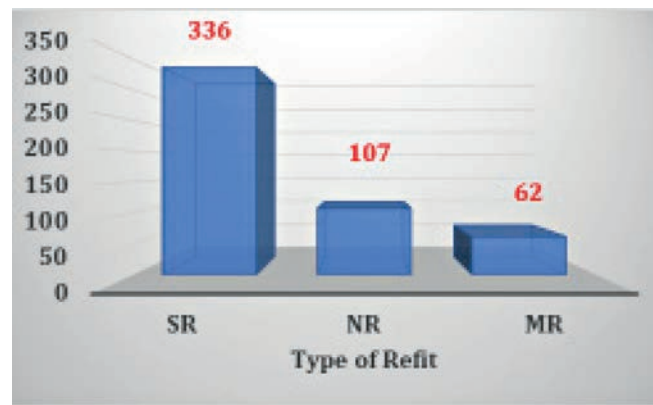
Repair Yards

The IMSS 2015 notes that India's growing maritime interests across wide geographical spaces,

underscore the central importance of adequate power projection in and from the seas, and for sea control capability in blue waters, to safeguard interests and counter threats before they can bear upon India. The primary means for this will be potent, balanced naval fleets supported by strong, integral and shore-based maritime air power. The *IN* presently has two fleets, each with multidimensional power projection and force protection capabilities.

In order to maintain a geographically diversified maintenance envelope for naval platforms, the *IN* has one Naval Dockyard (ND) each at Mumbai and Visakhapatnam, and a Naval Ship Repair Yard (NSRY) each at Kochi, Port Blair and Karwar. The repair and refit requirements of *IN* ships and submarines are collectively met by these repair agencies. The NDs have the capacity and capability to handle Medium Refits (MR). The Operational-cum-Refit cycle of each ship/class of ship is promulgated by Integrated Headquarters (IHQ) MoD (Navy) from time to time. Refits of *IN* ships and submarines are undertaken by the naval yards or offloaded to defence/private shipyards depending on the capacity and/or expertise.

The repairs and refits undertaken by the *IN* are categorized as Short Refit Guarantee Defect (SRGD), Short Refit (SR), Normal Refit (NR), Normal Refit-cum-Midlife Upgrade (NR-MLU), Medium Refit (MR), Medium Refit-cum-Midlife Upgrade (MR-MLU) and Essential Repairs and Dry Docking (ERDD). These repairs/refits are undertaken in accordance with the Operational-cum-Refit-Cycle (OCRC) promulgated by IHQ MoD(N) and the MoD from time to time, based on the operating experience, changes in technologies and induction/phasing out of different classes of ships. The number of refits handled by various yards in the decade under review (2011–21) are depicted in the following infograph. The corresponding number for the previous decade (2001–10) was about 320 SRs, ninety NRs and forty MRs.



Refits Undertaken by Repair Yards (2011–21)

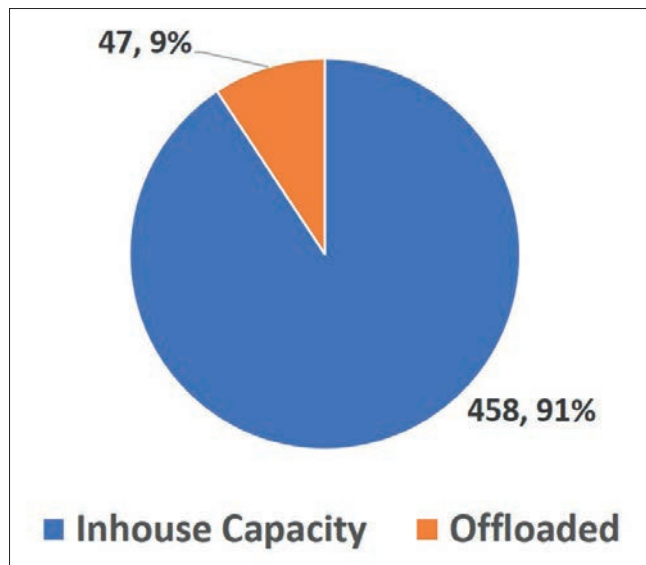
The *IN* took the lead in formulating its Maritime Capability Perspective Plan (MCCPP), outlining a clear roadmap for future inductions over three consecutive Five Year Plans from 2012 to 2027. The MCCPP has been a guiding document to the repair yards in laying the strategy and foundations, with regard to technical upgradation and infrastructure development. Over the past decade, the *IN*'s maintenance philosophy has been centred on improvement in maintenance, for sustained operational effectiveness. In 2017, Naval Headquarters (NHQ) implemented a policy for constitution of dedicated Project Management Teams for refit monitoring. The aim was to establish a cohesive team along with the Yard's Planning Division, functioning in a symbiotic manner with the singular goal of ensuring quality refits in time. It also aimed to provide complete visibility of the total refit planning, progress and status to the ship's staff through various project monitoring tools and software.

The *IN* repair yards have played a crucial role in ensuring combat availability of platforms, especially as the deployment of *IN* ships tripled as compared to the previous decade. Some significant events/operations, for which support was extended by the repair yards during the last decade, include the President's Fleet Review (2012), International Fleet Review (2016), refit of *Mhadei* (2012), *Sagar Parikrama II* (2013), *Lokayan* (2015),

Navika Sagar Parikrama (2017–18), refit of MCGS *Guardian* (2018), conversion of *Magar* to Cadet Training Ship (2018), mission-based deployments, the MR (2015) and SR of *Huravee* (2020), repairs to Philippines Navy Ship *Ramon Alcaraz* (2020), and many others. Apart from these standout events, naval repair yards continued to provide support to ships under maintenance, as well as to meet operational requirements of ships and submarines prior to deployment for missions/exercises as regulated by the *IN*'s combat posture.

In the past decade, the *IN* has had a mix of ageing ships and some of the most contemporary, technologically advanced platforms. Maintaining this generation gap in the maintenance portfolio was indeed a challenge. This diversity made it imperative for the repair yards to carefully evolve logistics and maintenance plans as well as Human Resources (HR) initiatives, thus ensuring the availability of trained manpower to maintain both new and old equipment. In light of the growing portfolio of ships under their maintenance envelope and repair yards, NHQ decided to tap into the spare capacity of public and private shipyards to optimize the load on in-house repair agencies.

The year 2015 was significant, as it accomplished refits of two Aircraft Carriers (*Viraat* and *Vikramaditya*) for the first time in this century. The fact that this was achieved smoothly by two separate yards, with significant support from Cochin Shipyard Limited (CSL), well within the scheduled durations, is testimony to the prowess and potential capabilities of these repair yards. While offloading refits eased some burden on dockyards, it also threw up new challenges in the way of overseeing of refits and ensuring quality of refits. In this regard, the policy on the generation of a comprehensive defect list through Comprehensive Maintenance Management System (CMMS), maintained by Indian Naval Ship Maintenance Authority (INSMA), was helpful in effective refit progress.



Capacity Distribution of Refits

A ship is a complex amalgamation of machinery and systems that need maintenance and repairs from time to time. Given the fact that maintenance is a must for all naval platforms and downtimes are a necessity, the thrust of the *IN* was on optimizing the maintenance and repair procedures in the dockyards. This approach ensured sustained availability of highly reliable platforms at sea for defence of the country. The hallmark of repair yards is their innate ability to seamlessly undertake the overhaul and maintenance of ships/submarines/yardcraft-based equipment and systems, using diverse technology. They are also able to efficiently and effectively meet this technological challenge, because of a highly skilled and trained workforce, inbuilt and continuously evolving high-quality management systems and the availability of a wide range of repair assets and facilities.⁶ This approach has resulted in the *IN* tripling the operational availability of ships (measured in the number of days the ship is available during a calendar year for deployment) in this decade (2011–21) as compared to the previous decade (2001–10).

Technology and materiel support form the bedrock over which the operational capability of any Navy is built. The *IN*'s ships and submarines are

routinely sent on distant deployments and for much longer durations. The maintenance support provided by various repair yards has ensured availability of combat-ready platforms well beyond the designed life. The Comptroller and Auditor General's (CAG) 2013 audit report on *Planning and Management of Refits of Indian Naval Ships* notes that the service life of a ship varies from twenty to twenty-five years primarily limited by the condition of hull.⁷ The *IN* continued to maintain larger vintage platforms like *Viraat* for thirty years, *Rajput* for forty-one years, *INS Ganga* for thirty-two years, *Taragiri* for thirty-three years and *Ranjit* for thirty-six years. Smaller platforms, with an anticipated life of twenty years, were operationally available for thirty years (such as thirty-two years for *Nishank*). The *IN* continues to operate the Russia-built *Rana* (over forty years old), *Ranvir* (over thirty-six years old), *Ranvijay* (over thirty-four years old) and other Indian-made ships, such as *Vipul* and *Vinash*, which are both more than thirty-four and thirty-three years old, respectively.

The year 2020 brought new challenges for the repair yards in the form of the COVID-19 pandemic affecting all facets of normal working, mainly due to associated lockdown/restrictions

on service, and availability of yard personnel. However, despite severe restrictions and challenges, the yards continued to attend to every critical defect, and in some cases, its personnel resided in the dockyard till completion of work—which in some instances extended to as long as two weeks. This ensured materiel readiness and operational availability of ships. The succeeding paragraphs will now explore the growth of the five repair yards in the last decade.

Naval Dockyard Mumbai

Brief History⁸: ND (Mbi) has a rich heritage dating back to 1735, when Lowji Nusserwanji Wadia set up a ship repair/building facility in Bombay to maintain the ships of the East India Company, upon a request made by the British. Today, it has transformed into a strategic asset of the nation, and is a yard with the capability to maintain advanced, state-of-the-art ships and submarines. In post-Independence India, ND (Mbi) transformed itself into an important national maritime asset on the Western seaboard. Its principal function since then has been to undertake planned as well as emergency refits of ships,



A Ship Docked at Naval Dockyard, Mumbai

submarines and yardcraft, apart from providing support to operational ships and submarines.

Record of Activities:

- **Resurrection of Main Propulsion Aggregate Onboard *Betwa*:** Following the unfortunate accident of the *Betwa* in December 2016, major structural deformations necessitated complete resurrection of the main propulsion aggregate of *Betwa* including the shaft lines, gearboxes and the main turbines. This was a mammoth task, never undertaken before. The scope of work was akin to the construction of a new ship and was successfully undertaken by ND (Mbi). The scope of work also entailed repairs to boiler control panels and renewal of stern glands.
- **Re-Engining Onboard INS *Akshay*:** The re-engining activity onboard INS *Akshay* was undertaken by the yard under supervision of M/s GRSE, during which the originally fitted radial engines were replaced by MTU16V1163TB93 to reduce the Mean Time Between Overhaul (MTBO). As part of re-engining, new thrust bearings with Gear Coupling (Tooth Coupling) were installed. The *IN* has been operating vintage platforms by giving them regular equipment upgrades during planned refits. Generally, engine replacement as part of such



Re-engining Onboard INS *Akshay*

refits is undertaken on a like-to-like basis. The re-engining onboard INS *Akshay* was unique, as it involved the replacement of vintage radial engines with an altogether new engine make and model. Such a replacement also necessitated that the Yard act as a propulsion-system integrator, a capability that previously was limited to shipbuilding yards.

- **Maiden Docking of *Vikramaditya*:** The maiden dry docking of INS *Vikramaditya* was undertaken at Cochin Shipyard in September 2016. A team of officers, supervisors and workers from the Dry Docks Department of ND (Mbi) played a significant role in the maiden docking. The docking plan for *Vikramaditya* was amended, based on the recommendations of the team from ND (Mbi), and the height of the dock blocks was reduced by 0.2 m to achieve adequate clearances during the ship's movement. The docking condition predictions, carried out by the team, matched the actual conditions achieved at the time of the docking and facilitated a smooth docking operation. The team was closely involved in the preparation of the dock floor as per the docking plan, checks for accommodation of the ship inside the dock and close monitoring of the docking operation.
- **Upgrading the Habitability of INS *Tarasa*:** Just prior to the scheduled transfer of INS *Tarasa* to Seychelles in late 2014, ND (Mbi) undertook an extensive habitability upgrade onboard the ship. Within the short duration of forty-five days the ND (Mbi) undertook refurbishment of living spaces and fitment of reverse osmosis and sewage treatment plants, both of which have proven crucial towards increasing the service life of the ship.
- **Maiden Medium Refit of *Talwar*:** The maiden MR of INS *Talwar* was carried out from May

2015 to April 2019. More than 50 tonnes of steel renewal was undertaken during the MR. Other major works accomplished during the refit included the overhaul of Cruise Reduction Gears (CRG), complete renewal of gas turbine (GT) air intake, maintenance routines of weapon systems and equipment and habitability upgrade. The maiden MR activities related to the Main Propulsion Plant work package, standardization of shipping out/in routes and overhaul procedures. All these were documented for implementation and further refinement during the refits of INS *Tabar* and INS *Trishul*.

- **Maiden Short Refit of *Kalvari* (2020):** Commissioned in September 2017, INS *Kalvari* underwent its maiden SR at ND (Mbi) in September 2019, over a seven-month period. Several activities were undertaken in order to benchmark performance indicators of the first-of-class submarine, as also to undertake a comprehensive review of the practical implementation of promulgated repair and refit procedures. The experience gained during the maiden SR of *Kalvari* will be extremely useful in optimal planning and refit execution.



INS *Kalvari*

Major Infrastructure Upgrades:

- **New Dry Dock and Wharves Project:** The dock design was initially envisaged for the docking of the erstwhile INS *Vikrant* and was later modified to dock INS *Viraat* as well in the early 1990s. A

revised sanction from the Cabinet Committee for Parliamentary Affairs was obtained in December 1994. The size of the dock was again revised in early 2000 to accommodate Aircraft Carrier *Vikramaditya*, as well as the Indigenous Aircraft Carrier (IAC). M/s Haskoning DHV Consulting Pvt. Ltd was contracted to prepare the Detailed Project Report (DPR) for the dry-dock, which it submitted in January 2005. The DPR was approved in September 2005, and financial sanction for the project was accorded in August 2007.

The approved tender was floated in November 2008. Four bids were received and in April 2010, M/s Hindustan Construction Co. was awarded the contract—thus setting in motion the construction of the dock—identified as the Aircraft Carrier Dock (ACD). The project was sanctioned at a cost of Rs 1,320 crore. The unique design envisaged construction of this Dry Dock into the sea rather than utilizing the limited land available at ND (Mbi). Trial docking of INS *Delhi* at this dock was undertaken in June 2019, and the project was commissioned in September 2019.

This Dry Dock is the largest in the *IN* and is capable of docking INS *Vikramaditya*. In all 8,000 metric tonnes of steel (equivalent to the amount used in the Eiffel Tower), and 5 lakh metric tonnes of concrete (1.5 times the amount used in the Bandra-Worli Sea Link), was used in the construction of this facility. The infrastructure includes a Dry Dock and two wharves for berthing ships up to displacement of 90,000 tonnes. The dock is 281 m in length, 45 m in width, 17 m in depth, and has also added 900 m of berthing space at ND (Mbi). More than 95 per cent of the equipment/material by value has been sourced domestically.

The dock can undertake simultaneous docking of ships with varying docking periods,



Aircraft Carrier Dock, Naval Dockyard (Mumbai)

thus optimizing utilization. Since its formal induction in September 2019, the dock has undertaken the docking of eleven ships and five submarines. The Dock Master Complex overlooking the docking operations was commissioned on 28 February 2022.

The availability of the Dry Dock has greatly enhanced the capability of ND (Mbi) for faster turnaround of ships requiring maintenance. By building this dock, the *IN* has also cut recurring capital costs on outsourcing docking requirements.

- **Armament Repair Facility (ARF):** The ARF of P1135.6 (Talwar Class) was commissioned in November 2011. Seventeen reference systems and test-stands, and thirty-five sub-systems of Talwar class, were included in the facility.

- **Augmentation of Cruiser Wharf:** The Cruiser Wharf, owing to its vintage and extensive usage, had deteriorated considerably. As part of this project, repairs amounting to major renewal of the Reinforced Cement Concrete (RCC) structure, cable ducts, bollards, etc., were undertaken. Repairs included those to the gravity fenders, which enhanced the safety of ships berthed at this wharf. The project was completed in April 2015.

- **Facilities to Support P75 Submarines:** The project for upgradation of infrastructure to support P75 class of submarines was completed in 2016. The upgrades entailed supply, installation and commissioning of mobile rectifier, mobile static frequency converter, and high-capacity battery-charging facilities.

- **Periscope Repair Facility (PRF):** The PRF was commissioned in September 2018 to undertake

repairs on attack and search periscopes fitted onboard SSK Submarines. The facility consists of an electronic workshop, a machine shop, collimators, reference test units' clean room and a pressure-test facility.

- **Civilian Accommodation:** The following accommodation has been added in the last decade.

Accommodation Added	Year
128 Type II accommodation at Naval Civilian Housing Colony (NCHC), Powai.	2017
48 Type II accommodation at NCHC, Ulhasnagar.	2017
128 Type III in configuration of G+16 & 24 Type IV quarters at NCHC, Powai.	2020
Two buildings with 128 Type II in configuration of G+16 at NCHC, Powai.	2020

Naval Dockyard Visakhapatnam

Brief History⁹: The Navy had a presence on the East coast as early as the 1940s. A handful of small warships were positioned at Visakhapatnam. To service them, in 1940, a boat repair shop was established under HMIS *Circars*. These vessels were used to provide logistics support to the British

Army operating in Burma. In 1958, the shop was converted into a Base Repair Organization (BRO) under INS *Circars*. This BRO was the forerunner of the Naval Dockyard, Visakhapatnam. In the late 1960s, there were a number of acquisitions in the form of new-age warships and submarines from friendly countries. While the eastern flank of the Navy welcomed these men-of-war, it was inevitable that the BRO had to expand and in 1972 it was converted into a full-fledged Yard capable of providing requisite maintenance support to contemporary vessels.

In the past decade, the singular focus of ND (Vizag) has been to maximize the availability of seaborne war-fighting assets of the Eastern Naval Command, and extending third-line maintenance assistance to Andaman and Nicobar Command (ANC), Coast Guard (CG) and shore establishments in the region.

Record of Activities:

- **IFR-16:** An International Fleet Review (IFR) was conducted at Visakhapatnam from 4–8 February 2016, which saw the participation of seventy *IN* ships and twenty-four foreign



A Warship Under Maintenance at Naval Dockyard, Visakhapatnam

ships. Several activities were undertaken by ND (Vizag) towards mobilization of the yard infrastructure, resources and repair capabilities. Some of these included:

- **Activation of Operations Room:** The ND (Vizag) Ops Room was activated to serve as a nodal point for rendering assistance to ships for defect rectification and other miscellaneous aspects such as the need for cranes, water supplies, berthing, positioning of ships at anchorage and fuel supply.
- **Production Activities:** A modified shift system was introduced on all production floors. All essential Technical Support Services were manned round the clock by either a two- or three-shift system. Repair teams were kept on standby for undertaking urgent repairs work, if required onboard ships.

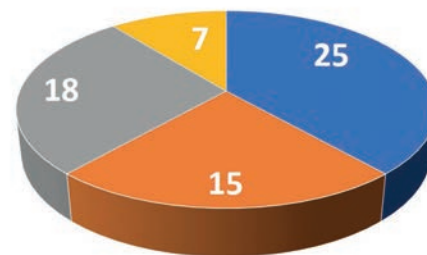


Personnel Manning the Shop Floors 24x7

- **Formation of Core Team for Presidential Yachts:** As occurrences of breakdowns/defects on the Presidential Yacht during the review would need to be addressed in real time, a core team comprising ten ND (Vizag) personnel each was formed for Presidential Yachts *Sumitra* and *Sumedha*. The Core team was instrumental in liquidating a defect onboard INS *Sumitra* where the Main Engine failed to clutch-in during the cast-off for rehearsals.
- **Positioning of Nodal Officers:** Nodal Officers were also appointed for the

remaining ships in the Presidential Column and mobile column, to undertake a comprehensive review of the operational state of these ships and identify possible defects/shortcomings which might possibly affect the ships' participation at the IFR.

- **Defect Rectification:** A total of 102 defects were projected by various ships, of which ninety-eight were attempted/undertaken by the Yard and four by the Fleet Maintenance Unit. All critical defects projected by the ship were liquidated, and overall compliance of 66 per cent achieved. Those defects that could not be attended were primarily due to the unavailability of ships at an alongside berth commensurate with defect-rectification timelines. On an average, ships were berthed alongside for only two days. Defects that remained unresolved were thus primarily due to paucity of time vis-à-vis scope of work and lead time for spares. Defects were also rectified onboard foreign ships such as UMS *King Aung Zeya* (F-11) of the Myanmar Navy and Mauritius' MCGS *Barracuda*.



■ Within 24 hours ■ Within 48 hours ■ 2-4 days ■ Beyond 4 days

Timeframe for Liquidating Defects During IFR

- **Maiden Short Refit (SR) of *Chakra*:** INS *Chakra* was commissioned on 23 January 2012 at Bolshoi Kamen, Russian Federation. The platform was leased to the *IN* for ten years. Short Refit of the submarine was undertaken by ND (Vizag) from May 2016 and the submarine was docked at Varuna Dry Dock. The SR

necessitated numerous preparatory activities and planning towards smooth execution. Since the *IN* was a nascent nuclear force, multiple challenges were faced with respect to Shore and Logistics Support during the refit and docking of the submarine, but were overcome through meticulous planning and coordination between all agencies involved with the refit.

■ **Refit of Jalashwa:** The ship was commissioned into active service in the US Navy (USN) on 6 March 1971 as USS Trenton (LPD-14). After being in active service for thirty-six years in the USN, the ship was transferred to the IN on 17 January 2007 and recommissioned into active service as INS Jalashwa (LPD-41) on 22 June 2007. The ship arrived at Visakhapatnam on 12 September 2007. The maiden Normal Refit of Jalashwa (the only US-origin warship in the IN inventory) commenced on 1 October 2017 and was completed on 4 October 2019. The major highlights of the refit are enumerated below.

- The refit was about capitalizing upon indigenous sources for repairs/refurbishment necessitated due to logistic constraints on account of non-availability of spares and replacement equipment. Detailed market research was undertaken and indigenous firms identified based on capability, past experience as well as association with US-based original equipment manufacturers (OEMs) to source spares for refurbishment. It was important to establish confidence among Indian firms so that they would apply as sub-contractors; if they did not, a large amount of equipment would be rendered unsupportable and become obsolescent. Getting them on board as sub-contractors was a major challenge, overcome through intensive deliberations, and regular liaison and intervention. The following methodologies were adopted in this regard:

- Sourcing spares through Indian associates of

US-based OEMs;

- Precise modification of near compatible indigenous substitutes;
- Indigenization/in-house refurbishment; and
- Upgradation of entire system to overcome obsolescence/lack of documentation.



INS *Jalashwa*: Only US-Origin Warship in the *IN* Inventory

- More than forty items of equipment were replaced as part of Alterations and Additions, or planned equipment upgrades. Additionally, forty-eight work packages were offloaded as the capacity/facility to undertake these jobs did not exist with the Yard.

■ **Training of Vietnam People’s Navy (VPN) Personnel:** Training of twenty VPN personnel in submarine mechanical and electrical system repairs was undertaken by ND (Vizag) for a duration of six months, 10 between November 2017 and May 2018.

Major Infrastructure Upgrades:

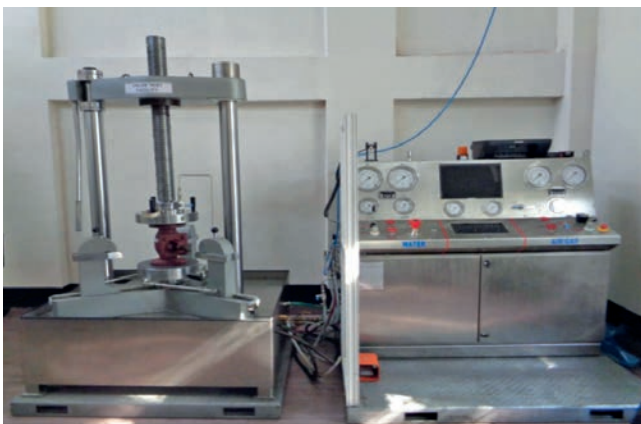
■ **MCS 5 Repair and Testing Facility:** This facility, commissioned in 2011, has enabled ND (Vizag) to undertake testing and repairs of Machinery Control Systems (MCS) fitted onboard various *IN* ships of the Eastern Naval Command.

■ **Additional Jetty:** The construction of a 172 m jetty in 2011 with a loading ramp, has facilitated faster loading/unloading of stores, especially for Humanitarian Assistance and Disaster Relief (HADR) operations.

■ **Integrated Commander of Yard Complex (C-of-Y):** The erstwhile C-of-Y complex was scattered in different places, which resulted in operational inefficiencies. Commissioning of the Integrated C-of-Y Complex in 2013 has helped to bring about significant efficiencies in providing berthing/unberthing services, filling/discharge services, and battery-charging facilities.

■ **Augmentation of Support Infrastructure for P17 Ships:** The basing of P17 ships at Visakhapatnam required ND (Vizag) to augment its support infrastructure for new-age platforms. The augmentation work was completed in 2016 and has provided crucial maintenance support to the P17-class of ships.

■ **Infrastructure Upgrade at Operational Works Centre (OWC):** The upgradation of infrastructure at OWC, which was completed in 2018, entailed providing additional facilities for welding/cutting, boat engine repairs, maintenance of the air conditioning and refrigeration system, and many other tasks. This upgrade has helped in improving the response to maintenance requirements of ships at the Eastern Naval Command.



Infrastructure Upgrade at Operational Works Centre (OWC)

■ **Damage due to Cyclone Hudhud:** Visakhapatnam was hit by the extremely severe cyclonic storm, Hudhud, on 12 October 2014. The cyclone caused extensive damage to the

infrastructure and assets of the Naval Dockyard, Visakhapatnam. The strong winds blew away galvalume/asbestos roofs, damaged jetty cranes at dry docks, power-supply pillar boxes, shutters, windows, etc. The heavy rains that accompanied the cyclone also caused extensive damage to equipment exposed due to damaged roofs/shutters/windows, thus adversely affecting the yard's capability to render core services to ships.

As part of pre-cyclone preparation, planning efforts focused on mitigating the after-effects for afloat assets berthed alongside as well as those in dry dock. When the cyclone made its landfall at the yard in full force, the surging seas flowed into the dry docks *Surya* and *Varuna*. Cranes on either side of *Varuna* dock also collapsed. In the absence of power supply, dockyard emergency generators were pressed into service to continuously dewater the docks. Despite the damage sustained, ND (Vizag) was able to successfully undertake the docking of LCM 413 on 16 October, just four days after the destruction caused by Hudhud.

A small group of volunteer officers from ND (Vizag) formed a team to liaise and work with Andhra Pradesh Electric Power Supply and Distribution Company Ltd. (APEPDCL) and restored power supply to all residential areas in Dolphin Hill within twenty-four hours. The Dockyard Apprentice School (DAS) and the Yard Services Division played a pivotal role in relief work. Additionally, a team of eighty officers and over 200 personnel, including DAS apprentices, and a contingent of cranes, forklifts and utility vehicles was pressed into action to assist relief efforts—especially towards the restoration of power supply to over 80 per cent of the yard on the first day itself.

In order to ensure early operationalization, prevent further damage to assets, and arrest possible security breaches, repairs to ND (Vizag)'s infrastructure and assets were undertaken on a

warfooting. The cost of these urgent repair works was Rs 7,322 lakh.



Comparison of ND (Vizag) Pre and Post Repairs after Cyclonic Storm Hudhud

Naval Ship Repair Yard (Kochi)

Brief History: NSRY (Kochi) started as a Base Engineering and Electrical Workshop in March 1945 to support the Royal Indian Navy (RIN) Ships during the closing days of the Second World War. With a strength of thirty-two men, the facility, spread over less than three acres of land, was meagre. It comprised a 178 m long and 9 m wide Jetty (now known as the North Jetty) and a few repair workshops. On 21 January 1948 the Base Engineering and Electrical Workshop was upgraded to become the BRO. Facilities such as a slipway, a boat repair shop and a yard utility service shop were added and manpower increased. An Apprentice Training School was also established to train and develop technical competence to address ship repair requirements.

The stationing of inshore minesweepers at Kochi in the mid-1980s triggered further expansion of the BRO, and the existing slipway was augmented to a modern 150-tonne slipway. The BRO was upgraded to a Naval Ship Repair

Yard (NSRY) in 1988. In 2012, the head of the organization was elevated to a two-star rank. Other facilities that came up included a full-fledged Fibre-Reinforced Polymer (FRP) Moulding and Repair Shop, a Minesweeping Gear Repair Facility and an Auxiliary Machinery and Shafting Repair Shop.

Today, NSRY (Kochi), is situated in an area of about 13 acres. The NSRY has two jetties, namely, the North Jetty (178 m in length, 8 m in width) and the South Jetty (471 m in length, 15 m in width). While in 2000, NSRY (Kochi) handled refits of four to five ships, the yard as on date on a sustained basis supports refits of eight to nine ships in a year. Further, unlike Naval Dockyards, NSRY (Kochi) also handles the operational load of the ships in the absence of a Fleet Maintenance Unit (FMU) or Flotilla Technical Support Unit (FTSU). In August 2018, NSRY (Kochi) also facilitated the Assisted Maintenance of INS *Tarangini* at Le Havre, France, during Lokayan-18.

Record of Activities:

- Preparation of *Tarangini* for Lokayan 15: Refit of INS *Tarangini* was undertaken by the yard from December 2014 to March 2015 prior to its departure for Lokayan 2015. Major jobs undertaken during this refit prior to its departure included renewal of echo-sounder transducer, routines on engines, Sewage Treatment Plant,



INS *Tarangini*

Rubber Inflatable Boats and auxiliary pumps. The work undertaken by the yard during the refit was key to the ship's sustenance during her eight-month voyage (May to December 2015) covering a distance of 17,000 nautical miles (nm) and visit to seventeen ports in fourteen countries.

- **Conversion to Training Ship:** In view of the anticipated growth in the number of warships and therefore personnel, the *IN* felt the need to induct additional Cadet Training Ships. In 2011, the *IN* contracted ABG shipyard for the construction of two Cadet Training Ships (CTS). The delivery of the first ship was scheduled by 2016. However, the *IN* terminated this contract in May 2017 as ABG shipyard had filed for bankruptcy. Due to increased intake, emergent delay in execution of contract with ABG shipyard and to meet the immediate requirement of more training ships, a decision was taken by the *IN* to convert patrol vessels *INS Sujata* and *Magar* to Cadet Training platforms.
- ***INS Sujata* to Cadet Training Ship:** The task of the refit was fully offloaded by NSRY (Kochi) to M/s ABG-WISL, Goa.¹¹ The refit for role conversion started in October 2010 and was completed in April 2012. The major work, apart from regular maintenance routines undertaken as part of the modification work package, included habitability upgrade, upgradation of Reverse Osmosis (RO) plants from 20 tonnes per day (TPD) to 30 TPD,

fitment of new air-conditioning plants and deck machinery essential for cadet training. NSRY (Kochi) played an important role in both refit planning and in monitoring refit progress overall vis-à-vis established cardinal dates.

- ***INS Magar* to Cadet Training Ship:** A comprehensive work package was prepared in consultation with M/s Anchor Offshore and M/s Tile Marine for undertaking the modifications required for the role conversion of the ship. The modification work package was offloaded to CSL and the work commenced in March 2018. As project overseer, NSRY (Kochi) undertook periodic reviews enabling completion by September 2018.

Support to ships during Operational Ship Training: The largest ship in Southern Naval Command is the 5,600-tonne amphibious vessel *INS Shardul*. Notwithstanding, NSRY (Kochi) has rendered vital maintenance support to much larger and advanced weapon-sensor fit ships deputed to Kochi from the Western and Eastern Fleets, such as destroyers, frigates, tankers and many others during OST at the Indian Naval Workup Team (INWT) in Kochi. The support extended by NSRY (Kochi) over the years to such larger ships has helped the yard develop new capabilities in terms of manpower skilling and capacities in terms of infrastructure and outsourcing avenues.



A New Home for Cadet Training: *INS Sujata* and *Magar*

- **INS *Jalashwa*—Defect Rectification on Engine Room Exhaust Blowers:** In May 2020, the Eastern Naval Command-based INS *Jalashwa*, during passage for Samudra Setu sortie, reported abnormal noise from both engine room ventilation motors, thereby severely impacting operational availability of the ship for the tasking. At the height of COVID-19, the task on repairs of these blowers was completed by NSRY (Kochi) in less than a day, thus ensuring operational continuity.



Defect Rectification onboard INS *Jalashwa* During COVID-19

Major Infrastructure Upgrades:

- **Extension of South Jetty at Kochi:** In order to cater to additional berthing space and services for *IN* ships based at Kochi, the existing 370 m South Jetty at Kochi was extended by another 100 m in 2014, thus taking it to 470 m.
- **Other Infrastructure:** The following infrastructure was added in the previous decade under review (2011–21):

Infrastructure	Year
Breaker switchgear repair facility	2016
Bearing Quality Control Facility	2016
Automatic Voltage Regulator Testing Facility	2016
Printed Circuit Board (PCB) Testing Facility	2016
Setting up of new Machinery Controls Division	2017

Infrastructure	Year
3D Printer Facility	2018
Electroplating Plant	2018
Effluent Treatment Plant	2018
Gyro Repair Facility	2021

Naval Ship Repair Yard (Karwar)

Brief History: NSRY (Kar) was set up in 2005 as a repair and refit organization on the west coast, as part of a truncated Phase-1 of Project Seabird. Its primary role is to support ships based at Karwar and Goa, and to undertake refits up to SR of ships fitted with Western diesels, and low-weapon fit ships, in addition to undertaking maintenance and repairs on the *IN*'s only Aircraft Carrier.

The Karwar naval base, once fully developed, will be the largest in the Eastern Hemisphere. NSRY (Kar) has progressively worked towards ensuring quality repairs and timely refits, despite being in its nascent stage, with only 50–70 per cent of the sanctioned strength (largely workforce with very limited experience) in the last decade. Through prioritization of refits, effective planning and judicious deployment of workforce, NSRY (Kar) has ensured time-bound completion of eighty-five refits till date, of which seventy-seven were undertaken between 2011 and 2021. Since commissioning, NSRY (Kar) has always maintained a very high tempo of refit and repair activities, notwithstanding challenges posed by the dearth of manpower and resources. From humble beginnings in 2004, wherein it was administered by an Officer-in-Charge, to commissioning in 2005 and appointment of the Captain Superintendent, NSRY (Kar) has progressively seen a change of guard over the last decade.

In 2012, the position of head of the organization was elevated to Commodore rank, which was further elevated to a two-star rank in 2018. NSRY (Kar) also has the distinction of having the *IN*'s

sole shiplift facility, which has been extensively utilized towards undertaking underwater repairs on multiple warships, since commissioning. The availability of the shiplift system gives NSRY (Kar) a unique advantage over other Naval Yards, in terms of ready availability of docking infrastructure.

Record of Activities:

- **Short Refit Dry Docking (SRDD) of INS Vikramaditya:** In 2016, the maiden SRDD of INS *Vikramaditya* was completed ten days ahead of schedule by NSRY (Kar). The refit was a daunting challenge due to the complex work package. The maiden docking of the ship in India was undertaken at CSL and added significant teeth to the *IN*'s maintenance capabilities. Though steered by NSRY (Kar), many other *IN* agencies, such as such ND (Mbi) and professional directorates at IHQ, helped in completing the maiden SRDD of the ship.
- **Utilization of Shiplift:** The shiplift system at NSRY (Kar) is a unique facility for docking/undocking of ships and submarines with a maximum load-carrying capacity of 9,960 tonnes. This facility gave NSRY (Kar) the unique ability to lift all vessels in the *IN*, except large tanker-sized vessels and aircraft carriers. In

demonstration of this capability INS *Delhi* was docked at the shiplift facility in 2014.

Since the facility was the first of its kind in the country at the time of commissioning in November 2006, a consultancy contract was concluded with M/s Redecon of Australia. The consultancy firm worked out all possibilities vis-à-vis the requirements and zeroed on to the firm M/s Rolls Royce, USA, as the main contractor for undertaking the work. The contract for construction of shiplift was signed between the *IN* and M/s Rolls Royce on 22 March 2002. M/s Rolls Royce further subcontracted the work of supply and commissioning of the Trolley Transfer System (TTS)—a sub-system for the shiplift—to TTS Norway. Other than these inputs, more than 70 per cent local content was used in this project.

The shiplift facility is an alternate to the conventional method of dry docking ships. In simple terms, a shiplift is a large platform that can be lowered into water, have a ship hauled-in and positioned over the cradle/blocks preset on its platform, and the platform-with-ship lifted vertically to ground level. Thereafter, the TTS is used to move the ship from the platform to the designated dry-berth.¹² Such docking is extremely efficient, especially when multiple ships are required to be docked.



Shiplift at NSRY (Karwar)



A Ship Docked at NSRY (Karwar)

Till date, 521 incident-free docking/undocking operations of ships and submarines have been undertaken at the shiplift facility, of which more than 350 have been undertaken between 2010 and 2021. The shiplift is now being maintained under a comprehensive five-year maintenance contract that commenced in November 2018.

- **Change in Docking Version for INS *Karuva*:** To increase the shiplift's utilization and to evolve docking methodology, maiden docking and re-docking of INS *Karuva* in single operation was undertaken by NSRY (Kar) in July 2020. The ship was undocked from its original position, taken to the new position and re-docked within a duration of six hours—otherwise an activity of two days.
- **Aid to Civil Administration:** The second wave of the COVID-19 pandemic in March 2021 created enormous stress on the medical infrastructure of Uttar Kannada District. Almost all COVID-designated hospitals, especially those in faraway rural areas, needed sustained availability of medical oxygen. As a part of assistance to Civil Administration during those testing times, sailors from NSRY (Kar) were deputed to ensure sustained functioning of medical oxygen infrastructure at designated COVID-19 hospitals in Uttar Kannada District. The sailors played a vital role in audit and functional checks of twenty-three hospitals in the district. In addition, the sailors were also actively involved in attending to defects in the oxygen distribution system in various hospitals. The efforts of the sailors contributed immensely to ensuring continuous availability of medical oxygen, especially in rural areas of the state, and the same has been widely recognized by several authorities.

Major Infrastructure Upgrades:

- **Augmentation of Yard Facility for INS *Vikramaditya*:** Following enhancements were completed:

- As part of Phase II and Phase III augmentation projects, sixty-one equipment/shop floor fixtures/work benches were commissioned between 2016 and 2017.
- A Universal Valve Testing Facility was set up in 2016.
- The Battery-Charging Facility was augmented in 2016.
- Combination Board Tester and PCB Rework Stations were procured and commissioned to enhance the repair facility in 2017.
- Provision was made for the anchorage of pontoons in 2018.

- **Augmentation of Diesel Engine Repair Facility:** Supply and commissioning of Multipurpose Fuel-Injection Test Rig for testing/calibration of Fuel-Injection Pumps (FIPs)/Fuel Injectors of Pielstick/MAN/Greaves engines, with general purpose tools and associated civil works to enhance the repair facility, were completed in 2016.



Diesel Engine Repair Facility

- **Power Supply for Scorpene Submarines:** Procurement, installation and commissioning of Mobile DC Rectifiers for shore supply, AC supply & DC Shore Battery-Charging Supply, to augment the power-supply facilities for Scorpene submarines, was completed in 2017.

Naval Ship Repair Yard (Port Blair)

Brief History: The 1963 Defence Review recommended that the *IN* should have one fleet in the Arabian Sea and one in the Bay of Bengal, along with the requisite base and logistic support facilities. Further, during the Commonwealth's Joint Exercise off-Trincomalee (JET) that was held in the Bay of Bengal in 1964 to enable the Indian fleet to maintain a high standard of efficiency, a need was felt for developing repair facilities at Port Blair.

Towards establishing a strong foothold in the Andaman and Nicobar Islands, MoD had accepted new acquisitions (additional ships, submarines and aircraft) during the 1964–69 Defence Plan. In 1969, the MoD provisioned logistics facilities in the Andaman and Nicobar Islands. In 1970–71, a long-term naval plan was chalked out and the Andaman and Nicobar Naval establishments were put under FOC-in-C, Eastern Naval Command. The setting up of a Repair Organization at Port Blair was approved in 1971, for the development of an advanced naval base in the Andaman and Nicobar Islands.

With the growth of ANC and induction of *IN* ships and craft in the Far Eastern Seaboard, the concept of facilitating frontline repair support was envisaged and Base Maintenance Unit was sanctioned in 1972 and was set up in 1973. The Repair Organization was later rechristened the Base Repair Organization (BRO) in 1978.

The induction of Floating Dock Navy (FDN-1) in 1987 added a major fillip to the yard's capabilities. On 12 November 1993, the BRO was upgraded to Naval Ship Repair Yard (NSRY), under the command of Captain Superintendent. Over the past forty-seven years, strategic importance of NSRY (PB) has grown manifold as a repair agency and technical support facility on the Far Eastern Seaboard. The NSRY (PB) continues to expand in capabilities despite limitations of its geographical separation from the mainland. The erstwhile Base

Maintenance Unit provided maintenance support to three Patrol Boats in 1973; it now has expanded in capacity and capability to support eighteen ships of different classes and varieties of equipment fit.

Record of Activities:

■ **Migration from Short Refit to Normal Refit:**

Over the years, NSRY (PB) has greatly grown in its ability to undertake more refits of larger tonnage ships. The tonnage of ships based at Port Blair has increased from 8,000 tonnes in 2010 to 20,000 tonnes in 2020. This increase is not only in mere tonnage but also in terms of complexity of machinery and controls. Till 2015, various NRs of these platforms were traditionally undertaken through ND (Vizag). Since 2015, the NSRY (PB) commenced undertaking NRs. Five NRs had been completed by 2021. Some of the notable refits undertaken by NSRY (PB) in recent years includes the NR of *Investigator* and *Bitra*, SR of *Saryu*, *Kulish*, *Kesari*, and LCUs.

■ **Floating Dock Navy-1 Medium Refit:**

FDN-1 was built by M/s Ishikawajima Harima Heavy Industries Company, Japan and was inducted by the *IN* in July 1987. The dock was earlier docked at M/s Colombo Dockyard in December 2004 for refit. After further extensive exploitation, the refit of FDN-1 was awarded to M/s Larsen and Toubro Limited, Chennai, at a cost of Rs 96 crore on Single Tender Enquiry (STE) basis, for commencement of refit from May 2019 for a period of nine months. This marked a major detour from the historic foreign dependence for the refit of the FDN. Major work entailed 700 tonnes of steel renewal, grit blasting and painting of approximately 115,000 sq. m of area (including underwater hull, ballast tanks, inner and outer wing wall, pontoon deck and top deck), repairs to ballast pumps, and much more. The refit was completed in July 2020.



Floating Dock Navy-1 Post Refit

- **Effective Utilization of Both FDNs:** With the induction of FDN-2 in May 2018 and availability of FDN-1 in July 2020 post-MR, the NSRY now has two Floating Docks fully available for docking operations at Port Blair. Since August 2020, fifty-three ships have been docked. Considering the likely future requirement of docking of Eastern Naval Command ships and submarines at FDNs, a feasibility study was undertaken based on the capability and limiting parameters of FDNs.

- **Enhancement in Manning:** Pre-2018, NSRY (PB) had sanctioned strength of nine officers, seven sailors and 393 civilians, which has been revised with additional sanction accorded over a period of three years, viz., 2018–19 (Phase-1), 2019–20 (Phase-2) and 2020–21 (Phase-3) to thirty-seven officers, 133 Sailors and 1,253 civilians and one Defence Security Corps (DSC) platoon.

- **Assistance to Friendly Foreign Naval Warships:** Various multilateral exercises like CORPAT, MILAN, SIMBEX, etc., are co-ordinated by ANC. As part of these exercises, friendly foreign countries (FFCs) visit Port Blair from time to time. NSRY (PB) has rendered assistance to friendly foreign vessels visiting Port Blair and has successfully rectified systemic and habitability defects projected by these ships.

Major Infrastructure Upgrades:

- **Induction of Floating Dock Navy (FDN-2):** FDN-2 is an indigenously designed and constructed Floating Dock located in Port Blair. Its main role is to serve the ANC as a



New Induction: Floating Dock Navy-2

platform for dry docking of warships and other vessels, for scheduled refits or emergency underwater repairs. The dock, which is a part of the 'Make in India' initiative, was built at M/s L&T Shipbuilding, Chennai, and inducted into service in May 2018. The FDN-2 also marks a shift in indigenous capabilities, especially as the previous FDN was constructed in Japan.

- **New Infrastructure:** A number of new assets have been created in the past decade. Some of them are tabulated below.

Infrastructure	Year
Technical Service Complex	2011
Electrical Workshop	2011
Refit Store Complex	2015
QC & Test Building	2016
Submarine Support Complex	2016

- **Jetty Extension Phase-II, ANC:** Jetty Extension Phase-II, ANC, was undertaken by Andaman and Lakshadweep Harbour Works (ALHW). The project commenced in August 2016 and was completed in March 2021. This work was specifically undertaken keeping in consideration the planned induction of FDN-II. The salient highlights of the project included the construction of a 230 m jetty, Guide Pin arrangement for securing the FDN-II alongside the dredging of a sink pit to enable berthing of FDN-II, construction of G+4 security tower and procurement of equipment like 80 TPD RO plant, two diesel generators, fire pumps and fresh-water pumps to make the jetty self-sustainable in terms of fresh water and electric supply.

Assistance to Friendly Foreign Navies by Repair Yards

Directorate of Fleet Maintenance is responsible for coordinating assistance relating to the materiel aspects of foreign ships. The assistance provided to

FFCs is enumerated in the succeeding paragraphs. **MCGS *Huravee*:** Formerly the INS *Tillanchang*, commissioned into the *IN* in 2001, it was gifted by India to Maldives in April 2006. Subsequently, MNDF's CGS *Huravee* has undergone three refits at ND (Vizag). Medium Refit of *Huravee* commenced at ND (Vizag) in May 2015 for a duration of ten months and was completed in January 2016. The ship departed to Maldives in February 2016, post participation in IFR-16. The ship also subsequently underwent a four-month refit in 2018, and nine-month refit in 2020.



Delivering Quality Refit During COVID-19

SCGS *Topaz*: Formerly the INS *Tarmugli*, commissioned into the *IN* in 2002, it was gifted by India to Seychelles in February 2005. Subsequently, SCGPS *Topaz* has undergone two refits at ND (Vizag). Medium Refit of the ship commenced in March 2016 and was completed by February 2017.



SCGS *Topaz*

MCGS *Guardian* W-5 Routines of Main Engines: An eleven-member *IN* team from ND (Mbi), was deputed from November 2014 to January 2015 for undertaking W5 routines. On completion of the routines several sea trials were conducted on 26–30 December 2014. The W5 routines (top-overhaul) of MCGS *Guardian* main engines were completed with sea trials achieving 1550 engine rotations per minute (ERPM) in December 2014, in a record period of thirty-four days.

Repair Assistance to SLNS *Samudra*: The Sri Lankan Navy had requested for an *IN* technical team to be deputed to Sri Lanka for repair assistance to SLNS *Samudra* and SLNS *Sayura*. An *IN* team comprising eight personnel from ND (Mbi), was positioned at Colombo in July 2016 to offer repair and technical assistance for resolving issues related to the main shaft line on both ships. Both ships had reported the inability to achieve full power due to teething issues on the main propulsion shafts. The team from ND (Mbi) undertook a thorough root-cause analysis and devised a comprehensive repair methodology. Later, in 2016, consequent to the repairs carried out under the supervision of the team from ND (Mbi), full power was restored and shaft line parameters were optimal.

Assistance to Vietnam: The *IN* deputed technical teams to Vietnam to render crucial technical assistance under the Composite Assistance Plan. Teams were deputed in July 2014 and November 2015. Additionally, a two-member *IN* technical delegation, led by Assistant Chief of Materiel (Dockyard and Refits), visited Vietnam on 13–15 May 2015 to provide design review/consultancy of Dockyard X-52 being established by the Vietnam People’s Navy (VPN).

Repairs of Philippines Navy (PN) Ship *Alcaraz*: Based on a request from the Government of Philippines, major repair assistance and material support was provided to PN *Alcaraz* by NSRY

(Kochi) in May 2020, after the ship experienced a fire in the engine room off Indian waters.

Repairs on Egypt Naval Ship *Shabab Al Misr*: Egyptian Naval Ship *Shabab Al Misr* entered Kochi on a friendly visit on 9 October 2017. The ship reported a defect (high exhaust temperature) on one of the banks of Port Main Engine. This defect impacted the ship’s availability for further operational deployment. NSRY (Kochi) undertook repairs on the engine that entailed calibration of the fuel-injection pump and adjustment of valve timing. Despite the unavailability of engine-specific calibration equipment, NSRY (Kochi) undertook innovative repairs, which were completed in four days, thus paving the way for the ship’s further planned deployment.

Indian Naval Ship Eksila

Brief History: Gas Turbines (GTs) have been used by the *IN* for over fifty years. The first GT engines operated by the *IN* were the M-2B GTs of the Petya class of ships, inducted in 1968. The idea of setting up an indigenous, composite and self-contained marine GT overhaul facility was conceived by the *IN* in the early 1980s. The facility would not only cater to contemporary GTs but those to be acquired in future as well. Thus, was born the Marine Gas Turbine Overhaul Centre (MGTOC) in 1991. The establishment was commissioned as a full-fledged unit—INS *Eksila*—in August 2000. The unit is entrusted with undertaking capital repairs overhaul of the *IN*’s marine GTs and Gas Turbine Generators (GTGs). Some key milestones achieved by the establishment since 2010 are tabulated below.

Milestone	Date
Maiden overhaul of 1241 RE Cruise Reduction Gear.	25 January 2010
Overhaul and trials of first GTG 1250-2E.	24 November 2010
First overhaul and successful trials (on in-house Test Bench) of 1241 RE Cruise RG.	29 December 2018

Milestone	Date
First overhaul and successful trials (on in-house Test Bench) of 1241 RE Cruise GT .	11 June 2021

M-15 Test-Bed Facility: The 1241RE (Veer class) ships, inducted into the *IN* in 1987, are fitted with M-15 GT aggregate manufactured by M/s Zorya Mashproekt, Nikolaev, Ukraine. These engines were



the *IN* has been at the forefront of ‘Make in India’. The roots of the *IN*’s march towards indigenization can be traced back to 1964 when the Central Design Office (CDO) was set up, which transformed to the Directorate of Naval Design (DND) in 1970. The CDO and the subsequent DND have been the bedrock of warship design activities. Self-reliance in the design of warships paved the path for the *IN*’s impetus and success in indigenization long



M-15 GT Testing Facility

being sent to the OEM workshop for overhauling and testing, which entailed substantial lead time and cost. In order to become self-reliant in this field, a project was conceived to enable the *IN* to test M-15 GTs in-house. The work on the Test Bed was completed in 2013 and acceptance trials were carried out in 2014.

⚓ **Naval Indigenization: Fostering Aatmanirbhar Bharat**

Historically, the *IN* relied on foreign sources for military technology and hardware. This option was exercised due to the substantial gap in technology capability and maturity between the *IN*’s requirements not only vis-à-vis domestic research capabilities, but also due to lack of interest in private industry. The latter face issues related to long-lead and capital-intensive R&D cycles, and issues of scalability due to the limited initial and repeat order sizes involved. Notwithstanding these challenges,

before the launch of the ‘Make in India’ initiative in 2014 and the Aatmanirbhar Bharat vision of 2020. Additionally, in order to accelerate indigenization and self-reliance, the Directorate of Indigenization was established at NHQ under Materiel Branch of IHQ MoD(N) in August 2005. Subsequently, two field units, Indigenous Development Units (IUs), one each at Mumbai and Visakhapatnam, were created and sanctioned in March 2010.

This early foray has been fundamental to the *IN*’s leadership position in indigenization efforts within the three Services. While considerable progress has been made in the ‘Float’ and ‘Move’ categories of naval platforms, a substantial gap exists in indigenization of components and systems under the ‘Fight’ category. With the concerted efforts by all stakeholders, *IN* has been able to develop twenty-three major equipment/systems and over 4,500 sub-assemblies/components indigenously for *IN* ships and submarines till date. These efforts

have translated into achieving Indigenous Content (IC) of nearly 90 per cent in the Float category,¹³ 65 per cent in Move,¹⁴ and 45 per cent in the Fight category.¹⁵

The *IN* embarked upon development of shipborne systems through two routes, one to harness the R&D potential at DRDO and the other through ‘Transfer of Technology’ (ToT) with industry partners. Over a period of time, while technology absorption matured in certain areas, a large gap still exists in the development of critical technologies, viz., system engineering, propulsion systems, materials, weapons and advanced manufacturing processes. Having realized that the entire industrial might of the country—whether it is the OFB, Public Sector Units (PSUs), Defence Public Sector Units (DPSUs), large private industries or Medium, Small and Micro Enterprises (MSMEs)—must partner with the *IN* for the *IN* to achieve its goal of self-reliance, synergizing the capabilities of the entire ensemble of India’s R&D, academic and manufacturing stakeholders, has been the key focus of the *IN*’s indigenization efforts. This is to not only reduce indigenization timelines but also bring in economy of effort in achieving its goals.

Government Policy Intervention

In the Union Budget of 2014–15, the Government of India announced the setting up of a Technology Development Fund (TDF). The fund was set up in 2016, and since then, funds have been allocated to DRDO and other R&D organizations focused on domestic technology development. Funding up to Rs 10 crore is available through the TDF for prototype development and trials.

Additionally, the Defence Procurement Policy (DPP) 2016 introduced a preference to ‘Buy Indian IDDM (Indigenously Designed, Developed and Manufactured)’. This is a major step by the MoD to promote indigenous design and development of

complex systems for the Defence Services. This has also encouraged Indian industry to collaborate with foreign vendors, to achieve key/niche technologies, and be the prime contractor. Increasing the limit for Foreign Direct Investment (FDI) from 26 to 49 per cent, and up to 100 per cent on a case-to-case basis for niche technologies; setting up the TDF; simplification of ‘Make’ procedures; pruning the list of Defence products which cannot be manufactured by non-Government agencies, to a very limited number—these are some of the Government initiatives that have helped provide a major boost to indigenization within the *IN*, and in the broader Defence Sector.

The ‘Make’ procedure has been further refined in DAP 2020 to make it more objective and time-bound, with increased focus on Indian industry, especially micro, small and medium enterprises (MSMEs). The Indigenous Content stipulations for various categories of procurement have also been laid down in the DAP 2020 and are tabulated below.

Category	Indigenous Content
Buy (Indigenously Designed, Developed and Manufactured) Indian	Indigenous design \geq 50%
Buy Indian	In case of indigenous design \geq 50%, otherwise \geq 60%
Buy and Make (Indian)	\geq 50% of the ‘Make’ portion
Buy Global – Manufacture in India	\geq 50%
Buy (Global)	Foreign Vendor – Nil Indian Vendor \geq 30%

Additionally, initiatives by the MoD, such as Innovation for Defence Excellence (iDEX) and Defence India Startup Challenge (DISC), are also helping accelerate the Defence innovation within the country.

Negative Import List: In an effort to boost indigenization, the Government, in August 2020, promulgated a list of 101 items that were embargoed for import as per laid-down timelines.

A further 108 items were added to this list in May 2021, and another 101 items in April 2022. More than seventy-five *IN* specific items are on these lists.

Innovation-Led Indigenization: Till the recent past, indigenization was focused on import substitution through reverse engineering and was limited to components/subsystems. This method, though helpful in management of existing inventories, left the *IN* saddled with decades-old technology. The current indigenization strategy is, therefore, increasingly focused on technology development in gap areas, rather than on requirement-based indigenization.

In order to tap into the potential of the industry for Defence innovation, the *IN* has been at the forefront of capitalizing Government of India initiatives like Innovation for Defence Excellence (iDEX),¹⁶ Defence India Startup Challenge (DISC),¹⁷ TDF, and the Make II scheme.¹⁸

iDEX and DISC: Some of the innovation focus areas proposed by the Indian Navy under the iDEX and DISC schemes includes but is not restricted to the following:

- Development of hardware-based, secure, offline encryption device;
- Development of advanced water purification system and bilge oily water separation system;
- Artificial-Intelligence-based Logistics and Supply-Chain Management System;
- Predictive, Preventive and Prescriptive machine-health monitoring system;
- Non-lethal devices for stopping vessels at sea; and
- Sensor miniaturization for drones.

Technology Development Fund: The TDF was set up in the Union Budget of 2014–15, to develop core technologies for Defence Equipment, Systems and Components through Private and Public Sector industries, particularly MSMEs, to promote

self-reliance and towards enhancing cutting-edge technology for Defence Services. Funding for each chosen project is capped at Rs 10 crore. As per the provisions of the scheme, the Government can fund up to 90 per cent of the cost of the project, with the remaining cost to be borne by the industry. The scheme is aimed at developing technologies under the aegis of DRDO, that will form the kernel of equipment to be fitted in Defence platforms.

Make II Scheme: Make Scheme is part of the 'Make in India' initiative, since 2016. It comprises Make I Scheme (Government-funded), Make II Scheme (Industry-funded) and Make III Scheme (Industry-funded where joint ventures and ToTs are allowed with a Foreign OEM). The DOI steers the 'Make-II' projects fielded by the Navy.

Streamlining of Indigenization Efforts

Towards bringing in efficiency in the indigenization efforts, the *IN* has adapted to the growing complexities of technologies and the need for vertical specialization and policy. The *IN*'s indigenization setup has undergone substantial reorganization in the last decade. Four separate agencies are now looking after the indigenization of the following specific verticals of the *IN*:

- Directorate of Indigenization: Ship systems (set up in 2005);
- Directorate of Air Projects and Plans: Aviation systems (set up in 2013);
- Directorate of Armament Production and Indigenization (set up in 2016); and
- Project Navy Interface Group: Submarine systems (set up in 2017).

The *IN* as a customer and the industry as a supplier need to have a clear understanding of the requirements and the plan for induction and indigenization. Keeping this aspect in focus, the indigenization requirements of the *IN* have been identified and shared with the industry. This

includes details on current requirements, with respect to new induction ships and submarines and life-cycle support imperatives of the existing *IN* inventory. Additionally, the *IN* has also identified a few niche technologies for R&D by leading academic institutions in the country.

In an effort to engage with industry and academia to highlight areas requiring indigenization efforts, the *IN* published guidelines and roadmap, which include:

- **Indian Naval Indigenization Plan (2015–30):** For equipment and systems of surface platforms. This document published in 2015, supersedes the Indigenization Plan published by the *IN* in 2008 for the period 2008–22.
- *Swavlamban*: a roadmap for industry to participate in the *IN*'s indigenization efforts published in August 2020.
- **Naval Aviation Indigenization Roadmap (2017–22):** published in October 2017.
- Annual Indigenization Plan for Weapon Stores.

- **Manual for Indigenization of Air Stores,** published in May 2018.

