Transition to Guardianship

The Indian Navy 1991–2000

Transition to Guardianship

The Indian Navy 1991–2000

Vice Admiral **GM Hiranandani**
PVSM, AVSM, NM, PhD (Retd)

Published by

Principal Director of Administration
Integrated Headquarters
Ministry of Defence (Navy)
Naval Headquarters, New Delhi

Lancer • New Delhi • Frankfort, IL
www.lancerpublishers.com

LANCER

Published in the United States by

The Lancer International Inc
19558 S. Harlem Ave., Suite 1,
Frankfort, IL. 60423.

First published in India by

Lancer Publishers & Distributors
2/42 (B) Sarvapriya Vihar,
New Delhi-110016

Printed and bound in India.

ISBN-13: 978-1-935501-26-8 • ISBN-10: 1-935501-26-7

Online Military Bookshop
www.lancerpublishers.com

IDR Net Edition
www.indiandefencereview.com

Dedication

"NO BIRD SOARS TOO HIGH IF IT SOARS WITH ITS OWN WINGS"

Dedicated to those who had the vision and the self confidence to take the first step and soar high to introspect, innovate and persevere in helping the Navy to achieve self reliance.

Contents

List of Maps

एडमिरल निर्मल वर्मा
पी वी एस एम, ए वी एस एम, ए डी सी
नौसेनाध्यक्ष
Admiral Nirmal Verma
PVSM, AVSM, ADC
Chief of the Naval Staff

रक्षा मंत्रालय
एकीकृत मुख्यालय (नौसेना)
नई दिल्ली - 110011
Integrated Headquarters
Ministry of Defence (Navy)
New Delhi - 110011

Foreword

"We cannot afford to be weak at sea. History has shown that whatever power controls the Indian Ocean, has in the first instance, India's sea borne trade at her mercy, and in the second, India's very independence itself".

Pandit Jawaharlal Nehru

The maritime tradition of India is as old as our civilization. Evidence of our seafaring heritage has existed in many forms, such as tales and anecdotes recounted in the Vedas and other mythological texts. The archaeological remains that proved the existence of a dockyard at Lothal in the Harappan civilization are a testimony to our ancient maritime moorings. In the past, record of the Indian Naval history was carried out by eminent writers such as CR Low, whose book on the Royal Indian Navy covered the period 1613 to 1863. But more recently, it has been a sterling indigenous endeavour that has kept the history clock ticking. In keeping with the imperatives of a need for recording recollections and experiences for posterity, the Indian Navy embarked upon a historical journey, which has led to the publication of five books thus far.

The first two books: *Under Two Ensigns — The Indian Navy 1945–1950* and *Blueprint to Bluewater — The Indian Navy 1951–1965*, were steered by Rear Admiral (Late) Satyindra Singh (Retd), to whom we owe immense gratitude for chronicling the origins of the Indian Navy and its transition to a Bluewater force.

The baton then passed to Vice Admiral GM Hiranandani (Retd), whose efforts resulted in *Transition to Triumph — History of the Indian Navy 1965–1975*, and *Transition to Eminence — The Indian Navy 1976–1990*. These two books encapsulated the Indian Navy's role in the wars with Pakistan as also our steady progress in becoming a 'Builder's Navy'.

Continuing with the narrative, this fifth book in the series covers the unique period of transitioning to a stage of 'guardianship'. The end of the Cold War introduced a new set of dynamics, which required us to change tack and yet maintain our modernisation process. The nation made a dramatic entry into the nuclear club and pushed back the Kargil intrusion during this time. A governmental review committee set up in its aftermath, began a period of defence transformation, a process that is still in progress. In line with streamlining of defence budgeting procedures, the Navy too began to lay more stress on judicious perspective planning.

Vice Admiral Hiranandani's erudite exposition comprehensively covers this momentous period and those who have a 'sense of history' would find this book an enlightening source to dwell upon. The illustrious author, unfortunately, passed away just before the publication of this work. But his spirit shall continue to guide us in this onerous initiative that we have undertaken to testify to the experiences of our own past.

(Nirmal Verma)
Admiral
Chief of the Naval Staff

Acknowledgements

During the four years of research that preceded compilation of this volume, the organisations and people who helped are too numerous for all to be mentioned by name, but some must be singled out for special thanks.

I owe a debt of gratitude to the PSOs, APSOs and Naval Headquarters Directorates for their unfailing readiness to help validate the facts.

I am grateful to the numerous senior service and civilian officers, serving & retired, who shared their insights. Those who had no objection to being quoted have been mentioned. The wishes of those who desired to remain anonymous have been respected.

The research for this volume involved many sources other than those listed in the Select Bibliography. I was fortunate to be able to interact with scores of senior officers who were generous in sparing their time for clarifying grey areas. I would like to thank also the many people who helped me with points of detail and directed me to sources I did not know about.

Many other people have made important contributions, which demand my grateful acknowledgement. Those from whose work I have benefited — often long before I considered writing this trilogy — and the colleagues from whose conversations I have learned much cannot be acknowledged individually, though I am happy to record the debt I owe to them.

I am especially grateful to:-

- Successive Commodores of the Bureau of Sailors (CABS) for providing required manpower.
- The writer sailors of the Naval History Project Office, Petty Officer Writers Manohar Gavade, Vijayan, Mangal Singh, Satya Prakash Singh and Leading Writers Abhilash K, Anup Kumar and LME Noel Alphonse for their assiduous typing of successive draft chapters and inserting finishing details into the maps.

The photographs, especially the cover pages, have been culled from the archives of NHQ's Directorate of Personnel Services.

The maps have been prepared by the National Hydrographic Office. I am grateful to the Chief Hydrographers Rear Admiral BR Rao and Rear Admiral KR Wassan, to Lt Cdr NSS Srinivas to whom this task was assigned and to his team of cartographers for preparing the maps so meticulously.

I am grateful to the officers and sailors, of the Naval History Division for their help in sifting voluminous source material, and especially to Cdr Abhijit Singh and Cdr Edwin Jothi Rajan for their tireless efforts in checking the draft chapters and the proofs of the volume.

Every effort has been made to contact all copyright holders. The publishers will be happy to make good in future editions any errors or omissions brought to their attention.

Above all, I should like to thank my wife Banu, my son Manik and daughter Meera who always found the time to read, re-read and comment on my working drafts from the point of view of a lay reader.

The full extent of what this book owes to my wife Banu is immeasurable. Such merits as this book may possess could hardly have found expression without her support. A moment's reflection will reveal the implications of such a long task on family's routine, convenience and happiness.

To my wife's brother, and dear friend Captain (Retired) Vijay K Ramchandani, Indian Navy, I shall remain extremely grateful for helping with my personal affairs which allowed me to concentrate fully on research and writing.

Preface

"To be secure on land we have to be supreme at sea".

— Pandit Jawaharlal Nehru

Introduction

In 1995, I was invited to write the History of the Navy covering the period 1965 to 1975. The intent was to provide authentic historical material for the general public, naval readers, media and scholars, seeking primary sources for research on our Navy.

To achieve credibility without breaching security of information, the History aimed to:

- Be factual, authentic, objective and non-judgemental to enable the reader to sift fact from fiction.
- Honestly recount achievements and shortcomings, without exaggerating successes or hiding setbacks, such that the officers of tomorrow were inspired to do better and learn from lessons of the past.
- Help perceptive naval officers destined for higher responsibility, to understand what their predecessors did, and why they did or did not succeed; as also to give them an understanding of the factors which have affected and which will continue to affect the development of our Navy in the years ahead.
- Present analyses and overviews that would help spur further research.

I felt it was important to provide a perspective of the impact that nuances such as geo-political alignments, the Cold War, the conflict in resource allocation between development and defence, the shortages of foreign exchange, etc had on the Indian Navy's development. The Navy's remarkable achievements can best be understood if the interaction between each of these nuances is fully comprehended.

The initial volume turned into a trilogy — "Transition to Triumph", (covering the period 1965 to 1975, published in 1999), "Transition to Eminence", (covering the period 1976 to 1990, published in 2004) and "Transition to Guardianship", (covering the period 1991 to 2000). These volumes depict the broad canvas of the Navy's activities over a period of 35 years from 1965 to 2000.

As in the preceding volumes, this volume "Transition to Guardianship" presents a concise record of the state of the Navy during the period 1991 to 2000. While the reader is encouraged to read the previous volumes of this trilogy, their contents are encapsulated below so that this volume may be read as a stand alone.

A few words on the structure of this book:

Preface provides an overview of the events preceding the period 1965 and of the two previous volumes. The key sections of this volume are also summarised so as to allow the reader to choose areas of interest at will, while saving the rest for more leisurely reading.

Section I provides the context of the emerging role of the Navy, in safeguarding the Indian Ocean SLOCs.

Section II describes the various operations undertaken by the Indian Navy in fulfilling this Guardianship role, in collaboration with other navies in the region.

Section III provides an overview of how the Navy consolidated and augmented force levels and accelerated the pace of self reliance and indigenisation despite considerable obstacles at the start of the decade.

Section IV describes the perspective plans of the Navy as they related to force levels, budgeting, information technology and human resources.

Section V provides an overview of matters that are related to and ancillary to the Navy.

Each section commences with a preamble that shares the contextual reference for the Chapters in that section. At the end of each section are Historical Reference Notes which outline a more detailed history on certain topics. In certain chapters, I have added a retrospect, in which I have taken

the liberty of sharing a personal perspective on the subject of the chapter in light of more recent developments.

The Navy's Development till 1965

When India attained independence in 1947, very few men had an understanding of sea power or of the role of a Navy. In schools and colleges, history classes paid more attention to the invading hordes that over the centuries had come from Central Asia. Little significance was attached to the fact that the far less numerous Europeans who had come by sea, initially to trade, had achieved India's subjugation into colonial status through naval force.

Most of our founding fathers had received their higher education in Britain and had close connections with British politicians and intellectuals who supported India's freedom movement. They were familiar with British political, bureaucratic and legal procedures and turned this to advantage in the struggle for freedom. All Indian Civil Service officers received their initial training in Britain. On return to India, their assignments were the same as those of their British counterparts. But at no stage, was sea power or the seaward defence of India within their purview. The defence of India was the prerogative of the British Commander-in-Chief of the Indian Armed Forces located in Delhi, in consultation with the Imperial War Office in London.

The Indianisation of the officer corps of the Army, Navy and the Air Force was initiated at Indian political insistence in the 1920's. Until 1939, when the Second World War started, most Indian officers were trained in Britain — the Navy at Dartmouth and Greenwich; the Army at Sandhurst, Camberley, Larkhill and Chatham and the Air Force at Cranwell. These British institutions ensured that the professional perceptions of Indian officers were analogous to those of their British counterparts.

Until 1939, the Royal Indian Navy (RIN) was responsible for coastal defence only. It had one naval base at Bombay and training establishments scattered in many regions of India. In September 1939, when the Second World War started, the Royal Indian Navy had five sloops, one trawler, one survey ship and one patrol craft. It had 114 officers and 1732 ratings (sailors).

During the war, the Royal Indian Navy underwent a phenomenal expansion. In 1945, when the war ended, the Navy had seven sloops, four anti-submarine frigates, eight corvettes, fourteen minesweepers, sixteen trawlers, one survey ship, two depot ships, thirty auxilliary vessels, one hundred and fifty landing crafts, two hundred harbour crafts and forty five harbour defence launches. The number of personnel had risen to 3014 officers and 27,433 ratings.

Nevertheless, despite the Second World War, the enormous individual and collective achievements of the Indian Army, Navy and Air Force made no great impact on the political or national mind.

The first significant event to evoke national interest was the trial of officers of the Indian National Army (INA) for treason. The INA, primarily a force drawn from amongst Indian soldiers captured by the Japanese after the fall of Malaya and Burma in 1942, was an anti-colonial movement led by Netaji Subhas Chandra Bose. The trial in 1945, of the INA officers — forged Indian public sentiment together. There was considerable debate on the complex military issue of whether Indian soldiers (who had earlier sworn loyalty to the British) fighting for independence from the British could be charged with treason. However, the national fervor in favour of the INA was so great that Pandit Nehru himself defended the INA officers on trial. The British had to comply with the countrywide demand for their release.

A similar kind of awareness was ignited in the aftermath of the Royal Indian Naval Mutiny of 1946. The basic causes of this mutiny stemmed from the specter of joblessness for the Indian sailors being demobilized after the war and the pent up resentment at the blatant and demeaning discrimination by 'white' officers against 'native' officers and men. Senior Indian political leaders however refused to extend their support to the mutineers. Once again the complex issue arose of whether naval mutiny was justifiable in the political struggle for freedom. Nevertheless, this awakened some public awareness as to the 'existence' of a Navy.

Perhaps, the greatest reason for the general lack of awareness of the role or importance of the Indian Navy was the fact that the seaward defence of India had vested solely with the British Navy. After the defeat of Japan in 1945, the Indian Ocean reverted to being a British lake, dominated by the Royal Navy. For all the above reasons, when India attained independence in 1947, the defence of India from seaward aggression was nowhere on the list of national priorities.

The Framework of Naval Growth 1947–1965

The partition of the Navy, between India and Pakistan in 1947, created several serious distortions. For example, the Navy's Boys Training Establishment and the Gunnery School were located in Karachi and went to the Pakistan Navy. The Indian Navy had to create these schools de novo.

Similarly, Muslim sailors serving in the Indian Navy were given the option to remain in the Indian Navy or go to the Pakistan Navy. As a result of this choice, the Indian Navy found that in some specializations all the senior sailors went off to Pakistan leaving only junior sailors in India, while in others only senior sailors remained. Therefore, in the early years after independence, the over-riding priority of the Indian Navy was to recover from the distortions of partition.

In those early years, the developmental choices confronting the Government were not easy. On the one hand was the idealistic pull of pacifist, non-violent, socialist, nonaligned policies. Adherence to these policies demanded budgetary priority for social and economic development and substantial investments in agriculture, industry and infrastructure.

On the other hand was the pragmatic realisation, reinforced by Pakistan's forcible occupation of Kashmir, that military capability could not be neglected. And whenever defence priorities were discussed, the Army and the Air Force were invariably accorded priority. The main reason that the Navy could survive this difficult situation was the momentum of the acquisition program, which the British themselves had initiated, before independence.

The British Contribution to Naval Development. In August 1947, Rear Admiral JTS Hall, RIN, was appointed as India's first Flag Officer Commanding Royal Indian Navy (FOCRIN). His Chief of Staff (now called the Vice Chief of the Naval Staff) was Commodore Martin H St L Nott.

These two farsighted officers, guided by Rear Admiral Lord Louis Mountbatten, then Viceroy of India, and assisted by Cdr (later Admiral) AK Chatterji, the first Director of Naval Plans, Lt Cdr (later Vice Admiral) N Krishnan, the Staff Officer Plans and Lt Cdr YN Singh, the navy's first aviator, prepared on "Outline Plan for the Reorganisation and Development of the Indian Navy". It visualised four essential roles for the Navy:

- To safeguard Indian shipping.
- To ensure that supplies could reach and leave by sea in all circumstances.
- To prevent an enemy landing on India's shores.
- To support the Army in sea borne operations.

By all accounts, Commodore Nott was a highly professional and intellectual man, gifted with foresight. To this day, Naval Headquarters awards an annual Commodore Nott prize for the best essay on naval matters to commemorate his contribution to the Indian Navy. Commodore Nott was able to synthesise the recommendations of earlier committees into force levels and to follow them through to acceptance.

The Indian Navy continued to have British Chiefs of Naval Staff until 1958. By all accounts, each one of them, after seeing at first hand, the earnestness, professionalism and ability of Indian naval officers and sailors, became ardent supporters of larger and more modern ships for the Indian Navy.

British Acquisitions. There is a view that by transferring to her dominions and colonies (Australia, Canada, India, Pakistan, New Zealand) the warships, tanks and aircraft rendered surplus after the Second World War, Britain killed two birds with one stone — ran down the sterling debt and got rid of surplus equipment. Politically, India was a member of the British Commonwealth. Britain had envisaged a clear role for the dominion (later British Commonwealth) navies in the developing Cold War of the Western powers against Communism. British fleets based at strategic points would form the nucleus for training dominion navies in the region, for example the Far East British Fleet was based at Singapore.

However, as far as the Indian Navy was concerned, because of this Commonwealth connection, it could train its officers and sailors in Britain until equivalent facilities were set up in India. It was able to obtain experienced senior British naval officers on deputation, until Indian naval officers became senior enough to replace them. It continued to have access to western naval tactical publications and joint services manuals. And the Indian Fleet, until 1964, participated in the annual Joint Exercises (JET) at Trincomalee in which the navies of Australia, New Zealand, Pakistan, Ceylon and Malaya exercised with the Far East British Fleet in the Bay of Bengal.

A significant contribution to the Indian Navy's growth was made by Admiral Lord Louis Mountbatten, who was the last Viceroy and the first Governor General of India. There is reason to believe that he lent his support to the force levels for the Indian Navy proposed by Commodore Nott in 1946.