Naval Innovation and Indigenization Organization, Delhi: In continuation of its efforts to increase self-reliance and promoting innovation to improve operational availability of its platforms, in August 2021, the *IN* launched the Naval Innovation and Indigenization Organization (NIIO). The NIIO puts in place dedicated structures for end-users to interact with academia and industry towards fostering innovation and indigenization in keeping with the vision of Aatmanirbhar Bharat. A Technology Development and Acceleration Cell (TDAC) has also been created for induction of emerging and disruptive technologies in an accelerated timeframe. On the day of the launch itself, memoranda of understanding (MoUs) were signed with the Rashtriya Raksha University, Makers Village (a Government-funded incubation centre at Kochi), the Uttar Pradesh Expressway Industrial Development Authority (for the



Launch of NIIO and Release of *Swavlamban*

UP Defence Corridor), and the Society of Indian Defence Manufacturers (SIDM). A compendium of the *IN*'s indigenization perspective plans titled *Swavlamban* was also released.

The NIIO was created as a three-tiered mechanism headed by the Vice Chief of Naval Staff (VCNS). At the apex level, the Naval Technology Acceleration Council (NTAC) chaired by VCNS, was set up. With nominated as well as ex-officio members, NTAC meets every six months to give higher directives to bring together the twin aspects of indigenization and innovation. Members of academia and of industry, as well as selected personnel of technical eminence, are also a part of NTAC.

The Technology Development and Acceleration Cell, a dedicated organization focused on innovation, was also created within the NIIO. Interacting with the academia and the industry, and channelling in-house innovations by naval personnel are all part of its charter of duties. With fast-paced change in technology, TDAC is an organization that focuses on emerging technology and interacts with academia and industry towards quick induction of niche technology for the war-fighting component. The Officer-in-Charge TDAC, in addition to heading the innovation component of NIIO, also acts as the Member Secretary of NTAC as well as the NIIO Working Group.

The TDAC was intentionally kept small and nimble. Initially, a complement of four officers—in addition to the officer in charge—was planned. The four officers were to represent the specializations of Navigation, Gunnery and ASW, in addition to one officer from the Electrical Branch. It was anticipated that such methodology would broad-base the in-house expertise available with TDAC. However, realizing that a demonstrated innovative mindset was more important than the branch or specialization, provision was made for any officer with the right aptitude to be appointed regardless of the branch.

This unorthodox hierarchy-less approach resulted in over thirty intellectual property rights (IPR) applications being filed by naval personnel in the very first year after NIIO was set up. The portfolio of innovations include equipment/systems for war-fighting (Mine Detection System, Torpedo Counter-Measure Systems, Missile Decoys and Ship Detection Algorithms); medical innovations (automatic nebulizer, low-cost digital stethoscope and many others); and dual-use items (deck paint, marine lifejackets). Patent applications for these were filed and the technology progressively transferred to the private sector, not only for manufacture but indeed aimed at boosting India's defence exports. In addition, apart from working with MSMEs and startups, the *IN* also signed MoUs with leading industrial houses (such as Tata Steel) and Academic Institutes (such as IIT Bombay) to work together on innovation. Joint patent applications were filed for many co-developed products.

During COVID-19, special focus was directed towards medical innovations. Few of the notable innovations include NavRakshak PPE (Personal Protective Equipment)¹⁹ innovated by a naval doctor, the technology for which was transferred to MSMEs/Private Sector, through the National Research and Development Organization (NRDC), thus aiding in overcoming the acute shortage of PPEs in the initial phase of COVID-19. This resulted in India transforming itself from a net importer of PPEs to an exporter. This was also the first instance of any of the Services successfully taking an innovation from idea to implementation, and paved the way for many more IPR applications and engagement with the industry for transfer of technology.

Subsequently, in March 2022, NRDC signed a licence agreement, with M/s Paayas Incorporation, Ludhiana, for transfer of technology developed by the *IN* under the TDAC. Additionally, Lieutenant

Commander Mayank Sharma designed and developed the Aadyant Oxygen Recycling System (ORS),²⁰ which enhances the useable life-support functionality of an oxygen cylinder by 200 to 400 per cent. This innovation has had a major impact in reduced consumption of oxygen and has many applications beyond COVID-19, including for defence applications, especially at a high altitude.

Srijan Defence Portal: Pursuant to Aatmanirbhar announcement, MoD developed and launched an Indigenization Portal on 14 August 2020, named srijandefence.gov.in, an open-source portal to provide information on items that can be taken up for indigenization by the private sector. On this portal, Defence Public Sector Undertakings (DPSUs)/Ordinance Factory Boards (OFB)/Service Headquarters (SHQs) can display details of their items (have been imported or being imported) which Indian industry can design, develop and manufacture as per their capability or through joint venture with OEMs. In all, 373 items of the *IN* were uploaded on the portal, of which twenty-seven were indigenized and a development order was placed for seventy-three items for indigenization.

Centre for Indigenization and Self Reliance (CISR): Centre for Indigenization and Self Reliance (CISR) was envisaged by the *IN* as a nodal agency to synergize the *IN*'s indigenization efforts through various directorates at NHQ, shipyards and local indigenization units. Initially, it was decided to set up CISR in Delhi. Accordingly, 1.5–2.0 acres of land at Brar Square in New Delhi, was allocated in July 2017 for establishing CISR. In December 2018, directives were issued to allocate 10 acres of land for CISR at Bhopal. Subsequently, in August 2020 approval in principle was accorded for setting up of CISR, including the creation of infrastructure and manpower and is currently under the active consideration of MoD for accord of sanction.

Major Indigenization Efforts in Collaboration with DRDO

Light Combat Aircraft (Navy): The LCA(N) programme is being jointly developed by the *IN* and the Aeronautical Development Agency (ADA). The project achieved a major milestone in January 2020 when the aircraft undertook the first-ever arrested landing on Aircraft Carrier *Vikramaditya* followed by a ski-jump take-off.



Light Combat Aircraft LCA(N) on Carrier Deck

Other decadal milestones with respect to development of the LCA(N) include:

- LCA(N) Trainer rolled out on 6 July 2010;
- Maiden Flight of LCA(N) Trainer (NP1) on 27 April 2012;
- Maiden ski-jump of LCA(N) Trainer (NP1) on 20 December 2014;
- Maiden Flight of LCA(N) Fighter (NP2) on 7 February 2015;
- Maiden taxi-in-Engagement of NP1 on 6 August 2015;
- Maiden Night Flying of NP2 on 21 May 2016;
- Maiden Arrested Landing of NP1 on 13 September 2019 and NP2 on 29 September 2019;
- Carrier Operations initiated from January 2020 onwards; and
- Maiden arrested landing on *INS Vikramaditya* on 11 January 2020.

High-Speed Expendable Aerial Target: In October 2021, Abhyas, the High-Speed Expendable Target (HEAT) developed by Aeronautical Development Establishment (ADE), Bengaluru, was successfully flight-tested. Abhyas was powered by a gas-turbine engine to sustain long endurance flights at subsonic speeds. Abhyas, the HEAT vehicle, is programmed for fully autonomous flight and is used as a target for anti-air weapon training at sea.



High Speed Expendable Aerial Target (Abhyas)

Composite Sonar Dome for P15A Ships: Prior to 2011, the *IN* was importing sonar domes. The Research and Development Establishment (R&DE) and Naval Physical and Oceanographic Laboratory (NPOL) took up the project for the development of the composite sonar dome in 2011. M/s Kineco, Goa, was selected as the manufacturing partner for the manufacture of two domes. Acoustic performance tests were completed at NPOL (Kochi), and the dome has been cleared for fitment onboard P15A class of ships. Two of these indigenously designed and developed Sonar Domes for *IN* ships from M/s Kineco, Goa, have now been fitted onboard INS *Kolkata* and INS *Chennai*. With this effort, India is now the fourth country to have this capability to manufacture domes. The indigenously developed domes are more than 50 per cent cheaper than those that were imported earlier.

Inertial Navigation System for Ship Application (INS-SA): A project for the development of INS-SA was concluded with DRDO in 2008 with the objective to indigenize high-accuracy navigation

system for surface ships. In March 2017, the indigenously developed system was handed over to the Indian Navy.

Indian Maritime Situational Awareness System (IMSAS): The IMSAS, state-of-art, fully indigenous software provides Global Maritime Situational Awareness, Maritime Planning Tools and analytical capabilities. The system has been developed by Centre for Artificial Intelligence (CAIR), Bengaluru and *IN* and was handed over in December 2020. The IMSAS provides maritime situation awareness, marine planning tools and analytical capabilities to *IN* ships by integrating onboard sensors and communication devices of all *IN* units through the graded-security solution. The system is also capable of undertaking Big Data analysis of merchant vessel movement patterns with anomaly detection. The IMSAS provides various maritime stakeholders a single platform for effective surveillance and monitoring of the coast. Stakeholders include Ministries of Defence, Home Affairs, External Affairs, Shipping, Agriculture, Petroleum and Natural Gas; the *IN*, the CG, Marine Police, Customs, Intelligence agencies, Fisheries, Port Authorities, DG Shipping, Directorate General of Lighthouses and Lightships (DGLL), DG Civil Aviation, Indian Space Research Organization (ISRO), etc.

Software Designed Radios: The *IN*, recognizing the importance of IP-based networking and flexible software-defined wireless communication devices to acquire an effective interoperable communication solution for its 'networking at sea' capabilities, approached DRDO for the development of Software-Defined Radios (SDRs). This system has been developed by Centre for Development of Advanced Computing (CDAC), CAIR and Weapons and Electronics System Engineering Establishment (WESEE). In June 2019, a contract

was signed for production of these systems with M/s BEL.

Legacy hardware-based communication sets will be replaced by software-based multiband, multifunction/mission radios to improve information-sharing and situational awareness through secure communication means.



Software-Designed Radios

Abhay Compact Hull-Mounted Sonar: This sonar, specifically meant for small ships operating in shallow waters, was developed by NPOL and handed over to the *IN* in November 2016.

HUMSA UG: This upgraded version of the Hull-Mounted Sonar Array (HUMSA) was developed by NPOL and handed over to the *IN* in November 2016. The HUMSA-UG is being installed on all Teg and Rajput class of ships.

Near-field Acoustic Characterization System (NACS): This system developed by NPOL provides a simple and operationally efficient means to determine the frequency-dependent 3D transmission and reception characteristics of hull-mounted

sonars, thus aiding in performance assessment and maintenance management. The system was delivered to the *IN* in November 2016.

Advanced Indigenous Distress Sonar System (AIDSS): This system developed by NPOL is used to generate a distress signal and was delivered to the *IN* in November 2016. The AIDSS is used by submarines (EKM class) to indicate distress to enable quick rescue and salvage. The system includes a life-saving alarm designed to transmit sonar signal of pre-designated frequency.

ARNAV (Computerized Naval Wargame for Tactical Training): ARNAV is a contemporary Naval Wargaming Software System developed by DRDO/Institute for Systems Studies and Analyses (ISSA) for procedural and tactical training. After extensive user-evaluation trials, the system was handed over to the *IN* in September 2019. The system has been deployed in Maritime Warfare Centres at Mumbai, Visakhapatnam and Kochi, as well as the Defence Services Staff College at Wellington.

Filters for P75 Submarines: Eighteen types of filters for P75 submarines used in hydraulic, lubrication, fuel and seawater systems indigenized by Combat Vehicles Research and Development Establishment (CVRDE), Chennai, were handed over to the *IN* in January 2021.

⚓ Shipbuilding

The Growth of Indian Shipyards: The last decade has witnessed India's dependence on her maritime environment expanding substantially as her economic, military and technological strength grew, her global interactions widened and her national security imperatives and political interests stretched gradually beyond the IOR. There seems little doubt today that the twenty-first century will be the 'Century of the Seas' for India and that the seas will remain a key enabler in her global resurgence.

Prime Minister Narendra Modi emphasized in his speech of March 2015 at the commissioning ceremony of MCGS *Barracuda*, 'We see growing global stakes and presence in the Ocean. Even in this changing world, the oceans hold the key to its fortunes, and we will all prosper when the seas are safe, secure and free for all.' Underscoring this importance and the need for growing maritime capabilities, the *IN*'s force levels and maritime capabilities, with steady focus on indigenization, have all contributed to its growth. The Maritime Security Strategy of the *IN* has accordingly reflected the need for substantive enhancement in its capabilities for exercising deterrence, projecting maritime power, providing maritime security and safeguarding India's maritime interests.

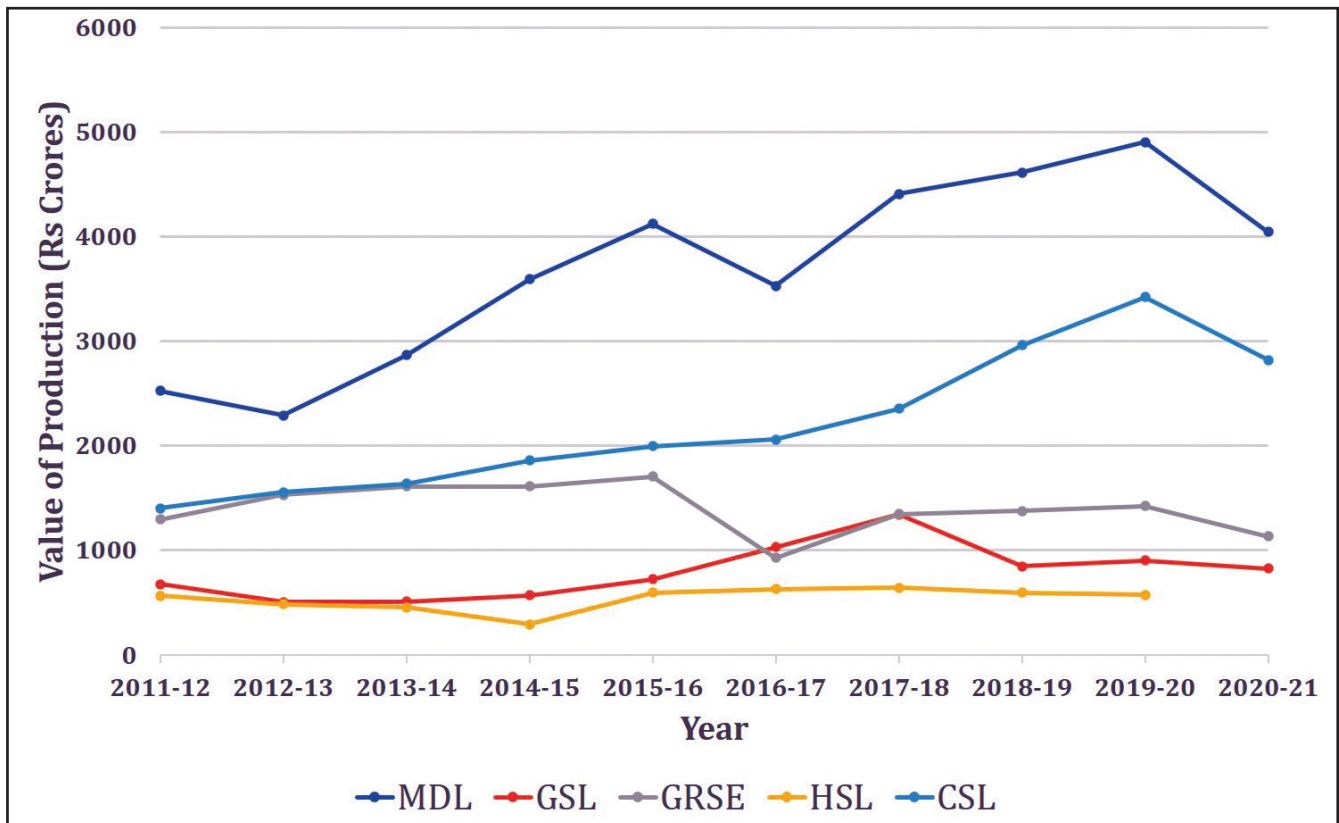
A robust domestic shipbuilding sector is one of the key primers for a growing Navy. The transformation of India's Naval shipbuilding capability has been a consistent theme in Indian maritime discussions. Since the 1960s—when the MoD acquired a number of shipyards and took the milestone decision of constructing the Leander-class frigates (with INS *Nilgiri* as the first) at the newly acquired Mazagon Dock Ltd (MDL), Mumbai—the *IN* has been invested in the development of an indigenous shipbuilding ecosystem. Over the years, India's Naval ship production initiative has made steady progress, contributing significantly towards catering to the *IN*'s shipbuilding needs.

The development of a successful shipbuilding sector has been pivotal to the rapid and robust economic growth in most countries that have long coastal boundaries. Shipbuilding has the potential to increase the contribution of the industry and the services sector to the national gross domestic product (GDP). The sector has an immense direct and indirect positive impact on most other leading industries such as steel, aluminium, electrical machinery and equipment, besides its huge dependence on the infrastructure and services sectors

in an economy. As a result of its multiplier effect on most manufacturing ancillary industries, and on account of its large-scale employment generation capability, the shipbuilding industry is also known as a mother industry. Most countries have laid immense emphasis on development of their shipbuilding sectors, which has also contributed to national economic development in such countries.²¹

Value of Production: The Value of Production of five major yards over the past decade is depicted in the figure below.

To cater to increasing numbers, diversity of operating assets, and areas of operation, the *IN* has formulated its Maritime Infrastructure Perspective Plan, in tandem with the Maritime Capability Perspective Plan (MCPP). These documents bring out that the *IN* will continue to maintain and develop adequately sized force levels that are balanced, flexible, versatile, threat-based and capability-driven, with supporting organizational structures, prepared to undertake and sustain maritime operations across the entire spectrum. Since maritime force levels and structures are developed and deployed over a period of several decades, the MCPP will continue to be refined, as per emergent threats and challenges. The *IN* continues to be at the forefront of indigenization, in line with the Government's vision for 'Aatmanirbhar Bharat'. In the decade 2001–10, the *IN* added 57,000 tonnes and thirty-three ships to its inventory, whereas in the decade 2011–21, the numbers grew to 92,000 tonnes and forty ships—a sign of growing throughput from the shipyards. Of the thirty-nine ships built for the *IN* in the last decade, thirty-three were built in Indian shipyards—a true recognition of its evolution from a Buyers' Navy to a Builders' Navy. Additionally, out of thirty-nine ships on order, thirty-seven are being built indigenously and Acceptance of Necessity (AoN) exists for the construction of forty-four ships and submarines to be built indigenously. Thirty-four



Value of Production of Five Major Shipyards from 2011-21

ships were decommissioned by the *IN* in both decades—2001–10 as well as 2011–21.

The succeeding paragraphs will explore the growth of old as well as new shipyards that are involved in the production of ships for the *IN* and the *CG*, over the last decade. The following shipyards have been covered in this section:

- Mazagon Dock Limited (MDL);
- Cochin Shipyard Limited (CSL);
- Goa Shipyard Limited (GSL);
- Garden Reach Shipbuilders & Engineers Ltd (GRSE);
- Hindustan Shipyard Limited (HSL); and
- Larsen and Toubro, Kattupalli.

Mazagon Dock Limited (MDL), Mumbai

Historical Evolution: MDL is one of India’s leading Defence PSU shipyards under the MoD. The History of Mazagon Dock dates back to 1774, when a small dry dock was constructed in Mazagon. Over the years, MDL has earned a reputation

for quality work and established a tradition of skilled and resourceful providing service to the shipping world, in general, and the *IN* and the *CG*, in particular. The MDL primarily undertakes construction of warships and submarines along with outfitting works in its workshops and facilities in Mumbai and Nhava. Over the years, the company has institutionalized shipbuilding in the country and created opportunities for increasing production capacity by investing in modern technologies and sophistication of the product portfolio, to serve Indian and overseas clients. The company has the capability to build integrated modular construction of warships, which substantially reduces construction time. With the construction of the Leander- and Godavari-class Frigates, Khukri-class Corvettes, Missile Boats, Delhi- and Kolkata-class Destroyers and the newly inducted Visakhapatnam class of Destroyers, Shivalik-class Stealth Frigates, the SSK submarines and the Scorpene submarine under its belt, the history of modern-day MDL almost maps the history of indigenous-warship-building in India.



Mazagon Dock Limited

Warship Production for IN: Over the last decade, the list of ships built by MDL for the *IN* are listed below.

Name of Ship	Keel Laying	Commissioning
INS <i>Satpura</i>	October 2002	August 2011
INS <i>Sahyadri</i>	September 2003	July 2012
INS <i>Kolkata</i>	September 2003	August 2014
INS <i>Kochi</i>	October 2005	September 2015
INS <i>Chennai</i>	February 2006	November 2016
INS <i>Kalvari</i>	December 2006 [#]	December 2017
INS <i>Khanderi</i>	December 2007 [#]	September 2019
INS <i>Karanj</i>	August 2008 [#]	March 2021
INS <i>Visakhapatnam</i>	October 2013	November 2021
INS <i>Vela</i>	July 2009 [#]	November 2021

Note: [#] indicates steel-cutting dates



Commissioning of INS *Visakhapatnam*

Indigenization Content: The MDL's commitment towards indigenization is evident from the fact that percentage of indigenization in the ships built by MDL has increased from 42 per cent (P15 Delhi-class) in the year 1997, to approximately 59 per cent (P15A Kolkata-class). The indigenous content in P15B-class Destroyers (Visakhapatnam class) is 75 per cent,²² which is a notch above their predecessors P15A and P15, reaffirming the Government's focus on the 'Make in India' Programme.²³

Infrastructure/Capacity Upgrades: As compared to the previous decade, concurrent shipbuilding capability of MDL has increased from six warships to eight to ten warships and submarines from six submarines to eleven submarines. The major infrastructure upgrades undertaken in the last decade are tabulated below.

Infrastructure/Capability Upgrade	Year
Wet basin 4 level luffing cranes commissioned under the Mazdock Modernization Project (MMP)	2012

Infrastructure/Capability Upgrade	Year
300-tonne heavy-duty goliath crane under the MMP	2013
Module Workshop	2014
Cradle Assembly Shop	2014
Store Building	2014
Submarine Assembly Workshop	2016
Inauguration of Nhava Yard and Workshop	2019

Cochin Shipyard Limited (CSL)

Historical Evolution: Cochin Shipyard Limited (CSL) was incorporated in the year 1972 as a fully owned Government of India company. In the last four decades, the company has been a strong-pillar of the Indian shipbuilding and ship-repair industry and also a player on the global shipbuilding front. The Company has built and repaired some of the largest ships in India and is presently building the prestigious Indigenous Aircraft Carrier (IAC) for the Navy. Over the years, CSL has evolved from building bulk carriers to smaller and more technically sophisticated



IAC: India's First Indigenously Built Aircraft Carrier

vessels such as Platform Supply Vessels (PSV) and Anchor Handling Tug Supply Vessels (AHTS).

CSL's key shipbuilding clients on the domestic front include the *IN*, the CG, the Shipping Corporation of India Limited, Lakshadweep Government, various Port Trusts, Inland Waterways Authority of India (IWAI), A&N Administration, Directorate General of Lighthouses and Lightships (DGLL) and Jindal Steel Works (JSW) group. CSL has also undertaken repairs of various types of vessels, including upgradation of ships of the oil exploration industry as well as periodical maintenance, repairs and life extension of ships.

Indigenous Aircraft Carrier (IAC): India's most complex warship indigenously built by CSL for the *IN* commenced its sea trials in August 2021. The contract for the Indigenous Aircraft Carrier

(IAC) was signed in May 2007. The keel for the IAC was laid on 28 February 2009. Phase-I, comprising 15,000 tonnes of hull construction and over 2,500 tonnes of outfitting, was completed on 12 August 2013—the time of its launch. As there was no precedence of aircraft carrier construction, a dedicated Carrier Acceptance Team (CAT) was constituted in July 2016. This obviated the need to depute a large number of personnel, for undertaking trials, to Kochi from various existing *IN* trial teams.

A comprehensive document for induction, development of support infrastructure and support facilities for IAC, known as 'Document for induction of Vikrant' or 'DOKVIK' was promulgated in March 2014. Periodic review of the multi-agency responsibilities at Naval Headquarters was crucial in resolving many interlinked issues.



IAC Undergoing Sea Trials

Note: CSL delivered the ship to the *IN* on 28 July 2022. The IAC was commissioned as *INS Vikrant* on 2 September 2022 with the Indian Navy's new ensign. The reincarnation of *Vikrant* is a true testimony to the country's zeal and fervour in pursuing aircraft carrier designing and building. India and the *IN* joined a select group of countries such as the US, the UK, France, Russia and China who currently have such capability.

The 40,000-tonne Indigenous Aircraft Carrier (IAC) is the first aircraft carrier designed and built in India, catapulting India into an elite league of countries capable of building complex aircraft carriers. The carrier is a mini floating city, with a flight-deck area covering the size of two football fields with approximately 2,000 km of cabling and 120 km of piping and is the largest warship built in the country. The IAC is 262 m long, 62 m at the widest part and height of 59 m, including the superstructure. The ship is designed for a top speed of 28 knots and with an endurance of 7,500 nautical miles.

Basin Trials of Indigenous Aircraft Carrier (IAC) were completed in November 2020, and since then, the ship has undertaken sea trials in August 2021, October 2021 and January 2022. The IAC is a leading example of the nation's quest for 'Aatmanirbhar Bharat' and IN's 'Make in India' initiative, with more than 76 per cent indigenous content.²⁴

The Carrier will be capable of operating a combination of aircraft, including MiG-29K, Kamov 31, Multirole Helicopters (MRH) and Naval Utility Helicopters (NUH). The IAC would also be the first warship to be built with special high-strength steel, developed and manufactured indigenously.

Refits of Indian Navy Ships: Refits of the following ships were completed at CSL:

Ship	Year	Remarks
INS <i>Viraat</i>	2012	Completed in record time (120 days). The ship was delivered to the IN two weeks ahead of the scheduled delivery date.
INS <i>Guldar</i>	2014	
INS <i>Cheetah</i>	2014	
INS <i>Aditya</i>	2015	
INS <i>Sukanya</i>	2015	
INS <i>Shardul</i>	2015	

Ship	Year	Remarks
INS <i>Vikramaditya</i>	2016	Maiden refit of INS <i>Vikramaditya</i> was carried out from 23 September 2016 to 5 November 2016 and completed five days ahead of schedule. First dry dock repairs of INS <i>Vikramaditya</i> were completed in record time of 74 days as against the contractual delivery period of 112 days.
INS <i>Viraat</i>	2016	Essential repairs and dry docking
INS <i>Shakti</i>	2017	
INS <i>Nireekshak</i>	2017	
INS <i>Airavat</i>	2017	
INS <i>Sujata</i>	2017	
INS <i>Sutlej</i>	2017	
INS <i>Shardul</i>	2018	
INS <i>Sagarbhwani</i>	2018	
INS <i>Jamuna</i>	2018	
INS <i>Jyoti</i>	2019	

Ships Delivered to CG: Over the last decade CSL delivered twenty Fast Patrol Vessels (290 tonne displacement, maximum speed 33 knots and endurance of 1,500 nautical miles) to the CG. These vessels are ideal for undertaking multifarious close-coast missions such as surveillance, interdiction, search and rescue and medical evacuation. Details are listed below.

Ship	Year
Five Fast Patrol Vessels	2013
Seven Fast Patrol Vessels	2014
Six Fast Patrol Vessels	2015
Two Fast Patrol Vessels	2016

Infrastructure/Capacity Upgrades: The following major infrastructure was upgraded in the last decade.

Infrastructure/Capability Upgrade	Year
State-of-the-art SAP implemented across all business areas of the shipyard.	2014

Infrastructure/Capability Upgrade	Year
Signed Memorandum of Intent (MoI) with DRDO for the export of defence vessels incorporating defence systems developed by DRDO and produced by Indian OEMs.	2017
Inauguration of the CSL Andaman & Nicobar Ship Repair Unit (CANSRU) at Port Blair.	2019
Inauguration of the CSL Mumbai Ship Repair Unit (CMSRU).	2019
Inauguration of the CSL Kolkata Ship Repair Unit (CKSRU).	2019
Signed MoU with M/s Fincantieri, Italy, for cooperation in the areas of design, shipbuilding, ship repair, marine equipment manufacturing, besides training and skill development.	2020

Goa Shipyard Limited (GSL)

Historical Evolution: Goa Shipyard Limited (GSL) established in 1957, is a leading shipyard on the west coast of India, functioning under the administrative control of the MoD. Beginning as a small barge building yard, GSL has garnered reputation as one of the most sophisticated shipbuilders in the country. For over four decades, GSL has designed, built and commissioned a wide range of sophisticated vessels for varied

applications in the defence and commercial sectors with special expertise in building modern patrol vessels of steel and aluminium hull structure. While making consistent progress in its core competency of shipbuilding, the yard has also proactively moved to exploit market opportunities by successfully diversifying into a related product range. It has designed and constructed Training Simulators for the *IN* and the Oil & Natural Gas Corporation (ONGC). A series of Interceptor boats have been built for the Ministry of Home Affairs (MHA) and are used by the Coastal State Police on the west coast.

The Damage Control Simulator built by Goa Shipyard for the *IN*, incidentally, is the only one of its kind in Asia and one of the very few existing worldwide. A Survival at Sea Training Facility has been designed and constructed by Goa Shipyard for ONGC for training of their personnel keeping in view real-life emergencies that may occur on oil platforms. The GSL has executed India's first Shore-Based Training Facility for carrier-borne aircraft in association with ADA Bengaluru at *INS Hansa*, Goa. The facility is used to train pilots



Goa Shipyard Limited

for the MiG-29K aircraft. The shipyard was also awarded another major project of constructing two Project 1136.6 Frigates from Russian technology for the Navy. This is the biggest contract in the history of Goa Shipyard.

Warship Production for the IN: A list of ships built by GSL over the last decade for the IN is tabulated below.

Name of Ship	Keel Laying	Commissioning
INS <i>Sudarshini</i>	January 2011	January 2012
Five GRP survey motor boats	-	2013
INS <i>Saryu</i>	December 2006	January 2013
INS <i>Sunayna</i>	September 2007	October 2013
INS <i>Sumedha</i>	May 2008	March 2014
INS <i>Sumitra</i>	April 2010	September 2014
Four 1000-tonne fuel barges	-	2018

Refits of IN Ships: Refits of the following ships were completed at GSL:

Ship	Year
INS <i>Tarangini</i>	2016
INS <i>Sunayna</i>	2016

Ships delivered to CG: A list of ships built by GSL over the last decade for the CG is tabulated below.

Ship	Year
CGS <i>Vaibhav</i>	2013
CGS <i>Samarth</i>	2015
CGS <i>Shoor</i>	2016
CGS <i>Sarathi</i>	2016
CGS <i>Shaunak</i>	2017
CGS <i>Shaurya</i>	2017
CGS <i>Sujay</i>	2017
CGS <i>Sachet</i>	2020
CGS <i>Sujeet</i>	2020
CGS <i>Sajag</i>	2021
CGS <i>Sarthak</i>	2021

Note: The follow-on vessels will have a greater indigenous content (70 per cent) compared to the 62 per cent of the previous batch.

Export Orders: The GSL delivered the following assets to FFCs.

Ship	Country	Year
Eleven Fast Interceptor Boats	Mauritius	2015–16
Mauritius CG Ship <i>Victory</i>	Mauritius	2016
Damage Control Simulator	Myanmar	2016
Mauritius CG Ship <i>Valiant</i>	Mauritius	2017
SLNS <i>Sayurala</i>	Sri Lanka	2017
SLNS <i>Sindurala</i>	Sri Lanka	2018

Infrastructure/Capacity Upgrades: Following major infrastructure upgradations were undertaken in the last decade.

Infrastructure/Capability Upgrade	Year
6000 T shiplift and dry berths as part of Yard 'Infrastructure Augmentation Plan'.	2011
Installation and commissioning of two 45 T Level Luffing cranes.	2012
Developed indigenous marine gearbox for CG NOPVs in collaboration with Ms Walchandnagar Industries resulting in import substitution of critical equipment.	2016
Inauguration of two Ship Assembly Shops (SAW 1 & 2), each 120 m in length, 35 m in width and 45 m in height, equipped with two 80 T Electrical cranes and process gas services.	2016
Collaborated with M/s Naiad Dynamics for manufacture and assembly of Fin Stabilizer Equipment at GSL under the 'Make in India' initiatives.	2019
State-of-the-art Steel Preparation Shop.	2019

Miscellaneous:

■ **Shore-Based Test Facility:** In March 2014, the Shore Based Test Facility (SBTF) built at Naval Air Station by GSL was operationalized. It was set up with technology and specialized equipment from Russia. The IN was able to integrate INS *Vikramaditya* into fleet by training the MiG-29K aircraft pilots in taking off and landing from the deck of the Aircraft Carrier (AC) in the simulated environment of

the SBTf. This facility, being the first of its kind in Asia and third in the world, provides fitness testing of aircraft and training for the pilots to land on the Naval Aircraft Carrier.²⁵

- **Nuclear, Biological, Chemical Training Facility 'Abhedya'**: GSL had signed the contract with the *IN* for construction of NBCTF on 31 March 2016 and delivered the project ahead of schedule, handing over the facility to the *IN* on 28 September 2018. The facility was commissioned in March 2019.



Nuclear, Biological, Chemical Training Facility: Abhedya

Garden Reach Shipbuilders and Engineers Ltd (GRSE), Kolkata

Historical Evolution: The genesis of Garden Reach Shipbuilders & Engineers Ltd (GRSE) dates back to 1884 when it started its journey as a small workshop to repair vessels of River Steam Navigation Company. In 1934, the Company was registered under the Indian Companies Act, 1913 and started its new journey as Garden Reach Workshops (GRW) Limited. The Company was acquired by the Government of India in the year 1960.

The first warship of Independent India, *INS Ajay* was commissioned by the *IN* in 1961, within one year of being taken over by the MoD. Since its operationalization, GRSE, a Mini Ratna Category 1 Company, has delivered 107 warships to the *IN*, CG, Mauritius CG and Seychelles CG. The first warship for export by India—Offshore Patrol Vessel, *CGS Barracuda*—was delivered by GRSE to Mauritius in 2014. The shipyard has built a wide array of vessels, from world-class Frigates to Fast



Garden Reach Shipbuilders and Engineers Limited (GRSE)

Attack Craft. GRSE has established a Virtual Reality Lab for achieving better ergonomics and in-depth understanding of the details of the ship in the design stage itself. Post modernization and revitalization, the shipyard has the capacity to build twenty ships (eight large and twelve small) concurrently.

Indian Navy Warships—Keel Laying to Commissioning (2011–21): Over the last decade GRSE has delivered nineteen ships to the Navy. Ninety per cent of indigenous content was achieved on ASW Corvettes and Landing Craft Utility Ships.

Name of Ship	Keel Laying	Commissioning
INS <i>Kabra</i>	June 2009	June 2011
INS <i>Koswari</i>	June 2009	July 2011
INS <i>Karuva</i>	June 2009	August 2011
INS <i>Kamorta</i>	November 2006	August 2014
INS <i>Kadmatt</i>	September 2007	January 2016
INS <i>Tarmugli</i>	March 2014	May 2016
INS <i>Tihayu</i>	October 2014	October 2016
INS <i>Tillanchang</i>	November 2014	March 2017
INS <i>Tarasa</i>	September 2015	September 2017
LCU 51	April 2013	March 2017
LCU 52	April 2013	August 2017
INS <i>Kiltan</i>	August 2010	October 2017
LCU 53	August 2013	April 2018
LCU 54	August 2013	May 2018
LCU 55	September 2014	December 2018
LCU 56	September 2014	July 2019
LCU 57	March 2015	May 2020
INS <i>Kavaratti</i>	January 2012	October 2020
LCU 58	August 2015	March 2021

Ships Delivered to the CG: The list of ships built by GRSE for the CG over the last decade are listed below.

Ship	Year
CGS <i>Rajshree</i>	2012
CGS <i>Rajtarang</i>	2012
CGS <i>Rajkiran</i>	2012
CGS <i>Rajkamal</i>	2012
CGS <i>Rajratan</i>	2013
CGS <i>Rajdoot</i>	2013
CGS <i>Rajveer</i>	2013
CGS <i>Rajdhvaj</i>	2013
CGS <i>Priyadarshini</i>	2019
CGS <i>Annie Besant</i>	2020
CGS <i>Amrit Kaur</i>	2020
CGS <i>Kanaklata Barua</i>	2020

Export Orders:

- **MCGS *Barracuda*:** The first-ever warship exported by India was an Offshore Patrol Vessel built by GRSE, and handed over to the Government of Mauritius at Kolkata on 20 December 2014.



Handing Over of the MCGS *Barracuda* by Prime Minister Modi



Commissioning of SCG PS *Zoroaster*

- **Seychelles CG PS *Zoroaster*:** This Fast Patrol Vessel built by GRSE was donated by India to the Seychelles and was delivered to the Seychelles' CG at Port Victoria, on 8 April 2021.

Infrastructure/Capacity Upgrades: Following major infrastructure upgradations were undertaken in the last decade:

Infrastructure/Capability Upgrade	Year
Implemented ERP System	2011
Integrated Shipbuilding Facility	2013
Modern hull shop, upgradation of TRIBON ship design software, augmenting capacity of inclined berth, shipbuilding shop, etc.	2016
Dry Dock of 10,000 tonne capacity, inclined berth of 4,500 tonne capacity, Pier Quay and associated works and systems.	2016
Module Hall, Paint Cell & Equipment	2016
First Defence PSU to go live on eTReDS Platform	2018
Commissioned Virtual Reality Lab	2018
Signed MoU with M/s BERD, Portugal for exploring Design Support to manufacture next-generation modular portable bridge solutions in India.	2019
Signed MoU with Naval Group France, a leader in European Naval Defence Industry to collaborate and engage, to offer high-end surface ships based on sea-proven Gowind design developed for export market.	2021

Hindustan Shipyard Limited (HSL), Visakhapatnam

Historical Evolution: The long journey towards making ships in India started during the pre-Independence years with the founding of the first green-field shipyard in the year 1941 in the name of Scindia Steam Navigation Co. Ltd by the great industrialist and visionary, Seth Walchand Hirachand, which is today known as the Hindustan Shipyard Ltd. After Independence, two-thirds of its holdings were acquired by the Government of India in 1952 and Hindustan Shipyard Ltd was incorporated on 21 January 1952. The remaining one-third share was acquired by the Government in July 1961 and the shipyard became a fully owned Government undertaking under the administrative control of the Ministry of Shipping (MoS). Considering the strategic requirements of the nation, the yard was brought under the administrative control of the MoD on 22 February 2010.

Over the years, HSL has built over 200 vessels, refitted five submarines and over 2,000 vessels of various types. HSL happens to be the only shipyard in India to have carried out the refits of three classes of submarines (refit of two Egyptian submarines in 1971, refit of Foxtrot-class (INS *Vagli*) and EKM-class (INS *Sindhukirti* and INS *Sindhuvir*) submarines of the Indian Navy.

Warship Production for Indian Navy: INS *Dhruv*, an Indian Ocean Surveillance Ship (OSS), was commissioned on 10 September 2021. Other vessels built by HSL for the *IN* include:

Ship	Type	Delivery
<i>Dhiraj</i> (VC 11163)	50T BP Tug	2013
<i>Sahas</i> (VC 11164)	50T BP Tug	2013
<i>Himmat</i> (VC 11162)	50T BP Tug	2014
<i>Sahayak</i> (VC 11176)	25 T BP Tug	2016
<i>Balwan</i> (VC 11175)	25 T BP Tug	2016
<i>Buland</i> (VC 11177)	25T BP Tug	2016



Hindustan Shipyard Limited

Ship	Type	Delivery
<i>Abhishek</i> (VC1179)	10T BP Tug	2019
<i>Aja</i> (VC 11181)	10T BP Tug	2019
<i>Bahadur</i> (VC11182)	10T BP Tug	2019
<i>Avatar</i> (VC 11183)	10 T BP Tug	2019
<i>Atal</i> (VC 11180)	10 T BP Tug	2019
<i>Ananta</i> (VC 11178)	10 T BP Tug	2019

The *IN* tugs *Balwan* and *Sahayak* were built in a record time of ten months from the date of keel-laying, so as to meet the requirements of the International Fleet Review 2016.

Refits of Indian Navy Ships: Refit of 127 vessels was completed during the last decade. Refits of the following *IN* ships were completed at HSL:

Ship	Year
<i>INS Sandhayak</i>	2011
<i>INS Kumbhir</i>	2011
Medium Refit-cum-Modernization of <i>INS Sindbukirti</i>	2015
<i>INS Gharial</i>	2015

<i>INS Magar</i>	2017
<i>INS Kesari</i>	2017
<i>INS Sindhuvir</i>	2020

Ships Delivered to CG: A list of ships built by HSL for the CG over the last decade is given below.

Ship	Year
<i>CGS Rani Avantibai</i>	2013
<i>CGS Rani Durgavati</i>	2015
<i>CGS Rani Gaidinliu</i>	2016
<i>CGS Rani Rashmoni</i>	2018

Infrastructure/Capacity Upgrades: Following major infrastructure upgradations were undertaken in the last decade:

Infrastructure/Capability Upgrade	Year
Entered into a MoU with M/s Hyundai Heavy Industries Co Ltd for transfer of technology for design and manufacture of submarines, including its systems/sub-systems.	2015
Implementation of Biometric Time & Access Control System	2017

Infrastructure/Capability Upgrade	Year
Replacement of 2 Nos. DG Sets each 1010 KVA capacity	2017
Replacement of firefighting seawater and oxygen pipelines in SRC & Yard.	2018
Supply, installation and commissioning CCTV Surveillance cameras as per IB Guidelines.	2018
Refurbishment of 132 KV Main Receiving Station and 11 KV. Switchgear at HSL (Combined with SOC 60, 62 & 66).	2019
Upgradation of CNC Plasma Cutting Machine (MESSER) in Bay-3 of Hull Shop.	2020
Implementation of latest ERP system SAP S4 HANA.	2020
Providing SAP IT infrastructure solutions & Data Centre.	2020

Larsen and Toubro (L&T), Kattupalli

Historical Evolution: L&T’s Kattupalli shipyard is located near Ennore and Kattupalli Ports, around 40 km from Chennai. The shipyard is designed for modular construction and repair of a wide range of defence ships and submarines. It covers an area of 900 acres and has a waterfront exceeding 1.5 km. A unique feature of L&T’s Kattupalli shipyard is the shiplift, designed and manufactured entirely by L&T. It enhances the capability of the shipyard

by enabling multiple jobs, both new builds and refits, to be handled simultaneously in several large dry and wet berths. Chronology of shipbuilding at L&T in general and Kattupalli shipyard more specifically is tabulated below.

Milestone	Year
L&T shipbuilding yard established in Hazira, Gujarat.	2006
Contract for Heavy Lift vessels from the Netherlands.	2006
Approval for Construction of Kattupalli Shipyard received from the Government of Tamil Nadu.	2008
Construction of Kattupalli Shipyard begins.	2009
First commercial vessel delivered (Roll Dock Sun) from Hazira.	2010
Kattupalli Shipyard operationalized.	2012
First defence vessel (Interceptor Boat) delivered from Hazira.	2012

Production for IN: In 2018, L&T Kattupalli delivered the ‘Floating Dock Navy’—an indigenously designed and built platform with state-of-the-art machinery and control systems capable of docking warships of up to 8,000 tons displacement. It has high-capacity Ballast Pumps, along with advanced automated Ballast Control



L&T Kattupalli

System. The dock covers provided with the FDN-2 facilitate repair and refit activities in inclement weather conditions.



FDN-2 built by L&T

Refits of Indian Navy Ships: Refits of the following *IN* ships were completed at L&T:

Ship	Type of Refit
INS <i>Jyoti</i>	Medium Refit (MR)
INS <i>Airavat</i>	Emergency Repair and Dry Docking (ERDD)
INS <i>Bangaram</i>	MR
INS <i>Batti Malv</i>	MR
INS <i>Darshak</i>	MR
INS <i>Kadmatt</i>	ERDD
INS <i>Cheriyam</i>	ERDD
INS <i>Sandbayak</i>	ERDD
INS <i>Kiltan</i>	Guarantee Repair and Dry Docking (GRDD)
INS <i>Aditya</i>	Short Refit (SR)
INS <i>Chetlat</i>	SR
INS <i>Car Nicobar</i>	SR
FDN-1	MR
INS <i>Kavaratti</i>	Dry Docking

In addition to the above *IN* ships, L&T has also undertaken refits of CG ships *Vishwast*, *Sarang* and *Vijit*. **Ships Delivered to CG:** The list of ships built over the last decade by L&T Kattupalli for the CG are listed below.

Ship	Year
CGS <i>Vikram</i>	2018
CGS <i>Vijaya</i>	2018
CGS <i>Veera</i>	2019
CGS <i>Varaha</i>	2019
CGS <i>Varad</i>	2020
CGS <i>Vajra</i>	2021
CGS <i>Vigraba</i>	2021

The entire design and construction processes for these seven ships have undergone dual certification from the American Bureau of Shipping and from the Indian Registrar of Shipping.

Export Orders:

- **Vietnam:** Larsen & Toubro (L&T) signed a contract worth US \$99.7 million (about Rs 668 crore) from the Vietnam Border Guard for design and construction of twelve high-speed patrol vessels (five built in India and balance seven in Vietnam) as well as for transfer of design and technology, along with supply of equipment and material kits for construction of follow-on vessels at a Vietnam shipyard. The first five high-speed patrol boats built under the US \$100 million Line of Credit (LoC) extended by the Government of India in 2016 are scheduled to be delivered between 2020 and 2021.
- **USNAVSEA/Chilean Navy:** L&T was awarded a US \$11.5 million firm-fixed-price contract in the support of the Government of Chile for an existing twin-screw Anchor Handling, Towing, Supply and Standby Vessel (AHTSSV). The contract, announced by the US Department of Defence (DoD) was executed under the US Foreign Military Sales (FMS) programme with the US Department of Navy's Naval Sea Systems Command (NAVSEA) as the contracting activity. The ship was part of the original order placed by Qatari fleet owner

Halul Offshore Services. When Halul Offshore Services cancelled the order, the ship was put on sale by L&T.



L&T-built Anchor Handling Towing Supply and Standby Vessel (AHTSSV)
 Source: Indian Embassy in Chile

Other Shipyards Involved in Warship Building

Apart from the ships made in the prominent shipyards listed above, the *IN* also provided opportunity to two other shipyards at building warships. Ships made by these shipyards include:

Name of Ship	Shipyards	Keel Laying	Commissioning
INS <i>Makar</i>	Alcock Ashdown, Gujarat	April 2008	September 2012
INS <i>Astradharini</i>	Shoft India	-	October 2015

⚓ Shortfalls in Indian Shipbuilding Industry

The 2015–16 report of the Public Accounts Committee on Indigenous Construction of Indian Naval Warships noted,²⁶ ‘The extent to which Indian Navy shipbuilding projects are being delayed and the scale of under-estimation reveals a deeper malaise.’ The report shed light on the audit findings that highlighted grave issues such as inadequate

shipbuilding practices, frequent mid-course changes, delays in finalization of weapon packages and an underestimation of costs by shipyards. A November 2020 report titled ‘Leveraging Defense Shipbuilding to Catalyse India’s Shipbuilding Industry’ published by National Productivity Council (NPC) and KPMG,²⁷ refers to shipbuilding in India as a marketplace dominated by a singular buyer, i.e., the Indian Defence sector. Despite the success of some private yards like L&T Katupalli, the sector is also weighed down by the failures of Pipavav and ABG shipyards. Some of the shortfalls in shipbuilding witnessed during the decade are enumerated in the succeeding paragraphs.

Naval Offshore Patrol Vessels

In 2011, the *IN* had inked a Rs 2,500 crore contract for five Naval Offshore Patrol Vessels (NOPVs), with the Gujarat-based Pipava shipyard. The contract was invited based on the ‘Buy and Make-in-India’ criteria mentioned in the 2011 Defence Procurement Policy. This essentially meant that the RFI was for Indian players and that Indian shipbuilding facilities were free to tie up with foreign entities that had relevant technical know-how.

By mid-2014, Pipava, though with a licence to make warships, had accumulated a debt of almost Rs 7,000 crore and was under severe pressure from its creditors to go in for a Corporate Debt Restructuring (CDR). Amidst the financial woes, Reliance Group acquired Pipavav Defence and Offshore Engineering Ltd in 2015 and later renamed it as Reliance Naval and Engineering Ltd (RNEL). The RNEL was, however, unable to execute the orders and resulted in significant delays.

In January 2020, the shipyard was taken to the National Company Law Tribunal after lenders invoked the insolvency and bankruptcy process to

recover close to Rs 12,429 crore in outstanding loans. Consequently in 2020, the *IN* cancelled the contract due to delays in delivery.

Anticipating the delay in the execution of the order for NOPVs, an AoN was accorded by the Defence Acquisition Council (DAC) for six Next Generation OPVs (NGOPVs) in September 2018, with categorization of procurement as Buy Indian (IDDM). The Request for Proposal (RFP) for these six NGOPVs was issued in March 2020. As the contract for five NOPVs was terminated in September 2020, a case was taken up with MoD for revising the number of NGOPVs from six to eleven, to cater to the shortfall as envisaged per the force level of OPVs (in the LTIPP). The RFP for eleven NGOPVs was subsequently issued in March 2021 to seven shipyards, namely, M/s MDL, M/s CSL, M/s GRSE, M/s GSL, M/s HSL, M/s L&T and M/s Shoft Shipyard.

Notwithstanding these setbacks Pipavav and RNEL were able to ink multiple MoUs/strategic partnerships. Some of them include:

- In 2015, under the 'Make in India' project the Russian Government chose the Pipavav Shipyard (RNaval) for the *IN*'s Naval Frigate order, which exceeded more than US \$3 billion thereby making it the private sector's biggest ever warship-building project.
- In 2015, Pipavav Defence & Offshore Engineering Co. Ltd formed a joint venture with one of the biggest ship-repairing centres in Russia—JSC Ship Repairing Centre Zvyozdochka. The venture was created for medium refits and life certification of 877 EKM Submarines in India.

Indigenous Aircraft Carrier

The *IN*, in order to maintain its maritime capabilities and to continue being the Preferred Security Partner in the IOR, has considered the availability

of three aircraft carriers as an operational necessity, so that at least one operational carrier is available on either seaboard at any given time, assuming that one could be under maintenance. The *IN*, therefore, considered it essential to propose the induction of India's Second Indigenous Aircraft Carrier (IAC-2) in the twelfth Long-Term Integrated Perspective Plan (LTIPP) (2012–27).

Towards this, in March 2013, the *IN* constituted a steering committee to formulate and finalize a 'Capability Definition Document (CDD)'. The aim of this document was to bring out the capability definition of the IAC-2 and concepts, which would drive the strategy for its design and construction, taking into account existing constraints, limitations, developments in technology and based on experiences of some developed western Navies in the construction of aircraft carriers. The report established that the ship would displace 65,000 tonnes and feature in the Catapult Assisted Take-off But Arrested Recovery (CATOBAR) configuration. It also identified that though the IAC-2 can indeed be built in India, it would need design consultancy from foreign design house.

In May 2015, the *IN* approached the Defence Acquisition Council (DAC) seeking Acceptance of Necessity (AON) for IAC-2, with nuclear propulsion. In December 2016, the case was fielded for consideration of Services Capital Acquisition Plan Categorization Higher Committee (SCAPCHC), which subsequently recommended the IAC-2 case for consideration of the DAC. Subsequently, in May 2017, during further deliberations, and also in light of budget constraints, the time penalty for creation of infrastructure (specific to the nuclear propulsion system) and, more importantly, on review of operational, aspects (such as the need for the carrier to operate at 30 knots for conduct of flying operations, even in nil

or adverse wind conditions), resulted in *IN* opting for the Integrated Full Electric Propulsion (IFEP).

However, whilst the case was being fielded in DAC, in December 2017, the MoD sought an independent assessment on the very requirement of the third carrier by an 'Expert Group' comprising retired Navy/Air Force Flag Officers. In January 2018, the *IN* submitted a fresh proposal to the SCAPCHC, which specified the IFEP over nuclear propulsion. Facing considerable delays, the MoD ordered a review of capital availability in May 2018, with respect to the *IN*'s committed liabilities and future acquisition projects. Though the *IN* has indicated the availability of requisite funds as per projected financial plans, the 'go-ahead' for fielding the case to DAC is presently pending. Separately, in December 2021, the Standing Committee on Defence submitted a report to the Parliament emphasizing the need for a third aircraft carrier.

Cadet Training Ships

In 2011, the *IN* contracted ABG Shipyard for building two Cadet Training Ships (CTS). The delivery of the first ship was scheduled within forty-two months and the second vessel after forty-eight months from the date of assigning the contract. The project suffered several construction delays due to weakening financial condition of the shipyard. The project gathered pace after relief provided by the Government of India to ABG under Corporate Debt Restructuring (CDR) and it was expected that the first ship would be ready by 2016. However, in 2017, the debt-laden shipyard was taken to the National Company Law Tribunal (NCLT) for initiating insolvency proceedings by its creditors. ABG Shipyard, while accepting the default, filed for bankruptcy. Subsequently, in May 2017, the *IN* terminated the contract with ABG Shipyard.

In April 2018, *IN* announced its intent to procure three Cadet Training Ships from Indian shipyards. This was cleared by the Defence Acquisition Council

in February 2019. An RFP for this procurement was issued in May 2020, wherein M/s L&T was identified as the L1 bidder. The contract with M/s L&T is likely to be concluded in 2022, and the ships will be inducted into the *IN* by 2026.

Minesweepers

In view of the depleted number of Mine Countermeasure Vessels (MCMVs), the *IN* has been trying to bridge this gap since 2005. Two attempts were made to acquire MCMVs in the last two decades, with the last being in 2016 with South Korean M/s Kagnam Corporation (the previous negotiations were also with the same company, terminated due to issues pertaining to pre-contractual commitments). In the second attempt, AoN for construction of twelve MCMVs was accorded by the Government of India in February 2015 to M/s GSL, on a nomination basis, with Transfer of Technology (ToT) from a foreign collaborator. M/s GSL was progressing two RFPs, one for the selection of foreign collaborators for ToT and the second one for MCM suite. The RFP for ToT was issued in December 2015 and the bids were received from M/s Kangnam Corporation (KNC), South Korea in January 2016. During the technical and contract negotiations KNC raised additional conditionalities with regard to contract compliance, which led to the cancellation of the tender in December 2017.

Subsequently, M/s GSL was directed to issue a fresh global Expression of Interest (EoI) which was published in March 2018. By May 2018, four firms responded, of which two (M/s Kangnam, Korea, and M/s Intermarine, Italy) qualified the specified criterion of Single Skin Non-Stiffened Glass Reinforced Plastic Hull. In the interim, the MoD suggested that the *IN* issue a fresh RFI to all shipyards manufacturing GRP MCMVs with shock as an essential parameter if need be. The RFI and operational/technical specifications incorporating the MoD's suggestion of permitting any GRP hull technology with shock requirement as an essential

parameter was issued. Response was received from Rosoboronexport JSCROE (Russia), M/s Svenska Aeroplan Aktiebolaget (SAAB) (Sweden) and M/s Intermarine (Italy). Responses submitted by the collaborators are currently under deliberation for formulation of an RFP.

Additionally, with the last of the minesweepers (INS *Kozhikode*) being decommissioned in April 2019, the *IN* was left without an MCM platform. In order to bridge this capability gap, in August 2021, *IN* published an RFI for leasing of three to four MCMVs through Government-to-Government agreements.

Fleet Support Ships (FSS)

The AoN for acquisition of five FSS was accorded by the Government of India in December 2015 under 'Buy (Indian)' on nomination basis to M/s HSL, Visakhapatnam. To expedite the construction of such a ship for the first time in India, the MoD attempted to conclude a collaborator contract between M/s HSL and M/s Hyundai Heavy Industries (HHI), South Korea. However, the contract could not be concluded in view of divergences on work share between M/s HSL and M/s Hyundai Heavy Industries (HHI), South Korea. This led to the issuance of a global RFP for selection of a global collaborator in October 2018 by M/s HSL, wherein M/s Anadolu Shipyard, Turkey, emerged as the L1 collaborator. A contract between M/s HSL and M/s Anadolu shipyard was signed in March 2020, and the project is expected to move at significant pace in terms of designing and finalization of other technical aspects. The contract for the shipbuilding of these FSS is likely to be concluded in 2022, with the first ship planned for induction starting 2026.

Policy Initiatives

Strategic Partnership (SP) Model

With the aim to institutionalize a functional mechanism to encourage broader participation of private sector, in addition to Defence PSUs and

OFBs in the manufacture of defence platform, equipment and systems, the Government of India, promulgated a new chapter (chapter 7) in the *Defence Acquisition Procedure (DPP-2016)*—titled 'Revitalising Defence Industrial Ecosystem through Strategic Partnerships'—in May 2017.

Project 75 (I)

Taking advantage of this policy direction, the *IN* pioneered the first use of the SP Model, by progressing the case for P75 (I) project (indigenous submarine). This is the largest project given to the Indian private sector, which will pave the way for self-reliance and establish India among submarine-building nations. The Government has approved issuance of RFP for the project P75 (I) to two SPs, comprising one PSU M/s MDL and one private Shipyard, M/s L&T. M/s Joint Stock Company Rosoboronexport JSCROE (Russia), M/s Navanita (Spain), M/s Naval Group (France) and M/s ThyssenKrupp Marine Systems TKMS (Germany) were identified as the possible foreign collaborators. The RFP for the P75 (I) project was issued to the two strategic partners in July 2021, subsequent to its approval by DAC in June 2021. The Project P75 (I) envisages the acquisition of six modern conventional submarines.

Naval Utility Helicopters (NUH)

The other project being progressed through the SP Model is the induction of 111 Naval Utility Helicopters (NUH), which would also create a firm base in the Indian Manufacturing Industry towards building helicopters indigenously. The AoN for the case was accorded in November 2018. The approval in terms of shortlisting SPs and foreign collaborators/OEM is pending. The MoD has insisted on inclusion of M/s HAL, a PSU, as SP in addition to Bharat Forge Limited, Tata Advanced Systems Limited, Adani Defence Systems and Technology Limited and Mahindra

Defence Systems Limited. Meanwhile, Airbus, Sikorsky and Rosoboronexport (ROE) have been identified as the foreign OEMs.

Integrated Full Electric Propulsion (IFEP)

The advanced global navies (the US, the UK, France, Italy, etc.) are inducting ships with IFEP/Hybrid Propulsion in their fleet owing to technological advancements and advantages it offers. The *IN* has actively pursued induction of Electric Propulsion (EP) technology for its future platforms. India's first Floating Test Range (FTR) Vessel *INS Anvesh*—built by M/s CSL for DRDO (operated by *IN*) and currently undergoing sea trials—is also the *IN*'s first Medium Voltage (MV) Integrated Full Electric Propulsion (IFEP) vessel. In order to manage this technology adoption, the Directorate of Marine Engineering (DME), which has been nominated as the nodal agency for induction and management of EP technology, formulated a 'Roadmap for Technology Management of Electric Propulsion' in 2020. The ship's crew have undergone primer training capsules at *INS Shivaji* for six weeks and were also trained at the MV lab in *INS Valsura*. In line with global trends, the *IN* is also considering IFEP/Hybrid propulsion options for its future fleet ships. A Landing Platform Dock (LPD), now on the drawing table, is envisaged with IFEP/Hybrid propulsion. In addition, EP is also being considered for the next generation of ferry craft.

Centre of Excellence

The *IN* has established many Centres of Excellence, in order to accelerate innovation and technology adoption. Some of the notable CoEs include Data Analytics (at Indian Naval Ship Maintenance Authority [INMA] at Mumbai), Big Data at *INS Valsura*, 5G at Signal School, Kochi and Marine Engineering at *INS Shivaji*. Additionally, WESEE has been nominated as the AI incubation centre of the Indian Navy.



Recognition as CoE: *INS Shivaji*

New Generation Firefighting System

In order to meet global protocols (Montreal and Kyoto protocol in respect of Ozone depletion potential (ODP) and Global Warming potential (GWP), respectively), the *IN* has migrated from the Halon-based FF system and CO₂ based FF system, to the environmentally benign New Generation Fire-Fighting system for onboard application, adhering to the Global Classification Society and other statutory norms.

Formulation of Directorate of Missiles

In order to set up a robust, responsive and adaptive Missile Life-Cycle Management Organization which would cater to the long-term technical capability development and consolidation of the *IN* (including for strategic missiles), the Directorate of Weapon Equipment (DWE) was reorganized into two specialist directorates—(i) DWE; and (ii) Directorate of Missiles (DM)—on 21 June 2018. The DM is now the Controlling Directorate and Functional Authority of all missile bases of the *IN*,

and coordinates all technical matters pertaining to induction, installation, testing and tuning, acceptance, maintenance in-service, ranging and scaling of spares, repairs and trials of conventional and strategic missiles.

Introduction of Higher Specs Fuel for IN Ships (LSHFHS – IN 512)

The *IN*, in collaboration with M/s IOCL, carried out an extensive, thorough study along with a comparative evaluation of existing international regulations (ISO, MARPOL, NATO, etc.) and as an outcome, new fuel specifications meeting international and NATO standards, were launched in January 2020. Supply of the new fuel through IOCL commenced in March 2020. This initiative would go a long way in enhancing equipment reliability, performance, reduced carbon footprint, emissions and, more importantly, would be a key enabler in the Navy's 'Mission-Based Deployment' on a global scale.

DG Naval Trials and Acceptance Authority (DGNATAA)

With the aim of synergizing and facilitating single-point responsibility and accountability, all trial and acceptance agencies were brought under the purview of Naval Trials and Acceptance Authority (NATAA) in December 2007. In view of the growth that the *IN* has witnessed in the last decade, and concomitant enhancement in operational tasking and maintenance/support requirements, a need was felt for strengthening the *IN*'s Trial and Acceptance organization. In September 2021, approval was accorded for 'Revitalization of NATAA organization and Charter', as the singular agency responsible and accountable for comprehensive 'Certification of Materiel Readiness'.

As part of the revitalization, NATAA was mandated to operate under the Director General

(DG) (Rear Admiral—from E/L cadres) and assisted by a Director of the rank of Commodore (at Mumbai). In the interim, prior to accord of Government of India sanction, ACOM (Mod) was appointed to dual-hat as DG NATAA. It was further envisaged that the NATAA organization would be under functional control of the Chief of Materiel (COM), through ACOM (Mod), while administrative control would continue to be exercised by FOC-in-C(West). The NATAA organization, with a revised charter, came into effect in January 2022. As a result of this revitalization, twenty trial agencies of the *IN* now operate under NATAA. The NATAA's charter includes:

- Trials and inspection of new construction ships and submarines;
- Management of in-service trials of commissioned ships and submarines;
- Steering policy formulation with regard to operation and maintenance of platforms and equipment; and
- Stealth management.

Indigenization of Warship Grade Steels and Aluminium

With acquisition of ships from various origins, different grades of steels have come into service. By 2010, there were ten steel grades and three types of structural profiles in use by *IN* ships and were being imported. Several challenges were associated with multiplicity of steel grades, such as maintaining large inventory, constraints in procurement due to low quantities, and uncertain availability. Further, in case of sanctions, the country would be stymied for want of steel. Consequently, a dire need for indigenous steel was felt and development of the same was considered ineluctable. The indigenous steel would serve as a strategic material, aiding in self-reliance for India in pursuing indigenous warship construction.

DMR249A Steel: DIVIR249A Steel—a Russian-grade steel with superior strength, better corrosion resistance and excellent weld ability—was selected for indigenization. The development of the subject steel, bulb bars and weld consumables was indigenously undertaken, based on Russian inputs in consultation with Defence Metallurgical Research Laboratory (DMRL), Hyderabad, and Indian firms. The indigenized steel was named as DMR249A steel. Indigenization of DMR249A commenced in 2000 and completed various phases till 2010. Indian firms such as M/s SAIL, M/s Essar, M/s Krishna Industries, M/s Midhani, M/s GEE and M/s Honavar, were associated for the development of DMR249A steels and weld consumables. Post development, the steel was inducted and has been in use for construction and repair purposes. It has also been used on several new ships, such as P28, NOPVs, P71, P15A/B, P17/17A. The estimated savings till date are to the tune of Rs 2000 crore.

DMR291A Aluminium: Post successful development of indigenous steel DMR249A, aluminium was also taken up for indigenization considering its huge requirement for warship construction, non-standardization in marine aluminium grades and import dependency. International grade AA5086 was selected for indigenization. The indigenization was taken up in consultation with DMRL and Indian firm M/s Hindalco. Part development of the plates has been completed. The remaining development is being progressed with the firm. The development will aid in self-reliance in ship construction and repairs.

Design of New Survey Motor Boats (SMBs)

Based on the recommendations received during Annual Hydrographic Conference 2013 and experience gained in operating SMBs over the last two decades, a need was felt to develop a new hull

form for two types of Survey Motor Boats (9 m and 11 m). Accordingly, the development of new hull-form designs for 9 m and 11 m SMBs was taken up as a project with IIT Kharagpur in March 2015. The NCDs for the approved designs of the new boats were promulgated in May 2020, and are being used for all future SMB procurements.

⚓ A Decade of Technological Advancements

This decade saw the induction of the technologically advanced and capable platforms such as INS *Vikramaditya*, the SSBN INS *Arihant*, the P75 class submarines, P-8I aircraft and MH 60-R multirole helicopters. Additionally, platforms such as INS *Chakra* and Sea Guardian drones were also inducted in the *IN* on lease. The *IN*'s operational capabilities also received a significant technological boost through technology infusion in areas such as communication and maritime domain awareness. While each of these capabilities are discussed at length in the individual chapters of this history volume, a summary of other technology-led advancements is listed below.

AI-Based Projects by Defence PSU Shipyards

A Task Force was constituted under the Chairmanship of Shri N Chandrasekaran, Chairman, Tata Sons, to study the strategic implications of 'Artificial Intelligence in National Security and Defence Needs' and to make appropriate recommendations in this regard. Some of the AI-based products/technologies under development by Defence PSU shipyards are as follows:

Mazagon Dock Limited (MDL):

- Robotic-weld inspection using advanced phased array technique to replace manual radiography
- Design and prototyping of remotely operated vehicle (ROV)

Garden Reach Shipbuilders and Engineers Limited (GRSE): GRSE entered into a strategic MoU with M/s Elbit Systems Ltd., Israel, on 12 April 2018 for indigenous development of an Unmanned Surface Vessel with Modular Multi-Mission Capacity in MCM, ASW, EW & Maritime Security.

Goa Shipyard Limited (GSL): Shipboard Equipment Condition Monitoring System.

Hindustan Shipyard Limited (HSL): Unmanned Underwater Vehicle.

Project Management Group (Combat Management System)—PMG (CMS)

Combat Management Systems (CMS) serves as the nerve centre of war-fighting on board ships. It integrates all sensors, viz., radars, sonars, EW systems, as well as shipborne guns, missiles, torpedoes, rockets, etc., and is capable of sending and receiving information to/from other platforms via the ship's Data Link equipment. The predecessors of the CMS were the Computer-aided Action Information Organization (CAIO) systems, which had limited functionality when compared to current generation CMS.

The erstwhile Project Management Group—Equipment for Command and Control Application (PMG-EMCCA) was constituted in 1993 to design and develop a CAIO system for the Brahmaputra-class of ships. In September 2004, two additional CAIO projects were added to the charter of this group—first for SNF-class ships and the other for new construction of the P17-class ships. Subsequently, in 2004 the group was rechristened as PMG (CMS) operating under Weapons and Electronic Systems Engineering Establishment in its present avatar. In 2014, WESEE was also designated as the Integration Authority for CMS of the Navy.

The Indigenous Combat System programme underwent rapid growth and evolution in the last

decade. Every new induction platform and all Mid-Life Upgrade projects now include the indigenous CMS. Building on its success with ship-borne CMS, the first indigenous Submarine Combat System (SCS) was conceived and conceptualized in the late 1990s and integrated onboard the first strategic platform by 2008. The success of the SCS programme drove WESEE to develop solutions for replacement of foreign systems on other boats. Presently eight CMS projects are being controlled by the group—CMS 71 (IAC), CMS 15 (Delhi Class), CMS 28 (Kamorta Class), MOD CMS (*Jalashwa*), CMS 16A (Brahmaputra Class), CMS 15B (Visakhapatnam Class), CMS 17 (Shivalik Class) and MOD CMS (other nine classes of ships).

Cyber Security—The sDrive

The Desktop Security Suite developed by WESEE had its beginnings with the release of a hard disk volume encryption application SENIC in 2003, which is today mandatorily installed on all Naval PCs. Around 2007–08, COTS pen drives started proliferating and became a major source of virus and malware infection of Naval PCs and networks. In order to overcome this lacuna, WESEE developed the sDrive in 2011, and now this is the standard portable media hardware for exchange of information in a non-networked environment. In all, 3,600 sDrives were released for Navy-wide deployment, along with Senic Guard in 2011–12, with an additional 550 being deployed in 2014. Based on the requirement of additional numbers and higher capacity, in 2018 a 32GB sDrive was developed on USB 3.0 technology.

Black Box-Based SECEM-III

SECEM (Secure Email) was developed by WESEE and subsequent to being graded by the Scientific Analysis Group (DRDO) was deployed Navy-wide

in December 1999, in all ships and establishments, to enable secured encrypted communication using the internet. SECEM was designed as a Windows 98-based software application, envisaged to be installed on standalone COTS PCs. The application also featured electronic shredding, drag and drop facility, online help and implemented an indigenously developed symmetric-key encryption algorithm. The software was upgraded in March 2006 to SECEM-II with additional functionality.

⚓ Conclusion

India's growing stature as a strategic and capable actor both within and beyond the IOR requires the *IN* to develop capacities and capabilities to not only fulfil roles that are mandated upon it but also in support of new emerging roles in response to the 'geopolitical churn' witnessed in the last decade. The growing impact of technology in military offensive and defensive capabilities that extend into the cyber and space domains have been instrumental in shaping the *IN*'s technological aspirations. With less than desired capital budget allocation over the years, the *IN* has prioritized its modernization plans that add more teeth to its capabilities.

In December 2019, (then) Chief of Naval Staff Admiral Karambir Singh, addressing the media on the eve of Navy Day, noted, 'Our (Indian Navy) aim is to get maximum bang for the buck.' Acknowledging the constrained fiscal environment, he went on to add that the *IN* would now focus on adding lethal capabilities to existing and new construction ships rather than just focusing on numbers.

The decade gone by stands out for some of the most prominent capability upgrades to the *IN*'s force structure composition. The induction of P-8Is, the commissioning of SSBN *INS Aribant*, the P75 submarines, P17-class frigates, Talwar-class frigates, P15A and P15B Guided Missile

Stealth Destroyers, P28 ASW Corvettes, Deepak-class Fleet tankers, and the impending addition of a second aircraft carrier, have added significant muscle to the *IN*'s force projection capabilities in this decade. The *IN* has also pioneered the leasing of critical assets, which include the nuclear submarine *Chakra* from Russia and *Sea Guardian* drones from the US.

Apart from the addition of capable assets, the *IN* also made a significant shift in its operations philosophy, which was largely made possible through the launch and operationalization of a dedicated GSAT-7 satellite. The availability of this satellite enabled the *IN* to evolve as a network-centric force.

The *IN* has been at the forefront of 'Aatmanirbhar Shipbuilding' for decades by providing early focus on indigenous warship designing and shipbuilding. Indian shipyards today are not only building ships for the *IN* but are also bagging export orders from FFCs. A healthy competition between PSU shipyards and private players like L&T has helped broaden the options for an ever-expanding naval force. While shortfalls exist with regard to certain asset classes such as NOPVs, minesweepers and fleet support ships, plans are afoot to bridge these gaps in the current decade.

While considerable progress has been made in indigenization of systems and equipment in the 'Float' and 'Move' categories and there is increasing push to replicate this relative success in the 'Fight' category, the *IN* is poised to emerge into a more potent, combat-ready, credible and cohesive force. The *IN* has adopted a dual strategy to maximize its capital by concurrently focusing on indigenization and the innovation of new and emerging technologies, such as electric propulsion, AI, cyber offensive and defensive capabilities, quantum computing, unmanned systems (in all three domains—surface, sub-surface and air), and many others. The DRDO, academia and industry

are continuously engaged and involved in an effort to create a sustainable ecosystem for defence production that is not restricted just to the defence PSUs and OFBs.

The dynamic demands placed on the *IN* have led to a rapid rise not just in the number of assets but also in their variety. This shift, coupled with increasingly frequent and longer deployment of *IN* assets away from base port, has thrown up unique challenges for the maintenance planners. To keep up with this rapid pace of asset expansion, the *IN* repair yards have continued to add new capabilities through technology infusion, infrastructure augmentation and addition. The commissioning of the Aircraft Carrier Dock at ND (Mbi), infrastructure for maintenance of SPV at ND (Vizag), refit handling capacity and capabilities at NSRY (Kochi), facilities to support *INS Vikramaditya* and capabilities to conduct refit of major warships at NSRY (Karwar), and creation of infrastructure to provide maintenance cover for increased number of heavier assets at NSRY (Port Blair), are some of the highlights that showcase the evolution of the repair yards through the decade.

Seeds sown in the last decade (2011–21) have placed the *IN* on the cusp of the next stage of evolution. If the previous decade is remembered for the transformation into a network-centric Navy, the next one will be for a Navy that front-foots technology incubation, innovation and adoption.

Notes

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- 2 Ministry of Defence (2013). *Technology Perspective and Capability Roadmap (TPCR) 2013*. New Delhi: Headquarters Integrated Defence Staff, MoD, Government of India. <https://www.mod.gov.in/sites/default/files/TPCR13.pdf>
- 3 Ministry of Defence (2018). *Technology Perspective and Capability Roadmap (TPCR) 2018*. New Delhi: ACQ Wing, MoD, Government of India. <https://www.mod.gov.in/sites/default/files/tpcr.pdf>
- 4 Cowshish, A. (2013). 'Technology Perspective and Capability Roadmap'. IDSA Comment. New Delhi Manohar Parrikar Institute of Defence Studies and Analysis. https://idsa.in/idsacomment/TechnologyPerspectiveandCapabilityRoadmap2013_acowshish_020713
- 5 Ministry of Defence Webpage, links to TPCR 2013 and 2018; <https://www.mod.gov.in/technology-perspective-and-capability-roadmap>
- 6 Gautam, G. and Sureshan, K.A. (2011). 'Outcome Budgeting for Naval Dockyards'. *Journal of Defence Studies* Vol. 5, No. 2: 147–58; https://idsa.in/system/files/jds_5_2_ggautam.pdf
- 7 Comptroller and Auditor General of India (2013). *Report 31 of 2013 – Planning and Management of Refits of Indian Naval Ships*. New Delhi: Government of India.
- 8 Singh, A. (2018). *Blue Waters Abov! The Indian Navy 2001–2010*. New Delhi: Ministry of Defence (N), Government of India. The author is a retired Vice Admiral of the Indian Navy.
- 9 Singh, A. (2018). *Blue Waters Abov! The Indian Navy 2001–2010*. New Delhi: Ministry of Defence (Navy), Government of India.
- 10 Ministry of Defence (2019). *Annual Report Ministry of Defence 2018–19*. See Chapter 4, Para 4.42, Page 37; <https://www.mod.gov.in/sites/default/files/MoDAR2018.pdf>
- 11 Western India Shipyard Limited was taken over by ABG shipyard in 2010.
- 12 'Planning and Managing the first shiplift project in India.' Sinclair Knight Merz Engineering Sdn. Bhd. http://dspace.unimap.edu.my/bitstream/handle/123456789/13792/038-039_planning%26managing.pdf?sequence=1&isAllowed=y
- 13 This category encompasses all materials, equipment and systems associated with the hull structures and fittings, including deck machinery.
- 14 Equipment under this category encompasses propulsion system, power generation diesel/gas/steam turbine engines, alternators, associated control systems (Integrated Platform Management System/Automatic Power Management System), Auxiliary Equipment/systems, viz., Pumps, AC and Refrigeration plants, Compressors, Switchboards, Communication equipment, Fire-fighting Systems.
- 15 Equipment under this category encompasses all types of shipborne weapons and sensors, armament that directly contributes to the combat capability of the platform.
- 16 The iDex initiative was launched in April 2018, and aims to achieve self-reliance and foster innovation and technology development in Defence and Aerospace by engaging industries including MSMEs, start-ups, individual innovators, R&D institutes and academia. iDEX is funded and managed by 'Defence Innovation Organization (DIO)' which was formed as a 'not for profit' company as per Section 8 of the Companies Act 2013. Defence Public Sector Undertakings (DPSUs) HAL and BEL are the two founder members.
- 17 The 'Defence India Startup Challenge' (DISC) was launched in August 2018. DISC is envisaged to enable calling for proposals to address specific technological needs of the Indian Defence Establishment. Applicants showing capability, intent, and promise

to be able to produce functional prototypes or convert existing technologies into products will be awarded up to Rs 1.5 crore in the form of grant/equity/debt/other relevant structures.

- 18 The “Make” procedure for indigenous design, development and manufacture of defence equipment and systems was simplified in DPP 2016. A new sub-category ‘Make II - Industry Funded’ was introduced under this procedure with primary focus upon import substitution. The revised Make II procedure has been promulgated vide DAP 2020 to address the objectives of wider participation of Indian industry, impetus for MSMEs and Start-ups, simplified implementation and timely induction of equipment, systems, sub-systems.
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- 22 MoD/PIB press release (16 November 2021): Curtain Raiser: Commissioning of *Viskhapatnam* and *Vela*; <https://pib.gov.in/PressReleasePage.aspx?PRID=1772352>
- 23 Mazagon Dock Ltd press release (28 October 2021): First Visakhapatnam Class Destroyer Delivered to the Indian Navy; <https://mazagondock.in/images/pdf/D-448-Visakhapatnam-Press-Release-2021.pdf>
- 24 MoD/PIB press release (8 August 2021): Indigenous Aircraft Carrier (IAC [P71]) ‘Vikrant’ Returns After Successful Maiden Sea Voyage; <https://pib.gov.in/PressReleasePage.aspx?PRID=1743815>
- 25 Goa Shipyard Ltd, ‘Celebrating 60 glorious years’, Bennett, Coleman & Co. Ltd, pp 164.
- 26 Lok Sabha Secretariat (2018). *Standing Committee On Defence (2017-2018) (Sixteenth Lok Sabha) Ministry Of Defence Demands For Grants (2018-19) Army, Navy And Air Force (Demand No. 20) Forty First Report*. New Delhi: Government of India; http://164.100.47.193/lssccommittee/Defence/16_Defence_41.pdf
- 27 Leveraging defence ship building to catalyse India’s shipbuilding industry: KPMG, https://www.npcindia.gov.in/NPC/Uploads/publication/Leveraging%20defence%20shipbuilding_LR371892.pdf
32. Mumbai: Export-Import Bank of India; <https://www.eximbankindia.in/Assets/Dynamic/PDF/Publication-Resources/ResearchPapers/42file.pdf>



33

Shipbuilding and Acquisitions

Capable, Credible and Combat Ready

⚓ Introduction

The last few decades have seen a marked impetus accorded to the shipbuilding industry. The renewed focus by the Government is indeed a much-desired and welcome policy initiative. Several landmark policy initiatives have been introduced to reinvigorate the shipbuilding sector. Among these, the identification of 'Shipbuilding and Repair' as one of the vital zones in the Twelfth Five Year Plan,¹ and approval of the Shipbuilding Financial Assistance Policy for Indian Shipyards,² emerge as major indicators of the Government's thrust to the sector.

The shipbuilding cycle spans a wide spectrum of sub-sectors—ship repair, spares, auxiliaries, logistics, etc. Each of these contributes towards greater employment and revenue generation. Therefore, investments in the shipbuilding sector can yield significant returns, both on economic as well as social indices.

The Indian Navy (*IN*), right from its inception, has been deeply committed to making its platforms in India, and has progressively graduated from a Buyers' Navy to a Builders' Navy. As on December 2021, out of forty-one ships on order, thirty-nine are being built in India, and include advanced and complex platforms such as an aircraft carrier, and submarines and destroyers. Since 2014, 78 per cent of Acceptance of Necessity (AoN) and 68 per

cent of contracts by value, were accorded to Indian shipbuilders.³ In view of the *IN*'s sustained focus on indigenous shipbuilding, many friendly foreign countries (FFCs) in the Indian Ocean Region (IOR) and beyond have started placing orders with Indian shipyards. Some of the major orders placed by the *IN*, and which have been delivered in the last decade, are detailed in the succeeding paragraphs.

⚓ Project 17

Project 17 was conceptualized by the *IN* to design and build stealth frigates in India. The Directorate of Naval Design (DND) framed the initial design for the Project 17-class Frigates. This design required 5,000 tonne stealth frigates with advanced suppression and management features. The final and detailed design was developed by Mazagon Dock Limited (MDL). These are multirole frigates and are the first-of-their-kind warships built in India, incorporating stealth features. The category classification is named after the Indian Shivalik mountain range. Shivalik-class frigates are driven by a Combined Diesel and Gas (CODAG) propulsion system, with a modern LM 2500 Gas Turbine propelling her to speeds in excess of 30 knots (or over 55 kmph). The ship's electric power is provided by four Diesel Alternators, which together produce 4 megawatts (MW) of power.



INS *Sahyadri*: Riding the Waves

The incorporation of numerous new design features onboard INS *Shivalik* effectively reduces the probability of her being detected at sea. The inbuilt structural, thermal and acoustic stealth features augment the potent capability of the ship to address threats in all dimensions of maritime warfare. The frigate can carry two advanced helicopters. While the first of the class, INS *Shivalik*, was commissioned on 29 April 2010, the balance two ships of this project were commissioned in the last decade. The dates of commissioning of other ships of the class are mentioned in the Appendices.

⚓ Project 15A

The P-15A Guided Missile Stealth Destroyers are follow-ons of earlier Delhi-class (P15) destroyers. The P-15A ships are indigenously designed by the Directorate of Naval Design (Surface Ship Group) or DND (SSG), the *IN*'s in-house design organization. These ships span 163 m in length, 17.4 m at beam and have a displacement of 7,500 tons. Propelled by four gas turbines in Combined Gas and Gas (COGAG) configuration, these ships are designed to achieve speeds in excess of

30 knots. The electric power is provided by four gas turbine generators and one diesel alternator, which together produce 4.5 MW of electrical power. Indian Navy Ships *Kolkata*, *Kochi* and *Chennai*, are three ships that are part of this project and were all commissioned in this decade. The ships of this class have been built by MDL, Mumbai. The first ship of the class, INS *Kolkata*, was commissioned in 2014, followed by the others.

The ship can be truly classified as a 'Network of Networks' as it is equipped with sophisticated digital networks, such as ATM-based Integrated Ship Data Network (AISDN), Auxiliary Control System (ACS), Automatic Power Management System (APMS) and Combat Management System (CMS). The AISDN is the information highway on which data from all the sensors and weapons ride. Whilst remote control and monitoring of machinery is achieved through ACS, the intricate power supply management is done using APMS. The CMS is used to integrate information from own data sources and collate information from other platforms using indigenous data-link system, to provide maritime domain awareness.



INS *Kolkata*: Expanding the Indian Navy's Blue Water Footprint

The unique feature of this ship is the high level of indigenization achieved, with most of the systems onboard sourced from within the country, which has generated a sound vendor base for future ships. Some of the major indigenized equipment/systems onboard INS *Kolkata* include the CMS, the ACS, the APMS, the Foldable Hangar Doors, the Helo Traversing System and the bow-mounted HUMSANG system. Crew comfort is a significant feature of Kolkata-class ships, and this has been ensured through ergonomically designed accommodation and galley compartments on modular concept.

⚓ Project 28

Long after the P25 Corvettes came into being, a new project, designated Project 28 (P28) for four Anti-Submarine Warfare (ASW) Corvettes, was taken up by this Directorate. The ship has been designed by the IN's in-house design organization DND (SSG). The functional design of these ships has evolved since commencing in 2003 and followed by development of detailed design by GRSE in the succeeding years. The hydrodynamic model testing of the ships was undertaken at M/s MARIN, the

Netherlands, to test and predict the hydrodynamic performance of this novel design. Built at GRSE, the first ship was christened *Kamorta*, after the first of the Petya class inducted from the erstwhile Soviet Union in the late 1960s. The other ships of Project 28 have been named *Kadmatt*, *Kiltan* and *Kavaratti* after the scenic islands in the Lakshadweep archipelago. All four ships of this class were commissioned in the last decade.

The ship's hull form is highly efficient, with excellent sea-keeping and manoeuvrability characteristics, having an overall length of 109 m and displacement of 3,450 tonnes. She can cut through the sea at a speed of around 24 knots. The hull of the ship is built with indigenous special-grade high-tensile steel (DMR249A), which was used for the first time for an Indian naval platform. The ships have 'Combined Diesel and Diesel (CODAD)' propulsion configuration with four diesel engines driving two controllable pitch propellers. The ship is also fitted with sophisticated indigenously developed stabilizers. The foldable hangar door fitted for the first time with a rail-less helicopter traversing system—also a noteworthy



INS *Kavaratti*: Out on a Hunt

first on any Indian Naval Ship—will give helicopter operations from the Corvette decks a significant edge over existing platforms of other warships. Indian Naval Ship *Kavaratti* has also been nominated as a platform to test the ‘Operator–Maintainer’ concept. Maintainers of high-end weapon and sensor equipment would dual-hat as operators of the equipment and Operators of low-end equipment would also maintain the equipment.

The P28 platforms mark the *IN*’s increasing efforts towards achieving contemporary stealth signatures and optimal sloped surfaces to reduce Radar Cross-Section (RCS) signature. Highlights of the design include inclined ship sides and reduced Infrared (IR) signature.

⚓ LCU MK4

The *IN*’s MK4 Class landing craft utility (LCU) vessels are built by Garden Reach Shipbuilders and Engineers (GRSE). The ships are intended for multirole amphibious missions jointly carried out by the Indian Army and Navy. The GRSE was awarded a contract by the *IN* for the design and construction of eight LCU ships in September 2011. Construction began in September 2012,

and the first ship in class, LCU-L51, was commissioned in March 2017, while the last of this project LCU-L58 was commissioned on 18 March 2021. The ships can primarily be deployed in amphibious warfare, Search and Rescue (SAR) operations, disaster relief, replenishment and evacuation operations.



INLCU-L56: Commissioning Ceremony

These ships span 63 m in length, 11 m at beam and have a displacement of 900 tons. These ships have been built to assist in amphibious operations by carrying out beaching operations and have an endurance of 1,500 nautical miles (nm). These ships also play a key role in carrying out maritime surveillance of Andaman and Nicobar Islands for preventing anti-poaching, illegal fishing, drug

trafficking, human trafficking, poaching and other illegal activities, and have enhanced the capabilities of Andaman and Nicobar Command (ANC) in Humanitarian Assistance and Disaster Relief (HADR) operations.

The ship is fitted out with state-of-the-art equipment and systems, such as the Integrated Bridge System (IBS) and Integrated Platform Management System (IPMS). The IBS of the LCU MK4 enables the shift over to the Digital Navigation compliant system being envisaged for all ships in the *IN* from the current system of using paper charts for navigation. The MK4 Class LCU is powered by two MTU 16V 4000 M53 marine diesel engines coupled to a twin-propeller fixed-pitch propulsion system.

🚢 Project 15B

The P15B Destroyers are follow-on ships of the Kolkata-class (P15A) Guided Missile Stealth Destroyers. These ships are indigenously designed by DND (SSG). Similar to P15A ships, P15B ships also span 163m in length, 17.4 m at beam and have a displacement of 7,500 tons. These ships are propelled by four gas turbines in COGAG configuration and are designed to achieve speeds in excess of 30 knots.

The P15B ships are designed with advanced weapon systems as compared to P15A. Some of these upgrades include the 127 mm MR Gun, Force Protection Guns, HUMSA NG Sonar, AEW Radar and Surface Surveillance Radar (SSR).



INS *Visakhapatnam*: Packing a Punch

In addition, the Enclosed Bridge of P15B ships has been redesigned to enhance the firing arcs of rocket launchers and has improved bridge visibility. The ships feature a reduced complement due to a high degree of automation achieved through an Integrated Communication System (ICS), an IPMS, an IBS and a CMS; INS *Visakhapatnam*, the first of the class, was commissioned on 21 November 2021.

⚓ Torpedo Launch and Recovery Vessel INS *Astradharini*

The indigenously built Torpedo Launch and Recovery Vessel INS *Astradharini* was commissioned on 6 October 2015. The design of the *Astradharini* was a collaborative effort of NSTL, M/s Shoft Shipyard and IIT Kharagpur and has a unique design of a catamaran hull form that significantly reduces its power requirement, and is built with indigenous steel.

The unique hull form of the ship demonstrated the country's ship design and shipbuilding capabilities. The ship has a length of 50 m, and is capable of operating at speeds up to 15 knots. The ship is designed with modern power generation and



INS *Astradharini*: Out for Trials

distribution, navigation and communication systems. The INS *Astradharini* is being used to carry out the technical trials of underwater weapons and systems developed by NSTL, a naval systems laboratory of the Defence Research and Development Organization (DRDO). It is a more advanced replacement for *Astravahini*, which was decommissioned on 17 July 2015. It has a complement of two officers and twenty-seven sailors, and can accommodate thirteen DRDO scientists.

⚓ Naval Project Management Teams (NPMTs)

In order to decentralize day-to-day decision-making and enhancing user interface with DRDO, through direct user inputs to the concerned laboratories, Naval Project Management Teams (NPMTs) were constituted at Visakhapatnam and Hyderabad. In order to enhance *IN-DRDO* synergy and put greater impetus on indigenization, additional steps like the frequency of Cluster Meetings was increased from annually to half-yearly and periodic *IN-DRDO* apex-level meetings were conducted to enhance synergy.

Induction of Equipment

The MRSAM is a quick-response medium-range surface-to-air missile jointly developed by India and Israel. The agencies involved in development and production of MRSAM/MFSTAR are DRDO, Israel Aerospace Industries and Bharat Dynamic Limited. The MRSAM was inducted in the *IN* onboard the Kolkata-class of Destroyers in 2014.

The *IN* inducted the Surface Surveillance Radar (SSR) from M/s Nova Integrated Systems Ltd (NISL), a Tata subsidiary, in 2017. The SSR is a state-of-the-art radar incorporating latest solid-state technology and is capable of detecting and tracking multiple surface targets over extended ranges.

The 12.7 mm Stabilized Remote Control Gun (SRCG) has been procured by *IN* from M/s Elbit Systems, Israel with Transfer of Technology to M/s AWEIL (erstwhile OFB) in September 2018. The 12.7 mm SRCG is a stabilized automated gun with optical/IR detection and tracking, capable of being fired remotely from within the ship. A significant rate of fire and high accuracy make the gun an ideal weapon against asymmetric threats. The SRCG is a replacement for the older 12.7 mm HMG.

Varunastra is an indigenous advanced heavyweight anti-submarine torpedo, designed and developed by NSTL. It is the first indigenous heavyweight torpedo and was inducted into the *IN* by then Defence Minister Shri Manohar Parrikar in 2016.

The TAL MK1 is the first indigenous advanced lightweight anti-submarine torpedo designed and developed by NSTL for the Navy. The torpedo was inducted into the *IN* on 3 March 2012 by then Raksha Mantri, Shri AK Antony.

Contracts Concluded

In addition to the inductions mentioned above, the *IN* has concluded a large number of contracts in the past decade to enhance its combat capability by leaps and bounds. Some of the contracts concluded are as mentioned below.

Contracts
BrahMos Missile
HUMSA NG Simulator
Side-Scan Sonar (SSS)
Mine Warfare Data Centre (MWDS)
Shtil Missile
Holographic Sights
Combat Management Systems
Barak Missile
Ship Handling Simulator for ANC
Ballistic Helmets
Integrated Bridge System (IBS)

Contracts
SAM Systems
New Torpedo Defence System (NTDS)
Expendable Aerial Targets (EAT)
Portable Diver Detection Sonar (PDDS)
Procurement of HUMSA Upgrade (UG) Sonars for <i>IN</i> ships and Training Establishments
Clip on Influence Sweep (CLOIS)
Combat Management Systems (CMS)
Procurement of Assault Rifles
3D C/D band Air Surveillance Radar ASR
Integrated Underwater Harbour Defence System (IUHDS)
Integrated ASW Defence Suite

The past decade saw an enhanced commitment by the *IN* towards indigenization and self-reliance. While considerable progress has been made in indigenous shipbuilding, in certain specific areas, where domestic industry has not developed adequate capacity for meeting naval requirements within the timelines required, the *IN* continues to seek foreign acquisition of ships. However, this occurs only in the most critical cases where shortfalls in capacity exist within the domestic ship industry. While the acquisition of INS *Vikramaditya* has been covered extensively in the previous history volume, other foreign acquisitions progressed during the decade are covered briefly in the subsequent paragraphs.

⚓ Acquisitions from Russia

Talwar-Class Frigates

The *IN*'s Talwar-class frigates have been built in Russia under an Indo-Russian joint production. The Talwar-class guided missile frigates are modified Krivak-III-class frigates, constructed at Yantar Shipyard, Kaliningrad, Russia. The frigate supports naval forces during air, surface, and sub-surface missions. The first and second frigates in the class, INS *Talwar* and INS *Trishul*, were commissioned in June 2003, while INS *Tabar* was commissioned in April 2004.



Talwar-Class Frigates

In July 2006, another contract was signed with the Yantar Shipyard for three additional frigates. Accordingly, the first of these three frigates, INS *Teg*, was launched in November 2009 and delivered to the *IN* on 27 April 2012. The second, INS *Tarkash* was commissioned on 9 November 2012 and INS *Trikand*, the third of the series in 2013, which marked the culmination of the three-ship contract for ‘Follow-On Talwar Class’.

Teg-class frigates carry a state-of-the-art combat suite including supersonic missile systems, advanced Surface-to-Air Missiles, upgraded medium-range gun, an electro-optical 30 mm close-to-air weapon system, anti-submarine weapons such as torpedoes, rockets and an advanced Electronic Warfare (EW) system. The Combat Management System ‘Trebovanie-M’ enables the ship to simultaneously deter multiple surface, sub-surface and air threats. It also carries an integrated Kamov 31 helicopter.

INS Chakra

Inducted by the *IN* in April 2012 on a ten-year lease, India returned the Russian-origin INS *Chakra* in June 2021. It was a 8,140-tonne Akula II-class K-152 Nerpa nuclear-powered attack submarine, with a maximum speed of 30 knots and could operate up to a maximum depth of 600 m. It was equipped with four 533 m and four 650 mm torpedo tubes. It was the second occasion in the series of nuclear-powered submarines acquired by *IN* from Russia on lease. Earlier, in 1988, a K-43 Charlie-class nuclear-powered cruise missile submarine had been acquired from the erstwhile Soviet Union. It

too, served the *IN* as INS *Chakra* from 1988 to 1991. The INS *Chakra* was instrumental in providing India with a first-hand experience in handling a nuclear submarine, as well as training its crew and helping it build its indigenous Arihant class of nuclear submarines. More details have been covered in the chapter on Submarines.

⚓ Acquisitions from Italy

Deepak-Class Fleet Tankers

In 2011 the *IN* commissioned two new fleet tankers, INS *Deepak* and INS *Shakti*. The Deepak-class tankers are constructed by the Italian shipbuilding company Fincantieri, at its Muggiano Shipyard. These fleet-class tankers are capable of providing refuelling and replenishment for the *IN*’s expanding fleet, and enhancing the *IN*’s blue water capabilities. These ships have a double-hull design, and have an overall length of 175 m, breadth of 25 m and a draught of 19.3 m. The full load displacement of the Deepak-class is 27,500 tonnes.

⚓ Conclusion

As the *IN* is migrating from a platform-centric to an ordnance-centric force in accordance with the charted course to steer, it has entailed institutional focus on ordnance availability, serviceability and precise delivery on target. Accordingly pan-*IN* organizational and policy changes have been implemented, including policies on life-cycle management of ordnance and revised *IN* ordnance management organization. The efforts towards ordnance-centricity have been validated with potent and precise delivery of ordnance on target, along with considerable improvement in ordnance availability to the end user. Considerable efforts have been made to standardize the weapon/sensor fit on our new construction ships. The focus is on standardization of indigenous weapons/sensors, in



INS *Deepak*: Replenishing the Armada

terms of capability with backward integration for compatibility with existing hardware.

Over the years, the *IN* has steadily evolved from a Buyers' Navy to a Builders' Navy. In 2012, the Maritime Capability Perspective Plan (2012–27) was approved. The MCPP emphasized a conceptual shift, concentrating on 'capability building' rather than being driven by 'numbers' of platforms. In 2014, the Twelfth Plan Document was approved by the Defence Acquisition Council (DAC). It highlights the *IN*'s focus on evolving a force structure corresponding to the geopolitical and economic aspirations of the nation, within the scope of funding and indigenous shipbuilding capacity.

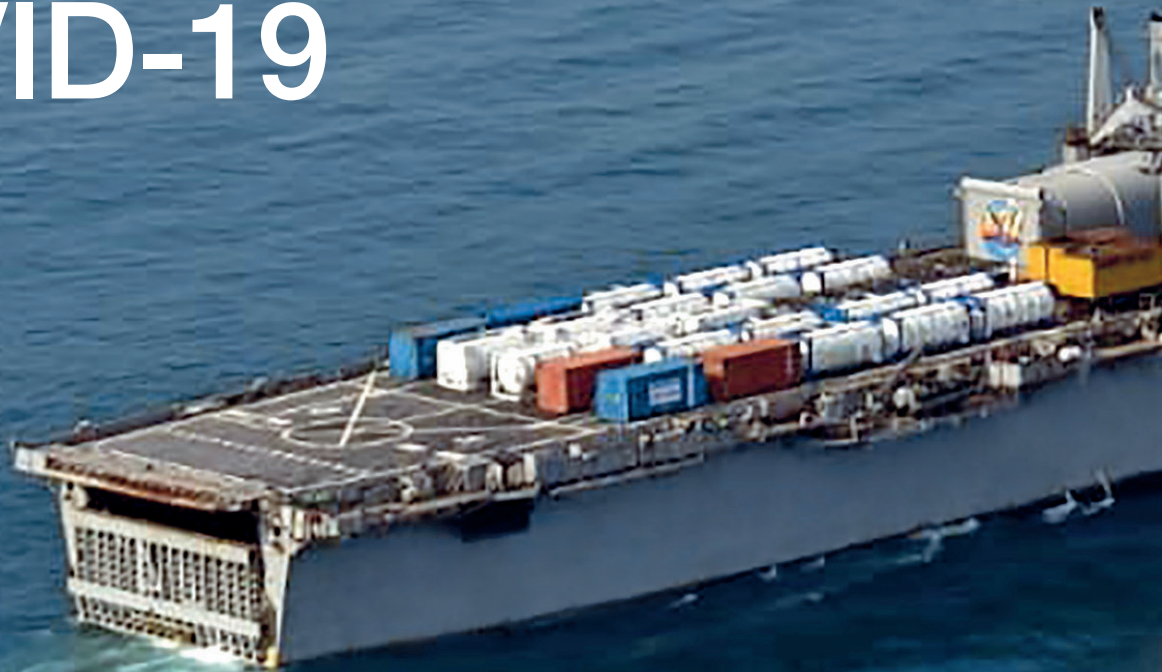
Notes

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6

COVID-19





34

COVID-19 Initiatives

Towards a Pandemic-Resilient Organization

⚓ Introduction

Coronavirus disease 2019 (COVID-19) has been the most significant global health crisis in the twenty-first century that directly and indirectly impacted human interaction and workplace practices. While at the national level, the primary challenge was the safety of the citizens, the Armed Forces, being a central element for national security, endeavoured to remain fully operational. Therefore, in addition to ensuring the health and safety of its service personnel and their families, the organizational focus also shifted towards the crucial task of aiding and directly delivering on the national initiatives for addressing the pandemic. The Armed Forces were called upon to assist Government agencies, using trained manpower and resources available.

As COVID-19 revealed systemic disabilities with regard to dealing with a public health emergency, it called for an investment in pandemic-resistant policies for a resilient future. The chapter highlights the specific initiatives undertaken by the Indian Navy (*IN*) as a part of its COVID-19 strategy for its personnel, in particular, and the *IN*, in general, to transform the service into a pandemic-resilient organization.

⚓ Background

COVID-19 is a highly contagious disease caused by Severe Acute Respiratory Syndrome

Coronavirus 2 (SARS CoV-2), and is transmitted through the airborne route or through droplets. The symptoms vary from breathlessness, cough, fever, lack of taste/smell, etc., to multiple organ failure and even death for people with comorbidities. After the World Health Organization (WHO) declared COVID-19 a pandemic on 11 March 2020, the steep rise in COVID-19 cases globally prompted India to declare it a 'notified disaster' on 14 March 2020. The pandemic went on to infect more than four crore people in India with more than five lakh deaths.

The fast spread of the pandemic led to grant of emergency powers to Competent Financial Authorities (CFA) in the *IN* for the utilization of funds, usually a wartime measure, for the purchase of COVID-19 related drugs, testing kits, protective gear and the creation of public health facilities. Public health strategies were formulated and implemented in the *IN*, directed towards: (i) maintenance of operational tempo; and, (ii) to fight increasing COVID-19 cases. Isolation/quarantining, maintaining social distancing and wearing masks in public places became a norm after the Government of India declared a national lockdown on 24 March 2020. As with the restrictions placed across the country during the first lockdown, in the *IN* also all services, offices and facilities—except for

essential services (healthcare, inescapable security operations and such like) were shut down for several succeeding months.

Role of *IN* During COVID-19 Pandemic

Amidst the rapidly increasing cases and lockdowns, the Armed Forces continued to operate at best efficiency. They not only strived to remain operational but were also at the forefront in aid to the nation's efforts to control the pandemic. Considering its fragile security in the neighbourhood, the *IN* was required to be at best operational readiness at all times. This necessitated personnel to be physically fit and work in close coordination with each other as a team, mostly in closed spaces *IN* ships and submarines, where the chances of infection spreading increases manifold. 'Ships are perfect petridishes for transmission of an airborne virus and the maritime domain complicates the efforts to limit the spread.'¹ Since the *IN* bases were located in major cities where the disease spread was rampant, keeping the headquarters and afloat platforms operationally ready while the lockdowns continued to be imposed on movements of people and materials was another big challenge.

While facing the unparalleled challenges posed by the COVID-19 in the first wave, the country saw a volatile border situation at the northern borders. The Galwan incident in June 2020 required a constant state of alertness by the Indian Armed Forces, including the *IN*, and ships were deployed in operational readiness.

The COVID-19 pandemic brought unprecedented, multi-layered challenges to the nation, including the Services. It is in this context that the *IN* took a twofold approach to fight the deadly COVID-19 pandemic. Firstly, in furtherance to its COVID-19 initiatives, the *IN* extended its medical services to the country. Quarantine Centres were set up for returning international travellers,

e.g., a facility for Kashmiri pilgrims ex-Iran was created in Mumbai. Naval Hospital facilities, whilst also treating affected naval personnel, were opened up to the civilian population suffering from COVID-19. New makeshift hospitals were set up for the treatment of civilians manned by naval personnel. The *IN* also participated in providing medical assistance abroad as part of the nation's initiatives towards fighting COVID-19. While hosting the initial patients at various facilities, *IN* medical staff and organizational HQs became more aware of the modalities for creating quarantine facilities, personnel and material aspects, morale and coordination issues and generally became more familiar with COVID-19. Secondly, the fulfilment of these objectives required administrative and operational modifications. At the administrative level, changes were brought about in administrative practices at the command level and at the training centres. This was accompanied by upgrading infrastructure in support of the nation's initiatives to address the challenges posed by the pandemic. Subsequent sections provide comprehensive details of all the initiatives that were undertaken by the *IN* to address the pandemic.

Afloat Platforms

Despite the severity and spread of the pandemic across all naval stations, *IN* aimed at the operational readiness of afloat platforms, and this was maintained at the highest level feasible. Public health strategies were formulated and implemented to control the rapid spread of the disease onboard afloat platforms, without compromising on operational commitment. This was achieved through the creation of sea bubbles, preventive and rigorous testing strategies onboard afloat platforms, prompt treatment of mild cases, and air evacuation of severe cases. The strategies adopted ensured that the *IN* suffered only four deaths and had a very



COVID-19 Care Centres and Isolation Centres Established by the Navy

low Case Fatality Ratio (0.003 per cent) in spite of being highly vulnerable to the disease.

Naval Hospitals

IN hospitals undertook various initiatives such as augmentation of the COVID treatment facilities, creation of isolation wards, training of Healthcare Workers (HCWs), creation of testing facilities, procurement of COVID-related drugs and testing kits and escalation of oxygen system.

The *IN* established COVID-19 Care Centres and Isolation Centres across a number of naval stations in order to provide COVID-19-specific treatment to *IN* personnel and their dependents as well as Defence Civilians and civilian patients. The facilities included a total of 670 beds in facilities in the Eastern Naval Command (ENC), 330 beds in facilities in the Southern Naval Command (SNC) and 410 beds across Naval Stations in the Western Naval Command (WNC).



IN Team Mobilized to Ahmedabad

Provision of Manpower to Defence Research and Development Organization (DRDO) COVID-19 Hospitals

The pandemic created a sudden demand for healthcare-related manpower, including doctors, nursing and paramedical staff to complement the existing force and also to supplement the staff who were infected with Coronavirus themselves.

In addition to the management within their commands, the *IN* also deputed its manpower and support team to DRDO COVID-19 Hospitals and COVID-19 Care Centres across the country. The *IN* provided a total of 229 personnel—including medical officers, specialists, nursing officers, paramedical staff and non-medical personnel including Battle-Field Nursing Assistants (BFNAs)—for the DRDO-established COVID-19 Hospitals in New Delhi (Sardar Vallabhbhai Patel Hospital), Ahmedabad (Dhanvantari COVID-19 Hospital) and Bihta, Bihar (ESI Hospital). The team of *IN* personnel deployed to Dhanvantari Hospital in Ahmedabad also included an Administrative Support Team comprising non-medical officers and sailors. This support team was a vital value-addition to the hospital and allowed the medical team to concentrate fully on patient-care duties. Medical Officers and Paramedical Sailors were also deputed to Kavaratti Islands to augment the health infrastructure. Ten hospital beds were allocated for the civilian population of Kavaratti at INHS *Sanjivani*, Kochi.

Provision of Beds at Naval Hospitals for Civilian Patients

In addition to giving the manpower for DRDO COVID-19 Hospitals, the *IN* also provided a total of 111 beds across seven Naval Hospitals for civilian patients at these Naval Stations. These include INHS *Patanjali* (Karwar), INHS *Sanjivani* (Kochi), INHS *Nivarini* (Chilka), INHS *Sandhani* (Karanja), INHS *Navjivani* (Ezhimala), INHS

Jeevanti (Goa), and INHS *Dhanvantari* (Port Blair). Notably, INHS *Patanjali* became the first hospital to establish a COVID-19 ward on 24 March 2020 in Uttar Kannada District that admitted eleven civilian COVID-19 positive patients. These civilians belonged to the Bhatkal-Shiroor belt where a large number of people, repatriated ex-United Arab Emirates (UAE) and Saudi Arabia, were suffering from COVID-19.

Vaccination

IN Hospitals throughout the country undertook the vaccination drive (including precautionary and booster doses). However, the initiative demanded more manpower and facilities to cater to the burgeoning COVID-19 related medical needs. The hospitals expanded their services not to include only to *IN* personnel but to take in civilian cases in the face of the infrastructure crunch that the country was facing during the time.



Vaccination Drive

All the frontline HCWs and FLWs were completely vaccinated with three doses of Covishield. Similarly, the *IN* carried out the vaccination drives for dependents of Armed Forces personnel, members of the Ex-Servicemen Contributory Health Scheme (ECHS), Defence Civilians, and their dependents through twenty Naval Vaccination Centres that were set up across the country.

Contribution to PM CARES Fund

To combat the COVID-19 pandemic and support national efforts to alleviate human suffering, one day's Basic Pay of all officers and sailors was donated to the PM CARES fund, with a provision of voluntary payment of more days of salary for as much time as deemed by individuals through a link provided on the IN's Naval Pay Office (NPO) website.

Building Capacity and Augmenting Medical Manpower

Expending the emergency financial powers of the Vice Chief of Naval Staff (VCNS), the Director General Medical Services–Navy (DGMS-N) procured TrueNat Real-Time PCR Machines along with test kits, and distributed them to various naval units. Further, a Supply Order for the procurement of one lakh doses of Covaxin was placed with M/s Bharat Biotech for vaccination of Service personnel and dependents at all commands. Further, medical manpower was augmented by various policy measures—such as extension of tenure of Short Service Commission (SSC) Medical Officers, utilization of Medical Officers who had gone on release, and recruitment of SSC Medical Officers. A multitude of medical equipment was procured for all Naval Hospitals as well as naval units to

enhance their capacity for managing the pandemic. Details of this capacity enhancement are given in succeeding paragraphs.

Testing Capability

Testing capacity for the SARS-CoV-2 virus at all Naval Hospitals was enhanced by the procurement of RT-PCR machines. In addition, several RT-PCR machines were provided to non-medical units with large populations to expand the diagnostic capability of the healthcare system and detect cases at the early stages of the disease. This helped in the containment of outbreaks. It was ensured that there was no shortage of consumables or test kits at any testing centre, at any stage.

Oxygen Provisioning

The total oxygen-generating and storage capacity of all Naval Hospitals was enhanced greatly throughout the second wave. Three Liquid Oxygen (LOX) Plants were installed at INHS *Asvini*, INHS *Kalyani*, and INHS *Jeevanti*. In addition, another LOX Plant was procured for INHS *Sanjivani* and additional oxygen-generating systems were ordered for all Naval Hospitals to meet the oxygen requirements. Further, to enable an increase in bedside provision of oxygen to patients, around



Augmenting Testing and Diagnostic Capability

1,330 oxygen concentrators were procured through various sources.

Other Medical Equipment

Further, a large amount of other necessary medical equipment is under procurement at the time of going into print—PSA-based oxygen generation plants, ECG machines, BiPAP ventilator machines, defibrillators, bedside cardiac monitors, infusion pumps, NRBM masks, and mobile X-ray digital machines, among others. These types of equipment will go a long way in augmenting the overall patient management at Naval Hospitals and managing any future pandemics.



Medical Infrastructure and Capacity Augmentation

Additional Measures

In addition to above mentioned measures, the *IN* issued guidelines to prevent the spread of COVID-19 variants in the future:

- All cluster outbreaks to be investigated on priority;

- All Commands and Stations advised to liaise with the Indian SARS CoV-2 Genomic Consortium lab through the district health authorities;
- Stocking of adequate lab kits for molecular/antigen tests at respective Naval Hospitals/units;
- Maintenance of Station quarantine facilities on standby compulsory for units; and
- Naval Hospitals to maintain ongoing COVID-19 wards with adequate ICU beds and oxygen facilities.

⚓ **The *IN*'s Contribution to the IOR Littorals**

Whilst the *IN* worked tirelessly in containing the effects of the pandemic on functioning, the Service was also on a learning curve on a day-to-day basis in handling COVID-19. The pandemic was a global black swan event and required an inclusive approach by all nations pitching in with their experiences and learning for a concerted fight against the rapid spread and large-scale fatalities, especially to aid smaller nations with lesser resources. The *IN* medical fraternity, while handling the contingency within the service, simultaneously made available the lessons learnt, SOPs documented, innovations created, tried, tested and patented, training imparted to non-medical personnel to effectively aid Healthcare Workers to the neighbouring countries within the IOR. This was done by publishing and making available documentation in the Indian Ocean Naval Symposium (IONS) website (<https://www.ions.global/COVID-19>) that gave access to all the member nations to work together with better understanding of handling the eventuality. Additionally, an 'Indian Ocean Naval Symposium COVID-19 Workshop' through Video Conference for interaction of experts and experience sharing was organized by the *IN* on 23 December 2020. The aim of the webinar was to have participants discuss standard operating

procedures, best practices, issues concerning COVID-19 management and the way ahead on administering the COVID Vaccine. The event also saw the participation of experts from the UK, Australia, Bangladesh, France, Iran, Kenya, Malaysia, Maldives, Mauritius, Myanmar, Oman, Singapore, South Africa, Thailand, Timor Leste.

Operation Samudra Setu I and II

In addition to the medical and associated institutes within the country, both intra-*IN* and outside of it, in coordination with other national authorities, the *IN* was called upon to perform some tasks overseas. These included evacuation of Indian citizens from abroad, transportation of equipment (especially oxygen cylinders) to India and delivery of food and medical aid to nations in the IOR. During the first wave, the *IN* undertook Operation Samudra Setu (Sea Bridge) for the repatriation of Indian citizens. The Operation lasted for fifty-five days in which *IN* Ships *Jalashwa*, *Airavat*, *Shardul* and *Magar* (all amphibious troop-carrying platforms) travelled 23,000 kilometres (km) by sea and brought back nearly 4,000 Indian citizens.

It was operationally and logistically a herculean task. Given physical distancing as the basic safety mandate, the ships had to create demarcated areas for quarantined clinics and for stationing of passengers. There were several other challenges that the crews had to overcome during the operations along with reducing the chances of infection. These included separation of the crew from passengers, availability of women staff for women passengers, provisions of lodging, boarding, recreation, medical assistance, cleaning and sanitation of crowded spaces. Additionally, for the smooth passage of the passengers, the *IN* had to ensure liaison with the host nations, document updating, speedy and smooth embarkation and disembarkation.²

Operational Challenges Faced Due to the Second Wave

The second wave of the pandemic turned out to be deadlier, due to the mutant Delta variant of the COVID-19 virus. Not only was it highly transmissible, but was also lethal as it reduced the blood-oxygen level in the patient to dangerous levels. The lethality numbers were in thousands every day. Therefore, the medical infrastructure was under huge pressure due to want of medical oxygen cylinders. The *IN* joined the country's efforts to meet medical oxygen requirements and launched Operation Samudra Setu II. Nine *IN* warships from three Naval Commands were extensively deployed for shipment of Liquid Medical Oxygen (LMO), also known as *Oxygen Express*, and associated medical equipment from the friendly foreign countries (FFCs) across the IOR.³

Seven ships were deployed to various countries such as Bahrain, Qatar, UAE, Brunei, Singapore, Kuwait, to transport medical supplies critical for COVID-19 as part of Operation Samudra Setu II. Indian Naval Ship *Talwar* brought the first consignment of 40 metric tonnes of LMO from Bahrain, followed by the next batch brought by *IN* Ships *Kolkata* (two 27 MT of LMO and 400 oxygen cylinders), and *Trikand* (40 MT of LMO). *INS Shardul* shipped in four 80 MT LMO containers, *INS Jalashwa* transported 18 cryogenic oxygen tanks and 3,650 oxygen cylinders; and *INS Tarkash* got two 20 MT LMO tanks along with 230 oxygen cylinders. Similarly, on the eastern seaboard, *INS Airavat* arrived at Visakhapatnam carrying eight 20-tonne cryogenic containers, 3,650 oxygen cylinders, 10,000 Rapid Antigen Test kits and other vital medical supplies from Singapore. (Details are provided in the annexure).

⚓ Impact of the Pandemic on Conduct of Training and Movement of Personnel

The nation-wide lockdown encouraged the *IN* training command to devise ways and means to conduct limited training by adhering to certain principles, such as physical distancing, split classes with non-mingling of segregated groups, open-air classes, self-assignments/learning and, subsequently, hybrid learning. All outstation transfers were deferred till 31 May 2021, except Command tenures, mandatory sea time and sea training, post-course dispersal, and conduct of courses at Tri-Services training institutions. Outstation leave was granted only in case of emergencies.

The 'Leave Mechanism', otherwise a methodically and meticulously planned activity, was now beset by factors such as delay in return-to-duty of personnel already on leave during lockdown, post-arrival quarantine of returnees, forced leave extensions due to non-availability of quarantine facility, and residential areas turning into Red Zones. All this made the earlier leave forecast ineffectual. Physical attendance in office operated with staggered timings, and was restricted to 50 per cent for sailors and all civilians, while officers were present as required and for inescapable commitments. Personnel with disabilities, comorbidities and pregnant employees were exempted from attending office.

During the second wave of COVID-19 in 2021, the *IN* took steps towards enhanced surveillance for cluster containment of the COVID-19 designated zones. There was intensified screening at all entry points, early reporting and prompt isolation of symptomatic personnel. Mass gatherings were banned, and outstation movement of personnel was minimized for prevention of infection.

One of the biggest challenges was the accumulating backlog of training. Ban on all forms of public transport meant that new courses could not

commence. Consequently, all courses that were to commence from April to July 2020 were cancelled/rescheduled. Training was continued for the 10,000-plus trainees who were already at various training establishments. Since off-campus instructors could not attend the training units due to the lockdown restrictions, instructions were progressed with on-campus instructors and Senior Course Participants who doubled up as instructors for junior courses.

Units were directed to conduct organized classes wherever feasible, maintaining necessary distance, and dormitories/dining halls were utilized for larger courses. Numerous other measures such as the shift of training to the accommodation blocks, so as to avoid movement of trainees, training in Gurukul format in open spaces, use of the internet to cover non-classified topics were instituted and this helped in progressing training for those who were already in the training units. Trainees were also encouraged to undertake self-study to cover certain topics with Standard of Knowledge 'C' and suitable doubt-clearing sessions were organized. Meal timings were also staggered, so as to maintain group integrity.

Another major constraint that many units faced was the need to cater to separate quarantine accommodation for both in-service personnel as also the civilian administration who sought the *IN's* help. Consequently, significant trainee accommodation was earmarked as quarantine accommodation, which further reduced the quantity of training accommodation. The decision of IHQ MoD(N) to hold in abeyance/cancel all permanent transfers also helped as expertise/experience available was retained.

International Training was one area that was considerably affected due to COVID-19, largely on account of the ban of all international flights. No new courses could commence for almost the complete year. However, online training for FFCs was commenced at NIETT, *Agrani* and *Hamla*. Specially curated dockets and training packages

were forwarded to countries that sought online training, and this was followed up with live classes on the internet over video conference. This also brought out the need for a secure online internet-based foreign training portal.

Special care was taken to ensure mental and physical well-being of trainees. Hence, notwithstanding lockdown restrictions, trainees were kept optimally involved and motivated by way of organized yoga and meditation classes in small groups by Physical Training Instructors/other competent people, individual exercise/running outdoors, small group debates/discussions and talks, etc. Isometric exercises were encouraged, which enable personnel to exercise without the use of any equipment and in confined spaces.

Planning for Future Waves

The recurring phases of the pandemic presented challenges to the *IN* at various levels—Command, training, operations, and administration, in addition to ensuring the good health of its personnel and extending its manpower and resources to the nation-wide effort to fight the pandemic.

The *IN* learnt several lessons, especially with regard to predicted future waves. The focus of the Service has been prevention, and maintenance of COVID-19-appropriate behaviour. All Naval Hospitals and facilities have geared up to meet any future surge/rise in COVID-19 cases and to provide aid to fellow citizens. Building capacity primarily focused on education, prevention, provision of adequate life-saving equipment, build-up of oxygen capacities, and centres to provide quality healthcare. Emphasis is also being given to personnel in the younger age group and to children to ensure a healthy population. Impetus is also being given to innovation for greater safety to: healthcare workers, transportation of infected patients, utilization of oxygen-saving devices,

devices for sterilization, and disinfection, to name just a few.