However, the most important element in British influence was the reliance placed by Pandit Nehru, the Indian Prime Minister, on the advice and opinion of Admiral Lord Mountbatten on Naval Headquarters' proposals for naval acquisitions. When the proposal for acquiring the second cruiser was encountering opposition in the Ministry of Defence, Admiral Pizey, the British C-in-C, discreetly mentioned it to Admiral Mountbatten in London. The latter equally discreetly mentioned the merits

of the proposal to Pandit Nehru, who in his inimitable style indicated his assent without ruffling the Defence Ministry's feelings. Similarly, when the acquisition of an aircraft carrier ran into opposition, Admiral Mountbatten's advice to Pandit Nehru led to the proposal being approved.

It is unfortunate that despite having done so much, Admiral Mountbatten was unable, as Chief of the British Defence Staff in 1965, to prevail upon the British Government and the British Admiralty to meet the Indian Navy's requirements for British ships and submarines.

This British inability led to the Indian Navy turning to Russia for its naval acquisitions. Not only was Russia able to meet the Navy's needs and expectations but also, being impressed by the ability of Indian officers and sailors, progressively responded to the Navy's requests for even better ships and submarines. However, in keeping with the Government's policy of non-alignment, Naval Headquarters continued to acquire naval equipment from Britain and indeed from other countries, whenever the technology, cost and terms of payment met its requirements.

Self Reliance. The stance of the Western powers on India's position on Kashmir and on her non-aligned foreign policy, as well as the embargoes of international Cold War politics made it clear that dependence on a single source of supplies was to be avoided. Self reliance, therefore, became a priority for national development — in the production of food grains, in heavy industry and especially for defence supplies.

Self reliance gathered great momentum after Mr. Krishna Menon became the Defence Minister in 1957. Pandit Nehru relied heavily on Mr. Krishna Menon's views on defence matters. During his five years in office till 1962, Mr. Menon initiated most of the projects which even today form the bedrock of Indian defence production:

- For the Army, tanks, artillery, vehicles, weapons and munitions.
- For the Air Force, fighters, fighter bombers and transport aircraft.
- For the Navy, frigates and their associated weapon and propulsion systems.

From a naval historian's viewpoint, Mr. Krishna Menon's contribution to naval self reliance was as monumental as Admiral Mountbatten's contribution. During his tenure, Mr. Menon acquired the Mazagon Docks Ship Repair Yard in Bombay from Mckinnon Mackenzie Ltd and the Garden Reach Ship Repair Yard in Calcutta. These ship repair yards became the hubs for the revival of India's warship building industry, which had become dormant after the British Navy switched from wooden warships to steel warships in the 19th century. In 1960 and 1961, Mr. Menon initiated discussions for the construction of frigate sized warships in India.

Transition to Triumph

The first volume in the Naval History trilogy, "Transition to Triumph", presented an overview of the events concerning the Indian Navy between 1965 and 1975. The decade was a crucial one, in that it not only established the Navy's credibility in the eyes of the nation, but also sowed the seeds for the transition to a deep sea Navy.

1962–1965

In 1958, Vice Admiral RD Katari took over as the first Indian Chief of Naval Staff. The serious military reverses inflicted on India during China's aggression in November 1962 came as a humiliating shock to the Government and to the nation.

Immediately after the cease fire, an extensive review was initiated of defence preparedness. The changes in defence policy from 1963 onwards were to have a profound effect on naval development. The major conclusions of the 1963 Defence Review were:

- The country needed to be free from its dependence on foreign supplies for defence needs.
- A Department of Defence Production needed to be setup to develop an adequate production base.
- The Army and the Air Force were to be expanded and modernised to cope with the new threat from China.
- The Navy's over aged ships were to be replaced and the Navy made into a balanced force. Naval presence on the East coast of India and in the Andaman and Nicobar islands was to be increased.

This gave the Navy, its first opportunity after independence, to systematically justify its requirements. The Government's acceptance of the Navy's requirements laid the foundation for subsequent proposals for naval development.

The requirements were phased in the form of a five year plan and led to the formulation of the 1964–1969 Defence Plan. The requirements of the Plan were discussed by the Defence Minister's Delegations during their visits to America in May 1964, to Russia in August 1964 and to Britain in November 1964.

Neither America nor Britain perceived any threat to India from China's Navy. In their view, India's priority was to contain China on India's land borders by strengthening the Army and the Air Force. Russia, however, was willing to meet the Navy's needs for ships and submarines and this laid the basis for the Indo–Russian Naval cooperation. By early 1965, it was clear that the Navy's needs, both for submarines and for ships, as accepted in the Defence Plan 1964–69, could only be met by Russia.

In Naval Headquarters, however, there continued to prevail a very strong preference for British acquisitions. The Navy's entire organization, operational structure, maintenance and repair system, documentation and logistic procedures, were similar to the British Navy. Turning to Russia for naval acquisitions could result in the British stopping the supply of confidential signaling, tactical and manoeuvring publications and joint services manuals which India was getting as a member of the British Commonwealth. All of these were critical for day to day functioning and operating with other Commonwealth navies.

A major psychological barrier was also that of having to learn the Russian language to understand Russian equipment manuals. Russian weapon, propulsion, electrical and electronic systems were entirely different from those of the British and this would entail extensive augmentation of maintenance and repair facilities. Experience with earlier British acquisitions had shown that it took several years to set up such facilities and in the intervening years, ships deteriorated.

Overall the difficulties were daunting. It is praiseworthy that despite these formidable problems, Naval Headquarters took the decision to acquire Russian ships and submarines. Within a brief period of four years between 1961 and 1965, the geopolitical and economic compulsions of America and Britain led India's Air Force, Army and Navy to accept Russia's generous offers of its latest conventional defence systems on extremely favourable financial terms. The 1956 Rupee Rouble Trade Agreement was extended also to defence sales from 1965 onwards.

Great care was nevertheless taken, not to sever the naval connection with Britain and Europe. In 1964, India and Britain agreed to collaborate on the construction of the British designed Leander class frigate in Mazagon Docks, Bombay. For this project, the British Government provided credit of 4.7 million pounds, which was used for purchasing the propulsion plant and weapon systems of the ships.

1965. In May 1965, Pakistan intruded into the Rann of Kutch. The 1965 Indo–Pakistan conflict saw no significant naval encounters. The Government had explicitly directed the Navy to desist from offensive action on the high seas. The Navy did, however, take away major learnings.

The British Government imposed an embargo on defence supplies to both countries. This precipitated Indian perceptions that despite India's traditional linkages with Britain, British credibility as a source of defence supplies could not be taken for granted. In 1965 itself, the first naval contract was signed for acquisition of Russian submarines, anti-submarine vessels and landing ships. Russian credits for defence supplies commenced the same year. The induction of vessels from Russia was to have widespread effects on the Navy.[1]

Further, two major deficiencies did come to light relating to seagoing forces. The first was that without a fleet tanker to replenish ships, destroyers and frigates were unable to stay at sea for more than a few days. A new tanker therefore joined the fleet in 1967.

The second deficiency was that there were just not enough ships to cater for operational contingencies on the East and West coasts of India and also in the Andaman and Nicobar islands. This deficiency was partly remedied when the Eastern Fleet was constituted in October 1971, just prior to the 1971 Indo–Pakistan conflict. However, it was not until 1975 that adequate force levels could be built up in the East.

Russian Ship and Submarine Acquisitions

From mid-1966 onwards, Indian submarine crews proceeded to Russia for training, commissioned submarines and sailed them home. All the submariners who were earlier trained in Britain also underwent training in Russia. By 1970, four submarines arrived in India. The submarine depot ship, *INS Amba,* was commissioned in the Black Sea in 1968 and arrived in 1969.

The first Russian surface vessels to arrive were five small patrol boats. These were followed by two landing ships in 1966. By 1970, five anti-submarine vessels were acquired.

The years between 1969 and 1971 were extremely critical for the Indo–Russian naval interaction. The Navy had selected some of its finest officers to induct the

1. Refer Chapter titled, 'Russian Acquisitions' in "Transition to Triumph".

Russian ships and submarines. These officers were quick to discern the Russian ships, limitations. For example, the tropical Indian climate was hot and humid. However, air conditioning systems had been designed for Russia's cool and dry temperate climate. The submariners found that their vessels had not been fitted with the latest equipment. Since the same "Russia trained officers" soon manned corresponding desks in Naval Headquarter directorates, they were able to interact with visiting Russian naval delegations, and project specific needs. It took a great deal of perseverance to break through the initial Russian resistance to Indian suggestions. Fortunately, over time, both sides developed mutual respect for each others professionalism.

By 1971, the Navy was able to identify several improvements that were to be fitted in the next series of Russian acquisitions. In the end of 1971, further orders were placed for four submarines, five anti-submarine vessels and six landing ships.

Russian Missile Boat Acquisitions

In 1964, the Indian defence delegation were shown missile boats but these evoked no interest because they had not been on the Navy's list of requirements. In 1965, professional naval circles started becoming aware of the potency of the threat that such small boats could pose to ships much larger than themselves, because of their surface to surface missiles. Russia had first supplied these missile boats to Indonesia who was engaged in a confrontation with Britain and the British Navy was not at all clear about how to deal with this threat.

Russia also supplied these boats to Egypt. During the 1967 Arab–Israel war, an Egyptian missile boat sank an Israeli frigate, *Eliath,* within minutes, which was approaching Port Said. The Indian Navy was quick to see the advantages of this new weapon system for coastal defence, having seen how the Pakistan Fleet, in the 1965 conflict, had bombarded Dwarka and got away. In end 1968, eight missile boats were ordered. These were better than those supplied to Indonesia and Egypt — they carried four missiles each instead of two.

These boats arrived in 1971 and were based in Bombay, where a missile preparation facility was being set up.

1971. The Defence Plan 1970–74 was approved in 1970. In addition to sanctions for the Russian acquisitions and indigenous construction, approval was accorded for the Navy to acquire six of the latest Seaking anti-submarine helicopters from Britain. These arrived in 1971. Approval was also accorded for the construction of corvettes in India.

The 1971 War[2] saw the Indian Navy achieve control of the Arabian Sea and the Bay of Bengal within a span of one week. India helped to liberate Bangladesh so that ten million refugees could return to their homes. America made its gesture of support to Pakistan by sending the *ENTERPRISE* carrier group into the Bay of Bengal. The Russian Navy, in an equally reassuring gesture of support to India, shadowed the American Navy's task force into the Indian Ocean. In 1971, the Indo–Soviet Friendship Treaty and Russia's veto in the Security Council during the Indo–Pakistan war helped cement Indo–Russian relations. After the 1971 war, the Russian Navy worked alongside the Indian Navy to clear the mines laid by the Pakistan Navy in the approaches to Chittagong harbour.

In 1971, the concept of the Indian Ocean as a 'Zone of Peace' crystallised in the UN.

1971–1975

From the naval point of view, the triumph of 1971 was a significant turning point in the transition of the Indian Navy :

- After the Navy's achievements in 1971, politicians, civil servants and the general public became aware of what a Navy could achieve in a military situation. Equally important, the Navy's effective interception of Pakistan's merchant ships proceeding to East Pakistan and its control of the maritime approaches and oil supplies to West Pakistan during the 1971 Indo–Pakistan conflict made the Government realize how the Navy's control of the sea lanes could decrease the enemy's ability to continue a fight.
- Immediately after the 1971 conflict, eight more missile boats were ordered having longer range, better missiles and a better fire control system for anti-aircraft defence. The attack on Karachi increased Russia's respect for the Indian Navy's innovative use of Russian missile boats and made them proud on the efficacy of Russian missile systems.
- With the potency of the Russian missiles having been so vividly proved, the Navy decided to fit missiles, in as many ships, as possible. To start with, two complete systems of missile launchers, missile fire control systems and associated power supplies

2. Refer Chapter titled 'The 1971 Indo–Pakistan War' in "Transition to Triumph".

were removed from two missile boats and fitted in two British frigates, which was an unprecedented achievement.

- After the sinking of *INS Khukri,* the Government accepted the Navy's urgent need for maritime patrol aircraft having the capability to counter attack a submarine.
- The Navy's instant, invisible presence off the Ceylon coast, in response to the Ceylonese Government's request for assistance in forestalling a coup was the first time that the Navy was asked to undertake such a task. Only the Navy could have done it discreetly. The use of the Army or the Air Force could have raised protests of interference in the internal affairs of Ceylon.
- The discovery of oil at Bombay High and the acceptance of the need to protect expensive, vulnerable oil rigs led to the revival of the Corvette Project. The Navy's requirement to fit the latest equipment made it attractive for European contenders to offer a number of options from the best equipment, then available.
- In 1972, *INS Nilgiri,* the first Leander class frigate built by Mazagon Docks, was commissioned on schedule. She was the first major warship to be built in India after a gap of over a hundred years.

Two major Defence Reviews marked the closing years of the decade 1965 to 1975. In 1973, a high level Apex Committee recommended special consideration for the Navy's development and cleared the Navy's proposals for replacing old ships and the development of support facilities. Soon after the Government approved the recommendations, there were several adverse developments.

The Arab–Israel war erupted in October 1973. As a reaction to America having rushed military aid to Israel, the Arab oil producing nations sharply increased the international price of oil. The oil crisis of 1973 affected economies worldwide. Since India imported much of her oil from the Persian Gulf, the unavoidable increase in the outflow of foreign exchange seriously dislocated national budgeting and decelerated defence projects.

Between 1973 and 1975, India's economic situation deteriorated swiftly and sharply. Domestic inflation reached an unprecedented 30 per cent per annum. The rise in prices of imported food, fertiliser and fuel drained foreign exchange reserves. There were setbacks in agricultural and industrial output. By 1975, it became clear that the Apex Group's recommendations would have to be reviewed.

Operational considerations also favoured another review. The Arab–Israeli War revealed to the world a new generation of weapons that Russia had supplied to the Arab nations. The Indian Defence Delegations who went to assess the performance of these new Russian weapon systems recommended their acquisition. Offshore oil discovered in Bombay High and threats to these offshore assets were to be catered for. After the 1971 war, Pakistan's armed forces had made several new acquisitions.

The Government constituted the Second APEX Group in 1975 to revise the Defence Plan 1974–79 and correlate physical and financial targets. For the first time after independence, defence planning was viewed in the wider perspective of the national economy in an attempt to mesh the Defence Five Year Plan with the national five year plan.

The Second Apex group accepted most of the Navy's projections. This Committee recommended enhanced allocation of funds to support core naval schemes which otherwise would have languished. The Government's acceptance of these recommendations underpinned the major acquisitions in 1975.

Transition to Eminence

The second volume in the trilogy of Naval History entitled "Transition to Eminence" covering the period 1976 to 1990 describes how the foundation was laid for the Navy's emergence as the eminent Navy of the South Asian region.

The international competition to 'sell arms' presented the Navy with an opportunity to acquire the latest technology from both the Soviet Union and the West and indigenise them through transfer of technology and increased self reliance.

The acquisitions from abroad synergised with innovations in warship design and production. New technologies drove innovation in indigenous shipbuilding concepts, in tactical doctrines, in personnel policies and in maintenance, refit and logistic procedures. In the preceding decade, the transition had been from British acquisitions to Russian acquisitions, from guns to missiles, from steam propulsion to gas turbines and from analogue to digital electronics.

Between 1976 and 1990, the transition was qualitatively different. Specialist teams mushroomed with a sharper

focus on how effectively the new systems would meet operational requirements and how they would perform in tropical conditions. Every working level strove to obtain and sustain peak performance.

During this period, the Navy's growth was affected by three crises, each of which delayed the import of naval equipment and the implementation of approved projects:

- The first crisis followed the 1973 Arab–Israel War when the price of oil rose very sharply.
- The second crisis from 1987 onwards originated from the failure of the monsoon in 1986 and the prolonged drought and financial austerity that ensued.
- The third crisis started in the late 1980s when the Soviet Union started re-structuring its economy, freeing its industry from centralised control, requiring factories to become financially self sustaining by charging international prices and requiring payment in dollars. The deliveries of Soviet equipment and spares were disrupted. It took some years to restore normalcy, partly because India herself was going through a financial crisis.

Viewed in retrospect, these crises were a blessing in disguise. Though they were a cause for concern at the time, they compelled the Navy to innovate, to develop indigenous substitutes and to make better use of its resources.

The growth of the Navy during the period was the outcome of several serendipitous factors:

The growth between 1976 and 1983 was the result of the Defence Reviews carried out by the Apex Committees in 1973 and 1975. Their recommendations led to the acquisition of Russian guided missile destroyers, ocean going rocket boats, minesweepers, MRASW aircraft and ASW helicopters. These Russian acquisitions coincided with the redesigning, then in progress, of the frigates that would follow the sixth and last of the Leanders. It led to the Project 16 Godavari class frigates redesigned to fit the Russian weapon systems, retaining the steam propulsion of the earlier Leanders and installing as many as possible indigenous systems of proven performance.

The growth between 1984–87 was accelerated by acceptance of the British aircraft carrier, *Hermes*. The confidence in the design organisation and the ability of the dockyards in integrating different weapon platforms led to sanction of more ships. In addition to the Russian willingness to assist indigenous warship production, private Indian industries showed interest in Defence R&D.

All these factors culminated in the sanctions for the indigenous production of guided missile destroyers (Project 15) and frigates (Project 16 A), missile corvettes (Project 25A), gas turbine propelled missile boats (Project 1241 RE), landing ships, survey ships, tankers and diverse smaller ships.

The failure of the monsoon in 1986 led to the drought of 1987 and financial stringency until 1990. The financial crisis of 1991 prolonged the period of austere naval budgets. Fortunately, Naval Headquarters' systematic and swift staff work in 1985 and 1986 had obtained sanctions for all naval projects and it was possible to keep these projects moving albeit at a slower pace, until the economy started recovering from 1994 onwards.

Despite being accorded lesser priority than the Army and the Air Force in the allocation of resources, the Navy was not only able to stay abreast of other navies in naval propulsion, weapon, sensor and computer technology, but also to achieve a respectable measure of self reliance.

Innovation in Warship Design and Indigenous R&D

The period 1976–90 was lively and exciting, both for innovation in design and for self reliance.

New ships entered service at a brisk pace, along with new sonars, radars, electronic warfare systems, missiles, torpedoes, propulsion and power generation systems. Few navies could have been so fortunate as to acquire, at the same time, such a wide variety of technologically modern equipment.

By bold improvisations, Russian, European and indigenous systems and equipment were successfully integrated and installed in Indian hulls. This process started in 1976, when the entire missile and close-range gun system of a 200-ton Russian missile boat was disconnected and re-installed in a 15-year old British anti-submarine frigate along with the latest Italian electronic warfare systems, thereby giving the Fleet an ocean-going, missile-warfare-capable frigate.

A few years later, it was decided to fit the entire missile and gun system, identical to that of the latest 800-ton Russian rocket boats[3] then being acquired, along with indigenous and European equipment, in a hull design evolved from the preceding Leander class frigates. The outcome was the three Godavari class frigates of the 1980s.

3. Known in Western naval parlance as "Nanuchkas".

Once the intricacies had been mastered of interfacing electrical and electronic equipment, regardless of their origin, voltage and frequency, there was no looking back. Appreciative of the success of Indian innovation, the Russians offered their latest weapon systems for the series of ships that followed — the 1500 ton missile corvettes of the Khukri class, the 6500 ton missile destroyers of the Delhi class and the 4000-ton missile frigates of the Brahmaputra class.

Side by side with these innovations in warship design, the Naval R&D laboratories developed sensors, weapons and systems better suited to India's tropical climate conditions and maximising indigenous content.

The outstanding naval R&D project of this period was the APSOH sonar, specially designed for hot and humid tropical conditions and proved at sea in Indian waters. Its derivatives continue to be fitted in the Navy's latest ships, twenty years after it was first developed.

The Air Arm

There were numerous developments in the Naval Air Arm in this period. The combat capability of the Air Arm leapfrogged from the technology of the 1950s to that of the 1980s:

- A second aircraft carrier, Viraat, and a wide variety of aircraft and helicopters equipped with the latest sensors and weapons were acquired.
- Vikrant underwent two modernisations, in preparation for embarking the new Sea Harrier fighter aircraft and the new Mk 42 B Seaking ASW helicopters.
- The maritime reconnaissance role was transferred from the Air Force to the Navy in 1976 with the taking over of the Air Force Super Constellations. The acquisition in 1977 of the MRASW Ilyushin (IL) 38s from the Soviet Union marked the rebirth of the shore-based arm of naval aviation.[4] In due course, the longer range and better equipped Long Range Maritime Patrol Tupolev (TU) 142s replaced the Super Connies.

The Submarine Arm

There were equally significant developments in the Navy's Submarine Arm.

In the early 1970s, evaluation had commenced of European submarines to decide which of these best met the Navy's requirements for commencing submarine construction in India. This evaluation culminated in short-listing of the German HDW 1500 submarine and the Swedish Kockums 45B submarine. The German HDW 1500 was selected after prolonged technical evaluations and competitive commercial negotiations. Contracts were signed in December 1981 for two submarines to be built in Germany followed by two to be built in Mazagon Docks, with an option clause for two more to be built in India.

To learn all aspects of submarine design, construction, overseeing, factory acceptance and sea trials and to facilitate transfer of technology, personnel from the Navy and from Mazagon Docks were deputed to Germany whilst the first two submarines were being constructed in Germany. These two submarines arrived from Germany in 1987. The 3rd and 4th submarines built in Mazagon Docks were commissioned in 1992 and 1994.[5]

The performance of the HDW submarines fully met the Navy's operational requirements. This was as much a tribute to Indian learning skills and meticulous insistence on quality as to the thoroughness of German training and transfer of technology.

During this period, studies that had commenced in the 1960s, on nuclear propulsion were continued. To better understand the technology, it was decided in the early 1980s to lease a nuclear propelled submarine from the Soviet Union for three years. The crew underwent training in Russia. INS Chakra operated in Indian waters from 1988 to 1991.

The Submarine Arm had started with eight submarines from Russia — four Kalvari class in 1968–69 and four Vela class in 1973–74. Due to the increased corrosion experienced in warm saline tropical waters and the deferment of 6-yearly refits since the repair facilities in Visakhapatnam Dockyard were not ready, the material state of the first four submarines deteriorated fast. Submarines were sent back to Russia for 6-yearly repairs. Concurrently, 6-yearly repairs were commenced in Visakhapatnam. Discussions with the Soviet side for successors to the earlier submarines culminated in the acquisition of the eight 877 EKM submarines between 1986 and 1990.[6]

4. The amphibious Sealand aircraft had phased out in the 1960s.
5. Negotiations for the 5th and 6th submarines were discontinued in 1987 due to a combination of cost escalation and resource constraints.
6. Known in Western parlance as the 'Kilo' class.

Submarine Arm projects were not restricted to Europe and Russia. A landmark deal was the VLF transaction with an American firm. The discussions with the Soviet Union and the United States culminated in 1984 with the selection of an American company, in collaboration with an Indian company, to design, manufacture, install and commission the VLF transmitting station which was commissioned in 1990.

The Indo–Russian Naval Interaction

The naval acquisitions from the Soviet Union that started in 1965, grew with future Russian acquisitions and installation of Russian weapons in Indian-built hulls, interfaced with European and indigenous equipment.

By 1987, this wide scope of cooperation in warship building required monitoring at high levels. Agreements were signed to ensure that deliveries were effected to the warship building yards — Mazagon Docks in Bombay, Garden Reach in Calcutta and Goa Shipyard — at the right time to avoid delays in their construction schedules. A Joint Indo–Soviet Working Group on Shipbuilding was set up to smoothen the way and clear problems in the licensed production of 1241 REs and the design assistance for the fitment of Soviet weapon systems in indigenous warships.

From the mid-1980s, the Soviet Union's economic restructuring resulted in an unforeseen interruption in the supply of the spares earlier indented. It took some time for new arrangements to be concluded with individual original equipment manufacturers/factories.

Operations

The two significant naval operations during this decade were Operations Pawan and Cactus.

Operation Pawan — 1987 to 1990. Operation Pawan started with the induction of the IPKF on 30 July 1987. The de-induction started in August 1989 and Operation Pawan terminated on 24 March 1990, when the final contingent of the IPKF sailed out of Trincomalee on board ships of the Eastern Fleet.

During Operation Pawan, the wear and tear on naval ships was substantial. The usage of ships exceeded stipulated norms by 50%. Despite the wear and tear, it was invaluable for its experience of low intensity conflict and inducting troops over uncharted beaches.

Immediately after the last contingent of the IPKF was de-inducted from Sri Lanka, ships and aircraft of India's Navy and Coast Guard were deployed for Operation Tasha to patrol the Palk Strait to minimise the movement of militants and their material between Sri Lanka and India. Operation Tasha started in April 1990 and continues to this day.

Operation Cactus — 1988. Whilst Operation Pawan was in full swing, a crisis erupted in Male, the capital of the Maldive Islands. On the night of 2nd/3rd November 1988, between 300 and 500 armed, Tamil/Sinhala-speaking mercenaries landed in Male harbour by boats from a mother ship and captured key locations. During this attempted coup, President Gayoom went into hiding and, in the early hours of 3 November, sought India's help and immediate intervention.

During the next 24 hours, the nearest naval ships were diverted to Male at maximum speed, naval reconnaissance aircraft established surveillance over the Maldive Islands. On the night of 3rd/4th, Air Force aircraft landed troops on Male's airport. On learning that these troops were headed for Male, the mercenaries hijacked a merchant vessel 'Progress Light', taking Maldivian VIP hostages with them, and set course for Sri Lanka.

INS Godavari was diverted towards Colombo to embark, by helicopter, the team of negotiators that had been flown from Male to Colombo. At first light on the morning of the 4th, the aircraft confirmed the detection of Progress Light and homed INS Betwa. INS Godavari with negotiators embarked arrived by midday on the 5th.

Negotiations for the release of the hostages made no progress. The mercenary leader insisted that the Progress Light would proceed only to Colombo for which the Sri Lankan Government denied permission.

On the 6th morning, 60 miles from Colombo, pressure commenced with small arms fire, followed by air-dropped depth charges ahead of the ship. When Progress Light still refused to stop, a broadside was fired on the forward cargo section. The ship stopped immediately.

Naval commandos boarded the ship and rescued the hostages. Godavari's helicopter evacuated the injured and the mercenaries were handed over to the authorities at Male.

Operation Cactus was a remarkably successful naval operation providing a friendly neighbouring Government with swift and timely assistance that averted a major political crisis.

Personnel. A number of problem areas in the area of personnel coalesced to compel introspection and reform in this period.

The crux of the problem was that having started to replace its aging ships, submarines and aircraft with

technologically better Russian, European and indigenous equivalents, the need increased for the Navy to have technically educated manpower in larger numbers and for them to build up and conserve expertise. The prevalent recruitment, training and promotion process was not yielding quality personnel in the numbers that the Navy needed.

Conserving expertise on hi-tech equipment was a knotty problem especially in warships and to a lesser extent in the air and submarine arms. The need was to arrive at the right balance between two incompatible requirements. It took time to find the right balance in terms of solutions.

Pay Commissions improved emoluments. Cadre Reviews improved career prospects. The Navy detached itself from the Army's recruitment organisation and soon better educated and better quality manpower began to join the sailor cadre. Innovative schemes for officer and Artificer entry helped to attract volunteers of the required calibre in sufficient numbers.

Notwithstanding these challenges, the growth of the Navy between 1976 and 1990 was extraordinary, especially in its progress towards self reliance and its growth to the position of being the strongest and largest Navy in South Asia.

Transition to Guardianship

Just as the outcome of the 1971 war had given the Navy triumph and the achievements between 1976 and 1990 marked the transition of the Indian Navy to a position of regional eminence, the decade 1991–2000 saw the Navy take on a leading role in safeguarding the Indian Ocean SLOCs.

This period, was in many respects the most fulfilling yet challenging decade that the Indian Navy experienced after Independence in 1947.

Fulfilling, because the Indian Navy came to be trusted and accepted as the major Guardian of the sea lanes in the Northern Indian Ocean. This decade marked tremendous strides in the assimilation of technology, hybridisation and indigenisation that led to a significant upgrading and consolidation of force levels.

Challenging because from most naval points of view, this period will rank as perhaps the most turbulent and demanding decade in our Navy's history. India went through some extraordinary peaks and troughs during the period. The failed monsoons of the late 1980s, the financial austerity that followed that retarded naval growth, the collapse of the Soviet Union in 1991 and its aftermath that choked the supply of spares, vessels and munitions severely impacted the naval growth. The momentum picked up in mid 90's but was again truncated due to the sanctions embarked on India due to its Pokhran tests. The Navy managed to overcome all these hurdles due to its realignment in the global order and indigenisation programmes in defence production.

The role of the Navy also evolved and expanded over the years. A small Navy that was started for coastal defence grew into a blue water force with ability to extend its reach. In May 2004, the Navy released a publication titled 'Indian Maritime Doctrine'[7]. This Doctrine provides a perspective on the role of the Indian Navy in light of its achievements in the previous decade.

The doctrine elaborates the Navy's role against aggression from seaward in a wider and contemporary perspective. It makes three important points:

Points	Rationale
The Navy needs nuclear submarines that can carry missiles with nuclear warheads.	India's Draft Nuclear Doctrine of "No First Use" stipulates the need for a sea-based, retaliatory, second-strike capability.
The sea area from the Persian Gulf to Straits of Malacca is a legitimate area of interest for the Indian Navy.	90% of India's trade by volume and 77% by value is seaborne. 90% of India's oil and natural gas comes from across the sea.
As the biggest and most powerful nation in the Indian Ocean Region, it becomes incumbent upon India to ensure peace and stability in the region.	The ongoing discourse on bilateral agreements for joint patrols in vulnerable segments of the region's sea lines of communication.

The Doctrine is important in that it has placed the role of the Indian Navy and the rationale thereof. It emphasised that:

- Sea areas cannot be occupied or fortified. At best they can be controlled for one's own safe use and denied to an adversary.
- Ensuring the import of critical cargoes like oil and gas will make maintaining one's Sea Lines of

7. Its stated aim is to make the fundamentals of the Doctrine available to every professional concerned with the maritime affairs of our country. The document requires every naval officer to imbibe the common vocabulary and the planning concepts laid down in the doctrine.

Communication (SLOCs) a primary national interest and denying SLOCs to the adversary a primary maritime objective.

- A short duration conflict (two-to-three weeks), particularly in a littoral will demand a greater reliance on land attack capabilities by maritime forces. Sea control would almost inevitably be required as the enabler of land attack capability.

Overview of Sections of "Transition to Guardianship"

This first section **'Emergence of a New World Order – The Context of Naval Growth 1991–2000'** illustrates the Indian Ocean Sea Lines of Communication and Choke Points and describes the perspective of the major navies in the Indian Ocean. It provides an overview of the development of the Indian Navy in the period 1947–1990 which laid a strong foundation for the Navy's growth in the decade 1991–2000.

Two significant influences had a great impact on the growth of the Indian Navy. The first was the severe resource crunch due to the calamitous national drought of 1987 which was followed by another financial crisis in 1991 due to spiraling oil prices post the Gulf war of 1990, which curtailed naval projects. From 1991 onwards, the Government took a series of measures to restore financial stability and to accelerate economic liberalisation which laid the base for rapid economic growth. The period from 1993–2000 saw India move to a high growth economic path, allowing for necessary investments in upgrading and consolidating force levels.

On the global geo-economic and geopolitic front, the dissolution of the Soviet Union in 1991 and formation of the Confederation of Independent States (CIS) made India re-appraise its role and national interests in the New World Order. While India retained its friendly relations with the CIS, cordial and sociable gestures from the USA, led to a significant realignment in its geopolitical relationships.

The decade witnessed the Navy's first ever overseas deployment for Humanitarian Relief Operations, as part of a UN mission in Somalia. The decade ended with the aggression in Kargil in Jammu & Kashmir by the Pakistan Army in 1999. The brazenness of the attack was compounded by the fact that it took place at the very time the Prime Minister of India was in Pakistan in response to an invitation from the Prime Minister of Pakistan to resume peaceful coexistence on the sub-continent.

The Kargil episode marked a turning point in the relations between India and the USA as described in the ensuing excerpt from the article titled 'American Diplomacy and the 1999 Kargil Summit at Blair House' written by Bruce Reidel.[8]

> *"The clarity of the American position on Kargil and its refusal to give Pakistan any reward for its aggression had an immediate and dynamic impact on the (Indo–US) relationship. Doors opened in New Delhi, to Americans that had been shut for years. The Indian elite — including the military — and the Indian public began to shed long held negative perceptions of the US. The stage was set for the unprecedented back to back summits between President Clinton and Prime Minister Vajpayee in 2000. After a quarter century gap in Presidential visits to India, Clinton's spring visit symbolised a new level of maturity in the relationship between the world's two largest democracies. Vajpayee's return visit formalized the commitment".*

Look East Policy.[9] The above strategic re-alignment resulted in initiation of the "Look East Policy" to forge closer relationship with the north Indian Ocean Region (IOR) as a whole across the entire spectrum of trade, investment, cultural, political, diplomatic and strategic ties.

The Indian Navy's reaching out to regional maritime neighbours led to organising "Get-to-know-each-other Milans" of South East Asian navies at Port Blair every alternate year in the Andaman Islands, in 1995, which until then had been denied visits by foreign warships.

Thus the emerging new world geopolitical order led to a situation where the major powers in the developed world grew increasingly comfortable for the Indian Navy to safeguard the SLOCs in the Northern Indian Ocean. At the same time, nations and navies that had been involved in the Confidence Building Measures initiated by the Indian Navy, felt more comfortable with India assuming this role.

The second section **'Safeguarding the Sea Lanes - The Emerging Role of the Navy in the New World Order'** details the naval operations undertaken to safeguard the SLOCs in the Northern Indian Ocean, and to assist in humanitarian and peace-keeping operations.

India has a vital interest in the security and stability of the SLOCS in the Indian Ocean since the nation's energy security is closely linked to its maritime security. The Gulf being the primary source of India's energy needs and the growing importance of Bombay High and other

8. Mr Reidel was U.S. President Clinton's Special Assistant for Near Eastern and South Asia Affairs in the U.S. National Security Council.