Training continues to be imparted to the *IN*'s non-medical personnel, called Battle Field Nursing Assistants (BFNA), for handling the COVID-19 pandemic and providing support to healthcare personnel when in need. The deployment of BFNAs at the DRDO Hospital in Ahmedabad had proved to be of immense benefit to the State Administration.

Conclusion

As the battle with the COVID-19 pandemic seems long drawn out due to high virus mutability, the *IN* has been compelled to systemically transform itself into a pandemic-resilient institution. Studies suggest a four-pronged plan in order to achieve a COVID-19-resilient institution,⁴ by: (i) putting stringent preventive-cum-mitigation mechanisms in place; (ii) providing efficient healthcare facilities; (iii) improved habitability; and (iv) long-term adaptation to new working norms.

The *IN* rose to the occasion in handling the crisis not only internally (within the Service and the country) but also externally (by deploying personnel and by transporting urgently required medical supplies to and from FFCs). There will always be critical requirement of the Armed Forces at all times of national emergencies. Therefore, to meet those requirements, the *IN* has equipped itself with short- and long-term COVID-19 adaption and mitigation measures at different echelons to emerge as a pandemic-resilient institution. As with the rest of the country, COVID-19 affected the *IN* similarly, but given the responsibilities entrusted upon the Navy, sea-going assets, organizations and personnel had to metamorphose and innovate to maintain operational functionality. All experiences, lessons learnt and SOPs were responsibly shared with neighbouring countries for a 'whole-of-region' effort in controlling the virus surges.

Annexures

Abbreviations Used (All Tables)

Abbreviations	Full Form
ANC	Andaman & Nicobar Command
BFNA	Battle-Field Nursing Assistant
ENC	Eastern Naval Command
HQ	Headquarters
HQMNA	Headquarters Maharashtra Naval Area
IDSC	Integrated Defence Services Command
INM	Institute of Naval Medicine
INMAS	Institute of Nuclear Medicine and Allied Sciences
L&M Islands	Lakshadweep & Minicoy Islands
IR	Infrared
KV	Kendriya Vidyalaya
LMO	Liquid Medical Oxygen
MO	Materials Organization
NAS	Naval Air Station
ND	Naval Dockyard
NCS	Navy Children's School
O ₂	Oxygen
PPE	Personal Protective Equipment
SFNA	School for Naval Airmen
SIF	Station Isolation Facility
SNC	Southern Naval Command
Vizag	Visakhapatnam
WNC	Western Naval Command

Operation Samudra Setu II (Oxygen Express and Shipment of Medical Supplies)

Date	Ship	Place	Details
25 April 2021	IN-hired vessel <i>Meghna</i>	L&M Islands	41 O ₂ cylinders (collected from the islands) were refilled in Kochi.
10 May 2021	INS <i>Airavat</i>	Vizag	8 Cryogenic O ₂ Tanks & other critical COVID-19 Medical Stores from Singapore.
10 May 2021	INS <i>Trikand</i>	Mumbai	Transshipping of LMO containers from Qatar.
10 May 2021	INS <i>Kolkata</i>	New Mangalore	Shipment of associated medical equipment from Kuwait.
11 May 2021	IN Ships <i>Kochi, Tabar</i>	New Mangalore Port	Cumulative consignment of 100 MT LMO & O ₂ cylinders from Kuwait.
12 May 2021	INS <i>Tarkash</i>	Mumbai	2 cryogenic containers filled with Liquid Medical Oxygen (LMO) (20 MT each), & 230 O ₂ cylinders from Qatar.
23 May 2021	INS <i>Trikand</i>	Mumbai	Brought 2 LMO containers of 20 MT each & 100 O ₂ cylinders from Qatar.
23 May 2021	INS <i>Jalashwa</i>	Vizag	18 Cryogenic O ₂ Tanks & other critical COVID-19 Medical Stores, including 3,650 O ₂ Cylinders & 39 Ventilators from Brunei & Singapore.
27 May 2021	INS <i>Shardul</i>	Kochi	Disembarked 4 ISO containers carrying 80 MT of LMO; brought from Kuwait & UAE.

Note: Operation Samudra Setu II and Mission SAGAR have been covered in the Chapter titled 'NEO, HADR & SAR: The Indian Navy in a Benign Role'

Innovations

Date	Command/Unit	Details
30 March 2020	ENC	Training non-medical naval personnel as BFNA to help Doctors & Paramedics in treating COVID-19 patients in quarantine/isolation facilities.
2 April 2020	ND (Mumbai)	Designed & developed own handheld IR-based temperature sensor for screening large numbers of personnel at ND entry gates, thus reducing load on security sentries manning the gates.
3 April 2020	ND (Vizag)	Designed an innovative 'Portable Multi-feed "Oxygen Manifold" (MOM)' using a 6-way radial header fitted to a single cylinder.
5 April 2020	SNC	Prepared Training Capsule for BFNA to train non-medical personnel to work as force-multipliers in emergencies.
8 April 2020	Naval Physical & Oceanographic Laboratory	Prepared alcohol-based hand-sanitizers for use by essential personnel on duty.
7 May 2020	Innovation Cell, INM (Mumbai) & ND (Mumbai)	PPE kits designed & produced by <i>IN</i> , tested by INMAS (Delhi).
13 May 2021	The SNC's Diving School	'Oxygen Recycling System' (ORS) for extending the life of O ₂ cylinders.
25 May 2021	ND (Vizag)	'Oxygen on wheels' (O ₂ plant on mobile platform); <i>IN</i> provided 'Oxygen on Wheels' plant to Palasa COVID-19 Care Centre.

COVID-19 Assistance by Shore Establishments/Units

Date	Ship/Site	Details
18 March 2020	INS <i>Vishwakarma</i> , Visakhapatnam	Quarantine Camp for Indian nationals evacuated from COVID-19-affected countries.
From 28 March 2020	INHS <i>Patanjali</i> , Karwar	Care & Treatment of COVID-19 patients.
28 March 2020	<i>IN</i> Quarantine Facility at Material Organization, Mumbai	44 Indian evacuees (including 24 women) from Iran, were quarantined for a month prior to returning home (J&K).
1 April 2020	HQ, Goa Naval Area	Assisting locals by distributing food & essential supplies during the nationwide lockdown.
4 & 8 April 2020	WNC, Mumbai	Ration packets (basic food items) to State Govt. for distribution to stranded migrant labourers.
9 April 2020	ND (Vizag), Visakhapatnam	Handed over In-House Portable Multifeed O ₂ Manifolds to Vizag District Administration.
12 April 2020	NAS <i>Utkrosh</i> & Material Organization, Port Blair	Food distribution camp for 155 labourers working for infrastructural development of NAS.
4 June 2020	Naval Base, Kochi	176 Indians from Bahrain & Oman, completed the mandated quarantine period.
29 April 2021	<i>IN</i> Hospital Ships <i>Jeevanti</i> (Goa), <i>Patanjali</i> (Karwar), & <i>Sandhani</i> (Karanja, Uran)	Kept ready beds with O ₂ for use by civil administration.
7 May 2021	INS <i>Chilka</i> and INHS <i>Nivarini</i> , Khurda	150-bed COVID-19 Care Centre set up.
11 May 2021	INS <i>Kalinga</i> , Bheemunipatnam	60-bed COVID-19 Care Centre set up & dedicated to the public.
16 May 2021	ND (Vizag) Nellore & Shri Kalahasthi, Andhra Pradesh	Repaired O ₂ plants.

Central Quarantine & Isolation Facilities

Command	Station	Units/COVID-19 Care Centres	Beds in Quarantine/ Isolation Facilities	No. of O ₂ Beds	No. of Beds for Civil Administration
WNC	Mumbai	Western Fleet	530	550	-
		HQMNA	357		
		Outlying units	438		
	Karwar	Gymnasium	80	100	10
	Goa	Vijay Block	174	40	4
		SIF <i>Gomantak</i>	30		
		SIF <i>Hansa</i>	35		
	Raigad (INHS <i>Sandhani</i>)	NCS	90	10	10
NKG School		15			
ENC	Vizag	Betwa Building	160	-	360
		NCS	150		
		<i>Eksila</i>	50		
		ND (Vizag)	200		
		<i>Kalinga</i>	60		
		KV2	40		
		MO (Vizag)	60		
ANC	Port Blair	INHS <i>Dhanvantari</i>	45	45	52
		HQ ANC	65	65	-
		IDSC	24	24	-
		Command Gym	50	50	-
SNC	Kochi	SFNA, Kochi	200	280	10
	Chilka	INHS <i>Nivarin</i>		20	15
	Ezhimala	INHS <i>Navjivani</i>		58	8

Notes

- 1 Ray S, Goyal S, Roy K, Chawla N, Singh RJ. (2020). 'Not the last pandemic- Investing in a Safe Navy for the future pandemic', *Journal of Marine Medical Society*, 22: S1-5.
- 2 Kesnur S., (2021) 'A Navy that dares, a Navy that cares.' *The Daily Guardian*, 27 May. <https://thedailyguardian.com/a-navy-that-dares-a-navy-that-cares/>
- 3 Ibid.
- 4 Maramraj KK, Roy K, Mookkiah I, Gopinath A. (2021). 'The COVID-19 Pandemic And Beyond: A Systems Thinking Analysis Using Iceberg Model To Transform An Organization Into A Pandemic-Resilient Institution', *Journal of Marine Medical Society*, 23: 75-81.





7

Naval
Outreach

35 | Sports and Adventure in the Navy

⚓ Introduction

The Indian Navy (*IN*) is focused on the comprehensive development of its personnel. This includes instilling in them esprit de corps, endurance and, most importantly, fitness via sports and adventure activities. In the past years, *IN* has widened the avenues of sporting categories to enhance sportsmanship among

personnel. Consequently, increased participation and availability of training facilities has brought several accolades to *IN* sportsmen in national and international arenas. This chapter overviews the evolution and progress in the twin disciplines of sports and adventure in the *IN* during the period 2011–21. The chapter also recounts the historic highs and the setbacks—events that figured as milestones accomplished by the *IN* in the decade.



Membership Limited: A Floating Fitness Field

Background: In 2002, the Naval Adventure Foundation (NAF) under Directorate of Naval Training (DNT) was bifurcated to create the Directorate of Adventure, Physical Fitness & Sports Activities (DAPSA) as an important facet of human resource development, established to encourage physical fitness and sports activities among *IN* personnel. The formation of DAPSA catalysed the upward graph of sports activities and achievements by *IN* personnel. Currently DAPSA has the following:

- Indian Navy Mountaineering Cell (INMC);
- Adventure and Physical Fitness Cell (APFC);
- Indian Navy Sailing Association (INSA);
- Indian Navy Polo and Equestrian Contingent (INPEC); and
- Indian Navy Sports Control Board (INSCB).

The following sections overview each of these, discuss their evolution as well as the events and achievements that took place during the decade as a result of the *IN*'s proactive engagement with sports and adventure activities, both within the country and abroad.

🚢 Indian Naval Mountaineering Cell

The INMC was established in 2002, to promote mountaineering as an adventure activity. It looks after the training, administrative and operational aspects of mountaineering expeditions, summiting high-altitude peaks and related sports. The INMC successfully achieved the Three Pole challenge by conquering Mt Everest in 2004, the North Pole in 2006 and the South Pole in 2008. Its achievements in the decade from 2011 to 2021 are enumerated below.

Mt Jogin I (6,465 m) and Mt Jogin II (6,342 m), 2012: Conducted in the months of September and October, this was the *IN*'s first mountaineering

expedition after its successful ascent of Mt Everest in 2004. After Everest, the INMC team had focused on treks to the North and the South Poles. This, along with other factors—such as the retirement of some members and the training of a new team for the expeditions—led to a shortage of members for other domestic expeditions in the interim years up to 2012.



Indian Navy Atop Mt Jogin

The team for Mt Jogin consisted of eighteen officers and sailors. Most of the members, though qualified in the Basic Mountaineering Course, were inexperienced in climbing. The team had to abandon the summit attempt just 400 m short of summit of Jogin I, near Gangotri in Uttarakhand, because of huge crevasses, risk of avalanches and non-availability of a safe route to climb. Commander (Cdr) SK Handa was the Officer-in-Charge of the team and Cdr Avinash Khajuria was the Climbing Team Leader. Though the team could not reach the summit, it was literally an 'ice-breaking' moment for the *IN* in the revival of climbing. Lessons learnt and experience gained would form the basis of many successful expeditions in the future, including a repeated successful summit of Mt Everest in 2017.

Mt Saiffee (6,167 m), 2015: The next mountaineering expedition by *IN* was to Mt Saiffee

in the Garhwal region of the Himalayas, in May 2015. It was the first major successful expedition for the *IN* after a gap of seven years and was led by Cdr Vishnu Prasad. Out of the thirteen team members, nine summited the peak.

Mt Stok Kangri (6,153 m), 2015: An expedition to Mt Stok Kangri in the Leh region was undertaken by Western Naval Command (WNC) from 5–18 August. Seven out of fourteen mountaineers were successful in summiting the peak on 15 August.

Mt Kun (7,077 m), 2015: A mountaineering expedition to Mt Kun in Ladakh was organized by Headquarters, Eastern Naval Command (HQENC), in August–September to commemorate the Golden Jubilees of the 1965 Indo-Pak War and the first successful Indian expedition to Mt Everest, which was led by legendary Captain (Capt) MS Kohli in the same year. The 2015 *IN* team comprised eight members and was led by Lt Cdr S Karthikeyan, an officer from the submarine arm. Three members—Lt Cdr S Karthikeyan, Lt Yogesh Tiwari and Lt Anant Kukreti—summited the peak on 10 September, battling extreme weather conditions. It was a significant achievement, being the first summit of a 7,000+ m peak since the summiting of Mt Everest by the *IN* in 2004, and it set the ball rolling for preparations for the next summiting of Mt Everest.

Trekking Expedition to Chadar, Zaskar District, Ladakh (2016): The WNC organized an adventure-cum-high-altitude-trekking expedition in February. A team of five officers and seven sailors, participated in the trek, led by Commodore (Cmde) Sanjeev Gupta. The 76 kilometre (km)-long Chadar Trek was successfully completed on the frozen Zaskar River in extreme climate conditions and was an important milestone.



Indian Navy Unfurling the Tricolour and Naval Ensign on Mt Kun

All-Women Trek to Pindari Glacier (3,660 m), 2016: In consonance with the Nari Shakti initiative of the Government of India and to motivate women officers to undertake mountaineering and high-endurance activities, a high-altitude trek to Pindari Glacier in Uttarakhand was organized in the months of March and April. Twenty-four women officers participated in the trek, with Cdr Priya Khurana as the team leader of the expedition. This was the first major all-women trek by the *IN* and would open doors for women officers to undertake mountaineering activities in the future.

Mt Jogin I (6,465 m) and Mt Jogin III (6,133 m), 2016: The expedition to the two peaks was conducted in May under the aegis of DAPSA with support from Indian Mountaineering Foundation (IMF). The team consisted of ten officers and sailors, including three women, and was led by Cdr DN Chaitanya. On 17 and 19 May five members each summited Jogin I and Jogin III, respectively. The highlight of the expedition was that all three women officers reached the summit.

Mt Satopanth (7,075 m), 2016: An expedition to Mt Satopanth was conducted by WNC in May–June. The twelve-member team was led by

Lt Cdr Vinit Doshi; six members summited the peak on 16 June, while five members summited another unnamed peak, Pt 6020, on 17 June.

Mt Mukut (7,120 m), 2016: An expedition to Mt Mukut was conducted by WNC in September–October with logistics and technical support from Nehru Institute of Mountaineering, Uttarakashi. The fourteen-member team was led by Surgeon (Surg) Cdr IB Udaya. The team succeeded in reaching the Summit Camp, but due to inclement weather, heavy winds and snowfall had to abandon the summit attempt just 150 m short of the peak.

Mt Kamet (7,756 m) and Mt Abi Gamin (7,355 m), 2016: Expedition to twin peaks of Mt Kamet and Mt Gamin in the Garhwal Himalayas was organized by ENC in May–June with logistics and administrative support from DAPSA. A thirteen-member team led by Cdr S Karthikeyan achieved success by summiting both the peaks—nine members summited Mt Kamet on 2 June, and four members summited Mt Abi Gamin on 4 June, after establishing a record eight camps en route to the summit. Mt Kamet was the highest climbable peak in India at that time.



Indian Navy Adventure Enthusiasts Scaling Mt Kamet

Mt Saser Kangri (7,672 m), 2016: A fourteen-member team led by Lt Cdr Yogesh Tiwari undertook an expedition to Mt Saser Kangri I, in

Ladakh, during August–September. After reaching a height of 7,300 m, inclement weather led the team abandon the expedition.

Mt Everest (8,848 m), 2017: The naval mission to Mt Everest, ‘Sagartal se Sagarmatha’, was flagged off by the Chief of Naval Staff on 23 March. The team had eighteen climbing members and six Everest Base Camp members. The expedition commenced on 4 April with a sixteen-day trek from Jiri (a short distance from Kathmandu) to Everest Base Camp, thus gaining height gradually and acclimatizing in the process. The team then summited Mt Everest, and Mt Lhotse (8,516 m)—the highest and the fourth-highest peaks in the world.



‘Nirbhik Nausainiks’: From the Depths of the Oceans to the Tallest Peak

It is indeed a matter of great pride that the team could place the Naval Ensign on top of Mt Everest at 8,848 m on 21 May at 0700 hrs and again on 27 May at 0730 hrs. Mt Lhotse, its sister peak, was summited on 25 and 27 May. The team performed commendably, with eleven members having summited either of the two peaks.

All-Women Mountaineering Expedition to Mt Deotibba (6,001 m), 2018: An all-women naval mountaineering expedition to Mt Deotibba was successfully conducted from 28 May to 10 June. Mt Deotibba is the second-highest peak in the Pir-Panjral range of Himachal Pradesh. The expedition

laid the foundation for an all-women *IN* expedition to scale more challenging peaks in the near future. The team summited the peak on 10 June.

Mt Menthosa (6,443 m), 2018: A ten-member mountaineering expedition comprising three officers and seven sailors drawn from various units of the Southern Naval Command (SNC) was flagged off from Kochi on 21 September. The team successfully summited Mt Menthosa on 16 October.

Mt Nanda Ghunti (6,309 m), 2019: The expedition spanned a month, 20 April–20 May. A team comprising ten mountaineers from the WNC successfully summited the peak on 8 May.

Mt Satopanth (7,075 m), 2019: A mountaineering expedition to Mt Satopanth in Uttarakhand was flagged off on 18 September. The team reached a height of 6,400 m but could not summit the peak due to bad weather. The team led by Lt Cdr Nandini Dam Roy consisted of thirteen naval personnel, including seven women officers and five sailors.

Mt Trishul (7,120 m), 2021: Located in the

Western Uttarakhand, the Trishul is a group of three Himalayan mountain peaks, with Trishul-I being the highest peak. The three peaks resemble a trident (weapon of Lord Shiva). The climb is a challenging one due to its technical features, like rock pinnacle, steep ice wall, overhangs, sketchy campsites, and long marches between camps and mixed-ice climb. As part of the ‘Swarnim Vijay Varsh’ celebration, the WNC conducted a major mountaineering expedition to Mt Trishul-I from 3 September–14 October. This maiden mountaineering expedition to Mt Trishul tragically ended with a major accident.



Expedition Flag-off



The twenty-member naval mountaineering expedition team was a blend of skilled and experienced naval climbers from all Commands and a few new mountaineers from WNC. The team occupied Camp 1 (5,200 m), Camp 2 (5,800 m) and Camp 3 (6,400 m) on 26, 28 and 30 September respectively. On 1 October, a mere 200 m from the Summit, the team was struck by an avalanche and six climbers suffered a fatal fall from approximately 6,900 m. The mortal remains of four—Lt Cdr Rajnikant Yadav, Lt Cdr Yogesh Tiwari, Lt Cdr Anant Kukreti, and Hari Om, MCPO-II—were recovered on 2 October.

The search had to be called off on 14 October due to bad weather and the onset of winter. Lt Cdr Shashank Tewari and Dukpa Tshering Sherpa were still missing as on March 2022.

⚓ Adventure and Physical Fitness Cell

The Adventure Cell is responsible for promoting, planning and conducting all sports and adventure activities. It conducts all land-, aqua- and aero-based activities such as running, cycling, swimming, sky-diving and so on. The Cell is responsible for selecting teams, training and coordinating inter-Services adventure activities, and supervising administrative actions such as obtaining requisite sanctions, liaising with various agencies, and the procurement, storage and maintenance of sports-related equipment.



Pulling Together

The succeeding paragraphs provide a year-wise list of events in which *IN* personnel participated in the decade 2011–2021, and won laurels.

Ultra Running

La Ultra, 2016: The *IN* forayed into ultra and endurance running in 2016, with the first ultra-running team of the Navy participating in La Ultra 111 km race at Ladakh also touted as India's toughest marathon. The route involved crossing the Khardung La pass (5,359 m) and average running altitude lay between 4,267 m to 4,572 m. The *IN* team of six runners was led by Capt Rajesh Wadhwa who, along with three other runners, Cdr Sunil Handa, Lt Amit Kumar and Hari Om, PO, completed the race within the cut-off time. Hari Om, PO also summited Mt Kang Yatse peak prior to participating in the race, which is a unique achievement. The *IN* went on to participate in many noteworthy ultra runs subsequently, as can be seen in the succeeding paragraphs.

Run of Kutch Ultra, 2017: Involving distances of 100 km and 160 km, Run of Kutch Ultra was held in February. The naval team was led by Cmde Balakrishnan, who himself completed 100 km along with nine other officers and sailors. Capt Rajesh Wadhwa went on to complete 160 km.

La Ultra, 2017: A naval team led by Capt Rajesh Wadhwa participated in 111 km and 222 km categories of La Ultra 2017 in Ladakh in August. Six members of the team successfully completed 111 km, and Cdr Sunil Handa completed 222 km, which entailed the crossing of two high passes of more than 5,334 m, namely, Khardung La and Wari La.

'Run the Rann' Race, 2018: The *IN* Team participated in the 'Run the Rann' race in the 101 km and 161 km categories. The race is run through the deserts of Kutch in Gujarat and runners have

to navigate the route through a track pre-fed onto a hand-held GPS device. The *IN* Team was led by Capt Rajesh Wadhwa who, along with Cdr Sunil Handa, Hari Om PO and RR Jat EAA (R) 3, completed 161 km. Ten officers and sailors completed 101 km.

La Ultra, 2018: Based on previous experiences, a very well-trained and diligently selected team led by Capt Rajesh Wadhwa participated in 111 km, 222 km and 333 km categories of La Ultra in August 2018. Six members of the team completed 111 km, RR Jat EAA (R) 3 completed 222 km and Cdr Sunil Handa completed 333 km, which involves crossing three high passes of more than 5,334 m, namely, Khardung La, Wari La and Tanglang La in seventy-two hours.



IN Personnel Participate at La Ultra, 2018, in Ladakh

Ultra Running, 2018: Lt Cdr Abhinav Jha participated in the thirtieth edition of the 100 km World Championship held at Sveti Martin na Muri, Croatia. He finished this strenuous race, ranking seventy-seven among 169 men and 115 women athletes from forty-one countries.

Hell Ultra, 2019: The *IN* participated in Hell Ultra race from Manali to Leh in June. Five *IN* runners completed the Hi-5s category of the race (five full marathons in five days from Leh to Manali). Sanjay Kumar EA (P) 3, Lt Cdr Yogesh Tiwari and Kapil Kumar, POPTI, took the top three positions in the race and beat the previous course record set by an American athlete by a huge margin.

Participation in Other Ultra Events, 2017–19:

In addition to the above ultra-races, the *IN* team also participated in Sky Ultra (Manali), Deccan Ultra (in the Sahyadri region), Malnad Ultra (in Karnataka), and Vagamon Ultra (in Kerala). Performance of naval runners was outstanding in all these races. The years 2017–19 were watershed years for the *IN* as far endurance and ultra-running was concerned. In 2018, two officers—Lt Cdr Suman Mishra and Lt Cdr Abhinav Jha—were selected by the Athletics Federation of India to represent India in the 100 km World Championship at Croatia. Lt Cdr Abhinav Jha was also selected to represent India in 100 km Asian Championship in 2019. In addition, the officer qualified to represent India in IAU 100 km World Championship; later cancelled due to the COVID-19 pandemic.¹

One of the stalwarts of ultra-running, Sanjay Kumar EA(P) 3, was awarded the MacGregor Memorial Medal in 2022 by the United Services Institute (USI) for his outstanding performance in high-altitude endurance races in mountains and trails in locations like Malnad, Manali, Ladakh and Deccan during 2018 and 2019. Instituted in 1888 to honour the memory of USI founder Maj. Gen. Charles MacGregor, this medal is awarded to Armed Forces personnel for their valuable military reconnaissance and high endurance achievements.

The Laurels of an Endurance Runner

Sanjay Kumar EA (P) 3, an avid runner and physical-fitness enthusiast, has done the Navy proud by winning a lot of laurels in marathon running. One of his most outstanding achievements perhaps has been his performance in the fourth edition of the Hell Ultra High 5 race conducted in the Himalayas.

Considered one of the toughest races in the world, participants in the Hell Ultra High 5 run five marathons on five consecutive days at an average altitude of 4200 m. The cumulative timing

of completing all five has to be under forty hours. Running the five marathons from 15 to 23 June 2019 Sanjay Kumar EA (P) 3 completed this feat in a little over twenty-eight hours, winning hands down and setting a new Course Record. In addition to the Hell Race, he also secured first position among the naval participants in the Solang Sky Ultra Marathon conducted in Solang Valley in September 2019.

The sailor also secured the second position among the naval participants in La Ultra—one of the most gruelling races, with harsh temperatures and lean oxygen levels. Crossing the Khardung La Pass at 5,480 m he completed the 111 km-category run in seventeen hours and four minutes. With a timing of forty hours and four minutes, Sanjay Kumar also holds a national record for completing the 600 km Mumbai-to-Goa chase along with eight runners in relay format. Some of his recent achievements in the last decade are tabulated below.

Event; Location	Date	Organized By	Time/Distance & Rank	Remarks
Run of Kutch 100 km; Thar Desert, Rann of Kutch	10 February 2017	Run of Kutch team	16 hrs 31 min Rank: 3 rd (IN Team) & 6 th Overall	
La Ultra The High 111 Km; Nubra Valley (Ladakh)	20 August 2018	La Ultra	17 hrs 04 mins 09 sec Rank: 2 nd (IN Team) & 9 th Overall	India's toughest & world's cruellest marathon
Hell Ultra High 5, 480 km; Manali to Leh	15-23 June 2019	Hell Race team	Cumulative time for 5 marathons: 28 hr 45 min 12 sec Rank: 1 st (IN Team) & 1 st Overall.	Set new course record for 5 marathons in 5 days at average height of 4,200 m
Solang SkyUltra 2019, 100 km; Solang (HP)	5-6 October 2019	La Ultra	27 hrs 16 mins 43 sec Rank: 2 nd (IN Team) & 4 th Overall.	
Bhatti Lakes Ultra & X Trail 10 th Edition; Delhi	11-13 October 2019	Bhatti Lakes Ultra	38 hr 40 min Winner Badge awarded	His longest non-stop-run.

Event; Location	Date	Organized By	Time/Distance & Rank	Remarks
Malnad Ultra 110 km; Maskalmardi (Karnataka)	2-3 November 2019	The Malnad Ultra	17 hr 12 mins 28 sec Rank: 9 th Overall	
Deccan Ultra 2020, 115 km;; Bhandardara (Maharashtra)	8-9 February 2020	Deccan Ultra team	23hr 48 mins 20 sec Rank: 5 th Overall	
Solang SkyUltra 2021, 60 km; Solang (HP)	10 October 2021	The Hell Race	n.a Rank: 1 st (IN Team) & 4 th Overall	Very tough race, with 4210 m elevation gain.
Swarnim Maitri Half Marathon (21 km); New Delhi	19 December 2021	Indian Navy	1 hr 22 min 33 sec. Rank: n.a.	
Amrit Run Mahotsav 12-hour Stadium Run; Mumbai	19-20 March 2022	WNC	88.4 km in 12 hrs Rank: 4th	
Tuffman Dusk-to-Dawn 12-hour Stadium Run; Panchkula (Haryana)	12-13 March 2022	Tuffman	104.92 km in 12 hrs Rank: 3 rd	

Cycling/Duathlon

Extremathon Duathlon Challenge from New Delhi to Drass, 2017: A team comprising sixteen Armed Forces personnel, including eleven members from the IN, was flagged off on 30 July to complete the world's longest and most challenging Duathlon, covering a distance of 1,400 km from New Delhi to Drass (in Kargil District of then J&K state). The Duathlon was led by Wing Cdr Paramvir Singh. The team ran the first leg of the race from New Delhi to Manali, covering a distance of 574 km in twelve days, reaching Manali on 10 August and commencing the second leg of the race—mountain cycling from Manali to Khardung La in Leh—on 11 August. The team reached Khardung La on 20 August after covering a distance of 557 km in ten days.

On 22 August, the team began last leg of the challenge—running a distance of 270 km from Leh to the Kargil War Memorial, culminating the Duathlon at Drass on 29 August 2017.

Brevet des Randonneurs Mondiaux, Cycling Events in 2017–18: Commander D Sunil Kumar successfully completed four long-distance endurance cycling expeditions called Brevet des Randonneurs Mondiaux (BRMs), organized worldwide by Audax Club Parisien. The officer accomplished four brevets category in the year 2017–18: (i) 200 km in twelve hours and thirty



Brevet Medal Surge: Cdr D Sunil Kumar
Qualifies as Super Randonneur

minutes at Visakhapatnam; (ii) 300 km in sixteen hours and forty-seven minutes at Visakhapatnam; (iii) 400 km in twenty-three hours and thirty minutes at Vijayawada; and (iv) 600 km in thirty-eight hours and forty-four minutes at Coimbatore. On completion of the series of four BRMs in a calendar year, the officer earned the title of *Super Randonneur* for the year 2017–18.

Solo Cycling Expedition, 2018: A solo cycling expedition was undertaken by Lt Cdr Manoj Gupta from Kashmir to Kanyakumari. The officer

undertook this challenging ride from 6 June to 16 July 2018 to create awareness regarding Armed Forces Flag Day, and to inspire young students to join the Indian Navy/Armed Forces.

The expedition commenced from Khardung La in Ladakh, and was flagged off by Commandant, Ladakh Scouts Regimental Training Centre, on 6 June 2018. Lt Cdr Gupta covered a total distance of 4,000 km on his bicycle, covering eleven states in this process. The expedition culminated at sunset point, Kanyakumari, where he was received by officers and sailors from INS *Kattabomman*.

Aero-Adventure

Skydiving Championship, 2016: Two *IN* teams participated in the first Indian National Skydiving Championship at Amreli in Gujarat, in May. Comprising predominantly MARCOS-cadre officers and sailors, the team trained at INS *Dega* and was led by Capt Rana V Singh. Despite tough competition from sister Services and professional civilian skydivers, the teams performed exceedingly well, with Team A standing first and Team B finishing fourth in the championship. In individual categories, K Wahajuddin, POCD, stood second and Lt Cdr Anand Revi finished fifth.

Para-Motoring Courses, 2020: DAPSA organized Basic and Intermediate Para-motoring courses for naval personnel for the first time in February 2020. A two-week course was conducted by the National Institute of Mountaineering and Adventure Sports (NIMAS) at Panikheti, Assam. Twenty personnel qualified the Basic Course and two, the Intermediate Course.

⚓ **Indian Naval Sailing Association**

Sailing imparts first-hand experience of wind, weather and the vagaries of the sea and fosters refinement of judgement and quality of ‘sea sense’. The unique value of this sport/adventure activity lies in its ability to develop initiative, courage,

comradeship, teamwork and endurance, particularly in rough weather. Established in 1961 in Kochi, INSA was shifted to New Delhi in the early 2000s. It operates under the aegis of the CNS as its Patron.



Sail Training Onboard INS *Tarangini*

The charter of INSA includes supervising the Operation of all Indian Naval Watermanship Training Centres (INWTCs), the Navy Sailing/Windsurfing Teams (NST/NWT), Ocean Sailing Node (OSN), Navy Boys Sports Company (NBSC) through an efficient and continuous liaison with external agencies, viz., Sports Authority of India (SAI) and the Yachting Association of India (YAI). The INSA is responsible for the overall conduct, management and performance monitoring of the NST and also for conducting sailing activities among naval communities and families to popularize the sport. It functions as a nodal agency for offshore sailing and planning deployment of naval sailing vessels such as the *Mhadei*, *Tarini*, *Bulbul*, and *Neelkanth*.

Indian Naval Watermanship Training Centres:

In this decade, the *IN*, with its emphasis on the watermanship activities, has enhanced its infrastructure by developing twelve INWTCs and YAI-affiliated clubs, taking the total number from ten to twenty-two. The INWTCs are spread across the various Commands, extending deep into the Bay of Bengal till Kardip at Kamorta Island. These INWTCs provide training infrastructure for not only *IN* personnel but also for naval families and NCC units. These INWTCs are located in

naval stations in all coastal states including at Lakshadweep, and in the Andaman and Nicobar Island territories.



IN's Watermanship Training Centre (INWTC), Mumbai

List of the INWTC and YAI Clubs

Command/Unit	Name of the INWTC
Western Naval Command	INWTC Mumbai
	INWTC Goa
	INWTC Okha
	INWTC Porbandar
	INWTC Karanja
	INWTC Karwar
Eastern Naval Command	INWTC Visakhapatnam
	INWTC Adyar
	INWTC Kolkata
	INWTC Kalinga
Southern Naval Command	INWTC Kochi
	INWTC Hamla
	INWTC Mandovi
	INWTC Lonavala
	INWTC Chilka
	INWTC Jamnagar
	INWTC Dronacharya
	INA Watermanship Training Area
	INWTC Kavaratti
	Offshore Sailing Club
Andaman and Nicobar Command	INWTC Port Blair
	INWTC Kamorta

Circumnavigation: Five centuries after Ferdinand Magellan's first circumnavigation attempt in 1521

on his ship, the journey to cover the entire globe remains as challenging as ever. The challenge is more daunting for a sailing boat that navigates only by harnessing the winds through its sails.

A true circumnavigation requires starting and ending at the same point, while travelling in one direction, crossing the Equator, passing all the three 'Great Capes' of three continents in the Southern Indian Ocean—Africa's Cape of Good Hope, Australia's Cape Leeuwin, and South America's Cape Horn. Indian Navy personnel have attempted this daredevil act of circumnavigating the globe on sailing vessels a few times in the last decades.

Sagar Parikrama II (1 November 2012–31 March 2013): Post the success of Sagar Parikrama-I (SP-I) undertaken by Captain Dilip Donde (Retd) in 2009–10, in 2012 a historical solo non-stop circumnavigation journey was undertaken by Lt Cdr Abhilash Tomy. He sailed across four continents, crossing the equator twice, and crossing the Indian, Southern Pacific, and Atlantic Oceans onboard Indian Naval Sailing Vessel (INSV) *Mhadei*. For the voyage to qualify as a 'Successful Circumnavigation', Lt Cdr Tomy had rounded the three 'Great Capes', cutting across the giant waves and throughout battling extreme climatic conditions that ranged from intense cold, to scorching heat and cyclonic winds. SP-I had involved stops at ports en route, while SP-II did not. On accomplishing this task at hand successfully on 31 March 2013 in 151 days, he became the first-ever Indian, second Asian, and seventy-ninth in the world to achieve such a feat. Given below are the details:

■ **Readying for the Journey:** At NHQ, preparations were made to address all and any contingencies that could occur during the circumnavigation, including inescapable repairs during the journey for which the vessel would be

permitted to enter the nearest port, post clearance from Integrated Headquarters (IHQ) Ministry of Defence (MoD) Navy and the Embassy/Port Authorities. The Indian High Commission/Embassy of India at all countries en route were empowered to cater to the lodging, boarding, and transportation needs and arrange for any incidental expenses for the INSV *Mhadei*. The IHQ MoD(N) had designated a two-member support team consisting of representatives from DAPSA and a technical member from DFM to oversee the repairs and provide logistical support at the port of call of the vessel in case of emergency. Sustenance provisions such as fresh/tinned/ready-to-eat meals for the duration of the voyage were adequately stocked by the skipper before departure from India.

■ **Flagged Off:** The expedition was flagged off from Gateway of India, Mumbai, on 1 November 2012 in the presence of the Flag Officer Commanding-in-Chief WNC, Vice Admiral SK Sinha, Lt Cdr VC Tomy (Lt Cdr Abhilash Tomy's father), and his mentor Vice Admiral Manohar Awati.



Lt Cdr Tomy Seeking Blessings from the Ocean God Lord Varuna



Away She Goes



Riding the Winds and the Waves

■ Circumnavigation:

- Leg 1 was from Mumbai to Cape Leeuwin in Australia. Within the initial few days of the voyage, Lt Cdr Tomy understood that most of the tasks done earlier with the help of the crew, now needed to be done single-handedly. He was also updated that Cyclone Nilam would not pose a danger to the voyage due to its changed course. On 12 November 2012, INSV *Mhadei* entered the Indian Ocean, leaving behind the Coast of India and the Arabian Sea, embarking on a new phase of its voyage. Exactly sixteen days after its departure from Mumbai, INSV *Mhadei* crossed the Equator, thereby officially recording its entry into the other hemisphere. Encountering trade winds, the journey towards the Tropic of Capricorn picked up speed. However, battling these winds was not an easy task, as tropical winds are well-known for their revolving storms, cyclones, and hurricanes. The signs of hostile climatic conditions were imminent with the surfacing of flying fish on the deck of INSV *Mhadei*. Crossing the Tropic of Capricorn on 27 November 2012, the skipper geared himself to face the ‘Roaring Forties’—caused by the displacement of winds from the Equator to the South Pole and the rotation of the

Earth—with very few landmasses acting as windbreaks. Sailing through the ‘Roaring Forties’ with a 35-knot wind speed and waves as high as 6–7 m, Lt Cdr Tomy, coping with the challenges, had to pull off the staysail as the pad-eye of the runner block broke off and the wind vane autopilot line parted, leaving no autopilot facilities for the voyage. On 11 December 2012, a major milestone in the circumnavigation was achieved when the *Mhadei* crossed the first of the three ‘Great Capes’, Cape Leeuwin in Australia. On many occasions during the journey, INSV *Mhadei* was recorded to be at the perfect place at the perfect time.



The Spirited Sailor Crosses the Equator

- The second leg of the expedition was from Cape Leeuwin to New Zealand. Very interestingly, the journey of the second leg commenced at 12:12:12 in date as well as time. Even though the duration of this leg seemed shorter, the difficult part while navigation was to prepare for and enter through the ‘Furious Fifties’, which are similar to but stronger than the ‘Roaring Forties’. From 26 December 2012, Abhilash Tomy sailed into the Pacific Ocean as he passed through the Sub-Antarctic Island of New-Zealand.
- On his third leg of the circumnavigation towards Cape Horn, Lt Cdr Abhilash Tomy succeeded on all the milestones along the way. On 9 January 2013, history was created as Lt Cdr Abhilash Tomy became the first Indian to sail and cross the 10,000-mile mark solo without any stops. On 17 January 2013, he successfully crossed Point Nemo, which stated that land would be accessible only either 2000 miles East or West from that point. On the morning of the eightieth day of the expedition, i.e., on 19 January 2013, he travelled across the longitude 108-degree West, denoting that the circumnavigation crossed the topographical mid-way mark of the voyage.
Lt Cdr Abhilash Tomy passed a remarkable and memorable day by hoisting the Indian Flag at the backstay of INSV *Mhadei* while rounding the Cape Horn on India’s Republic Day. This was the eighty-seventh day of the voyage and the fact that he was able to get the first visual contact of land ever since he had sailed, made it even more special.
- Manoeuvring ahead, the *Mhadei* sailed on to experience the adventures of the Atlantic as a part of the fourth leg of the expedition from Cape Horn to the Cape of Good

Hope. A British C-130J made a surprise overhead visit to acknowledge and exchange formalities. INSV *Mhadei*, in a gesture of acceptance and appreciation, bounced and tossed in the Atlantic. Valentine’s Day was the perfect gateway to mark the ingress of INSV *Mhadei* into the Eastern Hemisphere from the West. On 19 February 2013, INSV *Mhadei* crossed the last of the three ‘Great Capes’ thereby announcing to the world a successful solo navigation.

- Here onwards, from 20 February to 31 March 2013, began the final journey towards the destination, Mumbai. This, according to Lt Cdr Tomy, was the most challenging part of the expedition as the Indian Ocean had readied herself with an ‘ocean of challenges’ before the *Mhadei* could reach Mumbai, for instance, the Indian Ocean gave a huge warm welcome as temperatures rose to 30 degrees. En route, INSV *Mhadei* encountered a Dornier from the National Coast Guard of Mauritius on the occasion of National Day of Mauritius. Entering the piracy-infiltrated zone, INSV *Mhadei* caught up with the *IN*’s patrolling vessel on the Arabian Sea and was escorted by her.



Touching the Gateway of India After Five Months of Non-stop Sailing

By 24 March as they approached the Indian subcontinent, *Mhadei* picked up speed as they traversed through the trenches that divide the African Mascarene Archipelago from the Asian Islands of Maldives. In the course of the expedition, the sailing vessel crossed the Equator for the second time on 26 March 2013, pointing out the limited days left at sea. Recalling the journey amidst nature in all its forms made Lt Cdr Tomy fall in love with it and spend a few more days sailing in peace and serenity, surrounded by the beauty of nature.

- Historic Achievement:** On 31 March 2013, the *Mhadei* was received in an inflatable by Cdr Donde, the majestic boat builder of *Mhadei*, Ratnakar Dandekar, Alam PO, and other colleagues. A warm welcome awaited at the Naval Dockyard, from Vice Admiral Shekhar Sinha, the other Admirals, and the senior officers of the command. On 6 April 2013, a ceremonial event was held in the presence of the then President of India Shri Pranab Mukherjee at the Gateway of India, Mumbai.



Lt Cdr Abhilash Tomy Being Felicitated by the Supreme Commander

Navy Sailing Team, 2015: An NST was established at INWTC (Mumbai), with a sanctioned strength of fifty-nine personnel. The windsurfing component of the NST was shifted in March to INWTC (Goa), as the Navy Windsurfing Team in 2015.

Yachtsmen inducted in the NST/NWT undergo dedicated training in the sport of sailing onboard various Olympic classes of sail boats.

Ocean Sailing Node, 2016: An OSN was established in Goa in 2016 to encourage Ocean Sailing among naval personnel, emphasizing the spirit of adventure in maritime domain. The OSN maintains an inventory of six INSVs, of which two are Mhadei class (56 feet: *Mhadei* and *Tarini*) and four are Bulbul class (40 feet: *Bulbul*, *Neelkanth*, *Hariyal* and *Kadalpura*). The setting up of the OSN and the induction of a new racing cruiser and INSVs, have enhanced the IN's reach in the ocean-sailing world with various expeditions accomplished thus far. Some of the major expeditions during this decade for *Mhadei* and *Tarini* were the Sagar Parikrama II (discussed above), Navika Sagar Parikrama and Golden Globe Race (both discussed in succeeding paragraphs).

Navika Sagar Parikrama, 10 September 2017–21 May 2018: In a first-ever attempt, an all-women crew of six IN officers onboard INSV *Tarini* carried out a circumnavigation covering 22,000 nautical miles in 254 days. The team sailed across the three Great Capes, crossing the Equator twice. This circumnavigation was famously referred to as the



First-Ever Indian Circumnavigation of the Globe by an All-Women Crew

Navika Sagar Parikrama (NSP). Besides battling the challenges of the seas during the circumnavigation, the team recorded meteorological, oceanic, and wave data and even kept a track of marine pollution. The team also became a part of social engagements in host countries during their stopovers.

■ **The Vessel:** The INSV *Tarini*, built indigenously by Aquarius Shipyard at Goa, the yard that built the *Mhadei*, is all of 17.1 m in length. Capable of running solely on wind power and enduring long durations at sea, *Tarini* also has an onboard reverse osmosis plant that is capable of generating 30 litres of water per hour, an electronic chart-plotter with GPS, and a weather radar, two smart pilot self-steering systems, wind indicators for directions and speed, satellite communication for internet usage, a diesel generator and an engine. The onboard Wi-Fi allowed the team to communicate with family members and update their supporters about the status of their journey.



Indian-Made INSV *Tarini*

■ **Flagged Off:** The expedition was flagged off from Goa by then Raksha Mantri Shrimati Nirmala Sitharaman on 10 September 2017. In addition to the teamwork and courage of the all-women sailing team, the expedition demonstrated the diplomatic and military cooperation between the countries where the NSP crew visited. With the Ministry of External Affairs (MEA) at the helm of diplomatic affairs,

the High Commissions of India in Australia, New Zealand, the Falklands, and South Africa arranged the prior scheduled social engagements of the crew within the countries. The support crew from NHQ consisting of representatives from the Indian Naval Sailing Association (INSA) and IHQ MoD (N) were deputed to oversee repairs and provide logistical support at Fremantle, Lyttelton, Port Stanley, and Cape Town as a part of the military support.



Raksha Mantri Smt. Nirmala Sitharaman Flagging Off the All-Women Circumnavigation

■ **Circumnavigation:**

● The team arrived at the first stopover at Fremantle, a port city along the Western Coast of Australia on 1 November 2017, thereby accomplishing the first leg of the expedition. En route the region of subtropics, the team had encountered stronger winds, Westerlies (anti-trade winds) and Easterlies (trade winds) which deviate from a set course and flow towards the Poles or the Equator, respectively. During the journey, they had battled freezing weather and extremely strong winds speeding up to 35 knots. The unpredictable sea and the westwards-pushing winds had made things difficult for the team while navigating through the Tropic of Capricorn. During their sojourn at Fremantle, the crew arranged for replenishments of the sailing vessel, servicing the machinery and

the apparatus needed for the journey ahead before sailing for Lyttelton, New Zealand, on 5 November 2017.



First Stop: Fremantle

- Travelling to Lyttelton, the team entered the 'Roaring Forties' known for incessant winds all year round. INSV *Tarini* and crew faced many challenges while crossing the legendary Drake Passage ill-famed for its rough seas. This added feathers on *Tarini's* hat as Prime Minister Narendra Modi too praised the team for achieving such a feat! On reaching the Falkland Islands on 22 January 2018, the team got busy with prior scheduled commitments. The team toured the Falkland Island Community School where, as a token of gratitude, the entire crew was presented with six pens crafted by Colin Davies from material salvaged from the sunken ship *The Vicar of Bray*.
- INS *Tarini's* next destination was Cape Town, South Africa. The crew arrived at the South Africa Sailing Western Cape Yacht Club (RCYC) on 3 March 2018 and interacted with students of the Royal Cape Yacht Club Sailing Academy and the sailing community of Western Club as also with Mr Vitor Medina, Commodore of Royal Yacht Club, South Africa.

- The team bid adieu to Cape Town on 14 March 2018 and proceeded on their final mission of sailing back to Goa and completing the Navika Sagar Parikrama. The team was geared up to cross the Cape of Good Hope (last among the three 'Great Capes'). During the final leg, INSV *Tarini* encountered rough seas that affected its steering system. The team highlighted ingenuity as they devised an innovative strategy to control the boat by using the smallest sail available on board to maintain headway. This enabled them to move up to Port Louis, Mauritius. Reaching Mauritius on 18 April 2018, the team carried out the necessary repairs of the steering system with the help of the High Commission of India, Mauritius, in collaboration with the National Coast Guard, Mauritius.



Closer to Home

- **An Epic Voyage Completed:** The team arrived at the home port on 21 May 2018, after the successful completion of their epic voyage.



The 'Sensational Six' Return Home

Golden Globe Race, 2018: Cdr Abhilash Tomy, now retired, participated in the Golden Globe Race 2018 starting at Les Sables d'Olonne, France which entailed sailing around the world, single-handed, non-stop and without using any modern navigation aids.

The officer was sailing in the southern part of Indian Ocean after eighty-two days of racing when his boat was hit by a storm that dismasted the boat and resulted in his enduring multiple spinal fractures. The officer was rescued mid-ocean after a multinational effort. He was later awarded with the Nao Sena Medal (DD) for the grit and endurance displayed during the mishap. Indian Navy ships and P-8Is participated in this rescue, as did other international navies.



Bridges of Friendship: A Multinational Rescue Mission Succeeds

Navy Boys Sports Company, 2017: The *IN* set up the first Navy Boys Sports Company (NBSC) at INS *Mandovi*, Goa in 2017 as a joint venture between *IN* and SAI.

The aim is to identify potential talent for competitive sailing in boys between the ages of twelve to fifteen, and provide them with necessary training and support to produce world-class yachtsmen. The boys inducted are provided with education at Kendriya Vidyalaya, in addition to sail training, and are subsequently recruited into the *IN* under the Sports Quota Entry Sailor Scheme. The strength of NBSC has increased from five in 2017 to eleven in 2020. The following NBSC boys have secured positions in the Indian National Squad.



NBSC Goa—Catching Them Young

Name	Age	Sail Boat	Team
Nanavath Vamshi	16	Laser 4.7	In National Squad A
Mallesh Vadla	15	Laser 4.7	In National Squad B
Sachin B	15	Optimist	In National Squad A
Vishwanath P	14	Optimist	In National Squad B

List of Awards: Members of INSA received several accolades and awards as part of their sailing accomplishments in the decade under review (2011–21).

Name	Award	Year (Event)
Cdr Abhilash Tomy	(i) Kirti Chakra	2013 (SP II)
	(ii) Tenzing Norgay National Adventure Award	2013 (SP II)
	(iii) MacGregor Medal	2013 (SP II)
	(iv) Nau Sena Medal (DD)	2019 (Golden Globe Race)
Lt Cdr Vartika Joshi	All the officers were awarded the following three medals/awards:	8 March 2017 (NSP)
Lt Cdr Pratibha Jamwal		15 August 2018 (NSP)
Lt Cdr P Swathi	(i) Nari Shakti Puraskar	25 September 2018 (NSP)
Lt Aishwarya Bodapatti	(ii) Nao Sena Medal (Gallantry)	
Lt S Vijaya Devi	(iii) Tenzing Norgay National Adventure Award	
Lt Payal Gupta		

🚢 Indian Naval Polo and Equestrian Contingent

The Indian Naval Polo Equestrian Contingent (INPEC) was established in 1998 to provide ‘a platform to Naval personnel for achieving excellence in equestrian sports’ and to ‘facilitate participation of the Naval Equestrian Team in the National Championships’. In addition to the generation and assimilation of the spirit of sports and adventure, INPEC targets self-reliance in the functioning of the equestrian setup within the Navy.

At its inception (1998), INPEC received sanction from the Government of India for thirty horses. Consequent to the enthusiastic response from personnel to the twin sports of polo and tent-pegging, the three Naval Commands requested for INPEC nodes too. The first node was set up in

2001—the WNC Polo & Equestrian Contingent (WENPEC)—and a sanction for seventy horses was approved in 2002. The most recent sanction for an additional forty-two horses was received in 2018, following the establishment of an Equestrian Training Team (ETT) at Indian Naval Academy (INA), Ezhimala in 2011. The present status of INPEC and its nodes is tabulated below.

INPEC & Nodes	Year Set Up	Location	Strength (2022)
INPEC	1998	INS <i>India</i> , co-located with 61 Cavalry, Delhi Cantonment	35
Western Naval Command Polo & Equestrian Contingent (WENPEC)	2000	INS <i>Trata</i> , Mumbai	3
Southern Naval Command Riding and Adventure Sports Centre (SNCRASC)	2007	INS <i>Dronacharya</i> , Kochi	10
Eastern Naval Command Polo & Equestrian Contingent (ENPEC)	2009	INS <i>Satvahana</i>	14
INA	2011	Ezhimala	40
TOTAL			98

Note: The INA was provided with twenty-two horses (ex-INPEC) in 2010 for the training of cadets. It has associated infrastructure and manpower for sixty horses. However, as of March 2022, it has a strength of forty horses.

Participation in Events and Awards Won:

Increased participation of naval personnel in equestrian and polo events—along with the introduction of equestrian training of horses, personnel and riders as well as other management and administration—has led to an incremental increase in awards and achievements in the past few years. Some of the championships *IN* teams have participated in include the Sapta Shakti Horse Show in Jaipur, the National Tent-Pegging Championship in Greater Noida, Delhi Horse

Show, Jaipur Horse Show, and the National Equestrian Championships in Delhi. The *IN* has won ten Gold, six Silver and six Bronze medals.

Indian Navy Polo Team: The achievements of the *IN* Polo team from 2015 to 2021 are tabulated below.

Year	No. of Tournaments	Performance
2015	2: Kolkata Polo Season; and Noida Polo Season	Winner in one event Runners-up in one event
2016	2: Bangalore Polo Season; and Kolkata Polo Season	Runners-up in one event
2017	4: Jodhpur Polo Season; Jaipur Polo Season; Delhi Polo Season; and Bangalore Polo Season	Runners-up in two events
2021	1: Delhi Polo Season	Runners-up in event

Indian Navy Tent-Pegging Team: The team received fresh impetus with the recruitment of five Sports Quota Entry Sailor (SQES) in 2016. The team's achievements in the last five years are tabulated below.

Year	Events Participated In	Medal Tally
2015–16	National Equestrian Championship	-
2016–17	Delhi Horse Show National Equestrian Championship, Jalandhar	Gold: 1 Silver: 1
2017–18	Open Junior International Tent-Pegging Championship, Noida National Equestrian Championship, Delhi	Gold: 2 Silver: 2 Bronze: 1
2018–19	Jaipur Horse Show Delhi Horse Show National Equestrian Championship Meerut Horse Show Haryana Horse Show & REC	Gold: 5 Silver: 3 Bronze: 7
2020–21	AEC and REC Meerut National Tent-Pegging Championship (First time, an <i>IN</i> rider selected for Indian team)	Gold: 3 Bronze: 3

INA Cadets: Commencing 2016, INA cadets have participated in various competitions and the performance of INA team is tabulated below.

Year	No of Events	Medals
2016	8	Gold: 5, Silver: 4, Bronze: 2
2017	5	Gold: 4, Silver: 2
2018	10	Gold: 5, Silver: 6, Bronze: 6
2019	14	Gold: 5, Silver: 3, Bronze: 12
2021	9	Gold: 7, Silver: 4, Bronze: 5

Indian Navy Sports Control Board

Located in Mumbai, the INSCB was established in 1956 and is responsible for the overall control of sports in the Navy. It has three Indian Navy Sports Cells (INSCs) under it. As of 2022, the *IN* has 515 sportspersons (against the authorized strength of 535) across all disciplines. This figure is up from 500 sportspersons in the decade 2000–10. This shows the emphasis laid by the *IN* in developing sports facilities and encouraging sportspersons.

Sports Infrastructure Development (2011–21):

The last decade witnessed sports infrastructure development in terms of new facilities and the upgradation of existing facilities. This was achieved through the Sports Infrastructure Development Plan (SIDP) that was conceptualized in February 2015. Based upon the various inputs sought from the Commands, several new initiatives were undertaken. These inputs included creation of new state-of-the-art facilities such as astroturf/grounds/synthetic tracks in athletics stadiums/multipurpose indoor stadium with facility for handball, basketball, volleyball, badminton, etc.



Astroturf Hockey Field at INS Shivaji

The Commands also sought augmentation of existing facilities—viz., squash courts, tennis courts, badminton courts—in terms of flooring/lighting/air-conditioning; enhancement and upgrading of golf courses, creation of indoor stadium for boxing/gymnastics and development of exclusive cricket grounds/stadium.

The SIDP was promulgated in February 2016, prioritizing projects to be undertaken in a phased manner over three years (financial year [FY] 2016–17 to FY 2018–19). Since then, adequate progress has been made and major sports infrastructure development projects accomplished till date include 198 facilities completed and another 105 in progress throughout various Commands.

Details are tabulated below.