9. Refer to Reference Notes "Looking East - Past, Present and Future", and "Towards Regional Maritime Cooperation".

off-shore regions intertwine its maritime interests and energy security. The safety of the EEZ and interests outside the EEZ in deep seabed mining based on its long term requirements for manganese, nickel, cobalt and copper add to the maritime security dimension.

The threats of terrorism and piracy in addition to possible hostilities from neighbouring countries have led to a sharp increase in the perception of potential maritime threats to the economic and energy security of the country.

Four broad types of naval operations were undertaken in this period:

- Participation in the Humanitarian Operation of the United Nations in Somalia between 1992 and 1994 which was the Indian Navy's first ever overseas deployment in support of a United Nations Humanitarian Relief Operation.
- Low Intensity Conflict (LIC) operations like Operation Tasha in the Palk Bay, to interdict the illegal transit of men and material by the LTTE Tamil secessionists in northern Sri Lanka, Operation Swan in the west and northwest Arabian Sea coast to interdict Pakistani terrorists smuggling explosives, weapons and ammunition and Operation Leech and its successors in the Bay of Bengal, to interdict the smuggling of weapons, narcotics and explosives by secessionist militants in the north-eastern states of India.
- Anti-Piracy operation, namely Op Rainbow a joint operation with the Coast Guard in 1999 which resulted in the rescue of a hijacked merchant vessel Alondra Rainbow.
- Deterrent Operation namely Op Talwar in June 1999, wherein the Indian Navy enhanced security measures as a result of the Pakistani aggression on Kargil.

This section also deals with Goodwill visits between our Navy and foreign navies and the role of the Navy in providing humanitarian assistance during peace time. The experience in the above operations, showed how India's zone of peaceful maritime influence had gradually crystallised — from the distant Horn of Africa in the Northwest quadrant of the North Indian Ocean to the Strait of Malacca in the Southeast quadrant of the East Indian Ocean and to the Tropic of Capricorn in the South.

The third section **'Consolidating Force Capability — Enhancing the Navy's Capability to Fulfil its Emerging Role'** delves on the efforts made by the Indian Navy to diversify away from Russian acquisitions. It provides an overview of the measures taken to consolidate and enhance the Navy's force capability to enable it fulfil its emerging role in safeguarding the Indian Ocean SLOCs.

The section provides a background to the financial constraints in the beginning of the decade and its crippling effects on naval projects. It also brings out how the Navy arose from its predicament through a series of indigenisation programmes and its strategic realignment in the new global order.

The section starts with an overview of the Russian Acquisitions and describes the impact on the Indian Navy due to the dissolution of the Soviet Union. It also covers the progress made in the indigenous design and production of warships and covers the modernisations and service life extension programmes.

The chapter on Submarine Arm describes the changes in command and control, the problem of submarine medium refits, the induction of the Sindhughosh class of submarines, and the genesis of the discussions with France for the joint production of the Scorpene class of submarines.

Similarly the chapter on the Air Arm describes how the impressive strides in the combat capability of this arm steadily grew to match that of more advanced navies and covers developments related to Aircraft carriers Vikrant, Viraat and the Indigenous Aircraft Carrier Project, as also the acquisition of the Russian Aircraft Carrier Gorshkov (Vikramaditya).

The excellent work undertaken at the Naval Dockyards and the Naval Ship Repair Yards in ensuring naval maintenance, repairs and refit capacity is covered in the ensuing chapter.

The chapter on Logistics outlines, how the Logistic Delegations helped make a breakthrough in the procurement of spares from Russia and Ukraine in the mid 90's. It also describes the creation of the Integrated Logistics Management System (ILMS) that provided the Navy with a state-of-the-art Logistics Management system.

The section closes with a chapter on the contribution of research and development to naval self reliance.

The next section on **'Introspection, Perspective and Personnel Planning — Structural Dilemmas and Challenges'** deals with the dilemmas and structural challenges that confronted the Navy and the changes that were made to tackle them. The changes related to the areas of perspective planning, budget and resource allocations, changes in command and control structures and personnel related issues.

The section commences with a chapter highlighting the recommendations of the Committees on Higher Defence Management that were constituted to address defence policy, security and higher defence management issues. The most significant amongst these were 'The Committee on Defence Expenditure (CDE)', June 1990, 'The Ministry of Defence Estimates Committee 1990–91', 'The Kargil Review Committee of 1999', whose recommendation led to the constitution of a 'Task Force to Review the Management of Defence'. Most of the problems reflected in these reports were endemic and some of them continue to remain unresolved. Nevertheless, the process of introspection that commenced during this period has laid the foundation for future improvements.

The next chapter addresses the perspective of naval planning undertaken in consultation with the Defence Planning Staff (DPS). An assessment of the strength required in achieving the objectives of coastal defence, sea denial to the adversary and sea control forms the foundation for determining the force levels and therefore the perspective plans in the Navy.

The chapter on New Management Strategy (NMS) addresses the issue of finance and the release of funds for plan projects. It describes the steps taken by the Navy in becoming a leaner, more efficient organisation in order to reinvest the savings in modernisation and upgrades.

The chapter on Information Technology describes the Navy's significant achievements in harnessing the potential of Information technology starting from a policy for computerization and leading to an IT vision for the Navy.

The succeeding chapters highlight the changes in Command & Control structure that took place both in Naval Headquarters and in the Command HQ's. Personnel & HR issues are dealt with, in the chapters on Personnel & Talent Management, Training and Morale and Discipline.

The last section **"In Unison - Associated Organisations, Collaborative Efforts and Reference Data"** covers information in three categories:

- Associated services who work closely with the Indian Navy, namely the Coast Guard, the Naval Hydrography and Marine Cartography and Naval Oceanology and Meteorology Departments.
- An overview of Naval Ceremonial and organisations that provide training to young people wishing to enter a naval career — namely the NCC and the Sailing Training Ships.
- Material related to Pay, Welfare, and the efforts to provide better working conditions to our Naval staff.

Retrospect

A great strength of the Navy has been the candour with which it analyses the reasons for the problems it experiences. It has been my aim in this volume that in maintaining the Navy's tradition of candour, this volume will help the reader to create the future rather than just grasp the present and the past.

This book involved the putting together of contributions from a great many people and innumerable sources to whom I am most grateful. Although this volume of the history has been sponsored by the Indian Navy, it does not reflect the views either of the Indian Navy or the Government. The views and the interpretation of facts are entirely my own and for errors of fact, and for the opinions expressed, I alone take full responsibility.

By combining source material in the public domain and memoirs and recollections of participants, this book presents a reconstruction of events that is as accurate and authentic as the information available. Contentious topics have been discussed without trying to vindicate or criticise. My aim is to place before the serious and thoughtful reader, carefully researched facts and overviews of events that can help him to arrive at a conclusion.

To have had the opportunity to be the Navy's Historian for the past 15 years has given me many hours of both introspection and pleasure.

As I complete this volume of the trilogy, covering the history of the Navy for 35 years, I feel a great sense of pride in the achievements of our Navy.

Notwithstanding the setbacks and challenges that have been faced, successive generations of naval officers have worked tirelessly to overcome every obstacle in their quest to make ours the pre-eminent Navy in the region. It is my hope that our History will inspire the young naval officers of tomorrow to do even better.

New Delhi
30th August 2009

(GM Hiranandani)
Vice Admiral (Retired)

Glossary & Abbreviations

Note : Unless otherwise stated, a 'mile' in the text refers to a 'nautical mile', which is equal to 1.85 kilometres. One knot is a naval unit of speed equal to one nautical mile per hour.

A

A&N	Andaman and Nicobar Islands (in the Bay of Bengal)
A/C	Aircraft
A/D	Air Defence
AA	Anti Aircraft/also Artificer Apprentice
AAM	Air to Air (Anti-Aircraft) Missile
ABER	Anticipated Beyond Economical Repair (categorisation of ships' equipment when pre-planning refits/ modernisations)
ACAS	Assistant Chief of Air Staff
ACC	Appointments Committee of the Cabinet
ACD	Air Crew Diver
ACDS	Assistant Chief of Defence Staff
ACNS	Assistant Chief of the Naval Staff
ACNS (IW&OPS)	Assistant Chief of the Naval Staff (Information Warfare & Operations)
ACOM	Assistant Chief of Material
ACOM (IT&SYS)	Assistant Chief of Material (Information Technology & System)
ACR	Annual Confidential Report
ACV	Air Cushion Vehicle (also called hovercraft)
ACWP&A	Assistant Controller of Warship Production & Acquisition
ADA	Aeronautical Development Agency
ADE	Aeronautical Development Establishment
ADGWE	Addl Directorate General of Weapons and Equipments
Adm	Abbreviation for 'Admiral'
ADS	Air Defence Ship
AEC	Atomic Energy Commission
AEW	Air Borne Early Warning (aircraft/helicopter)
AF	Air Force
AFHQ	Armed Forces Headquarters
Ag	Acting
Ag Capt	Acting Captain
AGS	Aircraft General Stores
AHSP	Authority Holding Sealed Particulars (of naval equipment)
AIDS	Acquired Immuno Deficiency Syndrome
AIO	Action Information Organisation
AIP	Air Independent Propulsion
AIRCAT	Aircrew Categorisation Board
AIRCATS	Aircrew Categorisation and Standardisation Board (Navy)
ALC	Annual Logistics Conference
ALH	Advanced Light Helicopter
AMC	Annual Maintenance Charges
AMD	Anti Missile Defence
AMDI	Acoustic Miss Distance Indicator
AMPHEX	Amphibious Exercise
ANC	Andamans & Nicobar Command
ANMI	Allied Naval Manoeuvering Instructions (Formerly ATP 1)
ANOs	Associate NCC Officers
ANZUS	Australia, New Zealand, United States(pact)
AOCINC	Air Officer Commanding in Chief
AOG	Aircraft On Ground (indicating immediate need for action to make it operational)
AOM	Air Officer-in-charge Maintenance
AOP	Air Officer-in-charge Personnel
AOPV	Advanced Offshore Patrol Vessel
APA	Annual Practice Allowance (of each type of weapon and type of ship)
APARNA	Active Passive Radar for Navigation and Attack
APSOH	Advanced Panoramic Sonar Hull-mounted
ARD	Annual Review Demands (for stores and spares)
ARDE	Armament Research & Development Establishment
ARF	Asian Regional Forum
ARMEX	Arabian Sea Experiments
AS	Anti Submarine
As & As	Alterations and Additions
ASD	Admiral Superintendent Dockyard
ASE	Authorised Stores Establishment (Stores authorised for an aircraft squadron)
ASEC	Army Standing Establishment Committee
ASM	Air to Surface (anti-ship) Missile
AST	Afloat Support Team
ASV	Anti Surface Vessel (role for a helicopter)
ASW	Anti Submarine Warfare
ATAS	Active Towed Array Sonar
ATC	Air Traffic Control (tower)/Annual Training Camp
ATE	Avionic Test Equipment (for aircraft)
ATP	Annual Training Programme
ATU	Air Treatment Unit (fitted in ships and submarines for air conditioning)

ATV	Advanced Technology Vessel
AUW	All Up Weight (of an Aircraft on taking off with fuel and weapons)
AVSM	Ati Vishisht Seva Medal (award for distinguished service of an exceptional order)
AWACS	Airborne Warning and Aircraft Control System
AWS	Amphibious Warfare School
AZ	Alize(1960s vintage French carrier borne aircraft)

B

B & D	Basic & Divisional (initial training imparted to officers)
B & D	Base & Depot (refers to ships' spares stocked ashore)
BARC	Bhabha Atomic Research Centre (in Bombay/ Mumbai)
BBNI	Bhutan, Bangladesh, Nepal and India
Bde	Brigade
BDL	Bharat Dynamics Limited (Government Undertaking for production of missiles and torpedoes)
BE	Budget Estimate
BEC	Basic Engineering Course (in INS Shivaji/Naval Engineering College)
BEL	Bharat Electronics Ltd (Government Undertaking for production of radars, sonars, fire control systems, electronic warfare systems, etc)
BGF	Border Guarding Forces
BHEL	Bharat Heavy Electricals Ltd
BIMSTEC	Bangladesh, India, Myanmar, Sri Lanka and Thailand Economic Cooperation
BIOT	British Indian Ocean Territory
BMF	Base Maintenance Facility (for Russian aircraft)
BMS	Budget Monitoring System
BMU	Base Maintenance Unit (for ships)
Bn	Battalion
BOBMEX	Bay of Bengal Experiments
BOMS	Basic Operator-Maintainer School
BPT	Battle Practice Target (for surface firing practices - guns & surface to surface missiles)/Bombay Port Trust (now Mumbai Port Trust)
BRD	Base Repair Depot (for Air Force aircraft)
BRO	Base Repair Organisation (later named as 'Naval Ship Repair Yards')
BSF	Border Security Force (para military organisation)
BSNL	Bhart Sanchar Nigat Limited
BT	Bathythermograph (for measuring sea water temperatures at increasing depth)
BTE	Boys Training Establishment (subsequently Basic Training Establishment, INS Chilka)
BVR	Beyond Visual Range (air-to-air missile)

C

C&AG	Comptroller and Auditor General
CABS	Commodore Bureau of Sailors/Centre for Air Borne System
CACTUS	Naval operation in the Maldives, 1988
CAD	Computer Aided Design
CAIO	Computerised Action Information Organisation
CAN	Campus Area Network
CAP	Combat Air Patrol (aircraft)
Capt	Captain (naval rank equivalent to Army Colonel and Air Force Group Captain)/Also in naval parlance the Commanding Officer of a ship/submarine and naval establishment)
CARS	Computerised Attendance Recording System
CAS	Chief of the Air Staff
CASEX	Combined Anti Submarine Exercise
CAT	Central Administrative Tribunal
CATOBAR	Catapulated Assisted Take off but Arrested Recovery
CBG	Carrier Battle Group
CBI	Central Bureau of Investigation (the Central Government's investigation arm)
CBMs	Confidence Building Measures
CBR	Central Board of Revenue
CC	Commanders Conference (Conducted in Apr/May every year)
CCDT	Command Clearance Diving Team
CCPA	Cabinet Committee on Political Affairs (subsequently CCS)
CCS	Cabinet Committee on Security
CD	Clearance Diver
CDA	Controller of Defence Accounts
CDE	Committee on Defence Expenditure
CDM	College of Defence Management (at Secunderabad)
Cdo	Commando
CDP	Committee on Defence Planning
Cdr	Commander(naval rank)
CDS	Chief of the Defence Staff/Combined Defence Services (entrance examination)
CDT	Clearance Diving Team (CCDT — Command Clearance Diving Team)
CED	Central Equipment Depot
CENTCOM	Central Command (United States)
CENTO	Central Treaty Organisation (Turkey, Iran, Pakistan) in the 1950s and 1960s
CEOs	Chief Engineering Officers
CFA	Competent Financial Authority
CFL	Cease Fire Line (in Jammu and Kashmir)
CG	Coast Guard
CGDA	Controller General of Defence Accounts
CGS	Coast Guard Ship
CGV	Coast Guard Vessel
CHERA	Chief Engine Room Artificer
CIA	Central Intelligence Agency (foreign intelligence arm of the United States)
CID	Committee for Imperial Defence
CII	Confederation of Indian Industry
CILQ	Compensation in Lieu of Quarters(for sailors)
CIMS	Chief Inspector of Marine Stores
C-in-C	Commander-in-Chief
CIS	Confederations of Independent States
CLABS	Centre for Leadership and Behavioural Studies
CLCS	(United Nations) Commission on the Limits of the Continental Shelf
CLS	Controller of Logistic Support/Services (Navy)

CMD	Chief Managing Director/Chairman & Managing Director (of naval warship building yards)
Cmde	Commodore (naval rank equivalent to Army Brigadier and Air Commodore of Air Force)
CMFRI	Central Marine Fisheries Institute
CMP	Controller of Material Planning (naval logistics)
CMS	Coastal Minesweeper
CNAL	Computerised Naval-NBCD Allowance List
CNC	Computer Numerical Control
CNS	Chief of the Naval Staff
CNW	College of Naval Warfare (at Mumbai)
CNX	Chief of Naval Staff Exercise (annual exercise where CNS witnesses and assesses combat readiness of the Fleet/Fleets)
CO	Commanding Officer
COA	Chief of Acquisition
COAS	Chief of the Army Staff
COC	Centrally Organised Camps
CODE	Components and Devices
CODOG	Combined Diesel or Gas (propulsion system designed for using diesel engines for cruising at economical speed or using gas turbines for dashing at high speed)
COL	Chief of Logistics, subsequently CLS
COM	Chief of Material (Navy)
COMAN	Commodore Andaman & Nicobar
COMCEN	Communication Centre
COMCOS	Commodore Commanding Submarines
COMSUB	Commodore Submarines
CONIFPO	Controller Indian Frigate Project(in Britain) when construction started in MDL of Leander class frigates
COP	Chief of Personnel (Navy)
CORE	Combined Operational Review and Evaluation
COSC	Chief of Staff Committee
COTS	Commercial Off The Shelf (equipment built to commercial specifications as opposed to military specifications(MILSPECS) and hence less expensive and easier to procure)
COTS	Commercially off the Shelf Products
COY	Cdr of Yard
CPA	Closest Point of Approach
CPC	Central Pay Commission
CPO	Chief Petty Officer(Navy)/Central Police Organisation
CPRO	Controller of Procurement (naval logistics)
Crore	Ten million rupees (one hundred lakhs)
CRPF	Central Reserve Police Force
CSA	Chief System Administrator
CSIR	Council of Scientific and Industrial Research
CSL	Cochin Shipyard Limited (Cochin renamed as Kochi)
CTBT	Comprehensive Test Ban Treaty
CTD	Colour Tactical Display
CTS	Controller of Technical Services (naval logistics) / Cadet Training Ship
CUSAT	Cochin University of Science & Technology
CVC	Central Vigilance Commissioner
CW	Commission Worthy (sailor candidate considered worthy for becoming an officer)
CWH	Controller of Warehousing (naval logistics)
CWP & A	Controller of Warship Production & Acquisition (in Naval Headquarters)
CWPRS	Central Water and Power Research Station (Conducts model studies of harbours)

D

D & M	Divisional & Management (successor course to B & D)
D/G	Degaussing (reducing the underwater magnetic influence of a ship to avoid triggering magnetic mines)
DA	Diesel Alternator
DAS	Dockyard Apprentice School
DATE	Decision Aid for Technology Evaluation
db	decibel (a logarithmic unit of acoustic measurement)
DC	District Collector
DCC	Defence Committee of the Cabinet
DCD	Dockyard Completion Date (of a ship's refit)
DCDS	Deputy Chief of Defence Staff
DCMG	Defence Crisis Management Group
DCNS	Deputy Chief of the Naval Staff
DCPT	Director of Combat Policy and Tactics (now DSR)
DD	Destroyer
DDG	Guided-missile Destroyer
DDIMS	Director of Development and Inspection, Marine Stores
DDP&S	Department of Defence Production and Supplies
DDS	Department of Defence Services
Def Sec	Defence Secetary
DERF	Diesel Engine Repair Facilities
DF	Direction Finding
DFA	Deputy Financial Adviser
DG	Director/Directorate General
DG	Director General
DGAQA	Directorate General of Aeronautical Quality Assurance
DGCG	Director General Coast Guard
DGDPS	Director General Defence Planning Staff
DGI	Director General Inspection
DGNA	Director General Naval Academy
DGNAI	Director General Naval Armament Inspection
DGND	Director General Naval Design
DGNP	Director General Naval Project (B)-Bombay, (V)-Visakhapatnam
DGQA	Directorate General of Quality Assurance
DGS&D	Director General Supplies and Disposals (Central Govt)
DIA	Defence Intelligence Agency
DIT	Directorate of Information & Technology
Div	Diver
DLI	Deck Launched Interception (of adversary MR aircraft)
DLRL	Defence Electronics Research Laboratory
DLS	Director of Logistic Support
DM	Defence Minister (see also RM)
DME	Director of Marine Engineering
DMO	Defence Material Organisation/Director of Military Operations
DMS	Director of Management Services
DNAM	Director of Naval Air Material

DNI	Director of Naval Intelligence
DNO	Director of Naval Operations
DNOM	Director of Naval Oceanology & Metrology
DNPM	Director of Naval Provost Marshal
DOD	Department of Ocean Development
DoD	Department of Defence
DOE	Department of Electronics
DOP&T	Department of Personnel and Training
DOT	Department of Telecommunication
DP & S	Defence Production & Supplies (part of the MoD, formerly Defence Production)
DPI(N)	Director of Production and Inspection (Navy)
DPR	Detailed Project Report
DPRO	Director of Procurement (naval logistics)
DPS	Defence Planning Staff
DPSA	Deep Penetration Strike Aircraft
DPSU	Defence Public Sector Undertaking
DQA(WP)	Director of Quality Assurance (Warship Projects)
DRDC	Defence Research and Development Council
DRDL	Defence Research & Development Laboratory
DRDO	Defence Research and Development Organisation (part of the Ministry of Defence)
DSB	Defence Science Board
DSC	Defence Security Corps (Ex-servicemen re-employed for security of defence establishments)
DSMO	Director of Submarine Operations
DSR	Director of Staff Requirements (formerly DCPT)
DSRV	Deep Submergence Rescue Vessel/Vehicle (for submarine rescue and underwater search)
DSSC	Defence Services Staff College (at Wellington in the Nilgiri mountains)
DSV	Diving Support Vessel
DTG	Date Time Group(indicates the time that a signal is issued)
DTIB	Defence Technology Industrial Base
DWE	Director of Weapon Equipment
DWP	Director of Warship Projects
Dy	Deputy

E

EAP	Electrical Artificer Power/Control System/Weapon
EAR	Electrical Artificer Radio/Radar/Sonar
ECC	Emergency Committee of the Cabinet
ECCM	Electronic Counter Counter Measures (electronic warfare)
ECDIS	Electronic Chart Display Information System
ECM	Electronic Counter Measures (electronic warfare)
EDC	Estimated Date of Completion
EDP	Electronic Data Processing
EDS	Estimated Date of Supply (for stores)
EEZ	Exclusive Economic Zone
EIC	East India Company
EinC	Engineer in Chief
EKM	Project Designation of Russian design SSKs (NATO designation Kilo class submarine)
ELF	Extremely Low Radio Frequency (below 10 khz)
ELINT	Electronic Intelligence (electronic warfare)
EMI/EMC	Electro Magnetic Interference/Electro Magnetic Compatibility
ENC	Eastern Naval Command
EOD	Explosive Ordnance Disposal
ER	Extended Refit (western ships)
ERA	Engine Room Artificer
ERE	Extra Regimental Employment
ETRC	Equipment Table Revision Committee
EW	Electronic Warfare
EW	Electronic Warfare
EXOCET	French missiles

F

F-16	Multi-role fighter aircraft
FA(DS)	Financial Adviser Defence Services
FAC	Fast Attack Craft (for intercepting boats of militants and smugglers in shallow coastal waters)
FADS	Financial Adviser Defence Services
FAR	Federal Acquisition Regulations
FATS	Factory Acceptance Trials/Flight and Tactical Simulator (for Seaking helicopters)
FDI	Foreign Direct Investors
FDN	Floating Dock Naval
FF	Frigate
FFE	Free Foreign Exchange (essential for paying for import of naval equipment)
FFG	Guided-missile Frigate
FIAM	Flight in Air Material (for air dropped torpedoes)
FII	Foreign Institutional Investors
FIR	First Information Report
FLIR	Forward Looking Infra Red (sensor system that displays heat /infrared emitting objects)
FM	Finance Minister
FMCT	Fissile Materials Cut off Treaty
FMU	Fleet Maintenance Unit
FN	French Navy
FOBNA	Flag Officer Bombay Naval Area
FOC	Flag Officer Commanding
FOCEF	Flag Officer Commanding Eastern Fleet
FOCIF	Flag Officer Commanding Indian Fleet (predecessor of FOCWF and FOCEF when India had only one Fleet)
FOCINC	Flag Officer Commanding in Chief
FOCOD	Flag Officer Commanding Offshore Defence
FOCRIN	Flag Officer Commanding Royal Indian Navy
FOCWEF/FOCWF	Flag Officer Commanding Western Fleet
FODAG	Flag-officer Offshore Defence Advisory Group
FOGA	Flag Officer Goa Area
FOGNA	Flag Officer Goa Naval Area
FOL	Fuel, Oil and lubricants
FOMA	Flag Officer Maharashtra Area
FONA	Flag Officer Naval Aviation
FORTAN	Fortress Commander Andaman and Nicobar Islands (predecessor of CINCAN)
FOSM	Flag Officer Submarines
FOST	Flag Officer Sea Training
Foxtrot	NATO nomenclature of Russian submarines (Indian

class	Kalvari & Vela class)
FPB	Fast Patrol Boat
FPV	Fast Patrol Vessel (Coast Guard)
Frogmen	Underwater Commandos
FRU	Fleet Requirement Unit
FXP	Fleet Exercise Programme

G

GDP	Gross Domestic Product
GE	General Electric
GEBCO	General Bathymetric Chart of the Oceans
GED	General Engineering Department (of the erstwhile Soviet GKES that dealt with the delivery and exploitation of ships, submarines and aircraft)
Gen	General (Army)
GENMAS	Genform Management System
GFR	General Finance Regulations
GKES	State Committee for Foreign Economic Relations (the apex approving body of the erstwhile Soviet Union for meeting Indian naval requirements)
GMDSS	Global Maritime Distress Safety and Rescue Services Scheme
GNP	Gross National Product
GNS/GPS	Global Navigation System/Global Positioning System(Global satellite-based navigation position fixing system)
GOC	General Officer Commanding (Army)
GOCINC	General Officer Commanding in Chief (Army)
GOM	Group of Ministers
GOO	Group of Officers
GRSE	Garden Reach Shipbuilding and Engineering (in Calcutta)
GRT	Gross Registered Tons (ship size)
GRW	Garden Reach Workshops (in Calcutta later renamed GRSE)
GSE	Ground Support Equipment (for aircraft)
GSL	Goa Shipyard Limited (in Goa)
GSQR	General Staff Qualitative Requirement
GTD	General Technical Department (of the erstwhile Soviet GKES), dealt with shore infrastructure and interface with Soviet factories of items supplied by the GED.
GTRE	British' Gas Turbine Repair Establishment (India's Gas Turbine Overhaul Centre-GTOC is INS Eksila at Visakhapatnam).
GTs	Gas Turbines

H

H/O	Handing Over
HAL	Hindustan Aircraft Limited
HAS	Helicopter Anti Submarine
HATs	Harbour Acceptance Trials
HDL	Hooghly Docking Ltd, Calcutta
HDW	Howal Deutsch Werke (German Submarine Construction firm)
HF	High Frequency (long distance communications)
HF R/T	High Frequency Radio Telephony (voice communications between MR aircraft and MOR)
HIV	Human Immuno-deficiency Virus
HK	Seahawk(British carrier borne aircraft)
HLBH	High Level Budget Holders
HLC	High Level Committee
HMI	Himalayan Mountaineering Institute, Darjeeling
HMIS	His Majesty's Indian Ship
HMS	His/Her Majesty's Ship/Submarine(British)
HP	High Pressure
HPCL	Hindustan Petroleum Corporation Limited
HQ	Headquarters
HQ	Headquarters
HQ WNC	Headquarters Western Naval Command
HQANC	Headquarters Andaman and Nicobar Command
HRA	House Rent Allowance
HRD	Human Resources Development
HSL	Hindustan Shipyard Limited, Visakhapatnam
HUMINT	Human Intelligence (persons specifically trained for intelligence tasks)
HUMVAD	Hull Mounted and Variable Depth sonar
hz	hertz (unit of frequency)

I

I/C	In-Charge
IAC	Indigenous Aircraft Carrier
IAEA	International Atomic Energy Agency
IAF	Indian Air Force
IB	Intelligence Bureau (India's internal intelligence agency)
IB(s)	Interceptor Boats (Coast Guard)
IBL	International Boundary Line
IC	Internal Combustion
ICCP	Impressed Cathodic Current Protection (electric system activated in harbour to minimise underwater hull corrosion and prolong hull life)
ICE	Internal Combustion Engine (e.g. diesel engine)
ICG	Indian Coast Guard
ICS	Indian Civil Service (later called IAS)
IDAS	Indian Defence Accounts Service
IDEX	Indian Defence Exercise
IDSA	Institute of Defence Studies and Analysis (in Delhi)
IEDs	Improvised Explosive Devices
IFA	Integrated Financial Adviser
IFF	Identification Friend or Foe (radar-associated interrogator facility to identify friendly contacts appearing on radar. Lack of response is classified as foe)
IFR	International Fleet Review (held in Mumbai in February 2001)
IFS	Indian Foreign Service
IFTU	Intensive Flying Training Unit (evaluates naval aircraft on induction)
IGA	Inter Governmental Agreement (umbrella agreement for acquisition of Soviet/Russian military supplies)
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organisation
IHOP	Integrated Hull Outfit & Painting
IIS	Indian Institute of Science

IIT	Indian Institute of Technology
IKL	Ingeneer Kontor Lubeck (German Submarine Designing firm)
IL	Prefix for type of Russian aircraft manufactured by Ilyushin
ILMS	Integrated Logistic Management System (Navy)
IMA	Indian Military Academy
IMD	Indian Meterological Department
IMO	International Maritime Organisation
IMS	Inshore Minesweeper
IMSF	Indian Marine Special Force
IN	Indian Navy
INAS	Indian Naval Air Squadron
INBR	Indian Naval Book of References
INCB	International Narcotics Control Bureau/ Indian Naval Charge Books
INCS	Indian Naval Canteen Service
INDLT	Indian Naval Design & Liaison Team
INDQ	Indian Navy Detention Quarters
INHS	Indian Naval Hospital Ship (Asvini in Mumbai, Sanjivani in Kochi, Kalyani in Vizag, Kasturi in Shivaji, Jeevanti in Goa, Nivarini in Chilka, Dhanvantri in Port Blair, Patanjali in Karwar)
INMAC	Indian Naval Met Analysis Centre
INMARSAT	Indian Maritime Satellite
INMI	Indian Naval Manoeuvering Instructions
INS	Indian Naval Ship/Submarine
INSA	Indian Naval Sailing Association
INSMA	Indian Naval Ships Maintenance Authority
INSOT	Indian Naval Submarine Overseeing Team
INSV	Indian Naval Sailing Vessel
INTEG	Indian Navy Tactical Evaluation Group
IOC	Inter-Governmental Oceanographic Commission
IONS	Indian Ocean Naval Symposium
IORARC	Indian Ocean Rim Association for Regional Cooperation
IPADS	Integrated Pay Accounting & Disbursement System
IPC	Initial Provisioning Committee (constituted for every new type of ship/submarine/aircraft to recommend the range and scale of spares to be ordered for each fitted equipment for stocking 'On Board' and in the 'Base & Depot' stores).
IPKF	Indian Peace Keeping Force (in Sri Lanka 1987 to 1990)
IPS	Indian Police Service
IPV	Inshore Patrol Vessel (Coast Guard)
IRC	Integrated Repairs Complex
IRLS	Infra Red Line Scan (detection system fitted in aircraft)
ISBA	International Sea Bed Authority
ISC	Information Sharing Centre
ISI	Indian Standards Institution (now BIS-Bureau of Indian Standards) / Inter Services Intelligence (Pakistan)
ISRO	Indian Space Research Organisation
ISRR	Indian Search & Rescue Region
ISW	India Supply Wing (in London)
IT	Information Technology
ITI	Industrial Technical Institute
ITTE	Integrated Type Training Establishment (at Vizag in the 1960s and 1970s)
IW	Information Warfare
IWTA	Inland Water Transport Authority (East Pakistan)

J

J & K	Jammu and Kashmir
JCB	Joint Cipher Bureau
JCOs	Junior Commissioned Officers (Army counterparts of naval MCPOs and CPOs)
JCP	Joint Coastal Patrol
JCS	Joint Chiefs of Staff
JDS	Japan Defence Ship
JET	Joint Exercises at Trincomalee (in the 1950s)
JIC	Joint Intelligence Committee
JISWOG	Joint Indo Soviet Working Group on Shipbuilding (now JIRWOG)
JS	Joint Secretary
JSEPC	Joint Services Equipment Planning Committee
JSM	Joint Services Memorandum
JSQR	Joint Services Qualitative Requirement
JVP	Janata Vimuki Peramuna
JWO	Junior Warrant Officer

K

K 25	Senior Officer 25th Missile Boat Squadron
KA	Prefix for Russian helicopters manufactured by Kamov
KBPS	Kilo Bytes Per Second
Kilo Class	NATO nomenclature of Russian submarine (see EKM)
Kms	Kilometres
Knot	unit of ship speed - one nautical mile per hour
Kochi (K)	New name of Cochin
Kockums	Swedish Submarine Design and Construction firm
Kolkata	New name of Calcutta
KRC	Kargil Review Committee
KSL	Kochi Shipyard Ltd
KV	Kendriya Vidyalaya (Central School)

L

Lakh	One hundred thousand rupees
LAN	Local Area Network
LAPADS	Lightweight Airborne Passive Acoustic Detection System (inducted in SK 42 B helicopters)
LCA	Light Combat Aircraft
LCB	Least Cost Basis
LCC	Life Cycle Cost
LCU	Landing Craft Utility
LEMP	Leading Electrical Mechanic Power (Rank)
Lepus	Swedish, aircraft dropped, flare bomb to illuminate a target at night to assist air attack
LFDS	Low Frequency Dunking Sonar
LIMA	Lang International Maritime & Aerospace Exhibition
LLMC	Long Logistics Management System
LMA	Laccadive, Minicoy and Amindivi (islands now called Lakshadweep)