Promoting Khelo India

Projects	Completed	In Progress
Hockey Astro turf	3-SNC (INA, INS <i>Shivaji</i>) 1-WNC (Opposite Command Stadium) 1-ENC (Fleet Ground)	1-WNC (INS <i>Kadamba</i>)
Football Synthetic Surface	4-SNC (2-INA, INS <i>Shivaji</i> , SS School) 1-ENC (INS <i>Rajali</i>)	3- WNC (INS <i>Angre</i> /NCS Ground, <i>IN ships Kadamba, Hansa</i>) 1-ENC (Fleet Ground)
Golf Practice Area	2- SNC (<i>IN ships Chilka, Valsura</i>) 2- WNC (<i>IN ships Kadamba, Tanaji</i>)	1-SNC (INS <i>Garuda</i>)
Synthetic Athletics Track	1-WNC (Command Stadium) 2-ENC (INS <i>Satavahana</i> , Eastern Fleet Ground)	3-SNC (NAY[K], <i>IN ships Valsura, Shivaji</i>) 2-WNC (NAY[Goa], INS <i>Kadamba</i>)
Wooden Squash Court	6-SNC (2-INA, <i>IN ships Dronacharya, Hamla, Chilka, Shivaji</i>) 2-WNC (INS <i>Kadamba</i> /Near INWTC, MO [KAR]) 2-ENC (<i>IN ships Kattaboman, Adyar</i>)	4-WNC (MO [MBI], SO[K]), and <i>IN ships Gomantak, Hansa</i>)
Synthetic Badminton Court	7-SNC (3-INA, 2-SAFNA <i>IN ships Agrani, Hamla</i>) 6-WNC (2-Near R-38 Building New Navy Nagar. INS <i>Angre</i> /Sports zone, <i>IN ships Kadamba, Vajrakosh, MMCB Complex</i>) 15-ENC (10-Units at Visakhapatnam, INS <i>Kattaboman</i> , NOIC [WB], <i>IN ships Rajali, Parundu</i>)	10-WNC (2- <i>IN ships Tunir, Shikra</i> , NPO/IMSC, <i>Angre</i> , HQGNA, <i>Kadamba</i> , NAI [Pbr]) 1-SNC (INS <i>Venduruthy</i>)
Football Synthetic Surface	4-SNC (2-INA, INS <i>Shivaji</i> , SS School) 1-ENC (INS <i>Rajali</i>)	3-WNC (INS <i>Angre</i> /NCS Ground, <i>IN ships Kadamba, Hansa</i>) 1-ENC (Fleet Ground)

Projects	Completed	In Progress
Synthetic Tennis Court	24-SNC (9-INA, 3-INS <i>Valsura</i> , 2-INS <i>Hamla</i> , 2-INS <i>Chilka</i> , 2- <i>IN</i> ships <i>Shivaji</i> , <i>Dronacharya</i> , Signal School, <i>Agrani</i> , SAFNA, NIH [Goa], NCW [K]) 4-WNC (Apollo Ground, <i>IN</i> ships <i>Gomantak</i> , <i>Vajrakosh</i> , <i>Kadamba</i>) 11-ENC (10-Units at Visakhapatnam, <i>INS Kattaboman</i>)	13-WNC (<i>IN</i> ships <i>Tunir</i> , <i>Shikra</i> , <i>Asvini</i> , <i>Abhimanyu</i> , MO [Mbi], HQGNA, <i>IN</i> ships <i>Kadamba</i> , <i>Dwarka</i> , NAI [Pbr], <i>INS Sardar Patel</i>) 1-ENC (<i>INS Rajali</i>)
Cricket Ground with Pitch	1-ENC (Visakhapatnam) 2-WNC <i>INS Angre</i> sports zone, (<i>INS Vajrakosh</i>)	2-WNC (<i>INS Kunjali</i> /Kohli Stadium, NAY [Goa])
Upgradation of Gym	3-SNC (Venduruthy, Garuda, Shivaji) 8-WNC (Kohli Stadium, <i>Angre</i> fitness lounge, Jayestha/Dhanistha, Tarang [New Navy Nagar], 1- <i>INS Trata</i> , 1- <i>INS Hansa</i> /NOI [Goa], <i>INS Vikramaditya</i> , Command Mess) 6-ENC (2-Units at Visakhapatnam, <i>INS Kattaboman</i> , NOIC [WB], <i>INS Rajali</i> , SSB [Kol])	3-SNC (<i>IN</i> ships <i>Dronacharya</i> , <i>Garuda</i> , <i>Valsura</i>) 7-WNC (<i>IN</i> ships <i>Vajrabahu</i> , <i>Asvini</i> , <i>INSCC</i> Mumbai, <i>IN</i> ships <i>Tunir</i> , <i>Abhimanyu</i> , <i>Sardar Patel</i> , <i>Dwarka</i>)
Open-air Gym	9-SNC (3-INA, <i>IN</i> ships <i>Dronacharya</i> , <i>Venduruthy</i> , <i>Hamla</i> , SAFNA, <i>Chilka</i> , <i>Shivaji</i>) 8-WNC (5-Officers' & Sailors' enclave <i>INS Kadamba</i> , Kohli Stadium, Razia Park, New Navy Nagar, <i>INS Hansa</i> /In-living sports complex) 12-ENC (10-Units at Visakhapatnam, 2- <i>INS Kattaboman</i>)	13-WNC (<i>INS Angre</i> /WNC Mess, <i>Angre</i> Garden, WF/Admiral Walk, <i>IN</i> ships <i>Kunjali</i> , <i>Shikra</i> , <i>Abhimanyu</i> , <i>Tunir</i> , <i>Asvini</i> , MO[Mbi], <i>Dwarka</i> , NAI [Pbr], <i>Gomantak</i>)
Synthetic Basketball Court	18-SNC (4-INA, 2- <i>INS Valsura</i> , 2- <i>INS Hamla</i> , 2-SAFNA, 2- <i>IN</i> ships <i>Chilka</i> , <i>Kochi</i> , <i>Agrani</i> , NIH[Goa], <i>INS Shivaji</i> , NWC[K], <i>Mandovi</i>) 7-WNG (Aditi/Ahilya complex, Vandana complex, <i>IN</i> ships <i>Gomantak</i> , <i>Hansa</i> , <i>Vajrakosh</i> , NSRY [Kar], <i>INS Kadamba</i>) 11-ENC (10-Units at Visakhapatnam, 1- <i>INS Kattaboman</i>)	18-WNC (3- <i>INS Angre</i> , 2-MO[Mbi], 6-HQGNA, <i>IN</i> ships <i>Tunir</i> , <i>Asvini</i> , HQWF, <i>IN</i> ships <i>Abhimanyu</i> , <i>Tanaji</i> , 1- <i>IN</i> ships <i>Dwarka</i> , <i>Sardar Patel</i> , NAI [Pbr]) 1-SNC (<i>INS Venduruthy</i>) 3-ENC (2- <i>IN</i> ships <i>Rajali</i> , <i>Kattaboman</i>)
Synthetic Handball Court	2-SNC (<i>INS Chilka</i>) 1-ENC (Units at Visakhapatnam)	5-WNC (2-HQGNA, <i>INS Kunjali</i> , SO[K], <i>INS Kadamba</i>) 1-ENC (<i>INS Virbahu</i>)
Rock Climbing Wall	1-WNC (Kohli Stadium)	1-WNC (ND [Mbi]/Adventure Cell)
Kabaddi Mat	1-WNC (<i>INS Gomantak</i>)	2-WNC (<i>INS Kadamba</i> , HQGNA)
Swimming Pool	1-WNC, 1 SNC (<i>INS Chilka</i>)	

Other Milestones

Over the years, the outstanding achievements of naval sportspersons have been recognized and awarded by the Government of India, the SAI as well as Services Sports Control Board (SSCB). The

following naval sportspersons were presented the following prestigious awards:

Arjuna Award, 2012: The President of India conferred the prestigious 'Arjuna Award 2012' to Omkar Singh, MCPO II for excellence in Shooting.

This award was conferred on a naval sportsman for the fourth successive year.



Arjuna Award, 2012 Winner: Omkar Singh, MCPO II
Photo: K. Ananthan Source: The Hindu

Padma Shri, 2013: The President of India conferred the prestigious Padma Shri Award to NG Dingko Singh, MCPO STD, and Coach of Navy Boxing Team for his distinguished Service to the field of Boxing.



NG Dingko Singh, MCPO STD Receiving the Padma Shri
Source: PTI

Services Best Sportsman Award, 2013: Omkar Singh MCPO II was awarded 'Services Best Sportsman' for excellence in Shooting, which added another feather to his cap.

Services Best Sportsman Award, 2014: Harpreet Singh MCPO II was awarded 'Services Best Sportsman' for his performance in Shooting.

Thirty-fifth National Games, 2015: The Thirty-fifth National Games were held in Kerala from 31 January to 14 February 2015 in seven different cities (Thiruvananthapuram, Kochi, Alappuzha, Thrissur, Kannur, Kozhikode and Kollam). Around eighty IN sportsmen, including coaches and managers, participated in the event as part of the Services Team. Additionally, there were forty-nine naval sportspersons, who represented their respective states in the Games. Naval sportspersons won a total of forty-six medals—twenty-two Gold, nine Silver and fifteen Bronze.

Eighth Senior National Bodybuilding Championship, 2015: Naval bodybuilders won awards at the Eighth Senior National Bodybuilding Championship held on 27 February–1 March at Gandhidham, Gujarat.

Name Rank & P No.	Weight Category	Achievement
Murli Kumar R, MCPO II, 138003-W	100 Kg	Gold Medal (Mr India)
Vipin Peter, CPO, 134399-B	85 Kg	Gold Medal (Mr India)
Hariprasad SP, PO	+100 Kg	Gold Medal (Mr India)
Arundas CV, STD I, 402070-Y		Coach
KR Nair, MCPOAF I, 144994-H		Coach

Twenty-fifth Senior National Fencing Championship, 2015: The Championship was held on 25–28 February 2015, in Nasik, Maharashtra. The following naval personnel excelled in the same:

Name Rank & P No.	Weight Category	Achievement
Depender Jeet Singh SSR, NYA	Sabre	Silver (Team)
Virender Singh Johal NAH II, 239048-T	Sabre	Silver

Name Rank & P No.	Weight Category	Achievement
H Rabi Kumar Ag PO CK (S), 402006-N	Foil	Bronze (Individual) Silver (Team)
L Pradeep Singh, Ag POELR, 222122-Z	Foil	Silver (Team)
Huidrom Raju Meitei, Ag PO CK (S), 402455-Z	Foil	Silver (Team)
Rajbir Singh CHME, 132267-H	Foil	Coach
OS Meetal CPOWTR, 125901-R	Sabre	Coach

Shooting, 2017: On the international frontier, Omkar Singh, MCPO, represented India in the Commonwealth Shooting Championship at Gold Coast, Australia, and won a silver medal in the 10 m Air Pistol event. The National-level shooting arena was equally eventful. An *IN* contingent comprising seventeen shooters participated in the XVII Kumar Surendra Singh Memorial Shooting Championship at the Dr Karni Singh Shooting Ranges complex, New Delhi, in 2017 and won one Gold, one Silver and five Bronze medals. Pratik Borse, SSR, won an individual Gold medal in the 10 m Air Rifle event and Karan Sheoyran, Sea II won an individual Silver in the 25 m Sports Pistol Junior Men event. The *IN*'s chief shooter, Omkar Singh, MCPO I, once again proved his mettle by earning an individual Bronze medal in 10 m Air Pistol.

Weightlifting, 2017: In 2017, Commonwealth Weightlifting Championship held at Gold Coast, Lovepreet Singh, SSR of the *IN* Weightlifting team represented the country. He won a Gold in the men's junior division (105 kg) category.

Racketlon Championship, 2017 and 2018: Commander Ashutosh Pednekar's passion

for racket sports fetched India international recognition. He represented India in the first Thailand Open Racketlon Championship, held in



Cdr Pednekar: Conquering the Courts

Pattaya, Thailand, and won two Gold medals. The championship, the first ever to be held in Asia, was organized by the German Racketlon Federation under the auspices of the Federation International de Racketlon, the world ruling body. Cdr Pednekar once again brought laurels by winning a Gold medal in the sixteenth World Racketlon Championship held in Zurich, Switzerland, in 2018. He also won a Bronze medal in the Men's Advanced Open Age category. Over 400 players belonging to twenty-eight countries participated in the Championship.

Boxing, 2018: NT Lalbiakkima, SSR, (UT), of the *IN* represented India and won a Bronze medal in the Light Flyweight category (46–49 kg) in the first India Open International Boxing Tournament held at Thyagaraj Stadium, New Delhi, in February 2018. In the international ring, Vanlhpuria, SSR, of the *IN* represented India and won a Bronze Medal in the middleweight (75 kg) Category, at the twenty-ninth Ulaanbaatar Cup International Boxing Tournament held in Mongolia in June 2018.

Athletics: Participation by *IN* personnel in international athletics events in the last decade brought laurels to the country. The details are given as under.

- **Asian Games, 2018:** The Asian Games saw *IN* sportspersons perform with zeal and achieve medals. The Indian quartet, including the *IN*'s Muhammed Anas Y SSR, along with Relay Team members Rajiv Arokia, Dharun Ayyasamy and Muhammed Puthanpurakkal, won a Silver medal in the men's 4x400 m Relay race at the Asian Games 2018. In the men's 400 m run category Muhammed Anas Y, SSR, won a Silver medal with a timing of 45.69 seconds. Another Gold medal was earned and a new record set in the Asian Games by the *IN*'s Tajinder Singh Toor, Petty Officer (PTI), with a throw of 20.75 m.
- **Military World Games 2019:** Touted as bigger than the Asiad and Commonwealth Games, the Military World Games 2019 were held at Wuhan in China in the month of October. The *IN* fielded twenty-six sportspersons, including three officers for the event. The contingent participated in several events including athletics, shooting, gymnastics, tennis and modern pentathlon.
- **Olympics, 2012, 2016 and 2020:** In the last decade, *IN* personnel represented India at all the three Olympics, namely—London Olympics 2012, Rio Olympics 2016, and Tokyo Olympics 2020, showcasing the *IN*'s objectives to produce world-class athletes and sportspersons. Representation at the Olympics requires years of dedication and training by sportspersons, but also the constant upgrading of the institutional facilities that groom them. The efforts of the *IN* are being reflected in the outcomes in each passing Olympics.

Name	Event	Year
Sanjeev Rajput	50 m rifle three position	2012
Sandeep Tomar	Freestyle 57-kilogram Wrestling	2016
Kuldeep Singh	Wrestling (Coach)	
Md Anas Yahiya	400 metres and the 4 × 400 metres relay	
Tajinder Singh Toor	Shot Put	2020
Md Anas Yahiya	4 × 400 metres relay	
Jaibir MP	400 metre hurdles	

🚢 Conclusion

Sports and adventure activities have been given importance for their role in the all-round development of women and men in uniform in the Navy. Several new initiatives were taken keeping that objective in mind in the last decade. The span of activities has increased to include a large variety of sporting and adventure activities. The *IN* is not only participating but winning in a range of these events, both at national and international levels. Not only has there been increasing interest among officers and naval personnel towards sports and adventure activities, but they have also brought laurels to the Service and the nation at local and international levels. The focus of the *IN* on accretion of sports-related infrastructure development and upgrading over the last decade, will only add to the tally of the sportspersons and laurels they bring to the country.

Note

1. IAU is the International Association of Ultra Runners; <https://iau-ultramarathon.org/>



36 | Sea Cadet Corps

⚓ Introduction

The genesis of the Sea Cadet Corps can be traced back to the pre-Independence Karachi Sea Scouts, established by Mr Gokaldas Ahuja (founder, Honorary Commodore), a businessman by profession, in May 1938. The group taught young boys swimming, sailing, knots and splices. In July 1942, a sailing dinghy of the then Royal Indian Navy (RIN), with three trainees from His Majesty's Indian Ship (HMIS) *Dilawar* (the training establishment on the water front of Chinna Creek) capsized in the Creek. The trainees were rescued by the Sea Scouts who happened to be in the vicinity. As a gesture of appreciation, the Commanding Officer of the Navy's Boys Training Establishment, HMIS *Dilawar*, obtained approval for the Sea Scouts to use his establishment for their training. Subsequently, the Sea Scouts embarked RIN ships for training cruises and were given small-arms training in the Navy's Gunnery School (HMIS *Himalaya*) in Karachi.

During the Second World War, Mr Ahuja and some of the officers of his Sea Scouts were also granted honorary commissions in the RIN Volunteer Reserve (RINVR) force and participated in the motorboat patrols of Karachi Harbour. The young Sea Scouts learnt and imparted first-aid training and also carried out air raid precaution duties. Post-Independence, the Group relocated to Bombay in 1948. In February 1951, the Sea Scout

Group came to be known as the Sea Cadet Corps (SCC), with their training being carried out both at INS *Kunjali* and INS *Angre*. In order to establish a permanent training infrastructure for the SCC, and largely due to the efforts of Honorary Commodore Gokaldas Ahuja in securing land and raising funds, the foundation stone of Training Ship *Jawahar* was laid on 21 March 1963 and was eventually commissioned on 10 February 1966.

The Sea Cadet Council formed in 1956, was registered as a Public Registered Charitable Trust in 1973, with the Flag Officer Commanding-in-Chief (FOC-in-C) Western Naval Command as Chairman Trustee and eminent persons in the fields of shipping, industry, administration and the *IN*, as the other trustees. With institutional support and able leadership of the trustees, the intensity of sailing activities as well as training curriculum witnessed an increase in the 1980s, and fundraising began for the construction of a 'boating station' and associated facilities. As part of this expansion, the Naoroji Pirojsha Godrej Memorial Building Boat Station was built adjacent to TS *Jawahar* on land leased from the Government of Maharashtra, and was commissioned by the Chief of Naval Staff (CNS) in November 1991 as a facility at providing training infrastructure for about 100 cadets.


At the invitation of Prime Minister Jawaharlal Nehru, the SCC Cadets started participating in the Republic Day Parade in Delhi from 1958 onwards. Participation ceased after 1991 due to

objections raised by the National Cadet Corps (NCC). In their home states, SCC Cadets continue to participate in the Republic Day, Independence Day, State Day, Navy Day celebrations and other parades. In 1994, the CNS became ex-officio President of the Sea Cadet Council with the FOs C-in-C of the Western, Eastern and Southern Naval Commands as Senior Vice Presidents of the respective SCC Chapters.

Units of the Sea Cadet Corps are formed under the authority of the Sea Cadet Council, and are set up in Naval Establishments, Coast Guard (CG) Stations, Army Engineers Centres and in schools having adequate facilities and volunteers to run the Sea Cadet Corps Units.¹ The Unit Commanding Officers are responsible to the Commodore Superintendent, SCC, for the efficient functioning of their Units. The Units are responsible for imparting values, skills and a sense of discipline to boys and girls in a prescribed age-group through Nautical and Allied Training. The Units adhere to laid down regulations and instructions issued by the SCC National Headquarters located on Training Ship *Jawahar*, Mumbai. A list of SCC units is tabulated below.

Year	Location of SCC Unit
1948	Mumbai (Training now conducted at Training Ship <i>Jawahar</i> and INS <i>Kunjali</i>)
1975	Visakhapatnam at INS <i>Circars</i>
1975	Kochi at Seamanship School, INS <i>Venduruthy</i>
1980	Ootacamund at the Good Shepherd International School
1993	Port Blair at INS <i>Jarawa</i>
1995	Lonavla at INS <i>Shivaji</i>
1996	Goa at National Hydrographic School at Vasco Da Gama
2000	Pune at Bombay Engineer Group and Centre
2000	Daman at Coast Guard Public School at CGAS Daman
2001	Okha at INS <i>Dwarka</i>

Important Events of the Decade: A list of historic events pertaining to the SCC in the previous decade are tabulated below.

Year	Event/Activity
2011	Website launch of Sea Cadet Corps (www.seacadet.in)
2011	<p>Gift of Sailing Catamaran: A 38-foot sailing catamaran <i>Jaanu</i> was presented by an ex Sea Cadet Mr Vinay Sethi (Sea Cadet 1957–60). This gift was aimed to provide offshore sailing experience to the cadets.</p> 
	<p>Participation in President's Fleet Review 2011: The SCC participated in the President's Fleet Review on 20 December 2011 in Mumbai Harbour. Sea Cadet Sailing Catamaran <i>Jaanu</i> joined the assemblage of the IN, CG and Merchant Marine ships; (then) President, Her Excellency Smt. Pratibha Devisingh Patil, reviewed the Naval Fleet in Mumbai.</p>
2013	Sea Cadet Corps 75 th Year Ceremonial Parade was held at the Gateway of India, Mumbai, with 1,338 Cadets on Parade.
2013	<p>INSV <i>Mhadei</i>: A ceremonial reception was organized by the IN at the Gateway of India on 6 April 2013 with (then) President, His Excellency Dr Pranab Mukherjee, to receive the Sailing Vessel <i>Mhadei</i> after her solo unassisted circumnavigation under the able command of Lt Cdr Abhilash Tomy. Sixty SCC girl Cadets performed the Sailors Hornpipe Dance in the presence of the President of India, the CNS and other distinguished invitees.</p>
2015	Sea Cadet Corps girls' marching contingent was judged the best contingent at the Republic Day Parade held at Shivaji Park, Mumbai.
2016	<p>International Fleet Review: SCC girls performed the Sailors' Hornpipe Dance at the International Fleet Review 2016 City Parade at Visakhapatnam.</p>



Contingent of Sea Cadet Corps at Gateway of India

Note

1. Website of Sea Cadet Corps: www.seacadet.in



37 | National Cadet Corps

⚓ Historical Background

The genesis of the National Cadet Corps (NCC) can be traced back to that period of the First World War, when the British desperately looked towards India as a source of manpower for their war effort. The casualties suffered by the British Indian Corps in the war, were so heavy that the Indian Army Reserves could not cope with the demands for reinforcements. The British Government in India desired greater Indian participation in the war effort, and therefore, introduced the Indian Defence Force Bill in the Legislative Council in Delhi, on 21 February 1917. This Bill sought to obtain compulsory enrolment of the European/British subjects in India, and voluntary enrolment of the non-European/British subjects within the country. The Bill was essentially a war-measure, designed to meet the immediate military requirements of the Empire. This was also the time when Indian leaders were demanding a rightful place for Indians in the command and control hierarchy of the defence forces through entry into the officer cadre of the Armed Forces. They supported the Bill, with the hope that in the near future, facilities hitherto offered only to British youth, would be extended to Indian youth as well.

Continuous pressure from the Indian leaders compelled the British to prepare and refer the Indian Defence Force Bill to a select committee which finally resulted in the passing of the 'Indian

Defence Force Act 1917', by the Governor General, on 28 February 1917.

As per this Act, the Governor General could initiate enrolment of Indian students in a youth organization named the University Corps (UC). The objective of the UC was to train potential soldiers who could be called upon to assist in an emergency, and to curb anti-Government and subversive activities by channelling the energy of the youth through military training.

After the First World War, in 1927, UC was renamed as University Training Corps (UTC) by a Bill passed in the Legislative Assembly. The purpose behind this was to keep the UTC as a reservoir of trained graduates for the officer cadre in the British Indian Army, in an emergency. British authorities in India believed that military training of educated Indian youth would further create problems for the colonialists. Therefore, on ground, UTC cadets were generally provided theoretical knowledge with little or no practical training. And when the clouds of war gathered again on the European horizon, schools and colleges in India were still largely producing administrative support cadre for the British administration. When the requirement to enhance their officer cadre was felt, the British themselves faced difficulty in finding a sufficient number of suitable educated youth to fulfil the exponential needs of the British war machine.

With the outbreak of the Second World War in September 1939, the need to encourage more

Indian young men into Armed Forces increased. This time the Indian national leaders made it clear that they would not fight for the freedom of others when democracy and freedom were denied to India. Once the British Government assured them that they would grant India freedom after the war, they decided to make UTC a more attractive youth organization, which could provide good officers.

In 1942, UTC was remodelled on the lines of the Officers Corps of the UK and was renamed University Officers Training Corps (UOTC). With a view to enhance the British war-effort and to simultaneously satisfy Indian aspirations in the officer cadre, additional units were raised in some Indian universities. A Sea Scouts Corps was established to provide naval training to students interested in sea training. The British Government also established the Women's Auxiliary Corps (India) in 1942, on the pattern of the Women's Auxiliary Corps, UK. A large number of Indian women from different strata of society came forward to join it. This had a positive effect on Indian society, which after centuries, accepted women in military uniform. The Women's Auxiliary Corps broke the orthodox mindset of Indian society in many ways and paved the way for acceptance of young girls to join the force. By 1946, there were eighteen UOTC units—in Bombay, Calcutta, United Provinces, Punjab, Central Provinces, Madras, Delhi, Sind, Patna, Dacca, North West Frontier Province, Hyderabad, Travancore and Mysore.

In both World Wars, Indian manpower and supplies were vital to the British war effort. However, after the Second World War, analysis of UOTC revealed that it was unable to provide sufficient number of qualified Indian officers for the Armed Forces. In July 1946, the British Government in India decided to appoint a committee to study and make recommendations for establishment of a Cadet Corps organization on a nation-wide basis. It was to explore the feasibility of introducing

military training in schools and colleges as part of an 'all India Cadet Corps', which could inspire and attract educated youth for the Armed Forces.

The Cadet Corps Committee, with Pandit HN Kunzru as its chairman, was formed in New Delhi on 29 September 1946 under the interim Government of India. Pandit Hriday Nath Kunzru was considered an authority on defence affairs and had made outstanding contributions in discussions pertaining to defence issues. At the same time, a few sub-committees were also formed which were sent on study tours to the main provinces. One sub-committee was also sent on tour to Great Britain and France from 15 February 1947 to 31 March 1947, to study the Youth and Cadet organizations in those countries. The Cadet Corps Committee carried out an exhaustive study and submitted its report in March 1947.

After Independence, the recommendations of the Kunzru Committee were placed before the Constituent Assembly on 13 March 1948. After due deliberations and amendments, a Bill for the establishment of National Cadets Corps (NCC) was passed by the Assembly on 8 April 1948. The Bill received the assent of the Governor General on 16 April 1948, and the NCC came into being by an Act of the Parliament as Act No. XXXI of 1948, designated as 'The National Cadet Corps Act 1948'. This Act, with its thirteen clauses, prescribed the formation of the NCC in India.

The NCC was inaugurated on 15 July 1948, with a total of 20,000 cadets divided into ninety-six units. The Girls Division of NCC, with 270 cadets was created in July 1949. The Naval Wing of NCC came into being in July 1952, when the first Naval Unit comprising two officers and sixty cadets was raised in Mumbai.

The NCC aims to develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship, and the ideals of selfless service among the youth to

make them useful citizens. It is also focused on creating a human resource of organized, trained and motivated youth, to provide leadership in all walks of life including the Armed Forces, and to be always available for the service of the nation. It happens to be the largest uniformed youth service in the world, and has, over the decades, carved a niche for itself as a unique organization that works towards nation-building and is an encouragement to juniors. It engenders the building of a positive national character.

Dr APJ Abdul Kalam, then President of India, during his address to NCC cadets in November 2004, had expressed a desire that, if possible, NCC training should be made compulsory for all students. The issue was deliberated at length in various forums, such as the Central Advisory Committee (CAC) meeting, Joint State Representatives and Deputy Directors General (JSR&D) Conference, and the Parliamentary Consultative Committee Meeting held in 2005. Shri Pranab Mukherjee (then Raksha Mantri), proposed that the sanctioned NCC Cadet strength be further increased by two lakh. To implement the proposal, the Ministry of Defence (MoD) constituted a Working Group (WG) in September 2006. Based on its recommendations, it was decided to increase the cadet strength by two lakh, comprising 1,67,000 Army, 12,500 Navy and 11,500 Air Force NCC cadets, in phases over five years, at the rate of 40,000 additional cadets every year.

In order to cater to the expansion of the Corps, five NCC Group Headquarters, fifty NCC Army Units, ten NCC Naval Units and ten NCC Air Squadrons were also envisaged in the recommendations. The proposal of increasing the strength of the Corps by two lakh was approved by the Government in August 2010. By 2010, the NCC strength was close to 1.3 million, almost equal to that of the Indian Armed Forces.

⚓ NCC (Navy) through the Decade

The NCC (Navy) has continued imparting focused training to cadets through training camps at the Unit level (Annual Training Camps), Group Headquarters level (Combined Annual Training Camps) and at DGNCC level (Centrally Organized Camps). Additionally, NCC (Navy) cadets participate at the Nausainik Camp at Karwar, NCC Yachting Regatta at INS *Chilka*, and are attached to Indian Naval Academy, INS *Shivaji*, INS *Valsura* and Naval Dockyards every year to impart Navy-specific orientation training. The NCC (Navy) cadets are also part of the Republic Day Parade contingent each year.



Navy Chief's Visit to NCC Republic Day Camp, 2020

The NCC (Navy) cadets have also been deputed onboard *IN* ships across Western, Southern and Eastern Naval Commands and also onboard 1st Training Squadron ships for foreign visits to provide valuable sea-going exposure. Exposure to NCC (Navy) cadets through adventure activities such as sailing, windsurfing, kayaking and scuba diving also continued through the last decade.

In February 2021, Cadet Kaamya Karthikeyan of NCC junior wing of 1 Maharashtra Naval unit & a class VIII student of Navy Children School, Mumbai was awarded the PM Rashtriya Bal Shakti Puraskar for mountaineering.



Whilst these well-established training initiatives continued, some of the major capacity building initiatives with regard to expansion in capacity of NCC (Navy) through the last decade are enumerated below:

Addition of NCC (Navy) Units: Presently, there are 14.6 lakh NCC cadets, of whom 93,007 are Naval NCC cadets. They are administered by seventeen NCC Directorates and seventy-one Naval NCC Units pan-India. Eleven new Naval NCC Units were raised between 2011 and 2020, details of which are tabulated below.

Future Augmentation: With a special focus on expansion of NCC in border/coastal regions of the country, a scheme for further increase in cadet strength by one lakh in all three streams

Unit	Location	Year
3 Punjab Naval Unit NCC	Bathinda	2011
4 Odisha Naval Unit NCC	Bhawanipatna	2012
4 Gujarat Naval Unit NCC	Porbandar	2015
5 Gujarat Naval Unit NCC	Bhuj	2015
6 Gujarat Naval Unit NCC	Gandhidham	2015
7 Gujarat Naval Unit NCC	Verawal	2015
8 Gujarat Naval Unit NCC	Jamnagar	2015
9 Gujarat Naval Unit NCC	Navasari	2015
1 Jharkhand Naval Unit NCC	Ranchi	2015
1 Lakshadweep Naval Unit NCC	Kavaratti	2017
5 Odisha Naval Unit NCC	Paradip	2017

(Army, Navy and Air Force), was announced by the Hon'ble Prime Minister on 15 August 2020. The additional cadet strength is to be created by upgrading twenty-one NCC minor units (Army), eighteen NCC Naval Units and ten NCC Air Squadrons to their authorized cadet strength. The Government Sanction Letter for this scheme was issued on 7 October 2020.

Opportunities of Joining Armed Forces through NCC: Six vacancies are reserved per course for NCC 'C' Certificate holders for joining the *IN* after graduation through NCC Special Entry Scheme. From 2019 onwards, the eligibility criteria were revised to BE/BTech degree from an AICTE-recognized institution/University in order to bring it at par with other officer entries. Ten erstwhile NCC cadets have joined the *IN* as officers between 2011 and 2020.



38 | Navy Welfare and Wellness Association

NWWA has always believed in two things with regard to the Naval fraternity:

- (i) when you deploy, we 'deploy'; and leading from that,*
- (ii) 'a family that serves together, stays together'.*

The Navy Welfare and Wellness Association (NWWA) plays a vital role in ensuring that naval families are empowered and secure at all times. It is imperative to keep these networks thriving so they can be relied upon in times of war.

Vision

The NWWA's vision is to aid and support Naval families and to look after their well-being across different life-stages.

Mission

- Promoting community and camaraderie.
- Implementing programmes for community development and well-being.
- Facilitating development of academic and vocational skills.
- Rehabilitation of families of deceased naval personnel.
- Relieving hardships of people affected by natural disasters.

The Genesis of NWWA

At the time of India's independence, Navy wives were part of the Armed Forces Women's Welfare

Association. Their charter of duties included hospital visits to assist nurses in providing medical care to injured sailors, and the rehabilitation of widows of Service personnel. Navy wives were also trained in the discipline of military signals and helped send and receive messages in times of war.

The Naval Officers' Wives Association (NOWA) was formed in Mumbai in 1948, when Mrs Manek Soman proposed the formation of an organized welfare body to address the needs of sailors and their families in the post-Independence era. In 1949, NOWA was set up in Mumbai and Mrs Betty Davis was elected as its first President.

Transformation of NOWA to NWWA (Navy Wives Welfare Association): On 14 February 1986, NOWA was rechristened NWWA by then NOWA President Mrs Meera Tahiliani, wife of the Chief of Naval Staff (CNS), Admiral R.H. Tahiliani. In 1986–87 she was President-in-Chief of NOWA and later of NWWA. Under her stewardship, NWWA was registered as a charitable society under the Societies Act XXI of 1860, on the same day that it was christened NWWA. Accordingly, 14 February has since been celebrated as NWWA Diwas since. The evolution from NOWA to NWWA marked a significant stage in the process of democratization of the association. Sailors' wives were now integrated with equal rights of membership.

A second major development was initiated in 1991 by then NWWA President Mrs Lalita Ramdas, when the organization became truly

professional, launching multifaceted welfare and development programmes. The new form of the organization has been in place since then, meeting community needs directly through its programmes and projecting larger issues to the Indian Navy (*IN*) for necessary action.

Evolution from Navy Wives Welfare Association to Navy Welfare and Wellness Association: With the *IN* becoming gender neutral and the scope of the organization's work expanding to include Naval families across the lifespan; NWWA evolved to stay in sync with the changing times. Mrs Kala Hari Kumar, current President, NWWA, has been instrumental in the ensuring that this is important aspect reflected in the new name—Navy Welfare and Wellness Association. The President, NWWA, revealed the new name on 28 April 2022, post a pan-Navy competition to choose a suitable new name. While the name was changed, the acronym remains the same, signifying both continuity and change.

⚓ Exploring New Horizons

Taking pride in being an organization that always in sync with changing times, NWWA is constantly responsive to the needs of the naval community. A few of NWWA's focus areas are enumerated below.

Tarsh and Udyogika: Tarsh provides Sailors' wives an opportunity to learn the art of block printing. These units are established across all NWWA regions with a dual aim of Swawalamban (self-sufficiency) and Laghu Udyogika (Cottage Industry). Our ladies carry forward this traditional art form, whilst getting empowered to start their own units. Udyogika provides training in tailoring, embroidery, etc. Women are empowered to produce a variety of designer products such as bed linen, bath accessories, home-décor products, etc. These are then sold through Samudri outlets, enabling the women to generate income.

Samudri: Samudri is a platform for the community to showcase its creative and entrepreneurial talent. An initiative to collocate Samudri with Indian Navy Canteen Service (INCS) outlets was successful, increasing visibility and footfall. Thereafter, Samudri at INCS was inaugurated in Kochi on 12 November 2018. Samudri (NAVMART) was inaugurated in INCS Delhi in 2019.

Orientation Capsule: This initiative for young spouses facilitates a smooth transition into the Navy way of life, with its focus on the nation, community and camaraderie. The first capsule was conducted in Delhi in 2017 and has since become an annual feature of the NWWA calendar across all NWWA regions. Welcome Young Lady an NWWA publication geared at supporting the young spouses, has also been updated to reflect the sensibilities of the current generation.

Wellness Initiatives: The NWWA's Arogya group coordinates the Swasthya Saheli lecture series on important health topics, and conducts the Well Woman Clinic for monitoring of health status and early detection of diseases. The first Well Woman Clinic was conducted in February 2017 in New Delhi and these have since become an annual feature on the NWWA calendar across all regions.

Swayam Siddha, a 'Smart Mom' contest, was initiated in 2017 by then NWWA President Mrs Rina Lanba to spread awareness on maternal and child health issues amongst young mothers. The first 'Smart Mom' contest was held on 20 December 2017.

During Mrs Rina Lanba's tenure as President, NWWA, an acupressure course for ladies was started in Delhi on 29 August 2019, in collaboration with Care Heal Humanity Institute. This course proved especially helpful during the COVID-19 pandemic, when most could not visit hospitals.

Training Programme by Tata Institute of Social Sciences' School for Vocational Education: Following the signing of a memorandum of understanding (MoU) with TISS, by Mrs Rina

Lanba in Mumbai on 20 May 2016, NWWA members gained access to its popular course in Early Child Development, paving a road map for successful careers. However, the course was later discontinued due to policy changes within the university after which the university was no longer permitted to offer the course in satellite locations.

Launch of App for Community Connectedness: On 14 February 2017, NWWA launched a group on the Telegram app for community connectedness.

🚢 **Current NWWA Pan-Navy Initiatives**

Samuha-Indian Navy Website: The COVID pandemic in 2019–20 heightened the significance of community and the importance of leveraging technology to ensure that the community remained connected. This was the catalyst for the launch of the Indian Navy Community website Samuha—a one-stop digital platform where naval families can access information, find support and engage with each other.

The soft launch of Samuha took place on 22 April 2022 and the community launch of the website by Chief of Naval Staff Admiral R Hari Kumar and President NWWA Mrs Kala Hari Kumar took place on 2 November 2022, against the backdrop of the Commanders' Conference 2/22.

The NWWA, the beating heart of the Indian Navy, finds its rightful place on the Samuha platform. Each NWWA region has its own section on the website.

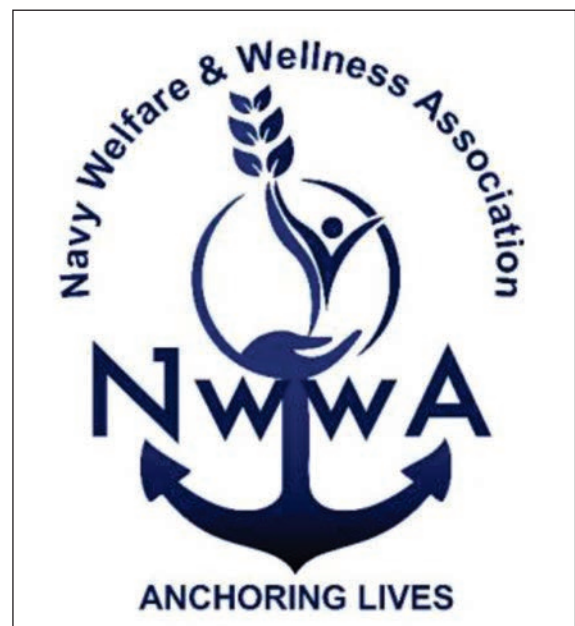
As a nod to becoming more environment conscious, *Veerangana*, an annual NWWA publication, was shifted to the digital medium in August 2022. The e-version is available on Samuha and only a few copies are printed for distribution to visiting dignitaries from India and abroad. Likewise, a call was taken for NWWA regions to publish the *Varuni* newsletter either biannually (as before), or annually, at their discretion. The e-version of *Varuni* is also uploaded and available on Samuha.



Mentoring Young Aspirants

Mentoring Youth for SSB Success: This programme was initiated in Mumbai on 31 July 2021 and thereafter also launched in Delhi and Kochi. It aims to mentor our youth to prepare for Armed Forces Service Selection Board Tests. The programme is conducted by ex-servicemen in respective Naval Children's Schools.

New NWWA Logo: The new logo was launched in August 2022 and is a creative description of an anchor symbolizing steadfast commitment to Welfare, Empowerment, Gender Neutrality and Wellness. The tagline, 'Anchoring Lives', signifies stability in life and strong bonds that inspire us to act.



New NWWA Logo



Release of Family Logbook

Family Logbook: Launched in August 2022, this is a personal financial record book to be used in the event of any unfortunate casualty. The motivation behind this was the struggle some members of our community experienced when they tragically lost their loved one.

Klay Day Care for Children: The NWWA signed an MoU with this leading chain in preschool and daycare. Since 17 August 2022, a nurturing and secure environment is ensured for our children while parents are at work.

Tri-Services families have access to 150 centres across the nation at concessional rates.

Webinars: A series of webinars were conducted to address various challenges faced by the naval community. 'Voices and Choices' was conducted in collaboration with the Association for Adolescent and Child Care in India (ACCI) to empower parents of adolescent children. These webinars were especially useful during the pandemic, when the community was strictly adhering to social distancing norms.

An MoU signed with Kalinga University: An MOU was signed with Kalinga Institute of

Industrial Technology to provide children of deceased personnel and serving sailors priority for admission to BTech courses under concessional rates. The NWWA also extended a platform to sell products made by tribal children studying at the Kalinga Institute of Social Sciences.

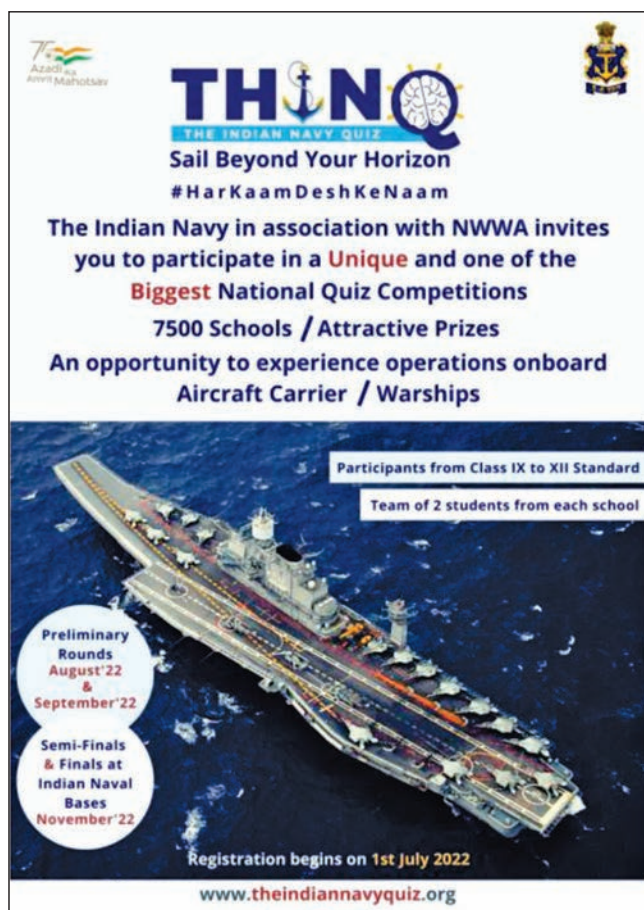
Chetna Early Intervention Centres (EIC): The EICs were established in Mumbai (INHS *Asvini* in September 2021), Kochi (INHS *Sanjivani*, May 2022) and Delhi (NWWA Kendra, Chanakya Bagh, August 2022) for early detection and intervention



Inauguration of Chetna Early Intervention Centre

of developmental disorders in children below the age of six. Chetna EICs provide naval families with access to intervention from multidisciplinary professional teams, all under one roof without having to travel large distances and spend huge amounts of money to access high quality services.

THINQ Nationwide Quiz: To commemorate seventy-five years of Indian Independence the *IN*, in collaboration with NWWA, invited 7,500 schools



THINQ Nationwide Quiz

from across the nation to participate in a nationwide quiz competition. The preliminary rounds were held online, while the semi-final and final rounds were conducted onboard INS *Vikramaditya*. The sixteen semi-finalist teams also witnessed air operations at INS *Hansa*, and the passing-out parade at Indian Naval Academy (INA), Ezhimala. This was excellent exposure for the young sparks to the fine Service that is the Indian Navy, and also gave them an opportunity to interact with top *IN* leadership.

⚓ Awards

PHDCCI's Astitva Samman Award: On 15 February 2019 in New Delhi, the PhD Chamber of Commerce and Industry presented NWWA the Astitva Samman award in recognition of NWWA's efforts in promoting women's empowerment. Mrs Rina Lanba, then President, NWWA, received the award on behalf of the organization.

⚓ Conclusion

F.A.M.I.L.Y. (Family Welfare, Aspirations for All, Marital Harmony, Insured Future, Learning and Skill Building, Young Minds) forms the bedrock of all NWWA initiatives geared at community and camaraderie. The NWWA's focus, under the stewardship of present President Mrs Kala Hari Kumar, has been to introduce new avenues for women empowerment, environment protection and to embrace technology, so that it remains ever responsive to the needs and growing aspirations of our dynamic community.





Appendices



SHIPS/ESTABLISHMENTS COMMISSIONED AND DECOMMISSIONED

Details of Ships, Submarines and Air Squadrons Commissioned

Ser	Name	Date of Commissioning	Remarks
1.	INS <i>Deepak</i>	21 January 2011	Fleet Tanker
2.	INS <i>Kabra</i>	8 June 2011	Fast Attack Craft
3.	INS <i>Koswari</i>	12 July 2011	Fast Attack Craft
4.	INS <i>Satpura</i>	20 August 2011	Multirole Frigate
5.	INS <i>Karuva</i>	25 August 2011	Fast Attack Craft
6.	INS <i>Shakti</i>	1 October 2011	Fleet Tanker
7.	INS <i>Chakra</i>	23 January 2012	Nuclear-Powered Submarine
8.	INS <i>Sudarshini</i>	27 January 2012	Sail Training Ship
9.	INAS 344	11 April 2012	Air Squadron – UAV
10.	INS <i>Teg</i>	27 April 2012	Guided Missile Frigate
11.	INS <i>Sabyadri</i>	21 July 2012	Multi-role Frigate
12.	INS <i>Makar</i>	21 September 2012	Hydrographic Survey Vessel
13.	INS <i>Tarkash</i>	9 November 2012	Guided Missile Frigate
14.	INS <i>Saryu</i>	21 January 2013	Offshore Patrol Vessel
15.	INAS 303	11 May 2013	Air Squadron – MiG-29K
16.	INS <i>Trikand</i>	29 June 2013	Guided Missile Frigate
17.	INS <i>Sunayna</i>	15 October 2013	Offshore Patrol Vessel
18.	INAS 322	12 November 2013	Air Squadron-ALH Dhruv
19.	INS <i>Vikramaditya</i>	16 November 2013	Aircraft Carrier
20.	INS <i>Sumedha</i>	7 March 2014	Offshore Patrol Vessel
21.	INS <i>Kolkata</i>	16 August 2014	Stealth Guided Missile Destroyer
22.	INS <i>Kamorta</i>	23 August 2014	ASW Stealth Corvette
23.	INS <i>Sumitra</i>	4 September 2014	Offshore Patrol Vessel
24.	INS <i>Kochi</i>	30 September 2015	Stealth Guided Missile Destroyer
25.	INS <i>Astradharini</i>	6 October 2015	Torpedo Launch and Recovery Vessel
26.	INS <i>Kadmatt</i>	7 January 2016	ASW Stealth Corvette
27.	INS <i>Tarmugli</i>	23 May 2016	Fast Attack Craft
28.	INS <i>Aribant</i>	25 August 2016	Strategic Strike Nuclear Submarine
29.	INS <i>Tihayu</i>	16 October 2016	Fast Attack Craft
30.	INS <i>Chennai</i>	21 November 2016	Stealth Guided Missile Destroyer
31.	INS <i>Tillanchang</i>	9 March 2017	Fast Attack Craft
32.	LCU L 51	28 March 2017	Landing Craft Utility
33.	LCU L 52	21 August 2017	Landing Craft Utility
34.	INS <i>Tarasa</i>	26 September 2017	Fast Attack Craft
35.	INS <i>Kiltan</i>	16 October 2017	ASW Stealth Corvette
36.	INS <i>Kakvari</i>	14 December 2017	Scorpene-class Diesel Electric Submarine
37.	LCU L 53	25 April 2018	Landing Craft Utility
38.	LCU L 54	25 May 2018	Landing Craft Utility
39.	LCU L 55	19 December 2018	Landing Craft Utility

Ser	Name	Date of Commissioning	Remarks
40.	INAS 313	22 July 2019	Air Squadron – Dornier,
41.	LCU L 56	29 July 2019	Landing Craft Utility
42.	INS <i>Khanderi</i>	28 September 2019	Scorpene-class Diesel Electric Submarine
43.	INAS 314	29 November 2019	Air Squadron – Dornier
44.	LCU L 57	15 May 2020	Landing Craft Utility
45.	INS <i>Kavaratti</i>	22 October 2020	ASW Stealth Corvette
46.	INS <i>Karanj</i>	10 March 2021	Scorpene-class Diesel Electric Submarine
47.	LCU L 58	18 March 2021	Landing Craft Utility
48.	INS <i>Visakhapatnam</i>	21 November 2021	Stealth Guided Missile Destroyer
49.	INS <i>Vela</i>	25 November 2021	Scorpene-class Diesel Electric Submarine

Details of Shore Establishments Commissioned

Ser	Unit	Date of Commissioning	Remarks
1.	INS <i>Dweeprakshak</i>	30 April 2012	Naval Base, Kavaratti Lakshadweep
2.	INS <i>Tanaji</i>	5 July 2012	Base Depot Ship, Mankhurd Naval Station
3.	INS <i>Baaz</i>	31 July 2012	Naval Air Station, Campbell Bay, Great Nicobar Island
4.	INHS <i>Navjivani</i>	12 December 2012	Hospital Ship, Indian Naval Academy, Ezhimala
5.	INS <i>Sardar Patel</i>	9 May 2015	Base Depot Ship, Porbandar
6.	INS <i>Vajrakosh</i>	9 September 2015	Naval Establishment, Karwar
7.	INS <i>Vishwakarma</i>	14 November 2015	Shipwright School, Visakhapatnam
8.	INS <i>Karna</i>	12 July 2016	Marine Commandos Unit, Bheemunipatnam
9.	INDC <i>Danteshwari</i>	12 December 2018	Dental Centre, Mumbai
10.	INHS <i>Sandhani</i>	24 December 2018	Hospital Ship, Naval Station Karanja, Mumbai
11.	INS <i>Kobassa</i>	24 January 2019	Naval Air Station, Shibpur, Andaman & Nicobar

List of Ships, Submarines Decommissioned

Ser	Unit	Date of Decommissioning	Remarks
1.	LCU 32	29 April 2011	Landing Craft Utility
2.	LCU 34	29 April 2011	Landing Craft Utility
3.	INS <i>Sharabb</i>	14 July 2011	Landing Ship Tank
4.	INS <i>Ratnagiri</i>	22 May 2012	Coastal Minesweeper
5.	INS <i>Krishna</i>	24 May 2012	Training Ship
6.	INS <i>Vindhyagiri</i>	11 June 2012	Frigate
7.	INS <i>Taragiri</i>	27 June 2013	Frigate
8.	INS <i>Tarasa</i>	7 November 2014	Fast Attack Craft
9.	INS <i>Nirdeshak</i>	19 December 2014	Hydrographic Survey Vessel
10.	INS <i>Alleppey</i>	13 March 2015	Coastal Minesweeper
11.	LCU L 33	29 April 2015	Landing Craft Utility
12.	LCU L 34	29 April 2015	Landing Craft Utility
13.	INS <i>Astravahini</i>	16 July 2015	Torpedo Launch and Recovery Vessel
14.	INS <i>Godavari</i>	23 December 2015	Guided Missile Frigate
15.	INS <i>Veer</i>	28 April 2016	Missile Boat

Ser	Unit	Date of Decommissioning	Remarks
16.	INS <i>Nipat</i>	28 April 2016	Missile Boat
17.	INS <i>Mabish</i>	11 November 2016	Landing Ship Tank
18.	INS <i>Matanga</i>	27 January 2017	Ocean-going Tug
19.	INS <i>Agray</i>	27 January 2017	Corvette
20.	INS <i>Viraat</i>	6 March 2017	Aircraft Carrier
21.	INS <i>Sindburakshak</i>	13 April 2017	Diesel Electric Submarine
22.	INS <i>Karwar</i>	9 May 2017	Coastal Minesweeper
23.	INS <i>Kakinada</i>	9 May 2017	Coastal Minesweeper
24.	INS <i>Nirbhik</i>	11 January 2018	Missile Boat
25.	INS <i>Nirghat</i>	11 January 2018	Missile Boat
26.	LCU – L36	9 February 2018	Landing Craft Utility
27.	LCU – L37	9 February 2018	Landing Craft Utility
28.	INS <i>Ganga</i>	22 March 2018	Guided Missile Frigate
29.	INS <i>Cuddalore</i>	23 March 2018	Coastal Minesweeper
30.	INS <i>Konkan</i>	23 March 2018	Coastal Minesweeper
31.	LCU – L38	30 March 2018	Landing Craft Utility
32.	LCU – L39	30 March 2018	Landing Craft Utility
33.	INS <i>Kozhikode</i>	13 April 2019	Coastal Minesweeper
34.	INS <i>Ranjit</i>	6 May 2019	Guided Missile Destroyer
35.	FAC T-81	28 January 2021	Fast Attack Craft
36.	INS <i>Rajput</i>	21 May 2021	Guided Missile Destroyer
37.	INS <i>Sandhayak</i>	4 June 2021	Hydrographic Survey Vessel
38.	FAC T-80	7 October 2021	Fast Attack Craft
39.	INS <i>Khukri</i>	23 December 2021	Guided Missile Corvette

HONOUR ROLL: PERSONNEL WHO LOST LIVES WHILST ON DUTY

Ser	Name and Rank	Date and Place	Brief Details
1.	Lt Pranava Likhite GS Sen, PO(AD)	5 March 2013 off Visakhapatnam	Accident of Helo CH 440 at Sea.
2.	Lt Cdr Nikhilesh Pal Lt Cdr R Venkit Raj Lt Cdr Alok Kumar Sanjeev Kumar, PO(UW)I KC Upadhyay, PO(UW) I Timothy Sinha, PO(UW)I Kewal Singh, LS(UC) I Sunil Kumar, SEA I (UW) III Dasari Prasad, MECH (R) II Liju Lawrence, LEMP Rajesh Tootika, LME Amit K Singh, STD I Atul Sharma, SEA I Vikash E, SEA I Naruttam Deuri, ME I Malay Haldar, EMR II Vishnu V, RO II Seetaram Badapalli, LS RPI	14 August 2013 INS <i>Sindburakshak</i> (Mumbai Harbour)	Accident onboard INS <i>Sindburakshak</i> .
3.	Lt Cdr Manoranjan Kumar Lt Cdr Kaish Singh Muwal	26 February 2014 INS <i>Sindburatna</i>	Fire incident onboard INS <i>Sindburatna</i> at Sea.
4.	Cdr Kuntal Wadhwa	7 March 2014, Mumbai	Accident onboard Yard 12701 (Kolkata Cell) at Mazagon Dock Ltd.
5.	Vishnu P Unni, SEA I RC III	3 October 2014 Ernakulam channel (Kochi)	During impromptu rescue effort to save Mrs Sangeetha and her daughter.
6.	Cdr Shishir K Yadavannavar James Jacob, POME V Krishna Raju, LS RC I Sangam Sharma, LME Gurjeet Singh, ME I	6 November 2014 Onboard TRV A-72	Accident of TRV A-72 at Sea.
7.	Lt Abhinav Nagori Lt Kiran Shekhawat	24 March 2015 off Goa	Accident of Dornier 240 at Sea.

Ser	Name and Rank	Date and Place	Brief Details
8.	Sanjeev Kumar, PO LOG (OC) Naval Civilians: B Sambamurthy, CM (F) Bhupendra Singh, Examiner P Nagendra Rao, HSK I RV Prasad Babu, HSK II Purna Chandra Senapati, AF (SK) Charan Maharana, SK N Chinna Rao, TMM G Srinivasa Rao, TMM	22 July 2016 Taking passage onboard AN-32 to Port Blair	Accident of AN 32 ex IAF at Sea.
9.	Neeraj K Rai, CHEAR Ashutosh Pandey, LME	05 December 2016 INS <i>Betwa</i> at Naval Dockyard Mumbai	Accident of INS <i>Betwa</i> during undocking.
10.	Lolam Sai Prasad, SEA 1 RP III	6 June 2018 INS <i>Carnicobar</i>	Man overboard.
11.	Mohan Raj R, SEA 1 (GW)	28 March 2019 onboard INS <i>Gomati</i>	Accidental firing of SRGM.
12.	Lt Cdr DS Chauhan	26 April 2019, Karwar	Fire onboard INS <i>Vikramaditya</i> .
13.	Gaurav Dutt, ERA 3	19 May 2020, at Sea	Accident at Sea onboard, INS <i>Sumedha</i> .
14.	Lt Rajeev Jha Sunil Kumar, Ag POELA(P)	04 October 2020 INS <i>Garuda</i> , Kochi	Power Hand Glider accident.
15.	Cdr Nishant Singh	26 November 2020, at Sea	MiG 29K accident at Sea.
16.	Lt Cdr Rajnikant Yadav Lt Cdr Yogesh Tiwari Lt Cdr Anant Kukreti Hari Om, MCPO-II Missing: Lt Cdr Shashank Tewari Dukpa Tshering Sherpa (Civilian)	01 October 2021 Mt Trishul expedition	Avalanche during the expedition. <i>IN</i> re-launched a search expedition for the missing personnel on 10 August 22.

SHAURYA AND KIRTI CHAKRA AWARDEES

Ser	Rank & Name	Gallantry Award	Year	Remarks
1.	Cdr Niteen Anandrao Yadav	Shaurya Chakra	2010	IL -38 Pilot. Handled aircraft emergency.
2.	Cdr Dilip Donde	Shaurya Chakra	2010	Solo circumnavigation on <i>Mhadei</i> .
3.	Chandra Shekhar, POWTR, CD III (Posthumous)	Shaurya Chakra	2010	Counter terrorist operations in Jammu & Kashmir.
4.	Lt Cdr Firdaus D Mogal (Posthumous)	Shaurya Chakra	2011	Lost life while saving lives of 6 personnel of INS <i>Shankush</i> who fell overboard due to inclement weather.
5.	Lt Cdr Rohith Mohandas Nambiar	Shaurya Chakra	2012	Handled aircraft emergency while CINCAN onboard.
6.	Lt Cdr Inderjeet Singh	Shaurya Chakra	2013	Firefighting operations during major fire on MV <i>Amsterdam Bridge</i> .
7.	Aadesh Kumar Sea I, CD III	Shaurya Chakra	2013	Counter terrorist operations in Jammu & Kashmir.
8.	Lt Cdr Abhilash Tomy	Kirti Chakra	2013	Non-stop and unassisted solo circumnavigation.
9.	Lt Cdr Manoranjan Kumar (Posthumous)	Shaurya Chakra	2014	Lost life while fighting a major fire onboard INS <i>Sindhuratna</i> .
10.	Cdr Gosavi Kaustubh Vijaykumar, NM	Shaurya Chakra	2015	Lifesaving on four occasions by Helo (MV <i>Star Eagle</i> , MV <i>Phyanka</i> , MV <i>Oceans Coolon</i>).
11.	Cdr Milind Mohan Mokashi	Shaurya Chakra	2015	Op Rahat as CO INS <i>Sumitra</i> .
12.	Aashu Singh, CHME	Shaurya Chakra	2017	Firefighting onboard INS <i>Viraat</i> .
13.	Capt (TS) P Rajkumar, NM	Shaurya Chakra	2018	Rescue Operations during Cyclone Ockhi.
14.	Amit Singh Rana, LME	Shaurya Chakra	2019	Counter terrorist operations in Jammu & Kashmir.

NAUSENA MEDAL (GALLANTRY) AWARDEES

Ser	Rank & Name	Year	Remarks
1.	Lieutenant Vikas Dahiya	2010	Counter terrorist operations in Jammu & Kashmir.
2.	Yaimachoul Singh, LS, CD II	2010	Counter terrorist operations during terrorist attack at Mumbai-Taj hotel.
3.	Jaidev, LS, CD II	2010	Counter terrorist operations in Jammu & Kashmir.
4.	Cdr Gangupomu Murali	2010	CO <i>Shankush</i> .
5.	Lt Cdr Ajay Kanwar	2010	IL-38 Pilot. Handled aircraft emergency.
6.	Rajan Singh, Sea I, CD III	2010	Counter terrorist operations in Jammu & Kashmir.
7.	Cdr Naveen Thapa	2011	Rescue operation of personnel of INS <i>Shankush</i> .
8.	Bijender, POA (AH)	2011	Rescue operation of personnel of INS <i>Shankush</i> .
9.	Cdr Arun Bahuguna	2011	Anti-piracy operations off Lakshadweep as CO <i>Cankarso</i> .
10.	Cdr S Muthu Kumaran	2011	Anti-piracy operations by MARCOS onboard MV <i>BBC Orinoco</i> in the Arabian Sea.
11.	Cdr Joji T Mundakel	2011	Anti-piracy operations off Lakshadweep as CO INS <i>Suvarna</i> .
12.	Cdr Shankar Man Rai	2012	Helo Pilot. Rescue of personnel from sinking ship MV <i>Rak Carrier</i> , off Mumbai.
13.	Cdr Subhal Nathan	2012	As CO INS <i>Kalpeni</i> , involved in capture of 61 Pirates in anti-piracy operations.
14.	Vinod Kumar, POME, ACM(D)	2012	Air Crew Diver. Rescue of personnel from sinking ship MV <i>Rak Carrier</i> , off Mumbai.
15.	Lt Cdr Sujith Parakkat Menon	2012	Helo Pilot. Rescue of fisherman during Cyclone Thane off the Andhra coast.
16.	Lt Sailesh Kumar Tyagi	2012	Anti-piracy operations, INS <i>Sukanya</i> .
17.	Ramesh Kumar Kumhar, POA, ACM(D)	2012	Air Crew Diver. Rescue of fisherman during Cyclone Thane off Andhra coast.
18.	Cdr Srivatsa Seshadri, NM (Bar)	2013	Helo Pilot. Medical assistance to patient onboard German Ship FRG <i>Braman</i> .
19.	Lt Cdr Dhirender Bisht	2013	Helo Pilot. Rescue of sailor from submarine in inclement weather.
20.	Lt Harisanker	2013	Helo Pilot. Rescue of patient from MV <i>Vishwa Vikas</i> .
21.	Mukesh Kumar, CHME	2013	Fire-fighting onboard INS <i>Satpura</i> .
22.	Lt Shailesh Tyagi, NM (Bar)	2013	Counter terrorist operations in Jammu & Kashmir.
23.	Cdr KM Arun Kumar	2014	Rescue of crew of a sinking Maldivian ship MV <i>Asian Express</i> as CO ICGS <i>Varuna</i> .
24.	Krishna Kumar Ag LS, CD II	2014	Air Crew Diver. Saved life of Cdr Hanspal (Pilot) after a Chetak Aircraft ditched off Visakhapatnam.
25.	Cdr Gosavi Kaustubh Vijaykumar, SC	2014	Helo Pilot. Medical evacuation of MV <i>Kurobe</i> .
26.	Capt Rajesh Dhankar	2015	Operation Rahat. CO <i>Mumbai</i> .
27.	Capt Pradeep Singh	2015	Operation Rahat. CO <i>Tarkash</i> .
28.	Cdr Kuntal Wadhwa (Posthumous)	2015	Lost life during CO ₂ Gas Discharge Test onboard Yard 701 (INS <i>Kolkata</i>).