LME Leading Mechanical Engineering (Rank)
LMGs Light machine guns
LND Local Naval Defence
LOC Line of Control
LOFAR Low Frequency Acoustic Ranging (enables detection of submarines at long ranges)
LOGDEL Logistics Delegations
LOGREQ Logistic Requirement (signal)
LOI Letter of Intent
LOP List of Priority Orders
LPD Landing Platform Dock
LPG Liquified Petroleum Gas
LPO Local Purchase Order for critical items. (Can be raised for both foreign and local items, Soviet demand procedure for meeting operationally required spares for ships/submarines/ aircraft)
LPR Local Purchase Request
LRMP Long Range Maritime Patrol (aircraft)
LRU Line Replacement Unit (for 'repair by replacement' in aircraft and helicopters)
LS Leading Seaman(Rank)
LST Landing Ship Tank (M)-Medium, (L)-Large
Lt Lieutenant(naval rank)
Lt Cdr Lieutenant Commander(naval rank)
LTA Light Transport Aircraft
LTPP Long Term Perspective Planning
LTTE Liberation Tigers of Tamil Eelam)
LWT Local Workup Team

M

MAD Magnetic Anomaly Detector (sensor in naval aircraft/ helicopters for detecting submarines)
MADDLs Mirror Assisted Dummy Deck Landings (done by carrier borne aircraft on shore airfields prior to embarkation)
MAN Metropolitan Area Network
MARCOS Marine Commandos
Maritime Relating to navigation or commerce on and in the sea.
MARS Marine Acoustic Research Ship
MAT Manning And Training (series of committees for working out the complements of Russian origin ships and the training of their commissioning crews)
MATCH Multi-role Anti Submarine Torpedo Carrying Helicopter
MBPS Mega Bytes Per Second
MCERA Master Chief Engine Room Artificer(Rank)
MCF Marine Commando Force
MCM Mine Countermeasures
MCPO Master Chief Petty Officer (I/II — First/Second Class)
MCR Machinery Control Room (in ships)
MDL Mazagon Docks Limited (in Bombay)
MEA Ministry of External Affairs
MERs Matric Entry Recruits (Sailors), Now SSR Senior Secondary (10+2) Recruit
MES Military Engineering Services (Inter-service organisation for all defence building construction and maintenance)
Met Meteorology
MFER Ministry of Foreign Economic Relations
MGB Main Gear Box (of helicopters)
MGO Master General Ordnance
MHA Ministry of Home Affairs
MHQ Maritime Headquarters
MI Prefix for Russian helicopters manufactured by Mikoyan
MIC Military Industrial Complex
MILSPECS Specifications for Military Equipment
MIS Management Information System
Mk Mark (British codification to indicate successive improvement in equipment)
MLR Money in Lieu of Rations (for sailors)
MLU Mid Life Update
MMCB Mobile Missile Coast Battery
MO Medical Officer/Material Organisation (naval logistics)
MOC/MOR Maritime Operations Centre (formerly Maritime Operations Room)
MOD/MoD Ministry of Defence
MoF Ministry of Finance(Defence Navy)
MOST Ministry of Surface Transport
MOU Memorandum of Understanding (signed between two Governments to formalize the scope of cooperation in matters of mutual interest)
MP Manning Plan (issued by NHQ periodically indicating the number of officers and sailors that will be appointed to ships and establishments in view of manpower shortages)
MPA Maritime Patrol Aircraft
MPT Madras Port Trust (now Chennai Port Trust)
MR Medium Range (guns), Maritime Reconnaissance
MRASW Maritime Reconnaissance and Anti Submarine Warfare (naval aircraft)
MRs Medium Repairs (six-yearly refits of Russian ships and submarines)
MRSOW Maintenance Reserve and Strike-Off Wastage (for aircraft and helicopters)
MS Material Superintendent (naval logistics)/Military Secretary
MS (Act) Maritime Safety
MT Motor Transport / Mechanical Transport
MTBF Mean Time Between Failures
MTBO Mean Time Between Overhaul
MTCR Missile Technology Control Regime
MTD Motor Transport Driver
MTE Mechanical Training Establishment
MTTR Mean Time To Repair (Equipment)
MTU Machinery Trail Unit
Mumbai New name of Bombay
MV Merchant Vessel
MVC Maha Vir Chakra (gallantry award of a very high order)
MWCs Maritime Warfare Centres (formerly TACT 'B' at Mumbai, ASTT at Cochin & ASTT at Vizag)

N

NA	Naval Attaché (in embassies)/Naval Adviser (in High Commissions)
NAD	Naval Armament Depot
NAI	Naval Armament Inspection
NAIS	Naval Aircraft Inspection Service
NAQAS	Naval Aeronautical Quality Assurance Service (earlier known as NAIS)
NARO	Naval Aircraft Repair Organisation (subsequently renamed NAY)
NAS	Naval Air Station
NASDO	Naval Aircraft Servicing Development Organisation
NASO	Naval Armament Stores Officer
NATO	North Atlantic Treaty Organisation
NATS	Naval Air Technical School(subsequently renamed Naval Institute of Aeronautical Technology)
NAVAC	Project designation of the new Naval Academy at Ezhimala(Kerala)
Naval	Relating to ships or shipping
NavDet	Naval Detachment
NAY	Naval Aircraft Yard (earlier known as NARO Naval Aircraft Repair Organisation
NBC	Nuclear, Biological and Chemical (weapons)
NBCD	Nuclear, Biological and Damage Control
NCA	National Command Authority
NCC	National Cadet Corps
NCCR	National Cadet Corps Rifles
NCML	Naval Chemical and Metallurgical Laboratory
NCNC	No Cost No Commitment
NCR	Non Convertible Rupee (used for Indo Russian rupee-rouble trade)
ND	Navigation (and aircraft) Direction (specialisation)
NDA	National Defence Academy
NDC	National Defence College
NDES	Naval Dockyard Expansion Scheme
NDT	Non Destructive Testing
NDU	National Defence University
NEDCO	M/s Netherlands Engineering Consultants of Netherland
NEVESBU	Netherlands Warship Design Bureau
NGRI	National Geographical Research Institute
NGS	Naval Gunfire Support (bombardment by ships' gunfire from seaward to support army operations on land)
NHO	National/Naval Hydrographic Office
NHQ	Naval Headquarters (now known as Integrated Headquarters Ministry of Defence (Navy) IHQ MoD (Navy)
NIAT	Naval Institute of Aeronautical Technology formerly Naval Air Technical School NATS)
NIC	National Informatics Centre
NIETT	Naval Institute of Education Technology and Training
NIEWP	Naval Indigenous Electronic Warfare Programme
NIO	National Institute of Oceanography
NIOHC	North Indian Ocean Hydrographic Commission
NIOT	National Institute of Ocean Technology
NKG	Naval Kindergarten
nm	Nautical mile of 2000 yards (vis a vis terrestrial mile of 1760 yards)
NM	Nao Sena Medal (awarded for gallantry in the face of the enemy. Also awarded for sustained operational proficiency not considered as gallantry)
NMERs	Non-Matric Entry Recruits (Sailors) now Matric Entry for Cooks, Stewards & Musicians
NMI	Nehru Mountaineering Institute Uttarkashi
NMS	New Management Strategy (Navy)
NODC	National Oceanographic Data Centre
NODPAC	Naval Oceanographic Data Processing and Analysis Centre
NOIC	Naval Officer in Charge
NORA	Naval Officers Residential Area
NPOL	Naval Physical and Oceanography Laboratory
NPS	Naval Public School
NPT	Non Proliferation Treaty (as applicable to nuclear weapons and technology)
NQAS	Naval Quality Assurance Service (formerly Naval Aircraft Inspection Service NAIS)
NRIs	Non Resident Indians
NRs	Navigation Repairs (Russian ships)/Normal Refits (other ships — 3-yearly Current Repairs for Russian ships and submarines)
NSB	Naval Selection Board/Not Stocked Before (for stores)
NSC	National Security Council
NSD	Naval Store Depot
NSEC	Naval Standing Establishment Committee
NSO	Naval Stores Officer
NSQRs	Naval Staff Qualitative Requirements
NSRY	Naval Ship Repair Yard
NSTL	Naval Science and Technology Laboratory
NTG	Naval Technical Group
NVG	Night Vision Goggles

O

O i/C	Officer-in-Charge
OBM	Over Board Machinary
OCA	Operational Control Authority (Navy)
ODAG	Offshore Defence Advisory Group
ODOC	Offshore Defence Operations Centre
OEM	Original Equipment Manufacturer.
OF	Ordnance Factory
OFB	Ordnance Factory Board
OFC	Oceanographic Forecasting Cell
OHT	Overt the Horizon Targeting
OJT	On Job Training (refers to the practical 'hands-on' training by an outgoing crew to an incoming crew)
OMB	Office of the Management & Budget
ONGC	Oil and Natural Gas Commission
OOD	Officer of the Day (in ships and submarines)
OOW	Officer of the Watch (in ships and submarines)
OP/Ops	Operation
OPDEF	Operational Defect (report made by ships and submarines)
OPEC	Organisation of Petroleum Exporting Countries

OPSTATE	Operational State (report made by ships and submarines)
OPV	Offshore Patrol Vessel
ORE	Operational Role Equipment
ORI	Operational Readiness Inspection
ORR	Operational Readiness Return (for aircraft and helicopters)
ORVs	Oceanic Research Vessel
OSCC	Offshore Security Coordination Committee
OSD	Officer on Special Duty
OTA	Officers Training Academy
OTC	Officer in Tactical Command
OTH	Over The Horizon (detection, etc)
OTHT	Over The Horizon Targetting
OTIs	Operating and Tactical Instructions(Ships, submarines and aircraft)

P

PAF	Pakistan Air Force
PAMS	Personal & Administration Management System
PAWAN	The name of the Inter-Service Operation in Sri Lanka (1987–1990)
PBOR	Personnel Below Officer Rank
PC	Personal Computer
PCT	Pre Commissioning Training
PDA	Principal Defence Advisor
PDRs	Pre Determined Routes (for civil airliners)
PDS	Principal Defence Secretary
PIMS	Personnel Information Management System
PM	Prime Minister/Pradhan Mantri/After midday
PMA	Project Management Authority
PMA	Principal Military Advisor
PMB	Project Management Board
PMF	Practice Missile Firing
PMO	Prime Minister's Office
PN	Pakistan Navy
PNC	Price Negotiating Committee (for major acquisitions)
PO	Petty Officer(Rank)
POK	Pakistan Occupied Kashmir
POL	Petrol, Oil and Lubricants
PPM	Planned Preventive Maintenance
PPOC	Principal Personnel Officers Committee
PR	Photo Reconnaissance/ Public Relations.
PRWONAM	Prediction of Regional Weather Using Observational Meso-Network & Atmospheric Modelling
psi	Pounds per square inch (pressure)
PSO	Principal Staff Officer (in Service Headquarters)
PSOC	Principal Supply Officers Committee
PSU	Public Sector Undertaking (government owned undertaking)
PTA	Pilotless Target Aircraft (for anti aircraft/ missile firing practices)
PTI	Physical Training Instructor
PVC	Param Vir Chakra (gallantry award of the highest order)
PVSM	Param Vishisht Seva Medal (award for distinguished service of the highest order)
PWD	Public Works Department
PWSS	Port War Signal Station(at harbour entrance)

Q

QR	Qualitative Requirement
QRF	Quick Reaction Force (helicopter-borne commandos)

R

R & D	Research and Development
R Adm	Rear Admiral
R&AW	Research and Analysis Wing (India's external intelligence agency)
R&D	Research and Development
R/T	Radio Telephony
R/V	Rendezvous (meeting point at sea)
RADAR	Radio Detection and Ranging device (above the sea)
RAF	Royal Air Force
Rating	British naval nomenclature for a Sailor
RCC	Recompression Chamber (divers)
RCD	Regional Cooperation for Development(Pakistan, Iran, Turkey)
RCS	Radar Cross Section (a measure of radar reflectivity. The concept of "stealth" aims to design ships and aircraft to minimise radar reflectivity and hence radar detectability.)
RCTB	Radio Controlled Target Boat (for surface gunnery firings)
RDX	Research Department Explosive (of British origin)
RE	Revised Estimate
ReCAAP	Regional Agreement for Combating Piracy & Armed Robbery
Recce	Reconnaissance
Retd	Retired
RGB	Russian abbreviation for sonobuoy (Radio Gydroacoustic Buoy)
RIB	Rigid Inflatable Boat
RIMC	Rashtriya Indian Military College
RIN	Royal Indian Navy
RINEX	Russia-India Joint Naval Exercises
RINR	Royal Indian Navy Reserve
RINVR	Royal Indian Navy Volunteer Reserve
RM	Raksha Mantri
RM	Raksha Mantri (Defence Minister)
RMA	Revolution in Military Affairs
RMA	Revolution in Military Affairs
RN	Royal Navy (British)
RNA	Revolution in Naval Affairs
RNO	Resident Naval Officer
RO	Reverse Osmosis (technology/plant on board ships and submarines to convert sea/brackish water to potable water)
ROE	Rules of Engagement
RPM	Revolutions Per Minute
RQAS	Regional Quality Assurance Service (formerly Regional Aircraft Inspection Service)
RRM	Rajya Raksha Mantri (Minister of State for Defence)

RTD Repair Technical Documentation (Russian)
Rupee Indian currency
RVZ RosVorooZenia (Name of Russian Government Weapon Corporation — formerly GED and GTD)
RZ Rocket Zenithnee (anti aircraft missile as in RZ 13 and RZ 61) Russian abbreviation

S

S/M Submarine
SA Scientific Adviser (to the Defence Minister/CNS). Also Supplementary Agreement (to procure items from Russia)
SAARC South Asian Association for Regional Cooperation
SADC South African Development Community
SAFs Singapore Armed Forces
SAG Surface Action Group
SAIL Steel Authority of India Limited
SAM Surface to Air (guided) missile
SANGRAM Tactical Wargaming Software
SAREX Search and Rescue Exercise(by ships, aircraft and helicopters at sea)
SATCOM Satellite Communication
SATs Sea Acceptance Trials
SAU Search & Attack Unit (of ships for an anti submarine operation)
SBS Special Boat Section (commandos)
SCAR Scientific Committee on Antarctic Research
SCC Sea Cadet Corps
SCON DVA Standing Committee on National Defence and Veteran's Affairs
SCS Sea Control Ship
SD Special Duties (cadre of officers promoted from the senior sailor cadre)/Ships Diver
SDAV Special Duty Aviation
SDB Seaward Defence Boat
SDC Special Duty Communication
SDF Self Defence Force
SDG Submarine Design Group
SDRS Ships Defect Reporting System
Sea I Seaman First Class(Rank)
Seabird Project designation of the new naval base at Karwar (in Karnataka)
SEAL Sea, Air & Land (US Navy acronym for their Marine Commandos)
SEATO South East Asia Treaty Organisation
SEM Sea Eagle Missile (British Air to Surface anti-ship missile)
SENSO Sensor Operator (refers to sailor manning an airborne sensor)
SFC Strategic Forces Command.
SFNA School for Naval Airmen
SFR Services Futuristic Requirement
SHAR Sea Harrier
SHIKARI Shipborne Ka & I band Radar Integrated
SHIKSHA Annual War Game/Exercise carried out on shore
SHOPS Ships Operating Standards (Promulgated by NHQ, lay down department-wise standard of proficiency to be achieved annually by each type of ship and submarine)
SI Signals Intelligence
Sidewinder Nomenclature of American air-to-air missile
SIMHIKA Indigenous Airborne Sonobuoy Processing System
SITREP Situation Report (a report which summarises the present situation)
SK Abbreviation for Seaking
Skyhawk Nomenclature of American carrier borne aircraft
Skylark Project Designation for Submarine VLF Communication facility, present INS Kattabomman
SLAF Sri Lankan Armed Forces
SLMS Ship Logistics Management System
SLOC Sea Lines of Communication
SMA Ship Maintenance Authority
SME Squadron Mobile Equipment (accompanies the squadron when it moves from ship to ship or ship to shore and vice versa)
SMP Self Maintenance Period (a period, normally in harbour, when a ships company carries out maintenance without outside assistance)
SMU Ship Maintenance Unit
SNC Southern Naval Command
SNF Soviet Naval Frigates
SNOM School of Naval Oceanology & Meteorology
SNSO Senior Naval Stores Officer
SOC Senior Officers Conference in Oct/Nov annually
SOMC Stabilised Operational and Manning Cycle (for manning ships)
SONAR Sound Navigation and Ranging (underwater)
SOP Standard Operating Procedure
SPDC Spare Parts Distribution Centre
SPO Store Petty Officer(Rank)
SPR Soviet Project Report
SRD Sagar Rakshak Dal
SRV Submarine Rescue Vessel
SSB Services Selection Board
SSBN Nuclear Propelled Ballistic Missile Firing Submarine
SSE Speech Secrecy Equipment (for aircraft to ship/ C116shore high frequency radio-telephone communication)
SSG Special Services Group (commandos)
SSI Small Scale Industry
SSK Submarine Search and Kill (conventional diesel/ electric-powered, quiet, Hunter Killer submarines). Project Designation of the German HDW 1500 submarines built in India
SSM Surface to Surface (anti-ship) Missile
SSN Nuclear powered attack submarine
STE Sailors Training Establishment (INS Chilka in Orissa)
STEA Strategic and Technological Environment Assessment
STEALTH Technology of designing warships and aircraft to minimise their detection by adversary radars and infrared sensors
STI Science & Technology Initiative
STOL Short Take Off and Landing (as applicable to Sea Harrier aircraft)

STOPs	Short Term Operating Cost Plans
STORM	Severe Thunderstorm Observational & Regional Modelling
STOVL	Short Take Off and Vertical Landing (as applicable to Sea Harrier aircraft)
STS	Sail Training Ship
Sub Lt	Sub Lieutenant (naval rank)
Surg	Surgeon
surgeon	Shipwright Artificer(Rank)

T

TA	Territorial Army
TACOM	Tactical Committee
Tadpole	Indigenous Sonobuoy developed with the airborne Simhika system
TAS	Torpedo Anti Submarine (officer specialisation)/ Towed Array Sonar
TBR	Torpedo Body Room
TCC	Technical Co-ordination Committee
TCM	Torpedo Countermeasures
TEC	Technical Evaluation Committee (precedes Price Negotiation Committee, PNC)
TECHINT	Technical Intelligence (Systems and Equipment specifically designed for intelligence tasks)
TF	Task Force
TG	Task Group
TIFR	Tata Institute of Fundamental Research (Bombay)
TLBH	Top Level Budget Holders
TLM	Tube Launched Missiles
TN	Tamil Nadu
TOT	Transfer of Technology/Time on Task
TOTED	Towed Torpedo Decoy
TPW	Torpedo Preparation Workshop
TRV	Torpedo Recovery Vessel
TTB	Target Triggered Burst (of proximity fuzed shells and missiles against incoming aircraft/missiles
TU	Prefix for Russian aircraft manufactured by Tupolev
TW	Territorial Waters (also Trade Warfare)
TWA	Towed Wire Array

U

UAE	United Arab Emirates
UAV	Unarmed Aerial Vehicle (for reconnaissance/ surveillance over land and sea)
UE	Unit Establishment (number of aircraft earmarked for flying tasks from the total holding of the air squadron)
UHF	Ultra High Radio Frequency (for short distance communications, 300,000 to 3,000,000 khz)
UK	United Kingdom (Britain)
UN	United Nations
UNCLOS	United Nations Conference on the Law of the Sea
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific & Cultural Organisation
UNICEF	United Nations International Children's Emergency Fund
UNIDO	United Nations Industrial Development Organisation
UNITAF	Unified Task Force
UOTC	University Officers Corps
UPSC	Union Public Service Commission (conducts tests for persons aspiring the join the Armed Forces)
US/USA	United States/United States of America
USI	United Services Institution
USS	United States Ship
USSR	Union of Soviet Socialist Republic (Soviet Union till 1991, thereafter Russia)
UTC	University Training Corps
UW	Under Water

V

V Adm	Vice Admiral (Rank)
V/S	Visual Signaling
VA	Vulnerable Area (classification for purposes of Air Defence)
VAT	Versatile Acoustic Target (for airborne sonobuoys, helicopter-borne sonars and homing torpedo trials/ exercises)
VATMS	Vessel & Air Traffic Management System
VCAS	Vice Chief of the Air Staff
VCDS	Vice Chief of Defence Staff
VCJS	Vice Chief of Joint Staff
VCNS	Vice Chief of the Naval Staff
VCOAS	Vice Chief of the Army Staff
VDS	Variable Depth Sonar(enables the sonar of a fast moving ship to be lowered on a cable, deep into the sea to detect submarines)
VHF	Very High Radio Frequency 30,000 to 300,000 khz)
VIP	Very Important Person
Vizag (V)	Vizagapatam /Visakhapatnam
VLCC	Very Large Crude-oil Carrier
VLF	Very Low Frequency (for communication with submerged submarines, 10 to 30 khz)
VMT	Very Many Thanks (naval abbreviation used for saying 'thank you')
VoA	Voice of America
VP	Vulnerable Point (classification for purposes of Air Defence)
VrC	Vir Chakra (award for gallantry of a high order)
VSAT	Very Small Aperture Terminal
VSM	Vishisht Seva Medal (award for distinguished service)
VSNL	Videsh Sanchar Nigam Limited
VSSC	Vikram Sarabhai Space Centre
VT	Variable Time (as applicable to radio proximity fuzes fitted on gun-fired anti-aircraft ammunition)
VTOL	Vertical Take Off and Landing (as applicable to Sea Harrier aircraft)
VVIP	Very Very Important Person

W

W/T	Wireless Telegraphy
WAN	Wide Area Network
WATT	Warship Acceptance Trials Team
WAU	Weapon Analysis Unit
WB	West Bengal

WECORS	Weapon Control and Repair Shop (Bombay)
WED	Weapon Equipment Depot
WEPPS	Web Enabled Production & Planning
WEQC	Web Enabled Quality Control
WESEE	Weapon & Electronic Systems Engineering Establishment (successor of WESO)
WESO	Weapons & Electronic System Organisation
WEWI	Web Enabled Work Instructions
WMD	Weapons of Mass Destruction(namely, Biological and Chemical weapons)
WMO	World Meteorology Organisation
WNC	Western Naval Command
WOT	Warship Overseeing Team
WOTS	Women Officers Training School
WOTS	Women Officers Training School
WPS	Warship Production Superintendent
WRINS	Women's Royal Indian Naval Service
WSAG	Washington Special Action Group (1971 India–Pakistan War)
WW I	1914–1918 World War (also known as First World War)
WW II	1939–1945 World War (also known as Second World War)
WWO	Warship Workup Organisation
WWR	War Wastage Reserves

X

X Craft	Midget submarines for penetrating harbours
XFAC	Extra Fast Attack Craft
XO	Executive Officer (2nd in command of a ship/naval establishment. Also officer of the Executive Branch)

Y

YARD	Yarrow Admiralty Research & Development
YSM	Yudh Seva Medal

SECTION I

Emergence of a New World Order

The Context of Naval Growth 1991–2000

Preamble

A nation that forgets its past has no future — Winston Churchill

The period 1991 to 2000 was the most challenging and demanding decade in the Navy's growth after its independence. It was also one of the most significant and successful decades since the Indian Navy came to be trusted and accepted as the major guardian of the sea-lanes in the Northern Indian Ocean. Two significant and very major influences shaped the growth of the Indian Navy during this period:-

- **India's Financial Situation**

A severe resource crunch ensued the calamitous national drought of 1987. The Gulf War of 1990 due to Iraq's invasion of Kuwait led to an increase in oil prices that aggravated the Indian balance of payments situation. Foreign exchange reserves decreased so sharply that they were barely adequate to finance more than a few weeks of imports. To avoid defaulting on repayment commitments, India had to airlift several hundred tons of gold abroad to secure loans to bridge the crisis. Inevitably, defence projects had to be curtailed. As a consequence, in June 1990, the Government constituted the Committee on Defence Expenditure.

From 1991 onwards, India's Narasimha Rao administration, with Dr. Manmohan Singh as Finance Minister took a series of measures to restore financial stability and to accelerate economic liberalization, which laid the base for rapid economic growth. The period from 1993–2000 saw India definitively break away from the derisive "Hindu rate of growth" to a high growth economic path.

- **Global Geo-Economics and Geopolitics**

In 1991, the collapse of the Soviet Union ended the Cold War that had started in 1946 between the rival ideologies of capitalism and communism. As did other countries, India re-appraised its role and national interests in the New World Order in which USA had emerged as the sole global superpower, post the collapse of the Soviet Union and the end of the Cold War.

For USA, the breakup of the Soviet Union and the emergence of India and China as potentially major global economies led to a significant re-alignment in its geopolitical relationships.

Starting in the mid-1980s, the US had been enthused by the economic liberalisation programme initiated by the Rajiv Gandhi administration. American private sector enterprises foresaw enormous potential for profit from sales to India's growing middle class, leading to several American Government and Commercial delegations visiting India, from 1985 onwards. These accelerated after the 1991 economic reforms. Major US Foreign Direct Investors (FDI) and Foreign Institutional Investors (FII) returned to India. This led to a blossoming pro-India economic sentiment, which in turn predisposed political and strategic thought in successive American administrations.

As the decade progressed, the US strategic fraternity: -

- Ceased to focus on the Soviet Union and the Warsaw Pact states as their foreseeable global antagonists.
- Identified Communist China as the only foreseeable challenger to American global interests.
- Began to believe that India had the potential to be a 'counterpoise' to China.

The Strategic Importance of India's Location

A consideration of India's geographical position would indicate clearly its strategic importance:-

From landward, the country shares its land border of 15,851 kms with seven neighbours — Afghanistan, Bangladesh, Bhutan, China, Myanmar, Nepal and Pakistan. From seaward, the peninsula of the Indian sub-continent has a coastline of 5422 kms touching 12 states and Union Territories. India also has a total of 1197 islands accounting for 2094 kms of additional coastline. India has an Exclusive Economic Zone of 2.2 million square kms.

The Andaman and Nicobar Islands in the east are 1300 kms from the mainland and lie adjacent to Southeast

Asian neighbours. The southernmost island of Great Nicobar is 170 kms from the northernmost Indonesian port of Aceh. The northernmost island of the Andaman chain is 16 kms from Myanmar's Great Coco Island. Additionally, the country shares maritime boundaries with five neighbours — Indonesia, Maldives, Myanmar, Sri Lanka and Thailand, none of whom share such boundaries between themselves.

With such a strategic location in the Indian Ocean (bordering seven states and straddling important sea-lanes) juxtaposed with the new geopolitical world order, it is not surprising that the Indian Navy has taken on itself a more proactive role in the region.

International Perception of India's role in safeguarding Indian Ocean SLOCs

International opinion about India's maritime role was wide-ranging and diverse. Nations seemed to slot India in a position depending on how they perceived the implications of its role on their larger interests in the region. To illustrate the larger point of how nations judge others based on a consideration of self-interest, it is useful to consider the examples of US, China and Japan.

USA. The US did not seem to take much notice of the Indian Navy until it realised it could really play a stabilising role in the region. The performance of the Indian Armed Forces and particularly the Navy in the Maldives in 1988 and in Somalia from 1992 to 1994 was the spur that was needed. It provided the necessary confidence for the US Department of Defence to fall into step with the US State Department, who wished to engage India as a counterpoint to China. This new perception of India was well reflected in the words of Henry Kissinger:

> "India is a self-contained regional power, not intent on throwing its weight around the neighbourhood. This view is not necessarily shared by its neighbours, and while India can hardly boast of excellent relations with its neighbours — Pakistan is an immediate case to the point — it has not projected power beyond its borders unless invited to do so (as it did in Bangladesh, Sri Lanka and the Maldives), and it has never rattled its sabre to threaten or intimidate its backyard."

US think tanks came to four broad conclusions during this decade:

- Firstly, that India will emerge as America's most important economic and geopolitical partner in Asia along with Japan. China will be a full-fledged superpower rival to the US within 10 years, whereas India will be seen as a reliable partner and counterweight to China.
- Secondly, the Middle East will remain central to American global interests with four focal points: Iraq, Iran, Palestine and the democratisation of large parts of West Asia.
- Thirdly, the war on terror will continue to be centred around Al Qaeda. With the Lashkar-e-Toiba confirmed as a part of Al Qaeda, Pakistan's room for manoeuvre is severely curtailed. The US needs Pakistan to control the situation in Afghanistan and Waziristan in its search for Osama bin Laden. It will not therefore push Pakistan beyond a point on stopping terrorism in the Kashmir Valley and other targets in urban India. In the long term, the US will be forced to get tougher with Pakistan on its propensity to foster terrorism.
- Last, but never the least, was the American continued preoccupation with oil. Concerned about the need to ensure uninterrupted flow of oil supplies from the Persian Gulf to the developed world, the US concluded that in the entire region between Africa and Japan, India was the only viable nation state with a navy that could help safeguard sea lines of communication. The Clinton administration revised earlier assessments of India's close relationship with the Soviet Union during the Cold War. They realised that despite Soviet assistance and support during the Cold war, India had not become a communist protégé inimical to US interests and could therefore assume a vital stabilising role in the Indian Ocean in partnership with the USA.

The Confidence Building Measures that had been initiated in 1992 led to the Malabar series of Naval exercises (interrupted only briefly by the nuclear tests that India carried out in May 1998). There was gradually an increased recognition and understanding of each other's crucial interests and strategic positions. By 2000, the US Administration had come to terms with what India considered were her vital security interests. The two sides established a bilateral Asian Security Dialogue, a Joint Working-group on Counter-terrorism, a Joint Working Group on UN Peacekeeping Operations.

It is now apparent that the US is anxious to build up India as a hedge against China in Asia. It perceives India as a potential bulwark against both Islamic extremism and Chinese militarism. For this it is willing to engage with the Indian Navy. India, on its part, seems to welcome the engagement but will be anxious not to get sucked into any potential or emerging Sino–American conflict.

China. In light of the fact that the two nations have a close geographical proximity, profoundly dissimilar politico–cultural mores and markedly similar regional aspirations, India and China have traditionally perceived each other in adversarial terms. That has however, not subsumed the atmosphere of mutual respect and despite differences a 'cautious' equilibrium has come to prevail. The 90s epitomised the tenuous calm that existed between the two navies.

The Chinese ascent had begun and they see themselves as worthy future challengers to the US. By natural consequence, they were getting assertive in pressing their economic claims in the South China Sea and pursuing interests in Asia, Africa and Latin America. But they seem to realise that for them to realise their ambitions, they had to contend with a resurgent India.

Japan. India and Japan share a long history of friendship. Since 1986, Japan has been India's biggest donor. It sees India as a power whose cooperation and support is vital to its essential needs.

The relationship is symbiotic and mutually beneficial. 80% of all Japanese oil comes from the Middle East. Even after the oil pipeline from Eastern Siberia is fully developed, Japan will remain dependent on Middle East oil for 60% of its requirements. Japan's oil tankers have to transit through the Strait of Hormuz, the Arabian Sea, the Indian Ocean, the Strait of Malacca, the South China Sea, the Bashi Channel and the East China Sea to deliver vital oil supplies to Japanese ports. Japan is particularly watchful about the safe passage of its oil supplies through these choke points. India's cooperation to ensure the safe passage of oil tankers and energy suppliers in the Indian Ocean is considered crucial to the safety of traffic.

In the light of India's emerging economic status in the 90s, Japan perceived it as a friend with whom it could cooperate as a global partner. The conclusion of a "Global Partnership" in 2000, only cemented the ties further.

Imperatives for the Indian Navy

The Indian Navy desired good and friendly relations with all its neighbours and demonstrated as much in its interactions with other navies. But it needed to engage in a manner that was compatible with the pursuance of its essential economic and security imperatives.

Protection of India's Economic and Scientific Interests

With an extensive coastline and numerous Island territories, India is endowed with an EEZ of 2.02 million sq kms. The responsibility for its protection lies with the maritime forces of the country, of which the Navy is the most prominent part. Even outside the EEZ, India has an interest in deep seabed mining based on our long-term requirements for manganese, nickel, cobalt and copper. These minerals, particularly manganese, are found in rich abundance in mineral nodules in the middle of the Indian Ocean.[1]

Similarly, scientific expeditions to Antarctica, though outside India's EEZ had significant value in terms of scientific research.[2] Supporting and protecting these explorations and expeditions was also the task of the Indian Navy.

Preserving India's Energy Security

India has a vital interest in the security and stability of the SLOCs in the Indian Ocean since its energy security is closely linked to maritime security. In addition to security concerns for its oil imports and the safety of offshore facilities at Bombay High, the threats of terrorism and piracy and possible hostilities from neighbouring countries had been distressing security agencies in the country.

To safeguard energy availability and affordability, to safeguard the exploration and exploitation of resources in her EEZ, as also her maritime assets and offshore infrastructure, it is critical for the Navy to make focussed investments in maritime assets that would ensure reach and endurance.

Introspection on Relationships in the New World Order

Assessments concerning economics and security had impelled India to introspect on its relationship with its neighbours and the world's major powers, giving primacy to geo-economic relations. This led to the initiation of the "Look East Policy" with countries in the northern Indian Ocean Region (IOR).

To dispel the deliberate disinformation that the Indian Navy was expanding out of proportion to its requirements, it was decided to let other navies interact with our Navy during exercises at sea as a way of confidence building. This was also to exhibit that with the resources available, the Indian Navy has become self reliant and has kept its few vessels equipped with the latest equipment.

1. Refer to Reference Note titled "Indian Ocean Deep Seabed Mining".
2. Refer chapter titled "Navy's Participation in Expeditions to Antarctica".

1

Sea Lines of Communication & Choke Points in the Indian Ocean

Introduction

Sea Lines of Communications (SLOCs) in the Indian Ocean, came into prominence in the 90s when forces of globalisation sparked a process of huge economic growth that resulted in increased consumption and competitive trade, creating an upsurge in oil demand in both developed nations and developing economies.