Ser	Rank & Name	Year	Remarks
29.	Vishnu P Unni, Sea I, RC III (Posthumous)	2015	Impromptu rescue effort to save Mrs Sangeetha and her daughter in Ernakulam channel Kochi.
30.	Cdr Sanjay Shukla	2016	Helo Pilot. Rescue of 19 personnel from distressed vessel MV <i>Jindal Kamakshi</i> off Mumbai.
31.	Cdr Ashok Kumar	2016	Diving for recovery of mortal remains of two officers and flight data recorder of ditched Dornier off Karwar.
32.	Anil Kumar, POA (ACMD)	2016	Air Crew Diver. Rescue of personnel from MV <i>Coastal Pride</i> in poor visibility and rough seas.
33.	Thongbam Prakash Singh, NA I (ACMD)	2016	Air Crew Diver. Rescue of personnel from distressed vessel MV <i>Jindal Kamakshi</i> off Mumbai.
34.	Lt Cdr Vikash Kumar Narwal	2016	MiG-29K Pilot, Handled aircraft emergency.
35.	Lt Cdr Prabhu	2016	Rescue Operations during Chennai Floods December 2015.
36.	Veer Singh, CPO, CDI	2016	Diving and salvage of aircraft- Dornier 240.
37.	Lt Cdr Neeraj Kumar	2017	Assistance to MV <i>Infinity</i> near Grandi island off Goa as NBCDO INS <i>Trikand</i> .
38.	Lt Cdr Anil Raina	2018	Counter terrorist operations in Jammu & Kashmir.
39.	Lt Cdr Kunal Saini	2018	Counter terrorist operations in Jammu & Kashmir.
40.	Lt Cdr Vartika Joshi	2018	Navika Sagar Parikrama. Circumnavigation on sail boat <i>Tarini</i> .
41.	Lt Cdr Pratibha Jamwal	2018	Navika Sagar Parikrama. Circumnavigation on sail boat <i>Tarini</i> .
42.	Lt Cdr Patarpalli Swathi	2018	Navika Sagar Parikrama. Circumnavigation on sail boat <i>Tarini</i> .
43.	Lt Cdr S Vijaya Devi	2018	Navika Sagar Parikrama. Circumnavigation on sail boat <i>Tarini</i> .
44.	Lt Cdr Aishwarya Boddapati	2018	Navika Sagar Parikrama. Circumnavigation on sail boat <i>Tarini</i> .
45.	Lt Payal Gupta	2018	Navika Sagar Parikrama. Circumnavigation on sail boat <i>Tarini</i> .
46.	Deepak Saini, POA (FD)	2018	Rescue Operations during Cyclone Ockhi.
47.	Sumit Raj, POA (FD)	2018	Rescue Operations during Cyclone Ockhi.
48.	Vijay Kumar Verma, LA (FD)	2018	Rescue Operations during Cyclone Ockhi.
49.	Siba Thekho, PAO (FD)	2018	Air Crew Diver. Rescue of survivors in Tugboat <i>Sonika</i> off Mumbai.
50.	Capt Naveen Thapa, NM	2019	Helo Pilot. Rescue of five Indian Coast Guard Officers and one Army Jawan from a capsized sailing boat near Mumbai.
51.	Cdr T Anup Kumar	2019	Helo Pilot. Rescue operations during Kerala Floods.
52.	Cdr Hari Govind R	2019	Helo Pilot. Rescue of injured crew from MV <i>Nu-sbi Nalini</i> .
53.	Cdr Vijay Varma	2019	Helo Pilot. Rescue operations during Kerala Floods.
54.	Lt Cdr Shirish Shivnath Pavale	2019	MARCOS operation for rescue of a hijacked vessel.
55.	Lt Cdr Manu Mishra	2019	Anchoring of abandoned MV <i>SSL Kolkata</i> . which was adrift and had caught fire, to prevent her from grounding.
56.	Pramendra Kumar, CPO (CD)	2019	Rescue operations during Kerala Floods.
57.	Amit, NA I (FD)	2019	Rescue operations during Kerala Floods.
58.	Lt Cdr Ruchir Rakesh Khajuria	2019	Counter terrorist operations in Jammu & Kashmir.
59.	Takhellambam Rakesh Singh, PO (CD)	2019	Counter terrorist operations in Jammu & Kashmir.
60.	Shaminder Singh, PO (PT)	2019	Counter terrorist operations in Jammu & Kashmir.
61.	Shri Niwash, Sea I (UW)	2019	Counter terrorist operations in Jammu & Kashmir.

Ser	Rank & Name	Year	Remarks
62.	Cmde Jyotin Raina, VSM	2020	Professional excellence during Indian response, post Pulwama attack.
63.	Lt Cdr Shailendra Singh	2020	Helo Pilot. Rescue of crew of MV <i>SSL Kolkata</i> .
64.	Lt Cdr Vikrant Singh	2020	Counter terrorist operations in Jammu & Kashmir.
65.	Lt Cdr Ravindra Singh Chaudhary	2020	Counter terrorist operations in Jammu & Kashmir.
66.	Sushil Kumar, LS (GW)	2020	Counter terrorist operations in Jammu & Kashmir.
67.	Capt Mrigank Sheokand	2020	MiG-29K Pilot. Handled aircraft emergency.
68.	Cdr Dhanush Menon	2020	Op Varsha Rahat. Rescue of stranded civilians.
69.	Haridas Kundu, CHA (FD)	2020	Op Varsha Rahat. Rescue of stranded civilians.
70.	Naveen Kumar, LS (UW)	2020	Counter terrorist operations in Jammu & Kashmir.

UNIT CITATIONS

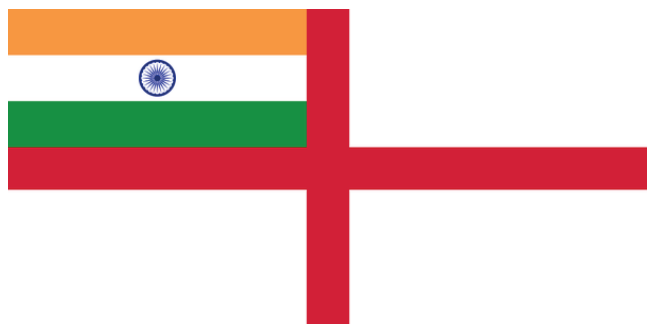
Ser	Name of Ships/Estb. & Others	Year
1.	<i>Mysore, Khukri, Nireekshak, Sindhuraj</i>	2010-11
2.	<i>Viraat, Sukanya, INAS 321/FSS, Sindhuvir</i>	2011-12
3.	<i>Ranvijay, Shardul, Sindhuvijay, Sudarshini, Chilka, Naval Dockyard (Mbi), Dega, FDN</i>	2012-13
4.	<i>Shivalik, Sutlej, Shalki, Kadamba, Rajali, NAY (Kochi), NSRY (PB)</i>	2013-14
5.	<i>Mumbai, Tarkash, INAS 315, Sindhudhvaj, Sumitra, Tarangini, CABS, Tunir, ND (Vizag)</i>	2014-15
6.	<i>Trikand, CCDT (Mumbai), INAS 312A, Sunayna, Asvini, Circars, India, Valsura</i>	2015-16
7.	<i>Tabar, INAS 310, Sindhughosh, Kirch, Sharda, Eksila, NSRY (Kar), Kardip, BVY (Kochi)</i>	2016-17
8.	<i>Trishul, Sahyadri, INAS322, Tarasa, Shivaji, NAY (Goa), Kattabomman, Jarawa</i>	2017-18
9.	<i>Sindhuvijay, Sujata, Karna, NSRY (Kochi), Utkrosh, Kalyani, MO (Mbi)</i>	2018-19
10.	<i>Gomati, Jalashwa, Shardul, Kesari, Hansa, Kalinga, Chilka</i>	2019-20

PRESIDENT'S COLOUR

President's Colour/ Standard	The President's Colour and President's Standard are awarded to various formations and units of the armed forces to acknowledge their distinguished and meritorious services as well as noteworthy contribution to the growth of the nation. In the <i>IN</i> , the President's Colour has been awarded to three commands, two fleets and the Submarine and the Air Arm earlier. The award of President's Colour/Standard to <i>IN</i> units is guided by GoI/MoD/D (Cer) Memorandum No. 4 (2)/2015/D (Cer) dated 6 September 2017, which lays down the eligibility of units as follows:	Indian Navy	May 1951
		Submarine Arm	December 2017
		Indian Naval Academy	November 2019
		INS <i>Shivaji</i>	February 2020
	<p>President's Colour</p> <ul style="list-style-type: none"> The Indian Navy and its duly constituted Commands, Fleets, Submarine Arm, Fleet Air Arm. Premier Training Establishments. Premier Base Establishments with Operational Role. <p>President's Standard</p> <ul style="list-style-type: none"> Capital Warships (Frigates and above). Squadrons/Divisions of Minor War Vessels. Submarine Squadrons. Fighter, Helicopter and MR Aircraft Squadrons. 	Naval Air Arm	September 2021
		22 Killer Squadron	December 2021 (President's Standard)
		INS <i>Valsura</i>	March 2022

CHANGES/MODIFICATION IN NAVAL ENSIGN AND PERSONNEL UNIFORM

Modification of Naval Ensign: The design of the Naval Ensign and Command Crest to include ‘*Satyameva Jayate*’ inscribed in Devanagari script below the Lion Capitol was brought into force on 15 Aug 2015.



IN Ensign pre 15 August 2014



IN Ensign post 15 August 2014

New Indian Navy Ensign: On 02 September 2022, in resonance with the national endeavor to move away from colonial past, a need was felt to transition to a new design that drew inspiration from Indian history. The new ensign now comprises two main constituents—the National Flag in the upper left canton, and a Navy Blue–Gold octagon at the centre of the fly side (away from the staff). The Octagon is with twin golden octagonal borders encompassing the golden National Emblem (Lion Capital of Ashoka—underscribed with ‘*Satyameva Jayate*’ in blue Devanagari script) resting atop an anchor; and superimposed on a shield. Below the shield, within the octagon, in a golden-bordered ribbon, on a Navy Blue background, is inscribed

the motto of the Indian Navy in golden Devanagari script. The design encompassed within the octagon has been taken from the Indian Naval crest, wherein the fouled anchor, also associated with colonial legacy, was replaced with a clear anchor.



New *IN* Ensign post 02 September 2022

Introduction of Collar Tabs: Wearing of collar tabs by senior officers has been a part of uniform in other services and paramilitary forces. The need to include collar tabs as part of Naval Uniform was deliberated in 2014. Subsequently, wearing of collar tabs by senior officers (Captain and above, including time-scale Captains), was implemented with effect from 1 January 2015.

Institution of Badges

Command Badge: The authority and responsibility associated with ‘Command’ of a unit is unique and merits recognition. The appointment of ‘Command’ is meted out only to the most deserving of officers in the Indian Navy.

As a symbol of its acceptance, the Chief of Naval Staff approved institution of the Command Badge for the Officers who had commanded or were in command of commissioned *IN* Units.

Officers currently in Command wear the Command badge on the right pocket while those who have commanded earlier, do so on the left pocket. This was instituted on 01 October 2015.



Command Badge

Aviation Medicine Specialist/Flight Surgeon

Badge: The Competent Authority approved wearing of Aviation Medicine Specialist/Flight Surgeon badge by all Naval Aviation Medicine specialists on being conferred MD in Aviation Medicine by the Institute of Aerospace Medicine, Bengaluru. This was instituted on 15 September 2017.

Presidential Service Badge: The Competent Authority approved wearing of President's Service Badge (PSB) for the President's Military Staff (i.e. Military Secretary to the President [MSP], Dy Military Secretary to the President [DMSP], ADCs to the President and JCO ADCs to the President) in Rashtrapati Bhavan, throughout their Service career. This was instituted in December 2019.

Institution of Medals

In 2017 the *IN* instituted the Sea Service and the Long Sea Service medals. The eligibility criteria for various categories of service personnel were determined to be as follows:

■ **Sainya Seva Medal (Clasp Sea Service)**

- **Indian Navy:** Personnel who have completed 2,190 days (six years) of cumulative afloat service *undertaking operations such as safety of Sea Lines of Communication (SLOCS), anti-piracy and coastal security missions* would be eligible for the medal. All afloat

tenures, including those in integral flights post-commissioning, would be counted towards afloat service. Tenures of embarked squadrons would not be counted towards afloat service.

- **Indian Army:** Personnel who are attached for 240 days to an afloat unit and have participated in Four Theatre-Level Operational Exercises (TROPEX) would be eligible for the medal.
- **Indian Air Force:** All Flying Branch personnel of the IAF who have undertaken 100 deck landings and 200 hrs of flying from a deck at sea would be eligible for the medal. The eligibility criteria for other personnel of the IAF would be as in the case for Army Personnel.

■ **Samanya Seva Medal (Clasp for Long Sea Service)**

- **Indian Navy:** Personnel who have completed 3,285 days (nine years) of cumulative afloat service *undertaking operations such as safety of SLOCS, anti-piracy and coastal security missions* would be eligible for the medal. All afloat tenures including those in integral flights post commissioning would be counted towards afloat service. Tenures of embarked squadrons would not be counted towards afloat service.



Sainya Seva Medal



Samanya Seva Medal

- **Indian Army:** All personnel who have been attached for 365 days to an afloat unit and have participated in Six Theatre-Level Operational Exercises (TROPEX), would be eligible for the medal.
- **Indian Air Force:** All Flying Branch personnel who have undertaken 200 deck landings and 300 hrs of flying from a deck at sea, would be eligible for the medal. The eligibility criteria for other personnel of the IAF will be as in the case for Army Personnel.

■ **Videsh Seva Medal with Clasp ‘Gulf of Aden’ for Anti-Piracy Operations**

- **Qualifying Area:** The entire sea area where anti-piracy operations are undertaken such as Somali Basin, Gulf of Aden and Southern Indian ocean.
- All Tri Service personnel embarked continuously for a period of 30 days onboard ships deployed by IHQ MoD(N) and MR aircraft who fly a minimum of three sorties or complete three hours of flying for anti-piracy operations, helicopter pilots, air operations officers and ground crew embarked onboard ships deployed for anti-piracy operations are eligible for award of this medal, wef 23 October 2008.



Videsh Seva Medal

Introduction of Digital Camouflage: The *IN* has been undertaking revitalization of uniforms from time to time, guided by aspects of comfort, ceremonials and combat applications, inter-service alignment and feedback from the field. In continuation of this effort, the Government of India accorded approval for Digital Camouflage in lieu of the previous version of Dress No 10A in June 2019, and the uniform was introduced for trials in November 2019. Wearing of this new uniform was institutionalized for officers from 1 January 2021, in two versions: 10A and 10B.



Digital Camouflage

VISIT BY FOREIGN SHIPS TO INDIAN PORTS

Ser	Date	Name of the Ship	Country	Port of Call
2011				
1.	4-10 January	USS <i>Safeguard</i>	USA	Port Blair
2.	7-11 January	<i>Charles de Gaulle, Meuse, Forbin, Tourville</i>	France	Goa
3.	9-12 February	RNO <i>Qabir Al Amwaj</i>	Oman	Kochi
4.	16-19 March	USS <i>Decatur</i>	USA	Chennai
5.	31 March-1 April	JS <i>Inazuma, JS Sazanami</i>	Japan	Kochi
6.	22-29 April	USS <i>Emory S Land</i>	USA	Goa
7.	23-27 April	USS <i>LA Jolla</i>	USA	Goa
8.	30 April-3 May	HTMS <i>Longlom</i>	Thailand	Port Blair
9.	2-6 May	<i>Dupuy de Lome</i>	France	Mumbai
10.	5-8 May	<i>Mistral, Georges Leygues</i>	France	Kochi
11.	23-27 May	HNLMS <i>Tromp</i>	Netherlands	Mumbai
12.	1-5 June	HMNZS <i>Te Mana</i>	New Zealand	Port Blair
13.	3-6 June	HMAS <i>Stuart</i>	Australia	Mumbai
14.	7-8 July	JS <i>Samidare, JS Umigiri</i>	Japan	Kochi
15.	7-10 July	TCG <i>Barbaros, TCG Yüzbaşı Kudret Güngör, TCG Gelibolu, TCG Gemlik</i>	Turkey	Mumbai
16.	11-14 September 15 September till refit completion	MCGS <i>Huravee</i>	Maldives	Chennai Visakhapatnam
17.	12-14 September & 29 September	USS <i>Defender</i>	USA	Port Blair
18.	28 September-1 October	JS <i>Uraga, JS Hatsushima</i>	Japan	Port Blair
19.	1-5 October	USS <i>Ford</i>	USA	Kochi
20.	7-10 October 15-18 October	HMS <i>Turbulent</i> HMS <i>Diligence</i>	UK	Goa
21.	21-25 October	HMAS <i>Toowoomba</i>	Australia	Mumbai
22.	27-28 October	JS <i>Takanami, JS Ōnami</i>	Japan	Kochi
23.	26-29 November	ROKS <i>Gang Gam-Chan, ROKS Chunji</i>	Republic of Korea	Mumbai
24.	5-7 December	HTMS <i>Kraburi, HTMS Makutrajakumarn</i>	Thailand	Port Blair
25.	26 December 2011-2 January 2012	RNOV <i>Al-Mua'zzar, RNOV Najah</i>	Oman	Mumbai
2012				
1.	1-6 February	HMAS <i>Ararat</i>	Australia	Port Blair
		BNS <i>Karatoa</i>	Bangladesh	
		RSS <i>Kallang, RSS Dauntless</i>	Singapore	
		HTMS <i>Tapi</i>	Thailand	
		KD <i>Selangor</i>	Malaysia	
		KRI <i>Pati Unus</i>	Indonesia	
		UMS <i>Bayint Naung</i>	Myanmar	
		KDB <i>Darulaman</i>	Brunei	

Ser	Date	Name of the Ship	Country	Port of Call
2.	6-7 February	JS <i>Murasame</i> , JS <i>Harusame</i>	Japan	Kochi
3.	8-12 March	HMAS <i>Parramatta</i>	Australia	Mumbai
4.	22-24 March 28-31 March	RSS <i>Stalwart</i> , RSS <i>Victory</i>	Singapore	Port Blair Visakhapatnam
5.	28 March-7 April	HMS <i>Echo</i>	UK	Mumbai
6.	7-10 April	USS <i>Carl Vinson</i> , USS <i>Bunker Hill</i> , USS <i>Halsey</i>	USA	Chennai
7.	23-26 April	HTMS <i>Kamronsin</i>	Thailand	Port Blair
8.	9-13 May	PLAN <i>Zhengbe</i>	China	Kochi
9.	10-13 June	HMS <i>Daring</i>	UK	Mumbai
10.	13-16 June	JS <i>Harusame</i> , JS <i>Murasame</i>	Japan	Kochi
11.	22-26 June	JS <i>Kashima</i> , JS <i>Shimayuki</i> , JS <i>Matsuyuki</i>	Japan	Mumbai
12.	16-20 August	SMS <i>Bremen</i>	Germany	Mumbai
13.	20-22 August	HMCS <i>Regina</i>	Canada	Kochi
14.	30 August-3 September	BACH <i>Esmeralda</i>	Chile	Mumbai
15.	13-16 September	USS <i>Gridley</i>	US	Mumbai
16.	25-27 September	ROKS <i>Wang Goen</i>	Republic of Korea	Mumbai
17.	17-19 September	JS <i>Makinami</i> , JS <i>Yūgiri</i>	Japan	Kochi
18.	9-11 October	KRI <i>Sultan Thaba Syaiffudin</i>	Indonesia	Port Blair
19.	20-22 October	JS <i>Uraga</i> , <i>Hachiyō</i>	Japan	Kochi
20.	25-30 October	<i>Dupleix</i>	France	Mumbai
21.	2-5 November	BNS <i>Bangabandhu</i>	Bangladesh	Kochi
22.	7-12 November	RFA <i>Fort Rosalie</i>	UK	Mumbai
23.	24-29 November	HNLMS <i>Rotterdam</i>	Netherlands	Mumbai
24.	28 November-2 December	<i>Marshal Shaposhnikov</i> , <i>Alatau</i> , <i>Irkut</i>	Russian Federation	Mumbai
2013				
1.	21-24 January	HMCS <i>Regina</i>	Canada	Mumbai
2.	10-21 March	UMS <i>King Aung Zeya</i> , UMS <i>Bayint Naung</i>	Myanmar	Visakhapatnam
3.	17-21 March	BNS <i>Gomati</i>	Bangladesh	Visakhapatnam
4.	13-17 April	<i>Montcalm</i>	France	Marmagoa
5.	22-25 April	HTMS <i>Phuket</i>	Thailand	Port Blair
6.	6-9 May	KRI <i>Pati Unus</i>	Indonesia	Port Blair
7.	13-17 May	HMS <i>Kent</i>	UK	Mumbai
8.	21-24 May	HMAS <i>Newcastle</i>	Australia	Kochi
9.	31 May-5 June	<i>Tonnerre</i> , <i>Georges Leygues</i>	France	Goa
10.	6-12 August	<i>Peace Ark</i>	China	Mumbai
11.	14-16 August	ROKS <i>Dae Jo-yeong</i> , ROKS <i>Hwacheon</i>	Republic of Korea	Mumbai
12.	29-31 August	JS <i>Akebono</i> , JS <i>Hamagiri</i>	Japan	Goa
13.	25-27 September	KRI <i>Teuku Umar</i>	Indonesia	Port Blair
14.	30 September-7 October	USS <i>Harpers Ferry</i>	USA	Goa
15.	14-22 October	HMS <i>Westminster</i>	UK	Goa
16.	3-8 November	SLNS <i>Sagara</i>	Sri Lanka	Goa

Ser	Date	Name of the Ship	Country	Port of Call
17.	3-7 November	USS <i>McCampbell</i>	USA	Chennai
18.	6-10 November	HMS <i>Bulwark</i>	UK	Goa
19.	23-25 November	KRI <i>Diponegoro</i>	Indonesia	Kochi
20.	26-28 Noveber	<i>Cantabria</i>	Spain	Goa
21.	19-22 December	JS <i>Ariake</i> , JS <i>Setogiri</i>	Japan	Chennai
2014				
1.	15-22 January	HMNZS <i>Te Mana</i>	New Zealand	Mumbai
2.	4-9 February	HMAS <i>Childers</i> HTMS <i>Pattani</i> RSS <i>Resilience</i> , RSS <i>Brave</i> KRI <i>Sutanto</i> BNS <i>Sangu</i> UMS <i>King Aung Zeya</i> , UMS <i>Anawrahta</i>	Australia Thailand Singapore Indonesia Bangladesh Myanmar	Port Blair
3.	12-15 February	HMAS <i>Darwin</i>	Australia	Kochi
4.	14-17 February	HTMS <i>Kraburi</i> , HTMS <i>Saiburi</i> , HTMS <i>Naratiwat</i>	Thailand	Port Blair
5.	24 February-6 March	HMS <i>Tireless</i> , HMS <i>Diligence</i>	UK	Goa
6.	16-20 March	<i>Jean Bart</i>	France	Goa
7.	4-7 April	USS <i>O'Kane</i>	USA	Goa
8.	6-9 April	HTMS <i>Sriracha</i>	Thailand	Port Blair
9.	14-16 April	KRI <i>Imam Bonjol</i>	Indonesia	Port Blair
10.	27-28 May	RSS <i>Valour</i> , RSS <i>Independence</i>	Singapore	Port Blair
11.	21-23 May	BNS <i>Ali Haider</i> , BNS <i>Nirmul</i>	Bangladesh	Mumbai
12.	16-20 May	PLAN <i>Zheng He</i> , PLAN <i>Weifang</i>	China	Visakhapatnam
13.	12-14 July	BNS <i>Osman</i> , BNS <i>Madhumati</i>	Bangladesh	Mumbai
14.	13-18 August	KDB <i>Daruttaqwa</i>	Brunei	Mumbai
15.	2-4 September	KRI <i>Bung Tomo</i>	Indonesia	Kochi
16.	14-16 September	KRI <i>John Lie</i> and KRI <i>Usman Harun</i>	Indonesia	Kochi
17.	27-30 September	KRI <i>Pattimura</i>	Indonesia	Port Blair
18.	10-14 October	<i>Leopold</i>	Belgium	Mumbai
19.	24-27 October	HMS <i>Northumberland</i>	UK	Mumbai
20.	15-18 November	ROKS <i>Choe Yeong</i> , ROKS <i>Cheonji</i>	Republic of Korea	Chennai
21.	26-28 November	JS <i>Bungo</i> , JS <i>Yaeyama</i>	Japan	Kochi
22.	6-14 December	HMS <i>Enterprise</i>	UK	Goa
23.	6-9 December	KRI <i>Frans Kaisiepo</i>	Indonesia	Kochi
2015				
1.	20-27 January	<i>Guepratte</i>	France	Goa
2.	16-20 March	USS <i>Paul Hamilton</i>	USA	Goa
3.	24-27 March	IRIS <i>Naghdi</i> , IRIS <i>Bandar Abbas</i>	Iran	Kochi
4.	1 April 2015-28 February 2016	MCGS <i>Huravee</i>	Maldives	Visakhapatnam
5.	7-10 April	HTMS <i>Thayanchon</i>	Thailand	Port Blair

Ser	Date	Name of the Ship	Country	Port of Call
6.	16-19 April	<i>Karlsruhe</i>	Germany	Goa
7.	19-24 April	TCG <i>Gediz</i>	Turkey	Mumbai
8.	24-27 April	HMAS <i>Newcastle</i>	Australia	Mumbai
9.	23-28 April	<i>Charles de Gaulle, Chevalier Paul, Jean De Vienne</i>	France	Goa
10.	3-7 May	JS <i>Amagiri, JS Harusame</i>	Japan	Chennai
11.	7-10 June	BNS <i>Somudra Joy</i>	Bangladesh	Kochi
12.	16-22 June	<i>Dixmude, Aconit</i>	France	Visakhapatnam
13.	18-22 June	HMNZS <i>Te Kaha</i>	New Zealand	Kochi
14.	1-5 July	TCG <i>Gediz</i>	Turkey	Chennai
15.	20-24 July	PLAN <i>Jinan</i>	China	Mumbai
16.	27 July-7 August	HMS <i>Enterprise</i>	UK	Goa
17.	16-18 September	ROKS <i>Gang Gam-chan, ROKS Daecheong</i>	Republic of Korea	Chennai
18.	8-12 September	KRI <i>Bung Tomo</i>	Indonesia	Kochi
19.	11-21 September	HMAS <i>Arunta, HMAS Sirius, HMAS Sheean</i>	Australia	Visakhapatnam
20.	1 October 2015-31 May 2016	<i>Epron</i>	Russia	Visakhapatnam
21.	1-5 October	RSS <i>Endeavour</i>	Singapore	Visakhapatnam
22.	7-16 October	USS <i>Fort Worth</i>	USA	Chennai
23.	13-16 October	ANS <i>Adhaffer</i>	Algeria	Kochi
24.	19-22 October	KRI <i>Teuku Umar</i>	Indonesia	Port Blair
25.	24-26 October	KRI <i>Sultan Iskandar Muda</i>	Indonesia	Kochi
26.	26 September-2 October	HMS <i>Richmond</i>	UK	Goa
27.	12-17 November	<i>Guayas – ‘Tall Ship’</i>	Ecuador	Kochi
28.	3-5 December	RNOV <i>Shabab Oman II</i>	Oman	Kochi
29.	5-8 December	KRI <i>Spica</i>	Indonesia	Kochi
30.	7-10 December	<i>Varyag, Bystry, Boris Butoma, Alatau</i>	Russia	Visakhapatnam
31.	21-24 December	SLNS <i>Samudura, SLNS Nandimitbra</i>	Sri Lanka	Kochi
2016				
1.	1-10 January	HMCS <i>Winnipeg</i>	Canada	Goa
2.	22-29 January	RNOV <i>Al Seeb, RNOV Al Shamikh</i>	Oman	Goa
3.	18-21 February	ANS <i>El Fatih</i>	Algeria	Kochi
4.	19-29 February	SAS <i>Spioenkop</i>	South Africa	Goa
5.	16-29 February	BN <i>Amazonas</i>	Brazil	Goa
6.	11-13 February	UMS <i>King Aung Zeya</i>	Myanmar	Port Blair
7.	22-24 March	JS <i>Uraga, JS Takashima</i>	Japan	Kochi
8.	3-12 April	USS <i>Blue Ridge</i>	USA	Mumbai & Goa
9.	12-16 April	<i>Tonnerre, Guepratte</i>	France	Kochi
10.	25-27 April	HTMS <i>Klaeng</i>	Thailand	Port Blair
11.	28-30 April	KRI <i>Imam Bonjol</i>	Indonesia	Port Blair
12.	29 July-4 August	USS <i>Frank Cable</i>	USA	Goa
13.	2-5 August	ANS <i>Ezzadjer</i>	Algeria	Kochi

Ser	Date	Name of the Ship	Country	Port of Call
14.	3-6 August	<i>Igor Belousov</i>	Russia	Visakhapatnam
15.	12-13 August	JS <i>Yuudachi</i> , JS <i>Yuugiri</i>	Japan	Mumbai
16.	22-25 August	HMAS <i>Success</i>	Australia	Chennai
17.	23-26 August	<i>Latouche-Treville</i>	France	Mumbai
18.	8-12 September	RSS <i>Persistence</i>	Singapore	Port Blair
19.	24-27 October	SLNS <i>Sayura</i> , SLNS <i>Suranimala</i>	Sri Lanka	Kochi
20.	25-29 October	HMAS <i>Australia</i>	Perth	Goa
21.	26-29 October	KRI <i>Wiratno</i>	Indonesia	Port Blair
22.	30 October-3 November	RSS <i>Formidable</i>	Singapore	Visakhapatnam
23.	23-26 November	HMAS <i>Arunta</i>	Australia	Goa
24.	14-21 December	<i>Admiral Tributs</i> , <i>Boris Butoma</i>	Russia	Visakhapatnam
25.	20-22 December	JS <i>Inazuma</i> , JS <i>Suzutsuki</i>	Japan	Goa
2017				
1.	28 February-2 January	<i>Cristobal Colon</i>	Spain	Mumbai
2.	25-28 March	IRIS <i>Naghdi</i> , IRIS <i>Tonb</i>	Iran	Kochi
3.	28-31 March	RSS <i>Tenacious</i>	Singapore	Port Blair
4.	29 March-3 April	Mistral, Courbet	France	Mumbai
5.	6-9 April	SLNS <i>Samudura</i> , SLNS <i>Suranimala</i>	Sri Lanka	Kochi
6.	24-28 April	<i>Dupuy de Lome</i>	France	Goa
7.	13-17 May	HMCS <i>Winnipeg</i>	Canada	Mumbai
8.	16-20 June	<i>Choi Young</i>	Republic of Korea	Kochi
9.	21-26 June	ARM <i>Cuauhtemoc</i>	Mexico	Mumbai
10.	4-7 July	HMAS <i>Newcastle</i>	Australia	Kochi
11.	8-14 July	JS <i>Izumo</i> , JS <i>Sazanami</i>	Japan	Chennai
12.	9-14 July	USS <i>Nimitz</i> , USS <i>Jacksonville</i> , USS <i>Princeton</i> , USS <i>Howard</i> , USS <i>Shoup</i> , USS <i>Chafee</i> , USS <i>Pinckney</i> , USS <i>Kidd</i>	USA	Chennai
13.	24-27 August	USS <i>Pearl Harbour</i>	USA	Goa
14.	3-5 September	KRI <i>Usman Harun</i>	Indonesia	Kochi
15.	7-14 September	SLNS <i>Sayura</i> , SLNS <i>Sagara</i>	Sri Lanka	Visakhapatnam
16.	9-11 September	JS <i>Teruzuki</i>	Japan	Kochi
17.	11-15 September	HMS <i>Monmouth</i>	UK	Goa
18.	2-6 October	FS <i>Auvergne</i>	French Navy	Karwar
19.	3-6 October	ROKS <i>Gang Gam-chan</i> , ROKS <i>Hwacheon</i>	Republic of Korea	Mumbai
20.	9-11 October	ENS <i>Shabab Misr</i>	Egypt	Kochi
21.	12-15 October	HMAST <i>woomba</i>	Australia	Port Blair
22.	16-19 October	BNS <i>Somudra Avijan</i>	Bangladesh	Visakhapatnam
23.	3-5 November	KRI <i>Imam Bonjol</i>	Indonesia	Port Blair
24.	9-12 November	RAN <i>Warramunga</i>	Australia	Goa
2018				
1.	15-17 January	JS <i>Amagiri</i>	Japan	Mumbai
2.	22-25 January	RSS <i>Resolution</i>	Singapore	Kochi

Ser	Date	Name of the Ship	Country	Port of Call
3.	4-7 February 15-18 February	BNS <i>Ali Haider</i> , BNS <i>Nirmul</i>	Bangladesh	Mumbai Chennai
4.	12-15 February	<i>Admiral Vladimírsky</i>	Russia	Mumbai
5.	1-5 March	BNS <i>Bangabandhu</i>	Bangladesh	Mumbai
6.	6-9 March	IRIS <i>Naghdi</i> , IRIS <i>Bayandor</i> , IRIS <i>Tonb</i>	Iran	Mumbai
7.	6-13 March	HMAS <i>Larrakia</i> HTMS <i>Narathiwat</i> RSS <i>Dauntless</i> BNS <i>Dhaleswari</i> UMS <i>King Sin phyu shin</i> , UMS <i>Inlay</i> SLNS <i>Suranimala</i> , SLNS <i>Samudura</i> KRI <i>Cut Nyak Dien</i> , KRI <i>Lemadang</i> KD <i>Leiku</i>	Australia Thailand Singapore Bangladesh Myanmar Sri Lanka Indonesia Malaysia	Port Blair
8.	15-20 March	<i>Jean de Vienne</i> , <i>Perle</i>	France	Mormugao, Goa
9.	25 March-3 April	UMS <i>Inlay</i> , UMS <i>King Sin Phyu Shin</i>	Myanmar	Visakhapatnam
10.	3-7 April	<i>Surcouf</i> , <i>Dixmude</i>	France	Chennai
11.	10-12 April	HTMS <i>Bangpakong</i> , HTMS <i>Makut Rajakumarn</i> , HTMS <i>Pattani</i>	Thailand	Kochi
12.	11-13 May	JS <i>Setogiri</i>	Japan	Visakhapatnam
13.	2-6 June	<i>Juan Carlos I</i> , <i>Blas De Lezo</i>	Spain	Mumbai
14.	22-26 June	<i>Dupuy De Lome</i>	France	Mumbai
15.	2-5 July	BNS <i>Dhaleshwari</i> , BNS <i>Abu Bakr</i>	Bangladesh	Visakhapatnam
16.	10 July onwards	SLNS <i>Sayurala</i>	Sri Lanka	Goa
17.	12 July onwards	MCGS <i>Huravee</i>	Maldives	Visakhapatnam
18.	3-7 September	BNS <i>Somudra Joy</i>	Bangladesh	Visakhapatnam
19.	9-10 September	JS <i>Setogiri</i>	Japan	Mumbai
20.	7-10 October	JS <i>Kaga</i> , JS <i>Inazuma</i>	Japan	Visakhapatnam
21.	8-11 October	SLNS <i>Sagara</i> , SLNS <i>Suranimala</i>	Sri Lanka	Kochi
22.	9-24 October	KD <i>Jebat</i>	Malaysia	Kochi
23.	4 -6 November	RNOV <i>Zinat Al Bibaar</i> , RNOV <i>Al Shinas</i>	Oman	Mumbai
24.	10-14 November	RNOV <i>Zinat Al Bibaar</i> , RNOV <i>Al Shinas</i>	Oman	Kochi
25.	9-13 November	HMAS <i>Ballarat</i>	Australia	Kochi
26.	10-12 November	RSS <i>Steadfast</i> , RSS <i>Formidable</i> , RSS <i>Unity</i> , RSS <i>Valiant</i> , RSS <i>Vigour</i> , RSS <i>Swift Rescue</i>	Singapore	Port Blair
27.	16-19 November	RSS <i>Steadfast</i> , RSS <i>Formidable</i> , RSS <i>Unity</i> , RSS <i>Valiant</i> , RSS <i>Vigour</i> , RSS <i>Swift Rescue</i>	Singapore	Visakhapatnam
28.	28 November-2 December	HMS <i>Dragon</i>	UK	Goa
29.	8-16 December	<i>Varyag</i> , <i>Admiral Panteleyev</i> , <i>Boris Butoma</i>	Russia	Visakhapatnam
30.	17-18 December	ROKS <i>Wang Geon</i>	Republic of Korea	Mumbai
31.	20-22 December	JS <i>Samidare</i>	Japan	Kochi
32.	22-26 December	USS <i>Anchorage</i>	USA	Visakhapatnam
2019				
1.	24-29 January	<i>Cassard</i>	France	Mumbai

Ser	Date	Name of the Ship	Country	Port of Call
2.	23-27 January	USS <i>Rushmore</i>	USA	Chennai
3.	1-4 February	BNS <i>Dhaleshwari</i>	Bangladesh	Kochi
4.	28 March-17 April	HMAS <i>Collins</i> , HMAS <i>Canberra</i> , HMAS <i>Newcastle</i> , HMAS <i>Parramatta</i> , HMAS <i>Success</i>	Australia	Visakhapatnam & Chennai
5.	18-20 April 22-25 April	RNOV <i>Zinaat Al Bibaar</i> , RNOV <i>Sadh</i> RNOV <i>Zinaat Al Bibaar</i> , RNOV <i>Sadh</i>	Oman Oman	Kochi Kochi
6.	19-22 March	KRI <i>Sultan Thaba Syaifuddin</i>	Indonesia	Port Blair
7.	28 April-1 May	JS <i>Samidare</i>	Japan	Vizag
8.	1-7 May	<i>Charles De Gaulle</i> , <i>Forbin</i> , <i>Provence</i> , <i>LatoucheTreville</i> , <i>Amethyste</i> , <i>Marne</i>	France	Goa
9.	10-4 May	HMAS <i>Toowoomba</i>	Australia	Chennai
10.	20-22 May	UMS <i>King Tabin Shwehtee</i> , UMS <i>Inlay</i>	Myanmar	Port Blair
11.	11-14 June	USS <i>John P Murtha</i>	USA	Visakhapatnam
12.	18 May-10 September	SLNS <i>Sindurala</i>	Sri Lanka	Goa
13.	27-29 June	RSS <i>Valiant</i> , RSS <i>Valour</i>	Singapore	Port Blair
14.	1-4 August	<i>Mendez Nunez</i>	Spain	Goa
15.	2-4 August	MCGS <i>Huravee</i>	Maldives	Tuticorin
16.	13-14 August	JS <i>Sazanami</i>	Japan	Kochi
17.	16 August	JS <i>Sazanami</i>	Japan	Off Mumbai
18.	7-12 September	SLNS <i>Sindurala</i> , SLNS <i>Suranimala</i>	Sri Lanka	Visakhapatnam
19.	10-12 September	JS <i>Asagiri</i>	Japan	Chennai
20.	13-18 September	HTMS <i>Kraburi</i>	Thailand	Port Blair
21.	14-17 September	BNS <i>Somudra Avijan</i>	Bangladesh	Visakhapatnam
22.	15-20 September	RSS <i>Tenacious</i>	Singapore	Port Blair
23.	25-27 September	ROKS <i>Munmu the Great</i> , ROKS <i>Hwacheon</i>	Republic of Korea	Mumbai
24.	12-16 October	BNS <i>Shadbinota</i> , BNS <i>Ali Haider</i>	Bangladesh	Visakhapatnam
25.	13-15 October	USS <i>Emory S Land</i>	USA	Visakhapatnam
26.	18-22 October	UMS <i>King Sin Phyu Shin</i> , UMS <i>Tabin Shwehtee</i>	Myanmar	Visakhapatnam
27.	4-7 November	KRI <i>Usman Harun</i>	Indonesia	Visakhapatnam
28.	9-15 November	HMS <i>Defender</i>	UK	Goa
29.	13-17 November	USS <i>Germantown</i>	USA	Visakhapatnam
30.	23-25 November	JS <i>Bungo</i> , JS <i>Takashima</i>	Japan	Kochi
31.	10-16 December	<i>Yaroslav Mudry</i> , <i>Yel'nya</i> , <i>Viktor Konetsky</i>	Russia	Goa
32.	24-26 December	JS <i>Sazanami</i>	Japan	Mumbai
2020				
1.	4-11 January	RNOV <i>Al Rasikh</i> , RNOV <i>Al Khassab</i>	Oman	Goa
2.	25-29 January	HMAS <i>Toowoomba</i>	Australia	Mumbai
3.	8-11 March	BNS <i>Shadbinota</i>	Bangladesh	Mumbai
4.	29 March-1 April	BNS <i>Shadbinota</i>	Bangladesh	Kochi
5.	13-17 March	HMAS <i>Parramatta</i>	Australia	Chennai
6.	14-17 May	STS <i>Vespucci</i>	Italy	Mumbai
7.	10-13 November	HMAS <i>Ballarat</i>	Australia	Goa

Ser	Date	Name of the Ship	Country	Port of Call
8.	10-13 December	BAP <i>Union</i>	Peru	Goa
9.	14-18 December	BNS <i>Somudra Avijan</i>	Bangladesh	Visakhapatnam
2021				
1.	29-31 March	<i>Tonnere, Surcouf</i>	France	Kochi
2.	1 July-11 July	<i>Minye Theinkhatbu, USM King Sin Phyu Shin</i>	Myanmar	Visakhapatnam

FOREIGN SHIPS PARTICIPATING IN IFR 2016

Ser	Ship Name	Country
1.	HMAS <i>Darwin</i>	Australia
2.	BNS <i>Somudra Joy</i>	Bangladesh
3.	<i>Amazonas</i>	Brazil
4.	PLAN <i>Liuzhou</i>	China
5.	PLAN <i>Sanya</i>	China
6.	<i>Provence</i>	France
7.	KRI <i>Usman Harun</i>	Indonesia
8.	IRIS <i>Alvand</i>	Iran
9.	JS <i>Matsuyuki</i>	Japan
10.	KD <i>Lekir</i>	Malaysia
11.	MCGS <i>Huravee</i>	Maldives
12.	MCGS <i>Barracuda</i>	Mauritius
13.	UMS <i>King Aung Zeya</i>	Myanmar
14.	RNOV <i>Al Seeb</i>	Oman
15.	RNOV <i>Al Shamikh</i>	Oman
16.	<i>Epron</i>	Russia
17.	SCGPS <i>Topaz</i>	Seychelles
18.	SAS <i>Spioenkop</i>	South Africa
19.	SLNS <i>Sayura</i>	Sri Lanka
20.	HTMS <i>Saiburi</i>	Thailand
21.	HMS <i>Defender</i>	UK
22.	USS <i>Antietam</i>	USA
23.	USS <i>McCampbell</i>	USA
24.	VPN <i>Dinh Tien Hoang</i>	Vietnam

VISIT OF *IN SHIPS* TO FOREIGN PORTS

Ser	Units	Port/Station	Country	Date from	Date to
2011					
1.	Aircraft – <i>IN</i> Dornier	Male	Maldives	06-Jan-11	11-Jan-11
2.	<i>Nirdeshak</i>	Male	Maldives	17-Jan-11	19-Jan-11
3.	<i>Nirdeshak</i>	Male	Maldives	02-Feb-11	05-Feb-11
4.	<i>Kalpeni</i>	Male	Maldives	03-Feb-11	05-Feb-11
5.	<i>Kalpeni</i>	Male	Maldives	09-Feb-11	11-Feb-11
6.	<i>Sukanya</i>	Port Victoria	Seychelles	19-Feb-11	23-Feb-11
7.	Aircraft – <i>IN</i> Dornier	Male	Maldives	20-Feb-11	25-Feb-11
8.	<i>Sukanya</i>	Port Victoria	Seychelles	03-Mar-11	07-Mar-11
9.	<i>Mysore, Jalashwa</i>	Alexandria	Egypt	08-Mar-11	08-Mar-11
10.	<i>Mysore, Jalashwa</i>	Tripoli	Libya	10-Mar-11	10-Mar-11
11.	<i>Tir, Krishna, ICGS Veera</i>	Muscat	Oman	11-Mar-11	14-Mar-11
12.	<i>Kesari</i>	Manado	Indonesia	14-Mar-11	18-Mar-11
13.	<i>Sukanya</i>	Port Louis	Mauritius	16-Mar-11	19-Mar-11
14.	<i>Tir, Krishna, ICGS Veera</i>	Abu Dhabi	UAE	16-Mar-11	20-Mar-11
15.	Aircraft – <i>IN</i> Dornier	Singapore	Singapore	18-Mar-11	25-Mar-11
16.	<i>Tir, Krishna, ICGS Veera</i>	Al Jubail	Saudi Arabia	24-Mar-11	28-Mar-11
17.	<i>Ranvijay, Ranvir, Delhi, Kirch, Jyoti</i>	Singapore	Singapore	18-Mar-11	21-Mar-11
18.	<i>Sukanya</i>	Port Louis	Mauritius	28-Mar-11	31-Mar-11
19.	<i>Ranvijay, Ranvir, Delhi, Kirch, Jyoti</i>	Subic Bay	Philippines	29-Mar-11	30-Mar-11
20.	Aircraft – <i>IN</i> Dornier	Male	Maldives	02-Apr-11	07-Apr-11
21.	<i>Airavat</i>	Chittagong	Bangladesh	03-Apr-11	07-Apr-11
22.	<i>Suvarna</i>	Male	Maldives	10-Apr-11	12-Apr-11
23.	<i>Suvarna</i>	Male	Maldives	17-Apr-11	19-Apr-11
24.	<i>Ranvijay, Ranvir, Delhi, Kirch, Jyoti</i>	Vladivostok	Russia	18-Apr-11	22-Apr-11
25.	Aircraft – <i>IN</i> Dornier	Belawan	Indonesia	24-Apr-11	27-Apr-11
26.	<i>Cheetah, Battimalv</i>	Belawan	Indonesia	24-Apr-11	27-Apr-11
27.	Aircraft – <i>IN</i> Dornier	Doha	Qatar	03-May-11	05-May-11
28.	<i>Ranvijay, Ranvir, Delhi, Kirch, Jyoti</i>	Manila	Philippines	04-May-11	07-May-11
29.	Aircraft – <i>IN</i> Dornier	Muscat	Oman	05-May-11	07-May-11
30.	<i>Delhi, Kirch</i>	Ho Chi Minh	Vietnam	10-May-11	13-May-11
31.	<i>Ranvijay, Ranvir</i>	Bandar Seri Begawan	Brunei	10-May-11	13-May-11
32.	<i>Jyoti</i>	Kota Kinabalu	Malaysia	10-May-11	13-May-11
33.	<i>Delhi, Kirch</i>	Singapore	Singapore	16-May-11	21-May-11
34.	<i>Ranvijay, Ranvir, Jyoti</i>	Jakarta	Indonesia	17-May-11	20-May-11
35.	<i>Shardul</i>	Port Victoria	Seychelles	04-Jun-11	06-Jun-11
36.	<i>Suvarna</i>	Male	Maldives	06-Jun-11	10-Jun-11
37.	<i>Shardul</i>	Port Victoria	Seychelles	11-Jun-11	15-Jun-11
38.	<i>Airavat</i>	Bandar Seri Begawan	Brunei	04-Jul-11	09-Jul-11

Ser	Units	Port/Station	Country	Date from	Date to
39.	<i>Airavat</i>	Sihnaoukville	Cambodia	12-Jul-11	16-Jul-11
40.	<i>Airavat</i>	Nha Trang	Vietnam	19-Jul-11	21-Jul-11
41.	<i>Airavat</i>	Haipong	Vietnam	25-Jul-11	28-Jul-11
42.	<i>Airavat</i>	Port Kelang	Malaysia	03-Aug-11	06-Aug-11
43.	Aircraft – IN Dornier	Male	Maldives	17-Aug-11	22-Aug-11
44.	<i>Tir, Krishna</i>	Phuket	Thailand	20-Aug-11	23-Aug-11
45.	<i>Tir, Krishna</i>	Port Kelang	Malaysia	25-Aug-11	28-Aug-11
46.	<i>Tir, Krishna</i>	Singapore	Singapore	29-Aug-11	01-Sep-11
47.	<i>Tir, Krishna</i>	Jakarta	Indonesia	04-Sep-11	07-Sep-11
48.	<i>Shivalik, Ranvijay, Gharial, Khanjar, Cora Divh, Cheriam, Aircraft – IN Dornier</i>	Trincomalee	Sri Lanka	19-Sep-11	23-Sep-11
49.	<i>Kora</i>	Male	Maldives	20-Sep-11	29-Sep-11
50.	<i>Trishul</i>	Djibouti	Djibouti	17-Oct-11	18-Oct-11
51.	Aircraft – IN Dornier	Male	Maldives	19-Oct-11	20-Oct-11
52.	Aircraft – IN Dornier	Male	Maldives	19-Oct-11	17-Nov-11
53.	<i>Mahish, Bangaram, Aircraft – IN Dornier</i>	Belawan	Indonesia	23-Oct-11	26-Oct-11
54.	<i>Brahmaputra</i>	Male	Maldives	30-Oct-11	13-Nov-11
55.	<i>Sarveksbak</i>	Port Victoria	Seychelles	06-Nov-11	07-Nov-11
56.	Aircraft – IN Dornier	Male	Maldives	01-Nov-11	02-Nov-11
57.	Aircraft – IN Dornier	Male	Maldives	15-Nov-11	17-Nov-11
58.	<i>Sarveksbak</i>	Mombasa	Kenya	25-Nov-11	28-Nov-11
59.	<i>Sarveksbak</i>	Mombasa	Kenya	01-Dec-11	04-Dec-11
60.	<i>Kabra</i>	Male	Maldives	05-Dec-11	09-Dec-11
61.	<i>Kora, Baratang</i>	Langkawi	Malaysia	06-Dec-11	09-Dec-11
62.	<i>Sarveksbak</i>	Port Victoria	Seychelles	15-Dec-11	19-Dec-11
2012					
1.	<i>Savitri</i>	Colombo	Sri Lanka	09-Jan-12	10-Jan-12
2.	<i>Tabar</i>	Male	Maldives	10-Jan-12	13-Jan-12
3.	<i>Savitri</i>	Port Victoria	Seychelles	15-Jan-12	17-Jan-12
4.	Aircraft – IN Dornier	Male	Maldives	17-Jan-12	22-Jan-12
5.	<i>Savitri</i>	Port Victoria	Seychelles	21-Jan-12	22-Jan-12
6.	LCU 35	Phuket	Thailand	23-Jan-12	25-Jan-12
7.	<i>Sandbayak</i>	Yangon	Myanmar	25-Jan-12	28-Jan-12
8.	<i>Savitri</i>	Port Louis	Mauritius	26-Jan-12	28-Jan-12
9.	<i>Ranjit</i>	Singapore	Singapore	26-Jan-12	28-Jan-12
10.	<i>Ranjit</i>	Subic Bay	Philippines	08-Feb-12	10-Feb-12
11.	<i>Savitri</i>	Port Louis	Mauritius	01-Feb-12	02-Feb-12
12.	<i>Suvarna</i>	Male	Maldives	06-Feb-12	10-Feb-12
13.	<i>Ranjit</i>	Busan	Republic of Korea	22-Feb-12	24-Feb-12
14.	<i>Ranjit</i>	Okinawa	Japan	28-Feb-12	29-Feb-12
15.	<i>Darshak</i>	Port Victoria	Seychelles	29-Feb-12	03-Mar-12
16.	<i>Darshak</i>	Cape Town	South Africa	14-Mar-12	17-Mar-12
17.	<i>Darshak</i>	Maputo	Mozambique	09-Mar-12	24-Mar-12

Ser	Units	Port/Station	Country	Date from	Date to
18.	<i>Ranjit</i>	Port Kelang	Malaysia	20-Mar-12	23-Mar-12
19.	<i>Betwa</i>	Doha	Qatar	25-Mar-12	29-Mar-12
20.	<i>Sharda</i>	Male	Maldives	25-Mar-12	30-Mar-12
21.	<i>Darshak</i>	Beira	Mozambique	26-Mar-12	28-Mar-12
22.	<i>Tir, Shardul, ICGS Varuna</i>	Jeddah	Saudi Arabia	26-Mar-12	29-Mar-12
23.	<i>Tir, Shardul, ICGS Varuna</i>	Port Safaga	Egypt	31-Mar-12	04-Apr-12
24.	<i>Tir, Shardul, ICGS Varuna</i>	Djibouti	Djibouti	08-Apr-12	11-Apr-12
25.	<i>Ranjit</i>	Makassar	Indonesia	10-Apr-12	12-Apr-12
26.	<i>Darshak</i>	Beira	Mozambique	12-Apr-12	14-Apr-12
27.	<i>Tir, Shardul, ICGS Varuna</i>	Salalah	Oman	14-Apr-12	17-Apr-12
28.	<i>Ranjit</i>	Surabaya	Indonesia	15-Apr-12	17-Apr-12
29.	<i>Darshak</i>	Maputo	Mozambique	16-Apr-12	18-Apr-12
30.	<i>Darshak</i>	Port Louis	Mauritius	23-Apr-12	26-Apr-12
31.	<i>Darshak</i>	Port Louis	Mauritius	11-May-12	14-May-12
32.	<i>Subhadra</i>	Male	Maldives	12-May-12	19-May-12
33.	<i>Rana, Shakti, Shivalik, Karmuk</i>	Singapore	Singapore	11-May-12	14-May-12
34.	<i>Rana, Shakti</i>	Subic Bay	Philippines	19-May-12	23-May-12
35.	<i>Shivalik, Karmuk</i>	Haiphong	Vietnam	19-May-12	23-May-12
36.	<i>Rana, Shakti, Shivalik, Karmuk</i>	Busan	Republic of Korea	29-May-12	02-Jun-12
37.	Aircraft – 2x <i>IN Dornier</i>	Muscat	Oman	02-Jun-12	04-Jun-12
38.	Aircraft – 2x <i>IN Dornier</i>	Muscat	Oman	04-Jun-12	04-Jun-12
39.	Aircraft – 2x <i>IN Dornier</i>	Manama	Bahrain	04-Jun-12	04-Jun-12
40.	<i>Rana, Shakti, Shivalik, Karmuk</i>	Tokyo	Japan	05-Jun-12	09-Jun-12
41.	Aircraft – <i>IN Dornier</i>	Male	Maldives	10-Jun-12	14-Jun-12
42.	<i>Savitri</i>	Port Victoria	Seychelles	13-Jun-12	14-Jun-12
43.	<i>Rana, Shakti, Shivalik, Karmuk</i>	Shanghai	China	13-Jun-12	13-Jun-12
44.	<i>Savitri</i>	Port Victoria	Seychelles	16-Jun-12	19-Jun-12
45.	Aircraft – <i>IN Dornier CG Dornier</i>	Muscat	Oman	21-Jun-12	23-Jun-12
46.	Aircraft – <i>IN Dornier CG Dornier</i>	Salalah	Oman	23-Jun-12	23-Jun-12
47.	Aircraft – <i>IN Dornier CG Dornier</i>	Djibouti	Djibouti	23-Jun-12	25-Jun-12
48.	Aircraft – <i>IN Dornier CG Dornier</i>	Dire Dawa	Ethiopia	25-Jun-12	25-Jun-12
49.	Aircraft – <i>IN Dornier CG Dornier</i>	Nairobi	Kenya	25-Jun-12	27-Jun-12
50.	Aircraft – <i>IN Dornier CG Dornier</i>	Port Victoria	Seychelles	27-Jun-12	30-Jun-12
51.	Aircraft – <i>IN Dornier CG Dornier</i>	Mombasa	Kenya	27-Jun-12	30-Jun-12
52.	<i>Rana, Shakti, Shivalik, Karmuk</i>	Port Klang	Malaysia	27-Jun-12	30-Jun-12
53.	Aircraft – <i>IN Dornier CG Dornier</i>	Nairobi	Kenya	30-Jun-12	02-Jul-12
54.	<i>Savitri</i>	Port Louis	Mauritius	01-Jul-12	04-Jul-12
55.	Aircraft – <i>IN Dornier CG Dornier</i>	Dire Dawa	Ethiopia	02-Jul-12	02-Jul-12
56.	<i>Mumbai, Talwar, Gomati, Aditya</i>	Alexandria	Egypt	02-Jul-12	05-Jul-12
57.	Aircraft – <i>IN Dornier CG Dornier</i>	Djibouti	Djibouti	02-Jul-12	04-Jul-12
58.	Aircraft – <i>IN Dornier CG Dornier</i>	Salalah	Oman	04-Jul-12	04-Jul-12
59.	Aircraft – <i>IN Dornier CG Dornier</i>	Muscat	Oman	04-Jul-12	06-Jul-12
60.	<i>Mumbai, Talwar, Gomati, Aditya</i>	Cartagena	Spain	11-Jul-12	14-Jul-12

Ser	Units	Port/Station	Country	Date from	Date to
61.	<i>Savitri</i>	Port Louis	Mauritius	12-Jul-12	15-Jul-12
62.	Aircraft – <i>IN Dornier</i>	Male	Maldives	15-Jul-12	19-Jul-12
63.	<i>Chetlat</i>	Trincomalee	Sri Lanka	18-Jul-12	20-Jul-12
64.	<i>Savitri</i>	Port Louis	Mauritius	23-Jul-12	26-Jul-12
65.	<i>Mumbai, Takwar, Gomati, Aditya</i>	Toulon	France	15-Jul-12	19-Jul-12
66.	<i>Mumbai, Takwar, Gomati, Aditya</i>	Haifa	Israel	30-Jul-12	02-Aug-12
67.	<i>Mumbai, Takwar, Gomati, Aditya</i>	Djibouti	Djibouti	08-Aug-12	11-Aug-12
68.	<i>Sharda</i>	Male	Maldives	12-Aug-12	17-Aug-12
69.	<i>Shardul</i>	Male	Maldives	15-Sep-12	20-Sep-12
70.	<i>Kumbhir, Baratang</i>	Belawan	Indonesia	20-Sep-12	23-Sep-12
71.	<i>Sujata, Varuna</i>	Chittagong	Bangladesh	29-Sep-12	02-Oct-12
72.	<i>Delhi, Deepak</i>	Durban	South Africa	04-Oct-12	07-Oct-12
73.	<i>Sujata, ICGS Varuna</i>	Yangon	Myanmar	05-Oct-12	08-Oct-12
74.	<i>Sujata, ICGS Varuna</i>	Phuket	Thailand	10-Oct-12	13-Oct-12
75.	<i>Delhi, Deepak</i>	Simons Town	South Africa	10-Oct-12	15-Oct-12
76.	<i>Sudarshini</i>	Padang	Indonesia	12-Oct-12	15-Oct-12
77.	<i>Savitri</i>	Male	Maldives	14-Oct-12	18-Oct-12
78.	<i>Sujata, ICGS Varuna</i>	Port Kelang	Malaysia	15-Oct-12	18-Oct-12
79.	<i>Delhi, Deepak</i>	Cape Town	South Africa	19-Oct-12	22-Oct-12
80.	<i>Sudarshini</i>	Bali	Indonesia	27-Oct-12	31-Oct-12
81.	<i>Delhi, Deepak</i>	Maputo	Mozambique	02-Nov-12	04-Nov-12
82.	Aircraft – 2x <i>IN Dornier</i>	Manama	Bahrain	03-Nov-12	05-Nov-12
83.	Aircraft – 2x <i>IN Dornier</i>	Muscat	Oman	05-Nov-12	07-Nov-12
84.	<i>Battimalv Aircraft – IN Dornier</i>	Phuket	Thailand	06-Nov-12	08-Nov-12
85.	<i>Delhi, Deepak</i>	Pemba	Mozambique	08-Nov-12	09-Nov-12
86.	<i>Tarkash</i>	Kaliningrad	Russia	09-Nov-12	17-Nov-12
87.	<i>Sudarshini</i>	Manado	Indonesia	10-Nov-12	13-Nov-12
88.	<i>Delhi, Deepak</i>	Mombasa	Kenya	12-Nov-12	15-Nov-12
89.	Aircraft – <i>IN Dornier</i>	Male	Maldives	18-Nov-12	22-Nov-12
90.	<i>Sudarshini</i>	Port Muara	Brunei	21-Nov-12	24-Nov-12
91.	<i>Tarkash</i>	Portsmouth	UK	22-Nov-12	25-Nov-12
92.	<i>Brahmaputra</i>	Port Victoria	Seychelles	26-Nov-12	28-Nov-12
93.	<i>Tarkash</i>	Valencia	Spain	30-Nov-12	03-Dec-12
94.	<i>Sudarshini</i>	Cebu	Philippines	01-Dec-12	04-Dec-12
95.	<i>Brahmaputra</i>	Port Victoria	Seychelles	03-Dec-12	06-Dec-12
96.	<i>Tarkash</i>	Port Said	Egypt	09-Dec-12	10-Dec-12
97.	<i>Sudarshini</i>	Manila	Philippines	09-Dec-12	24-Dec-12
98.	<i>Brahmaputra</i>	Port Louis	Mauritius	12-Dec-12	15-Dec-12
99.	<i>Tarkash</i>	Jeddah	Saudi Arabia	14-Dec-12	17-Dec-12
100.	<i>Brahmaputra</i>	Port Louis	Mauritius	19-Dec-12	20-Dec-12
101.	<i>Tarkash</i>	Salalah	Oman	22-Dec-12	23-Dec-12
102.	<i>Car Nicobar</i>	Trincomalee	Sri Lanka	25-Dec-12	27-Dec-12
103.	<i>Brahmaputra</i>	Port Victoria	Seychelles	30-Dec-12	03-Jan-13

Ser	Units	Port/Station	Country	Date from	Date to
104.	<i>Sudarshini</i>	Da Nang	Vietnam	31-Dec-12	03-Jan-13
2013					
1.	<i>Kabra</i>	Male	Maldives	06-Jan-13	11-Jan-13
2.	<i>Sindburakshak</i>	Sevrodinsk	Russia	07-Jan-13	29-Jan-13
3.	<i>Sudarshini</i>	Sihanoukville	Cambodia	12-Jan-13	15-Jan-13
4.	<i>Sudarshini</i>	Bangkok	Thailand	18-Jan-13	21-Jan-13
5.	<i>Sudarshini</i>	Singapore	Singapore	29-Jan-13	13-Feb-13
6.	<i>Sarveksbak</i>	Port Louis	Mauritius	03-Feb-13	07-Feb-13
7.	<i>Sindburakshak</i>	Tromso	Norway	06-Feb-13	10-Feb-13
8.	<i>Sarveksbak</i>	Port Louis	Mauritius	16-Feb-13	18-Feb-13
9.	<i>Sudarshini</i>	Port Kelang	Malaysia	16-Feb-13	19-Feb-13
10.	<i>Kalpeni</i>	Male	Maldives	17-Feb-13	21-Feb-13
11.	<i>Sindburakshak</i>	Portsmouth	UK	20-Feb-13	24-Feb-13
12.	<i>Sudarshini</i>	Phuket	Thailand	23-Feb-13	26-Feb-13
13.	<i>Sarveksbak</i>	Port Louis	Mauritius	27-Feb-13	01-Mar-13
14.	<i>Sudarshini</i>	Sittwe	Myanmar	06-Mar-13	09-Mar-13
15.	<i>Sindburakshak</i>	Cartagena	Spain	06-Mar-13	10-Mar-13
16.	Aircraft – <i>IN Dornier</i>	Male	Maldives	10-Mar-13	14-Mar-13
17.	<i>Sarveksbak</i>	Port Louis	Mauritius	10-Mar-13	13-Mar-13
18.	<i>Baratang, Battimalv</i>	Coco Island	Myanmar	17-Mar-13	18-Mar-13
19.	<i>Baratan, Battimalv</i>	Coco Island	Myanmar	21-Mar-13	22-Mar-13
20.	<i>Sindburakshak</i>	Alexandria	Egypt	22-Mar-13	26-Mar-13
21.	Aircraft – <i>2x IN Dornier</i>	Manama	Bahrain	23-Mar-13	25-Mar-13
22.	Aircraft – <i>2x IN Dornier</i>	Muscat	Oman	25-Mar-13	27-Mar-13
23.	<i>Sindburakshak</i>	Port Said	Egypt	27-Mar-13	28-Mar-13
24.	<i>Sindburakshak</i>	Djibouti	Djibouti	06-Apr-13	09-Apr-13
25.	<i>Sujata, Varuna</i>	Male	Maldives	08-Apr-13	11-Apr-13
26.	<i>Sujata, Varuna</i>	Colombo	Sri Lanka	17-Apr-13	20-Apr-13
27.	<i>Tarangini</i>	Colombo	Sri Lanka	17-Apr-13	21-Apr-13
28.	<i>Satpura, Kirch</i>	Singapore	Singapore	13-May-13	20-May-13
29.	Aircraft – <i>IN Dornier</i>	Male	Maldives	16-May-13	20-May-13
30.	Aircraft – <i>2x IN Dornier</i>	Phuket	Thailand	17-May-13	17-May-13
31.	Aircraft – <i>2x IN Dornier</i>	Singapore	Singapore	17-May-13	23-May-13
32.	Aircraft – <i>IN Dornier</i>	Muscat	Oman	21-May-13	23-May-13
33.	Aircraft – <i>2x IN Dornier</i>	Phuket	Thailand	23-May-13	23-May-13
34.	Aircraft – <i>IN Dornier</i>	Salalah	Oman	23-May-13	23-May-13
35.	<i>Mabish, Bangaram, Aircraft – IN Dornier</i>	Belawan	Indonesia	23-May-13	25-May-13
36.	Aircraft – <i>IN Dornier</i>	Djibouti	Djibouti	23-May-13	25-May-13
37.	<i>Satpura, Ranvijay, Jyoti, Kirch</i>	Port Kelang	Malaysia	25-May-13	29-May-13
38.	Aircraft – <i>IN Dornier</i>	Dire Dawa	Ethiopia	25-May-13	25-May-13
39.	Aircraft – <i>IN Dornier</i>	Nairobi	Kenya	25-May-13	27-May-13
40.	Aircraft – <i>IN Dornier</i>	Mombasa	Kenya	27-May-13	27-May-13
41.	Aircraft – <i>IN Dornier</i>	Port Victoria	Seychelles	27-May-13	30-May-13

Ser	Units	Port/Station	Country	Date from	Date to
42.	Aircraft – IN Dornier	Mombasa	Kenya	30-May-13	30-May-13
43.	Aircraft – IN Dornier	Nairobi	Kenya	30-May-13	01-Jun-13
44.	Aircraft – IN Dornier	Dire Dawa	Ethiopia	01-Jun-13	01-Jun-13
45.	Aircraft – IN Dornier	Djibouti	Djibouti	01-Jun-13	03-Jun-13
46.	Aircraft – IN Dornier	Salalah	Oman	03-Jun-13	03-Jun-13
47.	Aircraft – IN Dornier	Muscat	Oman	03-Jun-13	05-Jun-13
48.	<i>Satpura, Ranvijay, Jyoti, Kirch</i>	Da Nang	Vietnam	04-Jun-13	08-Jun-13
49.	<i>Kumbhir</i>	Yangon	Myanmar	06-Jun-13	07-Jun-13
50.	<i>Gharial</i>	Port Muara	Brunei	11-Jun-13	22-Jun-13
51.	<i>Satpura, Ranvijay, Jyoti, Kirch</i>	Manila	Philippines	12-Jun-13	16-Jun-13
52.	<i>Sukanya</i>	Port Victoria	Seychelles	16-Jun-13	19-Jun-13
53.	Aircraft – IN Dornier	Male	Maldives	18-Jun-13	22-Jun-13
54.	<i>Sukanya</i>	Port Victoria	Seychelles	25-Jun-13	26-Jun-13
55.	<i>Sukanya</i>	Port Louis	Mauritius	03-Jul-13	06-Jul-13
56.	<i>Trikand</i>	Kaliningrad	Russia	08-Jul-13	08-Jul-13
57.	<i>Trikand</i>	Kiel Canal	Germany	10-Jul-13	10-Jul-13
58.	<i>Trikand</i>	Portsmouth	UK	12-Jul-13	16-Jul-13
59.	<i>Sukanya</i>	Port Louis	Mauritius	12-Jul-13	13-Jul-13
60.	<i>Sukanya</i>	Male	Maldives	21-Jul-13	23-Jul-13
61.	<i>Trikand</i>	Valencia	Spain	22-Jul-13	26-Jul-13
62.	<i>Sukanya</i>	Male	Maldives	26-Jul-13	26-Jul-13
63.	<i>Trikand</i>	Port Said	Egypt	01-Aug-13	04-Aug-13
64.	<i>Trikand</i>	Djibouti	Djibouti	09-Aug-13	11-Aug-13
65.	Aircraft – IN Dornier	Male	Maldives	19-Aug-13	22-Aug-13
66.	<i>Kumbhir, Aircraft – IN Dornier</i>	Belawan	Indonesia	09-Sep-13	11-Sep-13
67.	<i>Mysore, Tarkash</i>	Kuwait	Kuwait	10-Sep-13	13-Sep-13
68.	<i>Tabar, Aditya</i>	Doha	Qatar	10-Sep-13	13-Sep-13
69.	<i>Bangaram</i>	Yangon	Myanmar	10-Sep-13	12-Sep-13
70.	<i>Mysore, Tarkash, Tabar, Aditya</i>	Dubai	UAE	15-Sep-13	18-Sep-13
71.	<i>Khanjar</i>	Male	Maldives	16-Sep-13	21-Sep-13
72.	<i>Sabyadri</i>	Fremantle	Australia	18-Sep-13	21-Sep-13
73.	<i>Mysore, Tarkash, Tabar, Aditya</i>	Muscat	Oman	19-Sep-13	23-Sep-13
74.	<i>Sharada</i>	Male	Maldives	26-Sep-13	26-Sep-13
75.	<i>Mysore, Tarkash, Tabar, Aditya</i>	Off Muscat	Oman	26-Sep-13	26-Sep-13
76.	<i>Sabyadri</i>	Jervis Bay	Australia	29-Sep-13	03-Oct-13
77.	<i>Gharial, Sharda, Tarangini</i>	Port Victoria	Seychelles	01-Oct-13	04-Oct-13
78.	<i>Sabyadri</i>	Sydney	Australia	04-Oct-13	11-Oct-13
79.	<i>Gharial, Sharda</i>	Port Victoria	Seychelles	08-Oct-13	09-Oct-13
80.	<i>Gharial, Sharda, Tarangini</i>	Port Louis	Mauritius	14-Oct-13	17-Oct-13
81.	<i>Gharial, Sharda</i>	Port Louis	Mauritius	21-Oct-13	22-Oct-13
82.	<i>Kalpeni</i>	Male	Maldives	22-Oct-13	26-Oct-13
83.	<i>Sabyadri</i>	Surabaya	Indonesia	24-Oct-13	27-Oct-13
84.	<i>Gharial</i>	Port Louis	Fremantle	26-Oct-13	27-Oct-13

Ser	Units	Port/Station	Country	Date from	Date to
85.	<i>Deepak, Trikand</i>	Port Suez	Egypt	14-Nov-13	15-Nov-13
86.	<i>Bitra, Aircraft – IN Dornier</i>	Phuket	Thailand	19-Nov-13	22-Nov-13
87.	<i>Jamuna</i>	Mombasa	Kenya	21-Nov-13	25-Nov-13
88.	<i>Aircraft – IN Dornier</i>	Male	Maldives	24-Nov-13	30-Nov-13
89.	<i>Shivalik</i>	Colombo	Sri Lanka	25-Nov-13	28-Nov-13
90.	<i>Vikramaditya</i>	Severodvinsk	Russian	01-Dec-13	01-Dec-13
91.	<i>Delhi</i>	Port Suez	Egypt	01-Dec-13	01-Dec-13
92.	<i>Jamuna</i>	Mombasa	Kenya	07-Dec-13	09-Dec-13
93.	<i>Shardul</i>	Port Louis	Mauritius	12-Dec-13	14-Dec-13
94.	<i>Trinkat</i>	Male	Maldives	16-Dec-13	21-Dec-13
95.	<i>Jamuna</i>	Mombasa	Kenya	22-Dec-13	25-Dec-13
96.	<i>Jamuna</i>	Mombasa	Kenya	26-Dec-13	29-Dec-13
2014					
1.	<i>Jamuna</i>	Dar-es-Salaam	Tanzania	09-Jan-14	11-Jan-14
2.	<i>Karuva</i>	Male	Maldives	23-Jan-14	28-Jan-14
3.	<i>Jamuna</i>	Dar-es-Salaam	Tanzania	22-Jan-14	25-Jan-14
4.	<i>Betwa</i>	Male	Maldives	15-Feb-14	16-Feb-14
5.	<i>Saryu, Battimalv</i>	Yangon	Myanmar	19-Feb-14	21-Feb-14
6.	<i>Aircraft – IN Dornier</i>	Male	Maldives	12-Mar-14	16-Mar-14
7.	<i>Airavat</i>	Batam	Indonesia	23-Mar-14	03-Apr-14
8.	<i>Gharial, Sujata, Sudarshini, ICGS Varuna</i>	Singapore	Singapore	16-Apr-14	19-Apr-14
9.	<i>Shivalik</i>	Qingdao	China	20-Apr-14	23-Apr-14
10.	<i>Gharial, Sujata, Sudarshini, ICGS Varuna</i>	Phuket	Thailand	21-Apr-14	24-Apr-14
11.	<i>Shivalik</i>	Qingdao	China	23-Apr-14	24-Apr-14
12.	<i>Koswari</i>	Male	Maldives	23-Apr-14	30-Apr-14
13.	<i>Shivalik</i>	Qingdao	China	24-Apr-14	25-Apr-14
14.	<i>Koswari</i>	Male	Maldives	25-Apr-14	27-Apr-14
15.	<i>Gharial, Sujata, ICGS Varuna</i>	Yangon	Myanmar	27-Apr-14	30-Apr-14
16.	<i>Trishul</i>	Port Victoria	Seychelles	29-Apr-14	01-May-14
17.	<i>Trishul</i>	Port Victoria	Seychelles	06-May-14	07-May-14
18.	<i>Trishul</i>	Port Louis	Mauritius	11-May-14	13-May-14
19.	<i>Sumedha</i>	Male	Maldives	17-May-14	19-May-14
20.	<i>Trishul</i>	Port Louis	Mauritius	18-May-14	19-May-14
21.	<i>Aircraft – IN Dornier</i>	Male	Maldives	16-Jun-14	20-Jun-14
22.	<i>Mysore</i>	Suwaikh	Kuwait	28-Jun-14	30-Jun-14
23.	<i>Mysore</i>	Suwaikh	Kuwait	06-Jul-14	08-Jul-14
24.	<i>Mysore</i>	Suwaikh	Kuwait	18-Jul-14	19-Jul-14
25.	<i>Sabyadri</i>	Hawaii	USA	07-Jul-14	30-Jul-14
26.	<i>Sabyadri</i>	Darwin	Australia	10-Jun-14	13-Jun-14
27.	<i>Shivalik, Ranvijay, Shakti</i>	Vladivostak	Russia	14-Jul-14	17-Jul-14
28.	<i>Aircraft – IN Dornier</i>	Male	Maldives	20-Jul-14	24-Jul-14
29.	<i>Shivalik, Ranvijay, Shakti</i>	Sasebo	Japan	23-Jul-14	26-Jul-14
30.	<i>Shivalik</i>	Hai Phong	Vietnam	05-Aug-14	08-Aug-14

Ser	Units	Port/Station	Country	Date from	Date to
31.	<i>Sbakti</i>	Sepanggar	Malaysia	06-Aug-14	09-Aug-14
32.	<i>Ranvijay</i>	Brunei	Brunei	08-Aug-14	11-Aug-14
33.	<i>Sahyadri</i>	Manila	Philippines	20-Aug-14	23-Aug-14
34.	<i>Trikand</i>	Male	Maldives	24-Aug-14	29-Aug-14
35.	<i>Jamuna</i>	Mombasa	Kenya	14-Sep-14	17-Sep-14
36.	Aircraft – <i>INDornier</i>	Male	Maldives	14-Sep-14	18-Sep-14
37.	Aircraft – <i>INDornier</i>	Male	Maldives	22-Sep-14	26-Sep-14
38.	<i>Tir, Gharial, Tarangini</i>	Muscat	Oman	06-Oct-14	09-Oct-14
39.	<i>Deepak, Mumbai, Teg, Talwar</i>	Antsiranana	Madagascar	09-Oct-14	12-Oct-14
40.	<i>Tir, Gharial, Tarangini</i>	Dubai	UAE	11-Oct-14	14-Oct-14
41.	<i>Kabra</i>	Male	Maldives	13-Oct-14	18-Oct-14
42.	<i>Jamuna</i>	Mombasa	Kenya	15-Oct-14	18-Oct-14
43.	<i>Deepak, Mumbai, Talwar</i>	Mombasa	Kenya	15-Oct-14	18-Oct-14
44.	<i>Tir, Gharial, Tarangini</i>	Manama	Bahrain	16-Oct-14	19-Oct-14
45.	<i>Jamuna</i>	Dar-es-Salaam	Tanzania	19-Oct-14	22-Oct-14
46.	<i>Kabra</i>	Male	Maldives	18-Oct-14	18-Oct-14
47.	<i>Deepak, Mumbai, Talwar</i>	Dar-es-Salaam	Tanzania	19-Oct-14	22-Oct-14
48.	<i>Teg</i>	Simonstown	South Africa	20-Oct-14	27-Oct-14
49.	<i>Tir, Gharial</i>	Al Jubail	Saudi Arabia	20-Oct-14	23-Oct-14
50.	<i>Sukanya</i>	Port Victoria	Seychelles	23-Oct-14	27-Oct-14
51.	<i>Deepak, Mumbai, Talwar</i>	St. Denis	France	27-Oct-14	30-Oct-14
52.	<i>Jamuna</i>	Dar-es-Salaam	Tanzania	31-Oct-14	02-Nov-14
53.	<i>Sukanya</i>	Port Victoria	Seychelles	01-Nov-14	04-Nov-14
54.	<i>Deepak, Mumbai, Talwar</i>	Port Victoria	Seychelles	06-Nov-14	09-Nov-14
55.	<i>Teg</i>	Cape Town	South Africa	06-Nov-14	10-Nov-14
56.	<i>Sukanya</i>	Port Louis	Mauritius	08-Nov-14	11-Nov-14
57.	<i>Jamuna</i>	Dar-es-Salaam	Tanzania	11-Nov-14	14-Nov-14
58.	<i>Teg</i>	Nacala	Mozambique	17-Nov-14	20-Nov-14
59.	<i>Sukanya</i>	Port Louis	Mauritius	16-Nov-14	19-Nov-14
60.	Aircraft – <i>INDornier</i>	Phuket	Thailand	19 NOV 14	19 NOV 14
61.	<i>Sukanya</i>	Male	Maldives	25-Nov-14	27-Nov-14
62.	<i>Sukanya</i>	Male	Maldives	30-Nov-14	02-Dec-14
63.	<i>Sukanya</i>	Male	Maldives	06-Dec-14	09-Dec-14
64.	<i>Sukanya</i>	Colombo	Sri Lanka	11-Dec-14	13-Dec-14
65.	Aircraft – <i>INDornier</i>	Male	Maldives	14-Dec-14	18-Dec-14
66.	<i>Sumitra</i>	Yangon	Myanmar	15-Dec-14	16-Dec-14
2015					
1.	<i>Trishul</i>	Male	Maldives	17-Jan-15	19-Jan-15
2.	<i>Trishul</i>	Male	Maldives	22-Jan-15	22-Jan-15
3.	Aircraft – <i>INDornier</i>	Male	Maldives	15-Feb-15	19-Feb-15
4.	<i>Ranjit</i>	Chittagong	Bangladesh	24-Feb-15	26-Feb-15
5.	<i>Gomati</i>	Male	Maldives	10-Mar-15	15-Mar-15
6.	<i>Tir, Kesari, ICGS Varuna</i>	Surabaya	Indonesia	01-Mar-15	05-Mar-15

Ser	Units	Port/Station	Country	Date from	Date to
7.	<i>Sudarshini</i>	Singapore	Singapore	02-Mar-15	07-Mar-15
8.	<i>Delhi</i>	Port Louis	Mauritius	10-Mar-15	13-Mar-15
9.	<i>Tir, Kesari, Sudarshini, ICGS Varuna</i>	Port Kelang	Malaysia	10-Mar-15	15-Mar-15
10.	<i>Sarveksbak</i>	Port Louis	Mauritius	11-Mar-15	14-Mar-15
11.	<i>Saryu, Battimalv</i>	Yangon	Myanmar	16-Mar-15	17-Mar-15
12.	<i>Tir, Kesari, ICGS Varuna</i>	Chittagong	Bangladesh	19-Mar-15	22-Mar-15
13.	<i>Saryu, Battimalv</i>	Coco Island	Myanmar	21-Mar-15	22-Mar-15
14.	<i>Darshak</i>	Yangon	Myanmar	19-Mar-15	22-Mar-15
15.	<i>Tir, Kesari, Sudarshini, ICGS Varuna</i>	Trincomalee	Sri Lanka	27-Mar-15	30-Mar-15
16.	<i>Sarveksbak</i>	Port Louis	Mauritius	28-Mar-15	31-Mar-15
17.	<i>Sumitra</i>	Hodeidah	Yemen	08-Apr-15	08-Apr-15
18.	<i>Mumbai</i>	Hodeidah	Yemen	09-Apr-15	09-Apr-15
19.	<i>Tarkash</i>	Hodeidah	Yemen	10-Apr-15	10-Apr-15
20.	<i>Sumitra</i>	Hodeidah	Yemen	11-Apr-15	11-Apr-15
21.	<i>Sarveksbak</i>	Port Louis	Mauritius	14-Apr-15	17-Apr-15
22.	<i>Karuva</i>	Male	Maldives	23-Apr-15	28-Apr-15
23.	<i>Cheetah, Aircraft – IN Dornier</i>	Belawan	Indonesia	04-May-15	07-May-16
24.	<i>Darshak</i>	Yangon	Myanmar	11-May-15	14-May-15
25.	<i>Kora</i>	Male	Maldives	17-May-15	22-May-15
26.	<i>Satpura, Kamorta</i>	Singapore	Singapore	18-May-15	22-May-15
27.	<i>Ranvir, Shakti</i>	Singapore	Singapore	22-May-15	26-May-15
28.	<i>Saryu</i>	Penang	Malaysia	24-May-15	26-May-15
29.	<i>Saryu</i>	Penang	Malaysia	28-May-15	29-May-15
30.	<i>Ranvir, Shakti</i>	Jakarta	Indonesia	31-May-15	04-Jun-15
31.	<i>Satpura, Kamorta</i>	Fremantle	Australia	04-Jun-15	08-Jun-15
32.	<i>Ranvir, Shakti, Kamorta</i>	Kuantan	Malaysia	17-Jun-15	21-Jun-15
33.	<i>Aircraft – IN Dornier</i>	Male	Maldives	21-Jun-21	25-Jun-21
34.	<i>Satpura, Shakti</i>	Satahip	Thailand	23-Jun-15	27-Jun-15
35.	<i>Ranvir, Kamorta</i>	Sihanukville	Cambodia	23-Jun-15	27-Jun-15
36.	<i>Teg</i>	Port Victoria	Seychelles	26-Jun-21	30-Jun-21
37.	<i>Trikand</i>	Djibouti	Djibouti	10-Aug-15	13-Aug-15
38.	<i>Trikand</i>	Haifa	Israel	19-Aug-15	22-Aug-15
39.	<i>Trikand</i>	Valencia	Spain	28-Aug-15	31-Aug-15
40.	<i>Trikand</i>	Plymouth	UK	05-Sep-15	08-Sep-15
41.	<i>Trikand</i>	Portsmouth	UK	12-Sep-15	13-Sep-15
42.	<i>Trikand</i>	London	UK	14-Sep-15	18-Sep-15
43.	<i>Trikand</i>	Toulon	France	25-Sep-15	29-Sep-15
44.	<i>Trikand</i>	Istanbul	Turkey	04-Oct-15	07-Oct-15
45.	<i>Trikand</i>	Safaga	Egypt	11-Oct-15	14-Oct-15
46.	<i>Trikand</i>	Djibouti	Djibouti	18-Oct-15	19-Oct-15
47.	<i>Tarangini</i>	Salalah	Oman	14-May-15	17-May-15
48.	<i>Tarangini</i>	Jeddah	Saudi Arabia	29-May-15	01-Jun-15
49.	<i>Tarangini</i>	Alexandria	Egypt	10-Jun-15	12-Jun-15

Ser	Units	Port/Station	Country	Date from	Date to
50.	<i>Tarangini</i>	Valetta	Malta	20-Jun-15	22-Jun-15
51.	Aircraft – <i>INDornier</i>	Male	Maldives	21-Jun-15	25-Jun-15
52.	<i>Teg</i>	Port Victoria	Seychelles	26-Jun-15	30-Jun-15
53.	<i>Tarangini</i>	Cadiz	Spain	02-Jul-15	05-Jul-15
54.	<i>Teg</i>	Port Victoria	Seychelles	06-Jul-15	09-Jul-15
55.	<i>Teg</i>	Port Louis	Mauritius	13-Jul-15	17-Jul-15
56.	<i>Tarangini</i>	Plymouth	UK	15-Jul-15	18-Jul-15
57.	<i>Teg</i>	Port Louis	Mauritius	23-Jul-15	26-Jul-15
58.	<i>Tarangini</i>	Kristiansand	Norway	25-Jul-15	28-Jul-15
59.	<i>Tarangini</i>	Aalborg	Denmark	01-Aug-15	04-Aug-15
60.	<i>Tarangini</i>	Rostock	Germany	06-Aug-15	09-Aug-15
61.	<i>Tarangini</i>	Bremerhaven	Germany	12-Aug-15	16-Aug-15
62.	Aircraft – <i>INDornier</i>	Male	Maldives	11-Aug-15	15-Aug-15
63.	<i>Tarangini</i>	Amsterdam	Netherland	19-Aug-15	23-Aug-15
64.	<i>Tarangini</i>	Le Havre	France	26-Aug-15	10-Sep-15
65.	<i>Tarangini</i>	Lisbon	Portugal	20-Sep-15	23-Sep-15
66.	<i>Tarangini</i>	Valetta	Malta	06-Oct-15	09-Oct-15
67.	<i>Tarangini</i>	Port Said	Egypt	18-Oct-15	21-Oct-15
68.	<i>Tarangini</i>	Djibouti	Djibouti	03-Nov-15	05-Nov-15
69.	<i>Tarangini</i>	Muscat	Oman	20-Nov-15	23-Nov-15
70.	<i>Beas, Betwa</i>	Bandar Abbas	Iran	28-Aug-15	01-Sep-15
71.	<i>Delhi, Deepak, Trishul, Tabar</i>	Dubai	UAE	05-Sep-15	08-Sep-15
72.	<i>Deepak, Tabar</i>	Manama	Bahrain	09-Sep-15	12-Sep-15
73.	<i>Delhi, Trishul</i>	Al Jubail	Saudi Arabia	10-Sep-15	13-Sep-15
74.	<i>Deepak, Tabar</i>	Kuwait	Kuwait	13-Sep-15	16-Sep-15
75.	<i>Delhi, Trishul</i>	Al Jubail	Saudi Arabia	10-Sep-15	13-Sep-15
76.	<i>Deepak, Tabar</i>	Kuwait	Kuwait	13-Sep-15	16-Sep-15
77.	<i>Delhi, Trishul</i>	Doha	Qatar	14-Sep-15	17-Sep-15
78.	<i>Delhi, Deepak, Trishul, Tabar</i>	Muscat	Oman	19-Sep-15	22-Sep-15
79.	<i>Tir</i>	Port Louis	Mauritius	25-Sep-15	26-Sep-15
80.	<i>Saryu, Aircraft – INDornier</i>	Belawan	Indonesia	30-Sep-15	03-Oct-13
81.	<i>Tir, Sujata, ICGS Varuna</i>	Port Victoria	Seychelles	01-Oct-15	05-Oct-15
82.	<i>Khukri</i>	Yangon	Myanmar	06-Oct-15	08-Oct-15
83.	<i>Tir, Sujata, ICGS Varuna</i>	Port Victoria	Seychelles	09-Oct-15	13-Oct-15
84.	<i>Tir, Sujata, ICGS Varuna</i>	Port Louis	Mauritius	17-Oct-15	21-Oct-15
85.	<i>Tir, Sujata</i>	Port Louis	Mauritius	25-Oct-15	28-Oct-15
86.	<i>Sahyadri</i>	Da Nang	Vietnam	02-Oct-15	06-Oct-15
87.	<i>Sahyadri</i>	Sagami Bay	Japan	14-Oct-15	19-Oct-15
88.	<i>Sahyadri</i>	Incheon	Republic of Korea	23-Oct-15	27-Oct-15
89.	<i>Kora, Savitri, Khanjar</i>	Trincomalee	Sri Lanka	27-Oct-15	30-Oct-15
90.	<i>Darshak</i>	Port Victoria	Seychelles	27-Oct-15	17-Nov-15
91.	<i>Sahyadri</i>	Manila	Philippines	01-Nov-15	04-Nov-15
92.	<i>Shardul</i>	Male	Maldives	15-Nov-15	21-Nov-15

Ser	Units	Port/Station	Country	Date from	Date to
93.	<i>Kesari</i>	Phuket	Thailand	19-Nov-15	21-Nov-15
2016					
1.	<i>Sunayna</i>	Port Victoria	Seychelles	05-Jan-16	15-Jan-16
2.	<i>Tarangini, Sudarshini</i>	Colombo	Sri Lanka	17-Jan-16	18-Jan-16
3.	<i>Karuva</i>	Male	Maldives	25-Jan-16	30-Jan-16
4.	<i>Sutlej</i>	Tanzania	Kenya	28-Jan-16	03-Mar-16
5.	<i>Vikramaditya, Mysore</i>	Colombo	Sri Lanka	23-Jan-16	24-Jan-16
6.	<i>Vikramaditya, Mysore, Deepak</i>	Male	Maldives	15-Feb-16	18-Feb-16
7.	<i>Saryu, Bitra</i>	Yangon	Myanmar	16-Feb-16	18-Feb-16
8.	<i>Kalpeni</i>	Male	Maldives	21-Feb-16	27-Feb-16
9.	<i>Tabar</i>	Port Louis	Mauritius	10-Mar-16	13-Mar-16
10.	<i>Karmuk, Aircraft – IN Dornier</i>	Belawan	Indonesia	16-May-16	19-May-16
11.	<i>Aircraft – P-8I</i>	Seychelles	Seychelles	20-Mar-16	23-Mar-16
12.	<i>Kuthar</i>	Male	Maldives	24-May-16	31-May-16
13.	<i>Kondul</i>	Male	Maldives	27-Mar-16	28-Mar-16
14.	<i>Beas</i>	Doha	Qatar	28-Mar-16	02-Apr-16
15.	<i>Kondul</i>	Male	Maldives	01-Apr-16	01-Apr-16
16.	<i>Tir, Sujata, Sudarshni, ICGS Varuna</i>	Phuket	Thailand	04-Apr-16	08-Apr-16
17.	<i>Sumedha</i>	Padang	Indonesia	10-Apr-16	15-Apr-16
18.	<i>Tir, Sujata, ICGS Varuna</i>	Colombo	Sri Lanka	15-Apr-16	19-Apr-16
19.	<i>Karmuk, Aircraft – IN Dornier</i>	Phuket	Thailand	19-Apr-16	25-May-16
20.	<i>Beas</i>	Male	Maldives	24-Apr-16	26-Apr-16
21.	<i>Airavat</i>	Brunei	Brunei	01-May-16	05-May-16
22.	<i>Airavat</i>	Singapore	Singapore	09-May-16	12-May-16
23.	<i>Delhi, Tarkash, Deepak</i>	Dubai	UAE	07-May-16	10-May-16
24.	<i>Delhi, Tarkash, Deepak</i>	Kuwait	Kuwait	12-May-16	15-May-16
25.	<i>Delhi, Tarkash, Deepak</i>	Manama	Bahrain	16-May-16	19-May-16
26.	<i>Karmuk, Aircraft – IN Dornier</i>	Belawan	Indonesia	16-May-16	19-May-16
27.	<i>Delhi, Tarkash, Deepak</i>	Muscat	Oman	21-May-16	24-May-16
28.	<i>Ganga, Trikand</i>	Bandar Abbas	Iran	24-May-16	27-May-16
29.	<i>Kuthar</i>	Male	Maldives	24-May-16	31-May-16
30.	<i>Satpura, Kirch</i>	Cam Ranh Bay	Vietnam	30-May-16	03-Jun-16
31.	<i>Sabyadri, Shakti</i>	Subic Bay	Philippines	30-May-16	02-Jun-16
32.	<i>Satpura, Sabyadri, Shakti, Kirch</i>	Sasebo	Japan	10-Jun-16	14-Jun-16
33.	<i>Aircraft – IN Dornier</i>	Male	Maldives	19-Jun-16	23-Jun-16
34.	<i>Sabyadri, Shakti, Kirch</i>	Busan	Republic of Korea	21-Jun-16	25-Jun-16
35.	<i>Sabyadri, Shakti, Kirch</i>	Vladivostok	Russia	29-Jun-16	03-Jul-16
36.	<i>Trikand</i>	Port Victoria	Seychelles	30-Jun-16	01-Jul-16
37.	<i>Trikand</i>	Port Louis	Mauritius	04-Jul-16	07-Jul-16
38.	<i>Trikand</i>	Port Louis	Mauritius	13-Jul-16	15-Jul-16
39.	<i>Trikand</i>	Port Victoria	Seychelles	19-Jul-16	21-Jul-16
40.	<i>Sunayna</i>	Male	Maldives	19-Jul-16	23-Jul-16
41.	<i>Sabyadri, Shakti, Kirch</i>	Port Kelang	Malaysia	20-Jul-16	24-Jul-16

Ser	Units	Port/Station	Country	Date from	Date to
42.	<i>Satpura</i>	Pearl Harbour	Hawaii	30-Jul-16	11-Jul-16
43.	<i>Satpura</i>	Pearl Harbour	Hawaii	02-Aug-16	05-Aug-16
44.	<i>Satpura</i>	Port Majuro	Marshall Islands	12-Aug-16	15-Aug-16
45.	<i>Satpura</i>	Pohnpei	Micronesia	18-Aug-16	20-Aug-16
46.	<i>Kolkata, Aditya, Trikand</i>	Port Victoria	Seychelles	26-Aug-16	28-Aug-16
47.	Aircraft – <i>IND</i> Dornier	Male	Maldives	26-Aug-16	30-Aug-16
48.	<i>Satpura</i>	Singapore	Singapore	31-Aug-16	04-Sep-16
49.	<i>Trikand</i>	Antsiranana	Madagascar	31-Aug-16	03-Sep-16
50.	<i>Kolkata, Aditya</i>	Port Louis	Mauritius	01-Sep-16	04-Sep-16
51.	<i>Trikand</i>	Dar-es-Salaam	Tanzania	06-Sep-16	09-Sep-16
52.	<i>Kolkata, Aditya</i>	Mombasa	Kenya	10-Sep-16	13-Sep-16
53.	<i>Trikand</i>	Maputo	Mozambique	16-Sep-16	19-Sep-16
54.	<i>Kolkata, Aditya, Trikand</i>	Durban	South Africa	20-Sep-16	23-Sep-16
55.	<i>Sumitra</i>	Surabaya	Indonesia	10-Oct-16	12-Oct-16
56.	<i>Karmuk</i>	Belawan	Indonesia	10-Oct-16	28-Oct-16
57.	<i>Shardul</i>	Port Louis&Port Victoria	Mauritius & Seychelles	25-Oct-16	15-Dec-16
58.	<i>Sumitra</i>	Suva	Fiji	26-Oct-16	29-Oct-16
59.	<i>Darshak</i>	Dar-es-Salaam	Tanzania	26-Oct-16	29-Oct-16
60.	<i>Tir, Shardul, Sujata, ICGS Varuna</i>	Phuket	Thailand	27-Oct-16	31-Oct-16
61.	<i>Darshak</i>	Dar-es-Salaam	Tanzania	10-Nov-16	13-Nov-16
62.	<i>Tir, Shardul, Sujata, ICGS Varuna</i>	Chittagong	Bangladesh	11-Nov-16	16-Nov-16
63.	<i>Karmuk</i>	Phuket	Thailand	16-Nov-16	24-Nov-16
64.	<i>Sumitra</i>	Auckland	New Zealand	17-Nov-16	22-Nov-16
65.	<i>Darshak</i>	Dar-es-Salaam	Tanzania	25-Nov-16	28-Nov-16
66.	<i>Darshak</i>	Port Louis	Mauritius	03-Dec-16	10-Dec-16
67.	<i>Sumitra</i>	Sydney	Australia	06-Dec-16	09-Dec-16
68.	<i>Sumitra</i>	Darwin	Australia	06-Dec-16	09-Dec-16
69.	<i>Sumitra</i>	Jakarta	Indonesia	16-Dec-16	19-Dec-16
70.	<i>Mbadei</i>	Cape Town	South Africa	24-Dec-16	01-Jan-17
2017					
1.	<i>Mbadei</i>	Reo	Brazil	23-Jan-17	01 Feb 17
2.	<i>Cancarso</i>	Male	Maldives	24-Jan-17	30-Jan-17
3.	<i>Kuthar</i>	Yangon	Myanmar	24-Jan-17	26-Jan-17
4.	<i>Kalpeni</i>	Male	Maldives	08-Feb-17	14-Feb-17
5.	<i>Sunayna</i>	Abu Dhabi	UAE	18-Feb-17	24-Feb-17
6.	<i>Mbadei</i>	Cape Town	South Africa	25-Feb-17	10-Apr-17
7.	<i>Darshak</i>	Colombo	Sri Lanka	07-Mar-17	10-Mar-17
8.	<i>Darshak</i>	Galle	Sri Lanka	22-Mar-17	25-Mar-17
9.	<i>Darshak</i>	Galle	Sri Lanka	06-Apr-17	09-Apr-17
10.	<i>Darshak</i>	Colombo	Sri Lanka	21-Apr-17	25-Apr-17
11.	<i>Tir, Sujata, Shardul, ICGS Sarathi</i>	Port Louis	Mauritius	10-Mar-17	14-Mar-17
12.	<i>Tir, Sujata, Shardul, ICGS Sarathi</i>	Port Victoria	Seychelles	18-Mar-17	22-Mar-17

Ser	Units	Port/Station	Country	Date from	Date to
13.	<i>Shardul</i>	Port Louis	Mauritius	21-Mar-17	23-Mar-17
14.	<i>Tir, Sujata, ICGS Sarathi</i>	Male	Maldives	27-Mar-17	31-Mar-17
15.	<i>Shardul</i>	Port Victoria	Seychelles	27-Mar-17	31-Mar-17
16.	<i>Kora</i>	Langkawi	Malaysia	20-Mar-17	26-Mar-17
17.	<i>Shardul</i>	Port Victoria	Seychelles	06-Apr-17	08-Apr-17
18.	Aircraft – IN Dornier	Phuket	Thailand	13-Apr-17	21-Apr-17
19.	Mumbai, Aditya, Trishul, Tarkash	Souda Bay	Greece	17-Apr-17	20-Apr-17
20.	<i>Shardul</i>	Male	Maldives	19-Apr-17	20-Apr-17
21.	<i>Sharda</i>	Port Victoria	Seychelles	21-Apr-17	22-Apr-17
22.	<i>Mumbai, Aditya, Trishul</i>	Toulon	France	24-Apr-17	27-Apr-17
23.	<i>Trishul</i>	Valencia	Spain	01-May-17	04-May-17
24.	<i>Tarkash</i>	Plymouth	UK	02-May-17	05-May-17
25.	<i>Tarkash</i>	London	UK	07-May-17	10-May-17
26.	<i>Mumbai, Aditya, Trishul</i>	Haifa	Israel	09-May-17	12-May-17
27.	<i>Rajput</i>	Yangon	Myanmar	11-May-17	13-May-17
28.	<i>Sumedha</i>	Male	Maldives	12-May-17	13-May-17
29.	<i>Sabyadri, Shivalik, Aircraft – P-8I</i>	Singapore	Singapore	12-May-17	21-May-17
30.	<i>Tarkash</i>	Lisbon	Portugal	14-May-17	17-May-17
31.	<i>Jyoti, Shivalik</i>	Kuantan	Malaysia	14-May-17	19-May-17
32.	<i>Mumbai, Aditya, Trishul</i>	Jeddah	Saudi Arabia	16-May-17	19-May-17
33.	<i>Tarkash</i>	Casablanca	Morocco	18-May-17	21-May-17
34.	<i>Kirch</i>	Male	Maldives	18-May-17	25-May-17
35.	<i>Kirch</i>	Colombo	Sri Lanka	26-May-17	29-May-17
36.	<i>Shardul</i>	Colombo	Sri Lanka	27-May-17	30-May-17
37.	<i>Sabyadri, Shivalik, Jyoti, Kamorta</i>	Surabaya	Indonesia	27-May-17	31-May-17
38.	<i>Tarkash</i>	Lagos	Nigeria	29-May-17	03-Jun-17
39.	<i>Jalashawa</i>	Colombo	Sri Lanka	30-May-17	01-Jun-17
40.	<i>Kirch</i>	Male	Maldives	18-May-17	25-May-17
41.	Aircraft – IN Dornier	Male	Maldives	20-May-17	22-May-17
42.	<i>Sumedha</i>	Colombo	Sri Lanka	21-May-17	24-May-17
43.	<i>Karmuk, Aircraft – IN Dornier</i>	Belawan	Indonesia	22-May-17	25-May-17
44.	<i>Sumitra</i>	Chittagong	Bangladesh	01-Jun-17	03-Jun-17
45.	<i>Teg</i>	Port Louis	Mauritius	04-Jun-17	07-Jun-17
46.	<i>Sumitra</i>	Yangon	Myanmar	06-Jun-17	08-Jun-17
47.	<i>Tarini</i>	Port Louis	Mauritius	06-Jun-17	17-Jun-17
48.	<i>Tarkash</i>	Luanda	Angola	08-Jun-17	11-Jun-17
49.	<i>Sabyadri</i>	Moresby	Papua New Guinea	12-Jun-17	15-Jun-17
50.	<i>Shivalik, Jyoti, Kamorta</i>	Fremantle	Australia	14-Jun-17	17-Jun-17
51.	<i>Tarkash</i>	Port of Walvis	Namibia	15-Jun-17	18-Jun-17
52.	Aircraft – IN Dornier	Colombo	Sri Lanka	19-Jun-17	22-Jun-17
53.	<i>Sabyadri, Shivalik, Jyoti, Kamorta</i>	Jakarta	Indonesia	20-Jun-17	24-Jun-17
54.	<i>Tarkash</i>	Cape Town	South Africa	21-Jun-17	24-Jun-17
55.	<i>Sunayna</i>	Port Victoria	Seychelles	26-Jun-17	29-Jun-17

Ser	Units	Port/Station	Country	Date from	Date to
56.	<i>Sunayna</i>	Port Victoria	Seychelles	26-Jun-17	30-Jun-17
57.	Aircraft – <i>IND</i> Dornier	Male	Maldives	27-Jun-17	01-Jul-17
58.	<i>Tarkash</i>	Port Louis	Mauritius	03-Jul-17	06-Jul-17
59.	Aircraft – <i>IND</i> Dornier	Male	Maldives	17-Jul-17	20-Jul-17
60.	<i>Ranvir</i>	Chittagong	Bangladesh	24-Jul-17	27-Jul-17
61.	<i>Ranvir</i>	Chittagong	Bangladesh	24-Jul-17	26-Jul-17
62.	<i>Sumitra</i>	Male	Maldives	25-Aug-17	25-Aug-17
63.	<i>Sumitra</i>	Male	Maldives	26-Aug-17	27-Aug-17
64.	<i>Sumedha</i>	Singapore	Singapore	29-Aug-17	30-Aug-17
65.	<i>Sumedha</i>	Singapore	Singapore	02-Sep-17	03-Sep-17
66.	<i>Sabyadri</i>	Jakarta	Indonesia	09-Sep-17	10-Sep-17
67.	<i>Sumedha</i>	Male	Maldives	13-Sep-17	16-Sep-17
68.	Aircraft – P-8I, IL-38	Salalah	Oman	13-Sep-17	16-Sep-17
69.	<i>Satpura, Kadmatt</i>	Singapore	Singapore	14-Sep-17	17-Sep-17
70.	<i>Shishumar, Mumbai</i>	Duqm	Oman	19-Sep-17	21-Sep-17
71.	Aircraft – P-8I, IL-38	Muscat	Oman	22-Sep-17	24-Sep-17
72.	Aircraft IL-38	Bahrain	Bahrain	23-Sep-17	-
73.	<i>Satpura, Kadmatt</i>	Haiphong	Vietnam	23-Sep-17	27-Sep-17
74.	<i>Gharial</i>	Chittagong	Bangladesh	28-Sep-17	30-Sep-17
75.	<i>Kochi</i>	Port Victoria	Seychelles	24-Sep-17	26-Sep-17
76.	<i>Gharial</i>	Chittagong	Bangladesh	28-Sep-17	30-Sep-17
77.	<i>Satpura, Kadmatt</i>	Manila	Philippines	03-Oct-17	06-Oct-17
78.	<i>Kochi</i>	Male	Maldives	02-Oct-17	04-Oct-17
79.	<i>Gomati</i>	Muscat	Oman	05-Oct-17	07-Oct-17
80.	<i>Kochi</i>	Male	Maldives	08-Oct-17	10-Oct-17
81.	<i>Tir, Sujata, Shardul, ICGS Sarathi</i>	Penang	Malaysia	08-Oct-17	12-Oct-17
82.	<i>Sumedha</i>	Male	Maldives	09-Oct-17	10-Oct-17
83.	<i>Satpura, Kadmatt</i>	Sasebo	Japan	12-Oct-17	15-Oct-17
84.	<i>Sumedha</i>	Male	Maldives	14-Oct-17	14-Oct-17
85.	Aircraft – P-8I	Manila	Phillipines	15-Oct-17	20-Oct-17
86.	<i>Tir, Sujata, Shardul, Tarangini, ICGS Sarathi</i>	Jakarta	Indonesia	18-Oct-17	22-Oct-17
87.	<i>Satpura, Kadmatt</i>	Vladivostok	Russia	18-Oct-17	30-Oct-17
88.	<i>Shivalik</i>	Yangon	Myanmar	20-Oct-17	21-Oct-17
89.	<i>Tarini</i>	Fremantle	Australia	23-Oct-17	05-Nov-17
90.	<i>Sukanya</i>	Belawan	Indonesia	24-Oct-17	26-Oct-17
91.	<i>Sutlej</i>	Colombo	Sri Lanka	26-Oct-17	06-Nov-17
92.	<i>Sutlej</i>	Colombo	Sri Lanka	26-Oct-17	29-Oct-17
93.	<i>Tarkash</i>	Port Victoria	Seychelles	27-Oct-17	29-Oct-17
94.	<i>Tarkash</i>	Port Louis	Mauritius	01-Nov-17	03-Nov-17
95.	<i>Kirpan</i>	Yangon	Myanmar	01-Nov-17	03-Nov-17
96.	<i>Tir, Sujata, Shardul, ICGS Sarathi</i>	Colombo	Sri Lanka	02-Nov-17	05-Nov-17
97.	<i>Sutlej</i>	Colombo	Sri Lanka	08-Nov-17	11-Nov-17

Ser	Units	Port/Station	Country	Date from	Date to
98.	<i>Kabra</i>	Male	Maldives	13-Nov-17	14-Nov-17
99.	<i>Sarveksbak</i>	Dar-es-Salaam	Tanzania	14-Nov-17	25-Dec-17
100.	<i>Sarveksbak</i>	Dar-es-Salaam	Tanzania	14-Nov-17	17-Nov-17
101.	<i>Satpura Kadmatt</i>	Laem Chabang Port	Thailand	17-Nov-17	24-Nov-17
102.	<i>Kabra</i>	Male	Maldives	18-Nov-17	19-Nov-17
103.	<i>Trikand</i>	Muscat	Oman	18-Nov-17	20-Nov-17
104.	<i>Sutlej</i>	Colombo	Sri Lanka	21-Nov-17	24-Nov-17
105.	<i>Kadmatt</i>	Sihanoukville	Cambodia	24-Nov-17	27-Nov-17
106.	<i>Satpura</i>	Bandar Seri Begawan	Brunei	25-Nov-17	28-Nov-17
107.	<i>Sarveksbak</i>	Dar-es-Salaam	Oman	27-Nov-17	30-Nov-17
108.	<i>Tarini</i>	Lyttelton	New Zealand	29-Nov-17	12-Dec-17
109.	<i>Kadmatt</i>	Belawan	Indonesia	30-Nov-17	02-Dec-17
110.	<i>Mumbai</i>	Port Louis	Mauritius	01-Dec-17	03-Dec-17
111.	<i>Satpura</i>	Port Kelang	Malaysia	03-Dec-17	07-Dec-17
112.	<i>Sutlej</i>	Colombo	Sri Lanka	04-Dec-17	07-Dec-17
113.	<i>Koswari</i>	Male	Maldives	06-Dec-17	07-Dec-17
114.	<i>Sarveksbak</i>	Dar-es-Salaam	Tanzania	10-Dec-17	12-Dec-17
115.	<i>Koswari</i>	Male	Maldives	11-Dec-17	12-Dec-17
116.	<i>Teg, Trikan</i>	Muscat	Oman	16-Dec-17	22-Dec-17
117.	<i>Sutlej</i>	Colombo	Sri Lanka	17-Dec-17	21-Dec-17
118.	<i>Shankush</i>	Muscat	Oman	21-Dec-17	24-Dec-17
119.	<i>Sarveksbak</i>	Dar-es-Salaam	Tanzania	22-Dec-17	25-Dec-17
120.	<i>Teg, Trikan</i>	Abu Dhabi	UAE	23-Dec-17	26-Dec-17
121.	<i>Teg, Trikan</i>	Abu Dhabi	UAE	23-Dec-17	26-Dec-17
122.	<i>Sarveksbak</i>	Port Louis	Mauritius	30-Dec-17	03-Jan-18
123.	<i>Sarveksbak</i>	Port Louis	Mauritius	30-Dec-17	03-Jan-18
2018					
1.	<i>Tarkash</i>	Salalah	Oman	06-Jan-18	07-Jan-18
2.	<i>Sumedha</i>	Ho Chi Minh City	Vietnam	12-Jan-18	14-Jan-18
3.	<i>Sarveksbak</i>	Port Louis	Mauritius	13-Jan-18	16-Jan-18
4.	<i>Tarkash</i>	Salalah	Oman	16-Jan-18	18-Jan-18
5.	<i>Cancarso</i>	Male	Maldives	21-Jan-18	22-Jan-18
6.	<i>Gomati</i>	Muscat	Oman	22-Jan-18	23-Jan-18
7.	<i>Tarini</i>	Port Stanley	Falklands	22-Jan-18	04-Feb-18
8.	<i>Sarveksbak</i>	Port Louis	Mauritius	25-Jan-18	28-Jan-18
9.	<i>Cancarso</i>	Male	Maldives	26-Jan-18	27-Jan-18
10.	<i>Gomati</i>	Muscat	Oman	27-Jan-18	28-Jan-18
11.	<i>Saryu, Kulish</i>	Phuket	Thailand	28-Jan-18	31-Jan-18
12.	<i>Tarkash</i>	Djibouti	Djibouti	08-Feb-18	10-Feb-18
13.	<i>Tir, Sujata, ICGS Sarathi</i>	Port Victoria	Seychelles	20-Feb-18	22-Feb-18

Ser	Units	Port/Station	Country	Date from	Date to
14.	<i>Trishul</i>	Salalah	Oman	21-Feb-18	22-Feb-18
15.	<i>Tir, Sujata, ICGS Sarathi</i>	Port Victoria	Seychelles	25-Feb-18	22-Feb-18
16.	<i>Tarangini</i>	Port Victoria	Seychelles	25-Feb-18	01-Mar-18
17.	<i>Tir, Sujata, ICGS Sarathi</i>	Port Victoria	Seychelles	25-Feb-18	01-Mar-18
18.	<i>Tarini</i>	Cape Town	South Africa	02-Mar-18	14-Mar-18
19.	<i>Trishul</i>	Oman	Duqm	04-Mar-18	05-Mar-18
20.	<i>Tir, Sujata, ICGS Sarathi</i>	Port Louis	Mauritius	05-Mar-18	07-Mar-18
21.	<i>Tir, Sujata, ICGS Sarathi</i>	Port Louis	Mauritius	09-Mar-18	14-Mar-18
22.	<i>Kolkata</i>	Doha	Qatar	11-Mar-18	15-Mar-18
23.	<i>Kulish, Baratang</i>	Coco Island	Myanmar	17-Mar-18	18-Mar-18
24.	<i>Kolkata, Gomati</i>	Abu Dhabi	UAE	17-Mar-18	20-Mar-18
25.	<i>Sharda</i>	Djibouti	Djibouti	17-Mar-18	18-Mar-18
26.	Aircraft – P-8I	Abu Dhabi	UAE	19-Mar-18	22-Mar-18
27.	<i>Tir, Sujata, ICGS Sarathi</i>	Dar-es-Salaam	Tanzania	20-Mar-18	24-Mar-18
28.	<i>Tir, Sujata, ICGS Sarathi</i>	Dar-es-Salaam	Tanzania	20-Mar-18	24-Mar-18
29.	<i>Sharda</i>	Djibouti	Djibouti	27-Mar-18	29-Mar-18
30.	<i>Sunayna</i>	Salalah(Anchor)	Oman	15-Apr-18	15-Apr-18
31.	<i>Brahmaputra</i>	Muscat	Oman	17-Apr-18	18-Apr-18
32.	<i>Tarini</i>	Port Louis	Mauritius	18-Apr-18	26-Apr-18
33.	<i>Tarangini</i>	Salalah	Oman	19-Apr-18	22-Apr-18
34.	<i>Sunayna</i>	Salalah	Oman	19-Apr-18	21-Apr-18
35.	<i>Mumbai, Trikand</i>	Port Victoria	Seychelles	21-Apr-18	24-Apr-18
36.	<i>Mumbai, Trikand</i>	Port Louis	Mauritius	27-Apr-18	30-Apr-18
37.	<i>Tarangini</i>	Jeddah	Saudi Arabia	03-May-18	06-May-18
38.	<i>Mumbai, Trikand</i>	Reunion Island	France	04-May-18	07-May-18
39.	<i>Shakti, Shayadri, Kamorta</i>	Singapore	Singapore	06-May-18	10-May-18
40.	<i>Airavat</i>	Chittagong	Bangladesh	08-May-18	11-May-18
41.	<i>Gomati</i>	Muscat	Oman	09-May-18	10-May-18
42.	<i>Mumbai, Trikand</i>	Moroni	Comoros	10-May-18	12-May-18
43.	<i>Sunayna</i>	Djibouti	Djibouti	12-May-18	14-May-18
44.	<i>Kamorta</i>	Kota Kina Ba	Malaysia	13-May-18	17-May-18
45.	<i>Shakti, Shayadri</i>	Sattahip	Thailand	13-May-21	17-May-21
46.	<i>Mumbai, Trikand</i>	Antsiranana	Madagascar	14-May-18	17-May-18
47.	<i>Sumedha</i>	Male	Maldives	15-May-18	16-May-18
48.	<i>Tarangini</i>	Valletta	Malta	20-May-18	23-May-18
49.	<i>Shakti, Shayadri, Kamorta</i>	Da Nang	Vietnam	21-May-18	25-May-18
50.	<i>Sunayna</i>	Djibouti	Djibouti	29-May-18	31-May-18
51.	<i>Satpura</i>	Singapore	Singapore	31-May-18	03-Jun-18
52.	<i>Tarangini</i>	Lisbon	Portugal	04-Jun-18	07-Jun-18
53.	<i>Kulish</i>	Belawan	Indonesia	06-Jun-18	09-Jun-18
54.	<i>Shakti, Shayadri, Kamorta</i>	Guam	USA	07-Jun-18	15-Jun-18
55.	<i>Teg</i>	Djibouti	Djibouti	13-Jun-18	14-Jun-18
56.	<i>Tarangini</i>	Bordeaux	France	14-Jun-18	18-Jun-18

Ser	Units	Port/Station	Country	Date from	Date to
57.	<i>Kochi</i>	Bahrain	Bahrain	15-Jun-18	16-Jun-18
58.	<i>Teg</i>	Salalah	Salalah	21-Jun-18	23-Jun-18
59.	<i>Shakti, Kamorta</i>	Makassar	Indonesia	23-Jun-18	26-Jun-18
60.	<i>Satpura, Kadmatt</i>	Chittagong	Bangladesh	25-Jun-18	28-Jun-18
61.	<i>Tarkash</i>	Port Victoria	Seychelles	26-Jun-18	29-Jun-18
62.	<i>Sabyadri</i>	Hawaii	USA	26-Jun-18	02-Aug-18
63.	<i>Sabyadri, Aircraft – P-8I</i>	Hawaii	USA	26-Jun-18	04-Aug-18
64.	<i>Tarangini</i>	Amsterdam	Netherlands	27-Jun-18	07-Jul-18
65.	<i>Tarkash</i>	Mombasa	Kenya	04-Jul-18	06-Jul-18
66.	<i>Trikand</i>	Colombo	Sri Lanka	06-Jul-18	08-Jul-18
67.	<i>Trikand</i>	Colombo	Sri Lanka	07-Jul-18	09-Jul-18
68.	<i>Sumitra</i>	Sabang	Indonesia	10-Jul-18	12-Jul-18
69.	<i>Tarangini</i>	Sunderland	UK	13-Jul-18	15-Jul-18
70.	<i>Tarkash</i>	Duqm	Oman	13-Jul-18	15-Jul-18
71.	<i>Teg</i>	Djibouti	Djibouti	14-Jul-18	16-Jul-18
72.	<i>Tarangini</i>	Esbjerg	Denmark	18-Jul-18	21-Jul-18
73.	<i>Tarkash</i>	Bandar Abbas	Iran	23-Jul-18	26-Jul-18
74.	<i>Tarangini</i>	Stavanger	Norway	26-Jul-18	29-Jul-18
75.	<i>Teg</i>	Salalah	Oman	27-Jul-18	29-Jul-18
76.	<i>Tarangini</i>	Harlingen	Netherlands	03-Aug-18	07-Aug-18
77.	<i>Teg</i>	Salalah	Oman	07-Aug-18	09-Aug-18
78.	<i>Deepak</i>	Salalah	Oman	09-Aug-18	10-Aug-18
79.	<i>Tarangini</i>	Le Harve	France	10-Aug-18	24-Aug-18
80.	<i>Sabyadri</i>	Suva	Fiji	13-Aug-18	16-Aug-18
81.	<i>Kolkata</i>	Dubai	UAE	14-Aug-18	16-Aug-18
82.	<i>Teg</i>	Djibouti	Djibouti	21-Aug-18	23-Aug-18
83.	<i>Kulish</i>	Jakarta	Indonesia	22-Aug-18	24-Aug-18
84.	<i>Sabyadri</i>	Darwin	Australia	29-Aug-18	15-Sep-18
85.	<i>Teg</i>	Djibouti	Djibouti	30-Aug-18	01-Sep-18
86.	<i>Tarangini</i>	Cardiz	Spain	03-Sep-18	06-Sep-18
87.	<i>Kirch, Sumitra, Coradivh</i>	Trincomalee	Sri Lanka	07-Sep-18	11-Sep-18
88.	<i>Kulish</i>	Singapore	Singapore	09-Sep-18	11-Sep-18
89.	<i>Teg</i>	Djibouti	Djibouti	10-Sep-18	11-Sep-18
90.	<i>Tarangini</i>	Palmero	Italy	14-Sep-18	17-Sep-18
91.	<i>Sabyadri</i>	Darwin	Australia	14-Sep-18	16-Sep-18
92.	<i>Trikand</i>	Port Louis	Mauritius	13-Sep-18	15-Sep-18
93.	<i>Kolkata, Tarkash</i>	Mombasa	Kenya	15-Sep-18	18-Sep-18
94.	<i>Mumbai</i>	Doha	Qatar	18-Sep-18	20-Sep-18
95.	<i>Teg</i>	Salalah	Oman	22-Sep-18	24-Sep-18
96.	<i>Kulish, Battimalv</i>	Yangon	Myanmar	24-Sep-18	26-Sep-18
97.	<i>Kolkata, Tarkash</i>	Maputo	Mozambique	25-Sep-18	28-Sep-18
98.	<i>Rana</i>	Ho Chi Minh City	Vietnam	27-Sep-18	30-Sep-18

Ser	Units	Port/Station	Country	Date from	Date to
99.	<i>Tarangini</i>	Haifa	Israel	27-Sep-18	30-Sep-18
100.	<i>Tir, Sujata, Shardul</i>	Changi	Singapore	30-Sep-18	03-Oct-18
101.	<i>Sudarshini, ICGS Sarathi</i>	Changi	Singapore	30-Sep-18	04-Oct-18
102.	<i>Kolkata, Tarkash</i>	Simonstown	South Africa	01-Oct-18	13-Oct-18
103.	<i>Teg</i>	Salalah	Oman	03-Oct-18	04-Oct-18
104.	<i>Rana</i>	Jeju	Republic of Korea	08-Oct-18	15-Oct-18
105.	<i>Rajput</i>	Colombo	Sri Lanka	11-Oct-18	12-Oct-18
106.	<i>Sunayna</i>	Djibouti	Djibouti	12-Oct-18	13-Oct-18
107.	<i>Tarangini</i>	Djibouti	Djibouti	13-Oct-18	15-Oct-18
108.	<i>Kolkata, Tarkash</i>	Toamasina	Madagascar	20-Oct-18	21-Oct-18
109.	<i>Tarmugli</i>	Yangon	Myanmar	22-Oct-18	23-Oct-18
110.	<i>Rana</i>	Manila	Phillipines	23-Oct-18	26-Oct-18
111.	<i>Tarkash</i>	Port Louis	Mauritius	26-Oct-18	27-Oct-18
112.	<i>Tarkash</i>	Port Louis	Mauritius	01-Nov-18	03-Nov-18
113.	<i>Rana</i>	Singapore	Singapore	01-Nov-18	04-Nov-18
114.	<i>Sunayna</i>	Salalah	Oman	03-Nov-18	05-Nov-18
115.	<i>Sunayna</i>	Salalah	Oman	05-Nov-18	05-Nov-18
116.	<i>Rana</i>	Surabaya	Indonesia	12-Nov-18	16-Nov-18
117.	LCU L-51	Phuket	Thailand	14-Nov-18	16-Nov-18
118.	<i>Rana</i>	Surabaya	Indonesia	17-Nov-18	18-Nov-18
119.	<i>Sunayna</i>	Salalah	Oman	26-Nov-18	28-Nov-18
120.	<i>Trikand</i>	Duqm	Oman	26-Nov-18	27-Nov-18
121.	<i>Tarini, Mbadei</i>	Port Victoria	Seychelles	26-Nov-18	03-Dec-18
122.	<i>Sujata</i>	Muscat	Oman	28-Nov-18	30-Nov-18
123.	<i>Tarangini</i>	Muscat	Oman	29-Nov-18	02-Dec-18
124.	<i>Tarangini</i>	Doha	Qatar	08-Dec-18	11-Dec-18
125.	<i>Rana</i>	Male	Maldives	09-Dec-18	10-Dec-18
126.	<i>Sunayna</i>	Djibouti	Djibouti	09-Dec-18	10-Dec-18
127.	<i>Surveksbak</i>	Port Louis	Mauritius	11-Dec-18	14-Dec-18
128.	<i>Brahmaputra</i>	Muscat	Oman	13-Dec-18	14-Dec-18
129.	<i>Brahmaputra</i>	Duqm	Oman	17-Dec-18	18-Dec-18
130.	<i>Sunayna</i>	Djibouti	Djibouti	20-Dec-18	22-Dec-18
131.	<i>Jamuna</i>	Colombo	Sri Lanka	20-Dec-18	23-Dec-18
132.	<i>Sarveksbak</i>	Port Louis	Mauritius	30-Dec-18	02-Jan-19
2019					
1.	<i>Sunayna</i>	Muscat	Oman	02-Jan-19	04-Jan-19
2.	<i>Jamuna</i>	Galle	Sri Lanka	04-Jan-19	07-Jan-19
3.	<i>Sunayna</i>	Salalah	Oman	11-Jan-19	12-Jan-19
4.	<i>Jamuna</i>	Galle	Sri Lanka	19-Jan-19	22-Jan-19
5.	<i>Sarveksbak</i>	Port Louis	Mauritius	18-Jan-19	21-Jan-19
6.	<i>Trikand</i>	Djibouti	Djibouti	27-Jan-19	08-Feb-19
7.	<i>Darshak</i>	Yangon	Myanmar	01-Feb-19	04-Feb-19
8.	<i>Jamuna</i>	Colombo	Sri Lanka	03-Feb-19	06-Feb-19

Ser	Units	Port/Station	Country	Date from	Date to
9.	<i>Sarveksbak</i>	Port Louis	Mauritius	06-Feb-19	10-Feb-19
10.	<i>Prabal</i>	Abu Dhabi	UAE	12-Feb-19	21-Feb-19
11.	<i>Sarveksbak</i>	Port Victoria	Seychelles	13-Feb-19	16-Feb-19
12.	<i>Trikand</i>	Salalah	Oman	19-Feb-19	21-Feb-19
13.	<i>Sarveksbak</i>	Port Louis	Mauritius	21-Feb-19	24-Feb-19
14.	<i>Darshak</i>	Yangon	Myanmar	23-Feb-19	26-Feb-19
15.	<i>Prabal</i>	Muscat	Oman	23-Feb-19	25-Feb-19
16.	Aircraft – <i>IN Dornier</i>	Male	Maldives	25-Feb-19	01-Mar-19
17.	<i>Trikand</i>	Djibouti	Djibouti	25-Feb-19	28-Feb-19
18.	<i>Prabal</i>	Salalah	Oman	04-Mar-19	05-Mar-19
19.	<i>Trikand</i>	Salalah	Oman	06-Mar-19	08-Mar-19
20.	<i>Trikand</i>	Djibouti	Djibouti	10-Mar-19	12-Mar-19
21.	<i>Shardul, Sujata, ICGS Sarathi</i>	Port Louis	Mauritius	10-Mar-19	14-Mar-19
22.	<i>Darshak</i>	Yangon	Myanmar	17-Mar-19	20-Mar-19
23.	<i>Sujata, ICGS Sarathi</i>	Beira	Mozambique	18-Mar-19	30-Mar-19
24.	<i>Shardul</i>	Beira	Mozambique	19-Mar-19	23-Mar-19
25.	<i>Car Nicobar</i>	Trincomalee	Sri Lanka	24-Mar-19	25-Mar-19
26.	<i>Shardul</i>	Maputo	Mozambique	25-Mar-19	27-Mar-19
27.	<i>Kadmat</i>	Langkawi	Malaysia	25-Mar-19	31-Mar-19
28.	<i>Shardul</i>	Beira	Mozambique	29-Mar-19	30-Mar-19
29.	<i>Trikand</i>	Salalah	Oman	30-Mar-19	31-Mar-19
30.	<i>Deepak</i>	Salalah	Oman	31-Mar-19	31-Mar-19
31.	<i>Tillangchang</i>	Colombo	Sri Lanka	31-Mar-19	02-Apr-19
32.	<i>Sagardwani</i>	Yangon	Myanmar	02-Apr-19	06-Apr-19
33.	<i>Shardul, Sujata, Tarangini, ICGS Sarathi</i>	Port Victoria	Seychelles	06-Apr-19	11-Apr-19
34.	<i>Shardul</i>	Port Victoria	Seychelles	06-Apr-19	10-Apr-19
35.	<i>Coradivb</i>	Trincomalee	Sri Lanka	07-Apr-19	08-Apr-19
36.	<i>Darshak</i>	Yangon	Myanmar	08-Apr-19	12-Apr-19
37.	<i>Savitri</i>	Male	Maldives	12-Apr-19	13-Apr-19
38.	<i>Trikand</i>	Duqm	Oman	12-Apr-19	14-Apr-19
39.	<i>Magar</i>	Port Beira	Mozambique	13-Apr-19	15-Apr-19
40.	<i>Kora</i>	Chittagong	Bangladesh	13-Apr-19	15-Apr-19
41.	<i>Shakti, Kolkata</i>	Cam Ranh Bay	Vietnam	13-Apr-19	16-Apr-19
42.	<i>Shakti, Kolkata</i>	Quindao	China	21-Apr-19	26-Apr-19
43.	<i>Mysore</i>	Bahrain	Bahrain	21-Apr-19	23-Apr-19
44.	<i>Trikand</i>	Djibouti	Djibouti	22-Apr-19	23-Apr-19
45.	<i>Magar</i>	Port Victoria	Seychelles	23-Apr-19	26-Apr-19
46.	<i>Shakti, Kolkata</i>	Busan	Republic of Korea	28-Apr-19	02-May-19
47.	<i>Trikand</i>	Muscat	Oman	01-May-19	03-May-19
48.	<i>Sharda</i>	Male	Maldives	05-May-19	06-May-19
49.	<i>Kolkata</i>	Singapore	Singapore	12-May-19	20-May-19
50.	<i>Trikand</i>	Salalah	Oman	13-May-19	21-May-19
51.	<i>Kalveri</i>	Djibouti	Djibouti	19-May-19	22-May-19

Ser	Units	Port/Station	Country	Date from	Date to
52.	<i>Bangaram, Saryu</i>	Yangon	Myanmar	26-May-19	27-May-19
53.	Aircraft – P- 8I	Salalah	Salalah	29-May-19	01-Jun-19
54.	<i>Kalveri</i>	Duqm	Oman	06-Jun-19	09-Jun-19
55.	<i>Sunayna</i>	Duqm	Oman	06-Jun-19	09-Jun-19
56.	Aircraft – P-8I	Singapore	Singapore	11-Jun-19	14-Jun-19
57.	Aircraft – P-8I	Muscat	Oman	16-Jun-19	21-Jun-19
58.	<i>Sunayna</i>	Salalah	Oman	17-Jun-19	18-Jun-19
59.	Aircraft – IN Dornier	Male	Maldives	18-Jun-19	22-Jun-19
60.	<i>Ranvir</i>	Colombo	Sri Lanka	18-Jun-19	20-Jun-19
61.	<i>Tarkash</i>	Djibouti	Djibouti	21-Jun-19	22-Jun-19
62.	<i>Chennai</i>	Muscat	Oman	20-Jun-19	21-Jun-19
63.	<i>Sumedha</i>	Phuket	Thailand	24-Jun-19	26-Jun-19
64.	<i>Kochi</i>	Port Victoria	Seychelles	26-Jun-19	30-Jun-19
65.	Aircraft – P-8I	Mauritius	Mauritius	27-Jun-19	02-Jul-19
66.	<i>Sunayna</i>	Port Rashid	UAE	28-Jun-19	29-Jun-19
67.	<i>Chennai</i>	Muscat	Oman	28-Jun-19	30-Jun-19
68.	<i>Tarkash</i>	Alexandria	Egypt	28-Jun-19	01-Jul-19
69.	<i>Sunayna</i>	Port Rashid	UAE	07-Jul-19	08-Jul-19
70.	<i>Tarkash</i>	Tangiers	Morocco	08-Jul-19	11-Jul-19
71.	<i>Trikand</i>	Muscat	Oman	09-Jul-19	10-Jul-19
72.	<i>Sunayna</i>	Port Rashid	UAE	14-Jul-19	16-Jul-19
73.	<i>Trikand</i>	Muscat	UAE	16-Jul-19	18-Jul-19
74.	<i>Shardul</i>	Male	Maldives	18-Jul-19	19-Jul-19
75.	<i>Kamorta</i>	Belawan	Indonesia	18-Jul-19	20-Jul-19
76.	<i>Tarkash</i>	Karlskrona	Sweden	19-Jul-19	22-Jul-19
77.	<i>Sunayna</i>	Muscat	UAE	24-Jul-19	25-Jul-19
78.	<i>Trikand</i>	Port Rashid	UAE	25-Jul-19	26-Jul-19
79.	<i>Tarkash</i>	St. Petersburg	Russia	25-Jul-19	30-Jul-19
80.	<i>Tarkash</i>	Helsinki	Finland	31-Jul-19	03-Aug-19
81.	<i>Kochi</i>	Muscat	Oman	02-Aug-19	03-Aug-19
82.	<i>Trikand</i>	Port Rashid	UAE	04-Aug-19	05-Aug-19
83.	<i>Sagardhwani</i>	Port Kelang	Malaysia	09-Aug-19	13-Aug-19
84.	<i>Tarkash</i>	Bergen	Norway	09-Aug-19	12-Aug-19
85.	<i>Kochi</i>	Muscat	Oman	12-Aug-19	14-Aug-19
86.	<i>Sagardhwani</i>	Port Changi	Singapore	14-Aug-19	18-Aug-19
87.	<i>Savitri</i>	Port Kalang	Malaysia	19-Aug-19	21-Aug-19
88.	<i>Tarkash</i>	Candiz	Spain	19-Aug-19	22-Aug-19
89.	<i>Mysore</i>	Salalah	Oman	23-Aug-19	25-Aug-19
90.	<i>Tarkash</i>	Dakar	Senegal	27-Aug-19	30-Aug-19
91.	<i>Sabyadri, Kiltan</i>	Laem Chabang	Thailand	31-Aug-19	03-Sep-19
92.	<i>Mysore</i>	Salalah	Oman	04-Sep-19	06-Sep-19
93.	<i>Kuthar, Kora</i>	Sabang	Indonesia	05-Sep-19	07-Sep-19
94.	Aircraft – IN Dornier	Phuket	Thailand	05-Sep-19	05-Sep-19

Ser	Units	Port/Station	Country	Date from	Date to
95.	<i>Tarkash</i>	Lagos	Nigeria	05-Sep-19	08-Sep-19
96.	<i>Sabyadri, Kiltan</i>	Sihanoukville	Cambodia	05-Sep-19	08-Sep-19
97.	<i>Mysore</i>	Port Rashid	UAE	12-Sep-19	14-Sep-19
98.	<i>Rajput</i>	Phuket	Thailand	12-Sep-19	14-Sep-19
99.	<i>Ranvijay</i>	Singapore	Singapore	12-Sep-19	14-Sep-19
100.	Aircraft – 2x IN Dornier	Colombo	Sri Lanka	17-Sep-19	20-Sep-19
101.	<i>Mysore</i>	Muscat	Oman	21-Sep-19	23-Sep-19
102.	<i>Tarkash</i>	Maputo	Mozambique	25-Sep-19	28-Sep-19
103.	<i>Sabyadri, Kiltan</i>	Sasebo	Japan	25-Sep-19	30-Sep-19
104.	Aircraft – P-8I	Sasebo	Japan	25-Sep-19	30-Sep-19
105.	<i>Mysore</i>	Muscat	Oman	30-Sep-19	02-Oct-19
106.	<i>Tir, Sujata, ICGS Sarathi</i>	Antsiranana	Madagascar	01-Oct-19	04-Oct-19
107.	<i>Shardul</i>	Antsiranana	Madagascar	02-Oct-19	04-Oct-19
108.	Aircraft – P-8I	Manila	Manila	03-Oct-19	03-Oct-19
109.	<i>Tarkash</i>	St.Denis	Reunion Islands	03-Oct-19	06-Oct-19
110.	<i>Tir, Sujata, Shardul, ICGS Sarathi</i>	Mombasa	Kenya	07-Oct-19	10-Oct-19
111.	<i>Mysore</i>	Doha	Qatar	09-Oct-19	11-Oct-19
112.	<i>Sabyadri, Kiltan</i>	Yokosuka	Japan	14-Oct-19	17-Oct-19
113.	<i>Tir, Shardul, Sujata, ICGS Sarathi</i>	Dar-es-Salaam	Tanzania	14-Oct-19	15-Oct-19
114.	<i>Tir, Shardul, Sujata, ICGS Sarathi</i>	Zanzibar	Tanzania	15-Oct-19	17-Oct-19
115.	<i>Gomati</i>	Salalah	Oman	20-Oct-19	21-Oct-19
116.	<i>Shardul</i>	Port Victoria	Seychelles	21-Oct-19	22-Oct-19
117.	<i>Chennai</i>	Port Rashid	UAE	23-Oct-19	24-Oct-19
118.	<i>Sabyadri, Kiltan</i>	Manila	Philippines	23-Oct-19	26-Oct-19
119.	<i>Gomati</i>	Djibouti	Djibouti	26-Oct-19	27-Oct-19
120.	<i>Shardul</i>	Port Louis	Mauritius	26-Oct-19	28-Oct-19
121.	<i>Sabyadri</i>	Da Nang	Vietnam	29-Oct-19	01-Nov-19
122.	<i>Gomati</i>	Salalah	Oman	31-Oct-19	02-Nov-19
123.	<i>Trikand</i>	Fujairah	UAE	07-Nov-19	09-Nov-19
124.	<i>Kiltan</i>	Jakarta	Indonesia	10-Nov-19	13-Nov-19
125.	<i>Gomati</i>	Salalah	Oman	11-Nov-19	13-Nov-19
126.	<i>Kesari, Chetlet, Aircraft – IN Dornier</i>	Yangon	Myanmar	11-Nov-19	19-Nov-19
127.	<i>Gomati</i>	Muscat	Oman	17-Nov-19	19-Nov-19
128.	<i>Trikand</i>	Doha	Qatar	17-Nov-19	21-Nov-19
129.	Aircraft – P-8I	Doha	Qatar	17-Nov-19	21-Nov-19
130.	<i>Nireekshak</i>	Trincomalee	Sri Lanka	25-Nov-19	27-Nov-19
131.	<i>Darshak</i>	Port Louis	Mauritius	25-Nov-19	28-Nov-19
132.	<i>Trikand</i>	Doha	Qatar	27-Nov-19	28-Nov-19
133.	<i>Magar</i>	Male	Maldives	27-Nov-19	28-Nov-19
134.	<i>Nireekshak</i>	Trincomalee	Sri Lanka	01-Dec-19	03-Dec-19
135.	<i>Trikand</i>	Muscat	Oman	07-Dec-19	08-Dec-19
136.	<i>Darshak</i>	Port Louis	Seychelles	09-Dec-19	12-Dec-19
137.	<i>Trikand</i>	Djibouti	Djibouti	13-Dec-19	14-Dec-19

Ser	Units	Port/Station	Country	Date from	Date to
138.	<i>Trikand</i>	Mombasa	Kenya	23-Dec-19	25-Dec-19
139.	<i>Darshak</i>	Port Louis	Mauritius	23-Dec-19	26-Dec-19
140.	<i>Darshak</i>	Port Victoria	Mauritius	30-Dec-19	02-Jan-20
141.	<i>Sumedha</i>	Salalah	Oman	31-Dec-19	01-Jan-20
2020					
1.	<i>Kesari</i>	Port Louis	Mauritius	02-Jan	24-May
2.	<i>Trikand</i>	Muscat	Oman	03-Jan-20	05-Jan-20
3.	<i>Airavat</i>	Port Victoria	Seychelles	04-Jan-20	06-Jan-20
4.	<i>Sumedha</i>	Salalah	Oman	10-Jan-20	11-Jan-20
5.	<i>Trikand</i>	Muscat	Oman	13-Jan-20	15-Jan-20
6.	<i>Chennai</i>	Muscat	Oman	15-Jan-20	16-Jan-20
7.	<i>Sumedha</i>	Duqm	Oman	18-Jan-20	19-Jan-20
8.	<i>Airavat</i>	Colombo	Sri Lanka	20-Jan-20	22-Jan-20
9.	<i>Chennai</i>	Muscat	Oman	23-Jan-20	24-Jan-20
10.	<i>Sumedha</i>	Djibouti	Djibouti	25-Jan-20	27-Jan-20
11.	<i>Koswari</i>	Male	Maldives	25-Jan-20	27-Jan-20
12.	<i>Airavat</i>	Antsiranana	Madagascar	30-Jan-20	02-Feb-20
13.	<i>Koswari</i>	Male	Maldives	30-Jan-20	31-Jan-20
14.	<i>Sumedha</i>	Salalah	Oman	04-Feb-20	05-Feb-20
15.	<i>Jamuna</i>	Colombo	Sri Lanka	06-Feb-20	09-Feb-20
16.	<i>Sumedha</i>	Salalah	Oman	12-Feb-20	13-Feb-20
17.	<i>Mysore</i>	Port Rashid	Dubai	13-Feb-20	14-Feb-20
18.	<i>Airavat</i>	Male	Maldives	15-Feb-20	16-Feb-20
19.	<i>Sukanya</i>	Yangon	Myanmar	16-Feb-20	18-Feb-20
20.	<i>Saryu</i>	Phuket	Thailand	17-Feb-20	20-Feb-20
21.	Aircraft – IN Dornier	Colombo	Sri Lanka	17-Feb-20	17-Feb-20
22.	Aircraft – IN Dornier	Colombo	Sri Lanka	17-Feb-20	20-Feb-20
23.	<i>Sumedha</i>	Salalah	Oman	19-Feb-20	20-Feb-20
24.	Aircraft – IN Dornier	Colombo	Sri Lanka	20-Feb-20	20-Feb-20
25.	<i>Mysore</i>	Muscat	Oman	20-Feb-20	21-Feb-20
26.	<i>Sukanya</i>	Yangon	Myanmar	22-Feb-20	26-Feb-20
27.	<i>Sindhusastra</i>	Yangon	Myanmar	23-Feb-20	26-Feb-20
28.	<i>Jamuna</i>	Galle	Sri Lanka	24-Feb-20	27-Feb-20
29.	Aircraft – P-8I	Reunion Island	France	27-Feb-20	03-Mar-20
30.	Aircraft – IN Dornier	Muscat	Oman	28-Feb-20	01-Mar-20
31.	<i>Mysore</i>	Muscat	Oman	29-Feb-20	01-Mar-20
32.	<i>Sunayna</i>	Duqm	Oman	01-Mar-20	02-Mar-20
33.	<i>Tarkash</i>	Muscat	Oman	06-Mar-20	07-Mar-20
34.	<i>Tir, Sarathi</i>	Port Louis	Mauritius	09-Mar-20	13-Mar-20
35.	<i>Shardul</i>	Antsiranana	Madagascar	10-Mar-20	15-Mar-20
36.	T83, T84	Trincomalee	Sri Lanka	11-Mar-20	12-Mar-20
37.	T83, T84	Galle	Sri Lanka	13-Mar-20	15-Mar-20
38.	<i>Jamuna</i>	Galle	Sri Lanka	13-Mar	16-Mar-20

Ser	Units	Port/Station	Country	Date from	Date to
39.	<i>Tir, Sarathi</i>	Port Victoria	Seychelles	18-Mar-20	19-Mar-20
40.	<i>Mysore, Aditya</i>	Male Anchor	Maldives	30-Apr-20	-
41.	<i>Jalashbwa</i>	Male	Maldives	07-May-20	08-May-20
42.	<i>Magar</i>	Male	Maldives	10-May-20	11-May-20
43.	<i>Sharda</i>	Off Colombo	Sri Lanka	11-May-20	12-May-20
44.	<i>Kesari</i>	Male	Maldives	12-May-20	14-May-20
45.	<i>Kesari</i>	Antsiranana	Madagascar	27-May-20	29-May-20
46.	<i>Jalashbwa</i>	Colombo	Sri Lanka	31-May-20	01-Jun-20
47.	<i>Kesari</i>	Moroni	Comoros	31-May-20	02-Jun-20
48.	<i>Jalashbwa</i>	Male	Maldives	04-Jun-20	05-Jun-20
49.	<i>Kesari</i>	Port Victoria	Seychelles	07-Jun-20	08-Jun-02
50.	<i>Shardul</i>	Bandar Abbas	Iran	08-Jun-20	08-Jun-20
51.	<i>Kesari</i>	Port Louis	Mauritius	14-Jun-20	15-Jun-20
52.	<i>Savitri</i>	Singapore	Singapore	16-Jun-20	17-Jun-20
53.	Aircraft – P8I	Moroni	Comoros	17-Jun-20	18-Jun-20
54.	<i>Airavat</i>	Male	Maldives	20-Jun-20	21-Jun-20
55.	<i>Jalashbwa</i>	Bandar Abbas	Iran	24-Jun-20	25-Jun-20
56.	<i>Kolkata</i>	Duqm	Oman	19-Jul-20	20-Jul-20
57.	<i>Kolkata</i>	Duqm	Oman	27-Jul-20	28-Jul-20
58.	Aircraft – IN Dornier	Male	Maldives	30-Jul-20	14-Aug-20
59.	<i>Kolkata</i>	Muscat	Oman	05-Aug-20	07-Aug-20
60.	<i>Trikand</i>	Djibouti	Djibouti	14-Aug-20	17-Aug-20
61.	<i>Talwar</i>	Salalah	Oman	15-Aug-20	16-Aug-20
62.	<i>Nireekshak</i>	Port Louis	Mauritius	24-Aug-20	25-Aug-20
63.	<i>Trikand</i>	Salalah	Oman	25-Aug-20	26-Aug-20
64.	<i>Nireekshak</i>	Port Louis	Mauritius	29-Aug-20	30-Aug-20
65.	<i>Karmuk</i>	Singapore	Singapore	07-Sep-20	08-Sep-20
66.	<i>Talwar</i>	Duqm	Oman	04-Sep-20	05-Sep-20
67.	Aircraft – IN Dornier	Male	Maldives	08-Sep-20	15-Sep-20
68.	<i>Trikand</i>	Duqm	Oman	12-Sep-20	14-Sep-20
69.	<i>Talwar</i>	Duqm	Oman	21-Sep-20	22-Sep-20
70.	<i>Trikand</i>	Duqm	Oman	24-Sep-20	24-Sep-20
71.	<i>Shivalik</i>	Jakarta	Indonesia	24-Sep-20	26-Sep-20
72.	<i>Sunayna</i>	Male	Maldives	26-Sep-20	27-Sep-20
73.	<i>Sunayna</i>	Male	Maldives	03-Oct-20	03-Oct-20
74.	<i>Trikand</i>	Djibouti	Djibouti	02-Oct-20	04-Oct-20
75.	<i>Tir, Sarthi</i>	Singapore	Singapore	06-Oct-20	07-Oct-20
76.	<i>Sukanya</i>	Yangon	Myanmar	15-Oct-20	17-Oct-20
77.	<i>Kamorta</i>	Trincomalee	Sri Lanka	16-Oct-20	17-Oct-20
78.	<i>Trikand</i>	Djibouti	Djibouti	18-Oct-20	20-Oct-20
79.	<i>Savitri</i>	Yangon	Myanmar	21-Oct-20	23-Oct-20
80.	<i>Trikand</i>	Salalah	Oman	05-Nov-20	06-Nov-20
81.	<i>Airavat</i>	Port Sudan	Sudan	02-Nov-20	04-Nov-20
82.	<i>Airavat</i>	Massawa	Eritrea	06-Nov-20	08-Nov-20

Ser	Units	Port/Station	Country	Date from	Date to
83.	<i>Airavat</i>	Djibouti	Djibouti	10-Nov-20	12-Nov-20
84.	<i>Tarkash</i>	Muscat	Oman	16-Nov-20	17-Nov-20
85.	<i>Airavat</i>	Mombasa	Kenya	20-Nov-20	22-Nov-20
86.	<i>Tarkash</i>	Salalah	Oman	25-Nov-20	26-Nov-20
87.	<i>Tarkash</i>	Djibouti	Djibouti	10-Dec-20	10-Dec-20
88.	<i>Sumedha</i>	Yangon	Myanmar	10-Dec-20	12-Dec-20
89.	<i>Tarkash</i>	Salalah	Oman	17-Dec-20	19-Dec-20
90.	Aircraft – <i>IN</i> Dornier	Yangon	Myanmar	22-Dec-20	22-Dec-20
91.	<i>Kiltan</i>	Ho Chi Minh City	Vietnam	24-Dec-20	26-Dec-20
92.	Aircraft – <i>IN</i> Dornier	Yangon	Myanmar	25-Dec-20	28-Dec-20
93.	Aircraft – P-8I	Yangon	Myanmar	26-Dec-20	26-Dec-20
94.	<i>Tarkash</i>	Djibouti	Djibouti	27-Dec-20	29-Dec-20
95.	<i>Kiltan</i>	Sihanoukville	Cambodia	29-Dec-20	01-Jan-21

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List of Abbreviations

AA	Anti-aircraft (firing)	AFSOD	Armed Forces Special
AAM	Air-to-air missile		Operations Division
AAP	Annual Acquisition Plan	AFTI	Armed Forces Training Institute
AAW	Anti-Air Warfare	AICTE	All India Council for Technical
ABER	Anticipated Beyond Economic		Education
	Repair	AIS	Automatic Identification System
ACCS	Advanced Composite	AISDN	ATM-based Integrated Ship
	Communication System		Data Network
ACNS (AM)	Assistant Chief of Naval Staff	ALHW	Andaman and Lakshadweep
	(Air Materiel)		Harbour Works
ACNS	Assistant Chief of Naval Staff	AMSS	[Sanchar] Automatic Message
(CSNCO)	(Communications, Space and		Switching System
	Network-Centric Operations)	AMWP	Annual Major Works
ACNS (FCI)	Assistant Chief of Naval Staff		Programme
	(Foreign Cooperation and	ANC	Andaman and Nicobar
	Intelligence)		Command
ACR	Annual Confidential Review	AoN	Acceptance of Necessity
ACS	Auxiliary Control System	APAR	Annual Performance Appraisal
AD	Air defence		Report
ADA	Aeronautical Development	APMS	Automatic Power Management
	Agency		System
AED	Automated External	APSO	Air Technical Assistant Principal
	Defibrillators		Staff Officer
AETF	Advanced Explosive Test Facility	APTT	Avionics Part Task Trainer
AETL	Advanced Energetic Test		(Simulator)
	Laboratory	AQAS	Aeronautical Quality Assurance
AEW	Airborne Early Warning		Service
AFA	Air Force Academy	AR/VR/MR	Augmented, Virtual and Mixed
AFAS	Addressable Flood Alarm		Reality
	System	ARD	Annual Review of Demands
AFS	Aviation Fuelling Station		

ARS	Automatically Replenished Stores	CANSRU	CSL Andaman & Nicobar Ship Repair Unit
ASCSOC	Area Coastal Security Operation Centres	CARES	Centre for Avionics Repair and Software Development
ASD	Admiral Superintendent Dockyard (Mumbai)	CATOBAR	Catapult Assisted Take-off But Arrested Recovery
ASR	Air Surveillance Radar	CBG	Carrier Battle Group
ASTS	Ammunition Status Tracking Software	CCDT	Command Clearance Diving Team
ASTT	Action Speed Tactical Trainer	CCI	Cabinet Committee on Infrastructure
ASW	Anti-Submarine Warfare		
ASuW	Anti-Surface Warfare	CCS	Cabinet Committee on Security
ASV	Anti-Surface Vessel	CDAC	Centre for Development of Advanced Computing
ATDS	Advanced Torpedo Decoy System		
ATMCC	Air Technical Mid-Career Course	CDE	Command Examination
		CDRI	Coalition for Disaster Resilient Infrastructure
ATPCT	Air Technical Pre-Commission Training Course	CDS	Chief of Defence Staff
AU	Andhra University	CEC	Cooperative Engagement Capability
AVSC	Ajay Vikram Singh Committee	CEMILAC	Centre for Military Airworthiness and Certification
AVSM	Ati Vishisht Seva Medal		
BEC	Basic Engineering Course	CFA	Competent Financial Authorities
BEL	Bharat Electronics Ltd		
BFNA	Battle-Field Nursing Assistants	CGDP	Controller General of Defence Production
BMP	Best Management Practices for Protection against Somalia-Based Piracy	CGPCS	Contact Group on Piracy off the Coast of Somalia
BRM	Brevet des Randonneurs Mondiaux, (endurance cycling races)	CISR	Centre for Indigenization and Self Reliance
BRTF	Border Road Task Force	C ⁴ I ² SR	Command, Control, Communications, Computers, Intelligence, Information, Surveillance and Reconnaissance (support functions)
BVY	Base Victualling Yard		
CAAIO	Computer-Aided Action Information Organization	CI/CT	Counter insurgency/counter terrorism
CAHSP	Calibration, Authorized Holding Sealed Particulars		
CAIR	Centre for Artificial Intelligence and Robotics	CIWS	Close-In Weapon System
CALS	Computer Aided Learning System	CKSRU	CSL Kolkata Ship Repair Unit
		CLS	Controller of Logistics Services

Cmde (CV)	Commodore Clothing & Victualling	CPT	Cockpit Procedure Trainer
CMF	Combined Maritime Forces	CRG	Cruise Reduction Gear
CMMS	Comprehensive Maintenance Management System	CRGO	Close Range Gunnery Officer
CMS	Combat Management System	CRIMARIO	Critical Maritime Routes Indian Ocean programme (EU)
CMSRU	CSL Mumbai Ship Repair Unit	CRS	Coastal Radar Chains
CNA (OF)	Controllerate of Naval Armament (Ordnance Factories)	CRSO	Command Regimental System Officer
CNA (DP)	Controllerate of Naval Armament (Defence Production)	CRW	Checks and Restoration Work
CNAMS	Centre for Naval Aviation Management System	CRZ	Coastal Regulation Zone
CNP	Comprehensive National Power	CSAILMS	Controller and System Administrator ILMS
CODAD`	Combined Diesel and Diesel propulsion configuration	CSN	Coastal Surveillance Network
CODAG	Combined Diesel and Gas propulsion system	CSNCO	Communications, Space and Network-Centric Operations
COM	Chief of Materiel	CSR	Corporate Social Responsibility
COMSAT	Command Level Safety Audits	CSRS	Coastal Surveillance Radar System
COOP	Crafts of Opportunity (COOP) Deployments	CTP	Composite Training Plan
COSAPH	Committee of Secretaries on Anti-Piracy and Hijacking at Sea	CTS	Controller of Technical Services
COSC	Chairman of the Chiefs of Staff Committee (the CDS)	CUSAT	Cochin University of Science and Technology
CODAD	Combined Diesel and Diesel (propulsion configuration)	CVRDE	Combat Vehicles Research and Development Establishment
CODAG	Combined Diesel and Gas	CWPRS	Central Water and Power Research Station
COGAG	Combined Gas and Gas (turbines configuration)	CWP	Contractor's Working Party
COMCOS	Commodore Commanding Submarines	DAA	Directorate of Aircraft Acquisition
CORPAT	(International) co-ordinated patrol	DAC	Defence Acquisition Council
CPGRAMS	Centralized Public Grievance Redress and Monitoring System	DALS	Directorate of Air Logistics Support
CPO	Chief Petty Officer	DAPI	Directorate of Armament Production and Indigenization
CPP	Controllable Pitch Propeller	DAPM	Directorate of Aviation Projects Management
		DAPP	Directorate of Air Projects & Plans
		DAPSA	Directorate of Adventure, Physical Fitness & Sports Activities

DAS	Dockyard Apprentice School	DIT	Directorate of Information Technology
DASE	Directorate of Aircraft Systems Engineering	DLQ	Deck Landing Qualification
DAWFS	Directorate of Air Warfare and Flight Safety	DLRL	Defence Electronics Research Laboratory
DCAP	Defence Capital Acquisition Plan	DM	Directorate of Missiles
DCN	Defence Communication Network	DMA	Department of Military Affairs
DCoC	Djibouti Code of Conduct	DMRL	Defence Metallurgical Research Laboratory
DCPS	Directorate of Civilian Personnel	DNAS	Directorate of Naval Air Staff
DEAL	Defence Electronics Applications Laboratory	DNCO	Directorate of Network-Centric Operations
DEDH	Direct Entry Diploma Holder	DND (SSG)	Directorate of Naval Design (Surface Ship Group)
DESA	Directorate of Ex-Servicemen Affair	DNE	Directorate of Naval Education
DFPDS	Delegated Financial Powers for Defence Services, 2021	DNOM	Directorate of Naval Oceanology and Meteorology
DFS	Defence Fire Services	DNS	Directorate of Naval Signals (under CSNCO)
DGNAI	Director General of Naval Armament Inspection	DNT	Directorate of Naval Training
DGQA	Director General Quality Assurance	DNSO	Directorate of Networks and Space Organization (under CSNCO)
DGAQA	Director General Aeronautical Quality Assurance	DoD	Department of Defence
DGLL	Directorate General of Lighthouses and Lightships	DOP	Directorate of Personnel
DGNAI	Director General of Naval Armament Inspection	DoS	Department of Space
DGNO	Director General Naval Operations	DPM	Defence Procurement Manual
DGQA	Director General of Quality Assurance	DPP	Defence Procurement Procedure
DI	Defect Investigation	DPSU	Defence Public Sector Units
DIA	Defence Intelligence Agency	DQA(N)	Directorate of Quality Assurance (Naval)
DIAT	Defence Institute of Advanced Technology	DQA(WP)	Directorate of Quality Assurance (Warship Production)
DINO	Deputy Inspector of Naval Ordnance	DRDO	Defence Research and Development Organization
DISSUB	Submarine in distress	DSCT	Directorate of Strategy, Concepts, and Transformation
		DSRV	Deep Submergence Rescue Vehicle
		DSSC	Defence Services Staff College

DWE	Directorate of Weapon Equipment	FIG	Fédération Internationale des Géomètres (International Federation of Surveyors)
EAC	Economic Advisory Council, NITI Aayog	FIG-IHO-ICA	International Federation of Surveyors-International Hydrographic Organization- International Cartographic Association
EAT	Expendable Aerial Targets		
ECCM	Electronic Countermeasures		
ECDIS	Electronic Chart Display Information System		
e-CHBs	e-Clothing History Books	FIP	Fuel-Injection Pump
ECHS	Ex-Servicemen Contributory Health Scheme	FIS	Financial Information System
EEZ	(India's) Exclusive Economic Zone	FLIR	Forward Looking Infra-Red
EMATT	Expendable Mobile ASW Training Target	FLWs	Frontline Workers (COVID- related)
ENC	Eastern Naval Command	FMS	Foreign Military Sales
E&O	Explosive and Ordnance	FMU	Fleet Maintenance Unit
EOD	Explosive Ordnance Disposal	FOC-in-C	Flag Officer Commanding-in- Chief
EOI	Expression of Interest	FODAG	Flag Officer Defence Advisory Group
EP	Electric Propulsion	FOGA	Flag Officer Goa Area
ERA	Engine Room Artificers	FOGNA	Flag Officer Gujarat Naval Area
ERDD	Essential Repairs and Dry- Docking	FOK	Flag Officer Karwar
ERP	Enterprise Resource Planning	FOMA	Flag Officer Maharashtra Area
ERPM	Engine rotations per minute	FONA	Flag Officer Naval Aviation
ESM	Electronic Support Measures	FOO	Fleet Operations Officer
ETS	Escape Training School	FOSM	Flag Officer Submarine
EW	Electronic Warfare	FOST	Flag Officer Sea Training
EWO	Electronic Warfare Officer	FOTNA	Flag Officer Tamil Nadu Area
EWOSC	Electronic Warfare Operations Support Centre	FPV	Fast Patrol Vessel
EUNAVFOR	European Union Naval Force	FR	Financial Regulations
FAJA	Fleet Assistant Judge Advocate	FRP	Fibre-reinforced polymer
FAC	Fast Attack Craft	FSED	Full-Scale Engineering Development
FAS	Fuelling at Sea	FTD	Flight Training Device (Simulator)
FC	Flight Critical	FTR	Floating Test Range
FCC	Fleet Clothing Centre	FTSU	Flotilla Technical Support Unit
FCR	Fire Control Radar	GeM	Government e-Marketplace
FDN	Floating Dock Navy	GFC	Global Financial Crisis (of 2008)
FFCs	Friendly Foreign Countries		

GFR	Government Financial Regulations	ICDP	Integrated Capability Development Plan
GIMS	Government Instant Messaging System	ICJ	International Court of Justice
GRDD	Guarantee Repair and Dry Docking	ICMS	Integrated Clothing Management System
GT	Gas turbine	ICO	International Cartographic Association
GTG	Gas Turbine Generator	ICS	Integrated Communication System
GUI	Graphical User Interface		
HADR	Humanitarian assistance and disaster relief	IED	Improvised explosive device
HCS	Human Capital Strategy	IFC-IOR	Information Fusion Centre–Indian Ocean Region
HCW	Health-Care Worker	IFEP	Integrated Full Electric Propulsion
HET	Higher Education Test		
HEAT	High Speed Expendable Target ('Abhyas')	IHO	International Hydrographic Organization
HFACS	Human Factor Analysis and Classification System Capsule	IHQ	Integrated Headquarters
HPAC	High-Pressure Air Compressors	IIC	In-house Indigenization Committee
HPCS	High Performance Computing System	IIRS	Indian Institute of Remote Sensing
HRA	High-risk area	IITM	Indian Institute of Tropical Meteorology
HRE	Higher Rank Examinations		
HSU	Hydrographic Survey Unit	ILMS	Integrated Logistics Management System
HQIDS	HQ Integrated Defence Staff		
HQ ODAG	Headquarters Offshore Defence Advisory Group	ILO	International Liaison Officer (IFC-IOR)
IAAMS	Integrated Automatic Aviation Meteorological Systems	IMAC	Information Management and Analysis Centre
IAQG	International Aerospace Quality Group	IMBL	International Maritime Boundary Line
IBA	Integrated Broadcast Application	IMD	India Meteorological Department
IBM	Integrated Bridge System	IMO	International Maritime Organization
IBSC	International Board for Standards of Competence	IMSAS	Indian Maritime Situational Awareness System
ICAO	International Civil Aviation Organization	IN	Indian Navy
ICCP	Impressed Current Cathodic Protection system	INA	Indian Naval Academy, Ezhimala

INACT	Incident Accident Analysis Comprehensive Tool	INPA	Indian Naval Placement Agency
INAICS	Indian Naval Accident and Incident Classification System	INPEC	Indian Navy Polo and Equestrian Contingent
INAS	Indian Naval Air Squadron	INS	Indian Naval Ship
INBA	Indian Naval Benevolent Association	INSA	Indian Navy Sailing Association
INBASS	Indian Navy Branch Allocation System for Sailors software	INSCB	Indian Navy Sports Control Board
INCA	Indian National Cartographic Association	INSC	Indian Navy Sports Cells
INCIS-IFR	Indian Naval Communication Interoperability System for International Fleet Review	INSIG	Incident Signal
INCOIS	Indian National Centre for Ocean Information Services	INSMA	Indian Naval Ship Maintenance Authority
INCOP	Indian Naval Common Operational Picture	INSOC	Indian Naval Strategic and Operational Council
INCREP	Incident Report	INST	Indian Naval Safety Team
INDAT	Indian Naval Delivery Acceptance Team	INTEG	Indian Navy Tactical Evaluation Group
INDL	Indian Navy Digital Library	INWTC	Indian Naval Watermanship Training Centre
INDOPACOM	US' Indo-Pacific Command (formerly, PACOM)	IOC	Indian Ocean Commission
INEP	IGNOU-Navy Educational Project	IONS	Indian Ocean Naval Symposium
INET	Indian Navy Entrance Test	IOR	Indian Ocean Region
INHD	Indian Naval Hydrographic Department	IORA	Indian Ocean Rim Association
INM	Institute of Naval Medicine	IOT	Internet of Things
INMC	Indian Navy Mountaineering Cell (under DAPSA)	IPMS	Integrated Platform Management System
INMAS	Institute of Nuclear Medicine and Allied Sciences	IPOI	Indo-Pacific Oceans Initiative
INMAC	Indian Naval Meteorological Analysis Centre	IPRD	Indo-Pacific Regional Dialogue
INOES	Indian Navy Online Examination System	IRSS	Infra-Red Suppression System
		IRTC	Internationally Recommended Transit Corridor
		ISAC	Incident Study & Analysis Cell
		ISL	International sea lane
		ISR	Intelligence, surveillance and reconnaissance
		ISRR	Indian Search and Rescue Region
		ISS	Island Security Scheme
		ISSA	Institute for System Studies and Analyses
		ISV	Immediate Support Vessel

ITMC	Information Technology Management Course	LPD	Landing Platform Dock
		LPM	Leading Patrol Man
IUHDS	Integrated Underwater Harbour Defence System	LRIT	Long-Range Ship's Identification and Trafficking
IUHDS	Integrated Underwater Harbour Defence and Surveillance System	LRU	Line Replaceable Unit
		LS	Leading Seaman
		LSO	Landing Safety Officer
IUU	Illegal, unreported and unregulated fishing	LTTE	Liberation Tigers of Tamil Eelam
IVMS	Integrated Victualling Management System	MAD	Magnetic Anomaly Detector
		MALE-RPA	Medium Altitude Long Endurance Remotely piloted aircraft
IWAI	Inland Waterways Authority of India		
IWTS	Infantry Weapon Training Simulator	MARCOM	Allied Maritime Command (UK)
JMSDF	Japanese Maritime Self-Defence Force	MARCOS	Indian Navy Marine Commandos
JAG	Judge Advocate General	MARSEC	Maritime Security Centre
JLN	Joint Logistics Nodes	MCM	Mine Countermeasures
JOCs	Joint Operations Centres	MCMV	Mine Counter-measures Vessel
JS (IC)	Joint Secretary (International Cooperation)	MCPO	Master Chief Petty Officer
		MCPP	Maritime Capability Perspective Plan
JS (D&ISA)	Joint Secretary (Disarmament and International Security Affairs)	MDA	Maritime Domain Awareness
		MDCC	Maritime Doctrines and Concepts Centre
JS (N)	Joint Secretary (Navy)		
JSSG	Joint Services Study Group	MER	Metric Entry Recruit
JSTI	Joint Services Training Institute	MFFS	Magazine Firefighting System
LAC	Line of Actual Control	MGTOC	Marine Gas Turbine Overhaul Centre
LCA	Light Combat Aircraft		
LCU	Landing Craft Utility	MIPP	Manpower Induction Perspective Plan
LIMO	Low-intensity maritime operations	MLU	Mid-life Upgrade
LINAC	Linear Accelerator	MMCB	Mobile Missile Coastal Battery
LL&MC	Long Logistics and Management Course	MMP	Mazdock Modernization Project
		MO	Material Organization
LMO	Liquid Medical Oxygen	MoD	Ministry of Defence
LMS	Learning Management System	MOD&SDLM	Modification and Scheduled Depot Level Maintenance
LOX	Liquid oxygen plants (COVID pandemic-related)	MOOC	Massive Open Online Course

MOOTW	Military Operations Other Than War	MWC	Maritime Warfare Centre
		MWDS	Mine Warfare Data Centre
MPMSDF	Multi-Platform Multi Sensor Data Fusion	MZI	Maritime Zones of India
		NAAC	National Assessment and Accreditation Council
MPR	Maritime Patrol Radar		National Academy of Coastal Policing
MPV	Multi-Purpose Vessel	NACP	Near-Field Acoustic Characterization System
MR	Medium Refit		Naval Armament Depot
MRAShM	Medium Range Anti-Shipping Missile	NACS	Naval Adventure Foundation
			Naval Flight-Testing Unit
MRCBF	Multi-Role Carrier Borne Fighter	NAD	Naval Armament Inspection (organization)
		NAF	National Aerospace Laboratories
MRCC	Maritime Rescue Coordinating Centre, Mumbai	NAFTU	Naval Aviation Management System
		NAI	Naval Aeronautical Quality Assurance Service
MRH	Multirole Helicopters		Naval Aircraft Servicing and Development Organization
MRIW	Maritime Reconnaissance Information Warfare	NAL	Naval Air Staff Requirements
		NAMS	Naval Trials and Acceptance Authority
MR-MLU	Medium Refit-cum-Midlife Upgrade	NAQAS	National Atlas and Thematic Mapping Organization
MRPA	Maritime Patrol and Reconnaissance Aircraft		National Level Pollution Response Exercise
		NASDO	Naval Pension Office
MRSAM	Medium Range Surface-to-Air Missile	NASR	Naval Aircraft Yard
MSC	Maritime Security Committee (IMO)	NATAA	Navy Boys Sports Company
			Naval College of Engineering
MSCC	Maritime Safety Coordination Centre	NATMO	National Council of Educational Research and Training
MSI	Maritime Safety Information		National Command Control Communication and Intelligence
MSIS	Merchant Ship Informational System	NATPOLREX	Naval Civilian Housing Colony
		NAVPEN	National Centre for Medium Range Weather Forecasting
MSIW	Maritime Information Sharing Workshop	NAY	Naval Communication Network
		NBSC	
MSME		NCE	
MSR	Maritime Silk Route	NCERT	
MSS	Mobile Signalling System		
MSTC	Maritime Security Transit Corridor	NC ³ I	
MTBO	Mean Time between Overhaul	NCHC	
MTT	Mobile Training Team	NCMRWF	
MVDP	Muzzle Velocity and Discharge Pressure	NCN	

NCSMCS	National Committee on Strengthening Maritime and Coastal Security	NIMAS	National Institute of Mountaineering and Adventure Sports
ND	Naval Dockyard	NIH	National Institute of Hydrography
NDA	National Defence Academy, Khadakwasala	NIIO	Naval Innovation and Indigenization Organization
NDC	National Data Centre	NIO	National Institute of Oceanography
NDMA	National Maritime Domain Awareness (Project)	NIOT	National Institute of Ocean Technology
NDRF	National Disaster Response Force	NIOHC	North Indian Ocean Hydrographic Commission
NEAS	Navy Entry Artificer Scheme	NLAO	Naval Local Audit Office
NEO	Non-combatant Evacuation Operation	NMF	National Maritime Foundation
NES	Navy Education Society	NMSC	National Maritime Security Coordinator
NEWN	Navy Enterprise-Wide Network	NOC	Networks Operations Centre
Nex-NEWN	Next Generation NEWN	NODPAC	Naval Operations Data Processing and Analysis Center
NF	Navy Foundation	NOFRA	Naval Officers Residential Area
NFC	Non Flight-Critical	NoK	Next of Kin
NFTS	Naval Flight Test Squadron	NOPV	Naval Offshore Patrol Vessels
NGC	Next-generation Corvette	NOS-DCP	National Oil Spill Disaster Contingency Plan
NGD	Next-generation Destroyer	NPMT	Naval Project Management Team
NGF	Next-generation Frigate	NPO	Naval Pay Office
NGMV	Next-generation Missile Vessel	NPOL	Naval Physical & Oceanographic Laboratory
NGOPV	Next-generation Offshore Patrol Vehicle	NR	Normal Refit
NHCC	Naval Higher Command Course	NRDC	National Research and Development Organization
NHO	National Hydrographic Office	NR-MLU	Normal Refit-cum-Midlife Upgrade
NHRC	National Human Rights Commission	NRL	Naval Reference Libraries
NIC	National Informatics Centre	NRS	Naval Regimental System
NICA	Naval Institute of Computer Applications	NRSA	National Remote Sensing Agency
NIEPA	National Institute of Educational Planning and Administration		
NIETT	Naval Institute of Educational and Training Technology		

NRSC	National Remote Sensing Centre	ORSA	Operations Research and System Analysis
NSA	National Security Agency	OSN	Ocean Sailing Node
NSCS	National Security Council Secretariat	OTHT	Over the Horizon Targeting
NSDC	National Skill Development Corporation	OTR	Operational Turn Round
NSRY	Naval Ship Repair Yard	PACOM	US Pacific Command
NST	Navy Sailing Team	PACE	People, Assets and Combat Efficiency
NSTL	Naval Scientific and Technological Laboratory	PBOR	Personnel Below Officer Rank
NSQF	National Skill Qualification Framework	PC	Permanent Commission
NSWTTC	Naval Special Warfare Technical Training Centre	PCA	Permanent Court of Arbitration (ICJ)
NTAC	Naval Technology Acceleration Council	PCASP	Privately Contracted Armed Security Personnel
NTDS	New Torpedo Defence System	PDDS	Portable Diver Detection Sonar
NTRO	National Technical Research Organization	PLA	People's Liberation Army
NUD	Naval Unified Domain (NEWN serves as the NUD)	PME	Professional Management Examination
NUH	Naval Utility Helicopters	PMSC	Private Maritime Security Companies
NWC	Naval War College	PO	Petty Officer
NWT	Navy Windsurfing Team	POL	Petroleum Oil and Lubricants
OCRC	Operational-Cum-Refit-Cycle	QA	Quality Assurance
ODA	Offshore Development Area	QFI	Qualified Flying Instructor
ODF	Ordnance Factory Boards	QNI	Qualified Navigation Instructor
OHSAS	Occupational Health and Safety Assessment Series	QuAEST	Quality Assurance Expert System Tool
OHSMS	Occupational Health and Safety Management System	RAN	Royal Australian Navy
OLSAT	Operational Level Safety Audits	RAQAS	Regional Aeronautical Quality Assurance System
OLTP	Online Transaction Processing	RAS	Replenishment at sea
ONGC	Oil & Natural Gas Corporation	RBIO	Rules-Based International Order
OPRC	Oil Pollution Preparedness, Response and Cooperation (IMO)	RCEP	Regional Comprehensive Economic Partnership
ORF	Observer Research Foundation	RCMA	Regional Centre of Military Airworthiness
ORM	Operational Risk Management	RCS	Radar Cross-Section
		RCSOC	Regional Coastal Security Operation Centre

ReCAAP	Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia	SDR	Software Defined Radios
		SEZ	Special Economic Zone
		SFNA	School for Naval Airmen
		SHADE	Shared Awareness and De- confliction
R&DE	Research and Development Establishment	SHOL	Ship Helicopter Operating Limits
RESS	Ready Event Sunshine Shelter (for a/c)	SHQ	Service Headquarters
RFID	Radio-frequency identification	SICADS	Ship Installed Chemical Agent Detection System
RFP	Request for Proposal		
ROC	Regional Operational Centre	SIDM	Society of Indian Defence Manufacturers
RPA	Remotely Piloted Aircraft		
RHC	Regional Hydrographic Commission	SIDP	Sports Infrastructure Development Plan
RLG	Reference Library Grant	SIF	Station Isolation Facility
RM	Raksha Mantri	Sim-NAMS	Simulator-Naval Aircraft Maintenance System
RPP	Refit Progress Planning		
RTI	Right to Information	SLE	(Submarine) Service Life Extension
SAC	Space Applications Centre		
SACEP	South Asia Cooperative Environment Programme	SLOC	Sea Lines of Communication
		SMS	Submarine School
SAG	Surface Action Group	SMMS	Ships' Material Management System
SAGAR	Security and Growth for All in the Region ('Neighbourhood First' initiative)	SMU	Submarine Maintenance Unit
		SNC	Southern Naval Command
SAI	Sports Authority of India	SNF	Standing NATO Forces
SAR	Search and Rescue	SNMG2	Standing NATO Maritime Group 2 (part of SNF)
SARS Co-2	Severe Acute Respiratory Syndrome Corona Virus 2	SNOM	School of Naval Oceanography and Meteorology
SATCOM	Satellite Communications		
SAUW	School of Advanced Underwater Warfare	SOC	Security Operations Centre
		SOLAS	Safety of life at sea
SBTF	Shore-based Test Facility	SPARSH	System for Pension Administration (Raksha)
SCAPCHC	Services Capital Acquisition Plan Categorization Higher Committee	SPB	Sagar Prahari Bal
		SR	Short Refit
SCI	Shipping Corporation of India	SRCG	Stabilized Remote Control Gun
SCS	Submarine Combat System	SRDD	Short Refit Dry Docking
SCSOC	State Coastal Security Operation Centres	SRDRS	Submarine Rescue Diving and Recompression System

SRGD	Short Refit Guarantee Defect	UES	University Entry Scheme
SRGM	Super Rapid Gun Mount	UGC	University Grants Commission
SSBS	Service Selection Boards	UMS	Unmanned Marine Systems
SSC	Short Service Commission	UNREP	Underway replenishment of
SSCB	Services Sports Control Board		stores at sea
SSM	Surface-to-Surface Missile	UNSC	United Nations Security Council
SSMO	Surface-to-Surface Missile Officer	UNSCR	United Nations Security Council Resolution
SSR	Surface Surveillance Radar	UPSC	Union Public Service
SSRV	Submarine-support Rescue Vessel		Commission
SSS	Side-Scan Sonar	VA	Vital Areas
STOBAR	Short Take-Off But Arrested Recovery	VATMS	Vessel and Air Traffic Management System
STP	Sewage Treatment Plants	VBSS	Visit, Board, Search and Seizure
TACCO	Tactical Coordinator	VCNS	Vice Chief of Naval Staff
TAPAS	Tactical Aerial Platform for Advanced Surveillance Beyond Horizon	VLSRSAM	Vertical Launched Short Range Surface-to-Air Missile
TDAC	Technology Development and Acceleration Cell	VP	Vital Points
TDF	Technology Development Fund	VOSS	Vessel Observations Ships Scheme
TEDBF	Twin Engine Deck-Based Fighter	VSF	Veteran Sailors' Forum
TFG	(Somali) Transnational Federal Government	VTS	Vacuum Toilet System
TLS	Through Life Support	WESEE	Weapons and Electronic Systems Engineering Establishment
TMC	Technical Management Course	WFP	World Food Programme
ToT	Transfer of Technology	WMO	World Meteorological Organization
TRIDAMO	Tri Services Detachment at MO (Port Blair)	WNC	Western Naval Command
TRISAD	Tri Services Advance Detachment (Chennai)	WSIE	White Shipping Information Exchange
UASS	Upper Air Sounding Systems	WSTF	Water Survival Training Facility
UAV	Unmanned Aerial Vehicle	XFAC	Extra Fast Attack Craft
		YAI	Yachting Association of India



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