Covering an area of 73,556,000 sq kms, the Indian Ocean consisted of some of the most critical sea lanes and choke points that connected the oil rich Middle East, East Asia and Africa with Europe and on which most oil and goods trade came to depend. The ocean became the highway of international trade. It inevitably led to a rivalry between countries for dominance of key trade routes and choke points.

The Indian Ocean

Security of the SLOCs

The ocean's vast spread hosted heavy international maritime traffic that included half of the world's container cargo, one third of its bulk cargo and two third of its oil shipment. Its waters carried heavy traffic of petroleum and petroleum products from the oilfields of the Persian Gulf and Indonesia and contained an estimated one third of the world's offshore oil production. The SLOCs connected major ports through some strategically significant seas and gulfs — the Persian Gulf; the Red Sea; the Laccadive Sea, between Kerala and the Lakshadweep in the Arabian Sea; the Andaman Sea in the Bay of Bengal, between the Andaman Islands and Burma; the Gulf of Aden at the entrance to the Red Sea and Gulf of Oman at the entrance to the Persian Gulf. In about ten years, between 1985 and 1995, the region saw a jump in cargo and oil traffic by nearly 30%. It was the first sign of the area's growing prominence.

The Navy realised soon enough that to cater to the changed realities, its maritime vision needed to cover the critical areas in the Indian Ocean where our vital national security interests lay. It therefore redrew its area of interests to include the Persian Gulf and the Malacca Strait.

In addition, another phenomenon had a part to play in the Navy's reworking its priorities — 'power projection'. Traditionally, Navies have followed a doctrine of littoral power projection along with the 'sea control' that principally manifested itself in amphibious landings and carrier air power. This changed during the Cold War, when a confrontation between the Soviet and Western navies on the high seas created a 'blue water' emphasis to naval doctrines. The end of the Cold War era, however, saw a return to a littoral priority. The new doctrine proposed a model of 'power projection' in the littorals that meant the deployment of standoff military capabilities to deliver significant force either to deter or coerce. Power projection thus, became the centrepiece of the world's advanced navies. It became critical for the Indian Navy, to take measures to maintain presence, especially in and around critical SLOCs.

Safeguarding the SLOCs

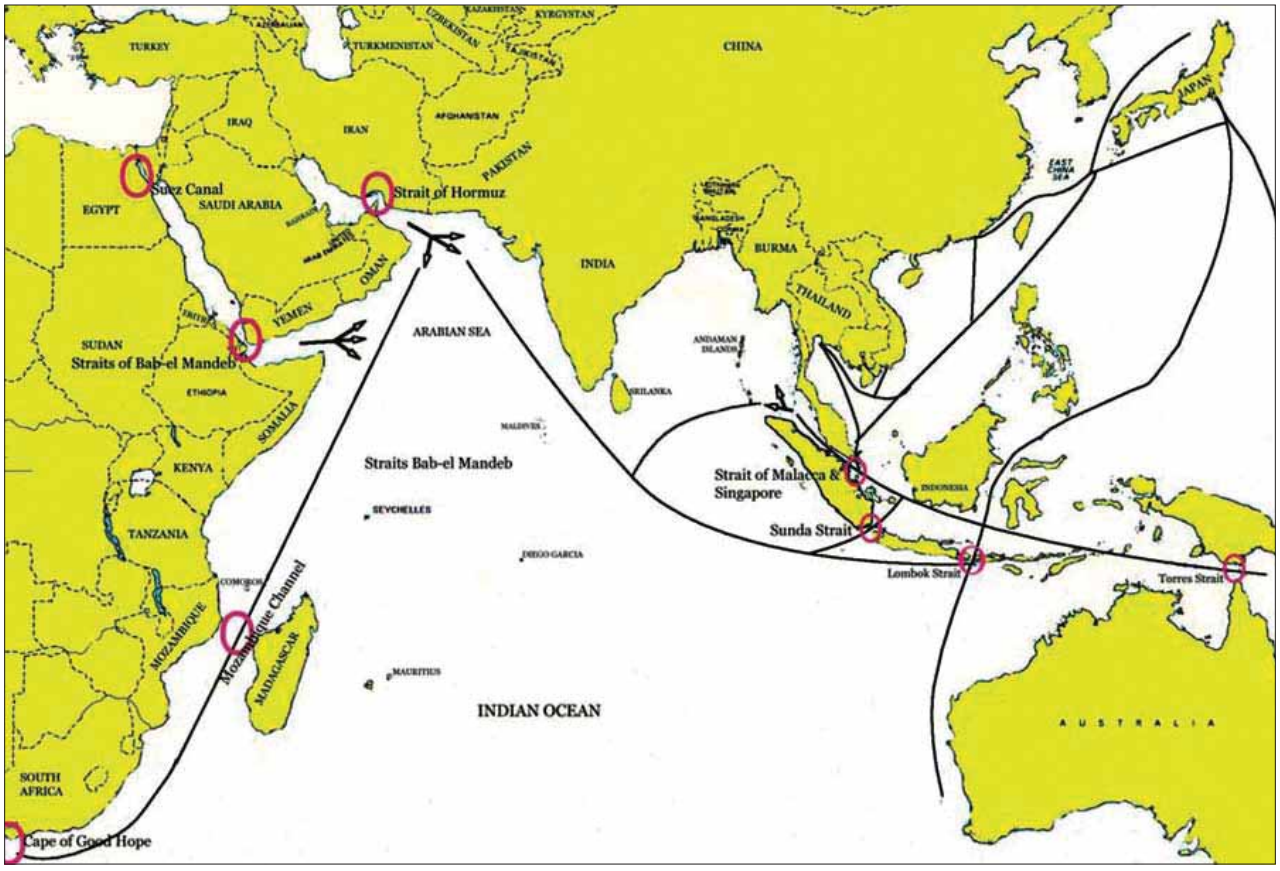
Indian Ocean Sea Lines of Communications (SLOCs)

To appreciate the scale of the Navy's concerns about safeguarding the SLOCs, it is instructive to consider the sheer expanse and stretch of the area that major Sea Lines of Communications (SLOCs) in the Indian Ocean covered.

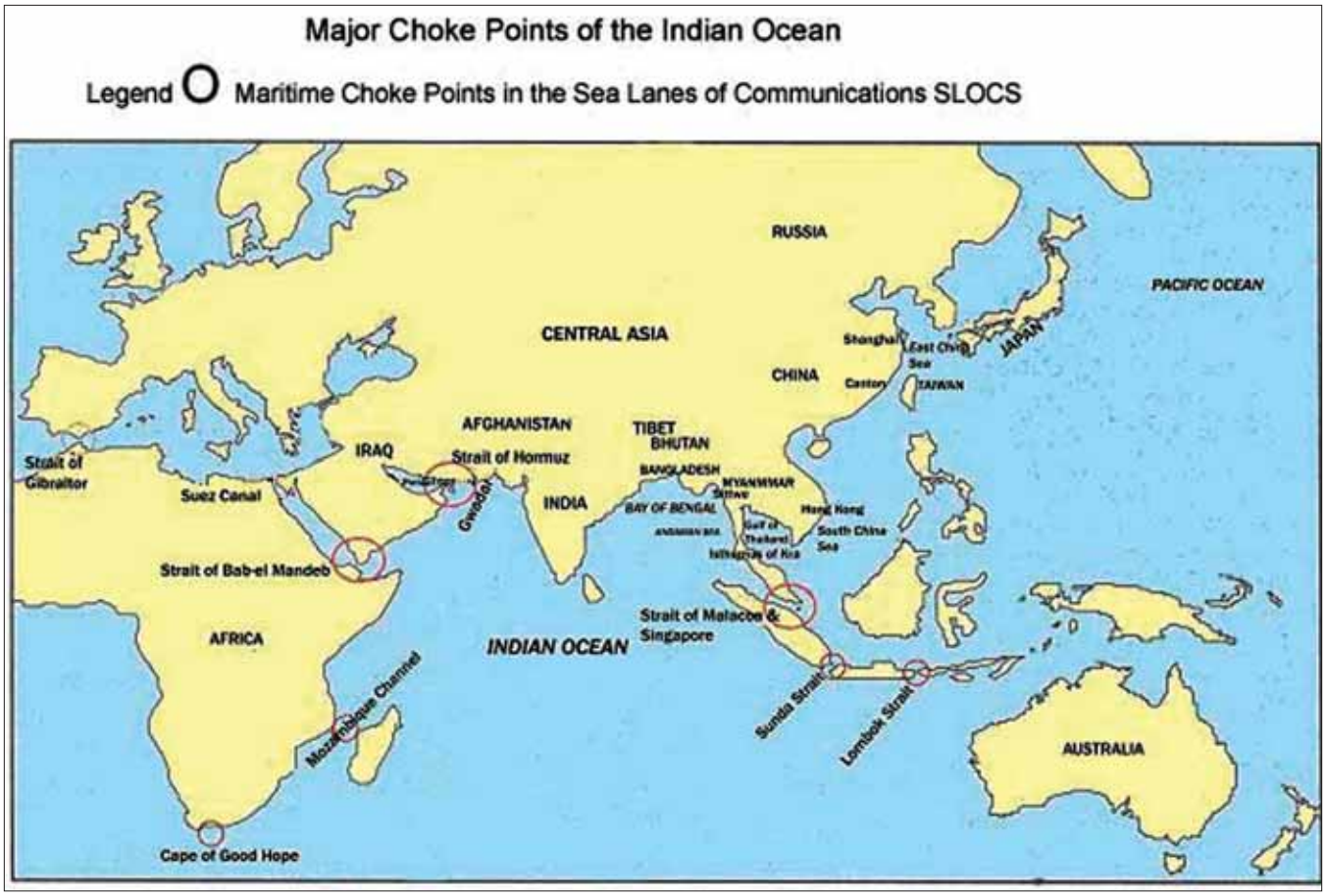
Major Choke Points of the Indian Ocean

Major choke points in the Indian Ocean that conceivably required greater security included:-

- The Strait of Hormuz between the Persian Gulf and the Gulf of Oman.
- Bab-el-Mandeb at the southern access to the Red Sea and the Suez Canal.
- The Mozambique Channel between Madagascar and the coast of Africa.
- The Strait of Malacca between Sumatra and Malaysia.
- The Sunda Strait between the Indian Ocean and Borneo.
- The Lombok Strait between the Indian Ocean and the Sulawesi.



Indian Ocean Sea Lines of Communications (SLOCs)



The Emergence of New Threats

With 'presence', 'patrolling' and 'projection', many regional and sub-regional powers thought they had got the power equation right. But, evidently their plans hadn't catered for the twin scourges of piracy and terrorism. The increased maritime activity of the post-globalisation era undoubtedly resulted in economic expansion and development. However, despite 'maritime bonding', this phenomenon strangely, precluded the emergence of a vibrant trans-oceanic community, possibly because wide dissimilarities and divergent interests in regional countries led them to shun each other, but prompted each to pursue economic linkages with Europe and North America. As a result, trade in the SLOCs grew exponentially in value and importance. The high value cargo transiting through its waters was only an invitation for the twin threats of 'Piracy' and 'Terrorism' to raise their ugly heads.

Piracy. One of the biggest threats to shipping that emerged in the late 80s was that of Piracy. According to the International Maritime Organisation (IMO) 'piracy', since the early 90s, posed a threat to shipping of the same scale as it did in medieval ages. 2680 incidents recorded since 1984 (roughly one every third day over the last twenty years), occurred mostly in territorial waters while ships were at anchor or berthed. A steady increase was witnessed in the 90s decade and as statistics show, there was a marked increase in incidents involving firearms.

Incidents	In 1991	In 2001
Number of Incidents	107	338
Unarmed Incidents	89	3
Gun-armed Incidents	1	73
Incidents when berthed in port	no data	47
Incidents when at anchor	no data	156
Incidents when steaming	no data	130

Soon, it was clear that any disruption in traffic flow through 'choke' points in the Indian Ocean (such as the Straits of Hormuz, Malacca, Lombok and Sunda) could have disastrous consequences. The disruption of energy flows in particular was a considerable security concern for littoral states, as a majority of their energy lifelines are sea-based. Since energy is critical in influencing the geo-political strategies of a nation, any turbulence in its supply

would have led to serious security consequences. Given the spiralling demand for energy, it became inevitable for countries to sensitise themselves to the security of the sea lines of communications (SLOCs) and choke points of the region.

Terrorism. Sea Terrorism, in the late 80s was a novel concept, rather too perverse for rational comprehension by national maritime forces that had a linear mind-set. The enormity of the threat that it posed became clear in the 90s, as there was a sudden rush in the number of sea attacks. In 2000, the attack on the American Naval Warship, USS Cole at Aden stunned the world. It was a grim portent of what was to follow in the 9/11 attacks on the USA. Navies reacted by factoring in 'Terrorism' in their plans of operations. But it wasn't an easy exercise as 'asymmetric warfare' was going to take much more time, experience and large-scale coordination to tackle effectively.

The increasingly violent nature of incidents, as illustrated below, demonstrated the need for greater co-operation on a multilateral basis to counter these threats.

The Spectrum of Incidents

1985 On the 7th of October, four men representing the Palestine Liberation Front took control of the Italian passenger liner Achille Lauro off Egypt. Holding the passengers and crew hostage, they demanded the release of fifty Palestinians in Israeli prisons.

1998 On the 16th of April, the Malaysian tanker Petro Ranger sailed from Singapore bound for Ho Chi Minh City with a cargo of $1.5 million worth of diesel fuel and kerosene. The next day, the agents reported the vessel missing. It transpired that Indonesian hijackers in the South China Sea had seized the vessel. The hijackers held the ship's Australian captain at gunpoint for 10 days whilst they transferred more than a third of the cargo to a Chinese-registered vessel. The Chinese Maritime Police intercepted the vessel on 26th April. The hijackers were executed.

1999 MV Alondra Rainbow was hijacked in October 1999 by masked pirates armed with guns and swords. The hijackers were later found to be Indonesian personnel. The ship was rescued by the Indian Navy.

2000 On the 12th of October, the United States Navy Warship, the USS Cole, berthed alongside in Aden was rammed by a terrorist rubber dinghy full of explosives. The attack left seventeen sailors dead and thirty nine injured.

In response to such incidents, the US 5th Fleet was established in 1995, at Bahrain and Kuwait to cover the Indian Ocean, the Persian Gulf, the Arabian Sea and the Red Sea, to monitor the sea lines of communication throughout the region.

In the same year, India and the US signed the "Agreed Minutes on Defence Relations between the US and India" which stated that both sides recognized the importance of enhancing defence cooperation, that the growth of bilateral relations in new areas would be evolutionary and related to convergence on global and regional issues and that enhanced defence cooperation was designed to make a positive contribution to the security and stability of Asia.

The US Defence Secretary visited India that year. Praising the Indian Navy's contribution in securing SLOCs, in his address to the National Defence College, he also emphasised his nation's shared interest with India in the security and stability of the Persian Gulf region. He reiterated the very strategic basis of the relationship that was based on ensuring the freedom of the seas. It was a fitting testimonial to the Indian Navy's approach of securing the SLOCs in the 90s — through cooperation, collaboration and coordination.

In Retrospect

The Indian Navy, in this decade, realised the increasing significance of safeguarding the SLOCs and made efforts in that direction. By doing so, it sought to further the national strategic interests (of supporting free trade in a growing market economy) and also helped guarantee similar benefits for its littoral neighbours.

Significantly, the Indian Navy, for the first time began to show signs of increased cooperation with western navies. India and the United States conducted two major, joint naval exercises in the 1990s and a third one in 1996. These were the first significant joint naval exercises that India has ever engaged in with a major navy, and helped open the door for similar exercises with other countries. Soon exercises were undertaken with France. By early 2002, it had expanded to include the British and the Singapore Navies.

The initiative taken in the 90s of cooperation and collaboration not only helped deal effectively with the threats of piracy and terrorism but also aided in the evolution of perspectives that take into account differing perceptions, sensitivities and national interests of the concerned states.

2

Major Navies in the Indian Ocean

Introduction

To understand the role of the Navy in the 90s it may be important to review the circumstances in which the Navy was required to operate in that time — especially with regard to the increased presence of other navies in the region.

By the early 90s, the Indian Ocean had a marked central presence in the affairs of the world, not just from an economic but also a military point of view. Not surprisingly, the region abounded with the presence of many navies. The Indian Navy was a significant force in the Ocean with an expanded sphere of operations. The US, with a base at Diego Garcia and owing to its naval operations in East Asia was also a dominant player. Britain (that formed the British Indian Ocean Territory, way back in the 60s) had since reduced its presence. The French possessed vital territory in the form of some critically positioned islands. The Chinese, the Japanese and other regional navies were also beginning to realise the ocean's strategic significance and show interest in the region.

The Unfolding of Events (1945–80)

The phenomenal rise in interest in the Indian Ocean had its roots in history. The question of its dominance, really, harks back to 1945 when, at the end of the Second World War, a cold war erupted between two powerful countries — USA and USSR. This confrontation, which was primarily a conflict of competing interests and overlapping ambitions, ended with the dissolution of the latter and Russia emerging as the largest (but militarily weakened) constituent of a new confederation.

Throughout the Cold War, the over-riding goal of US policy in the Indian Ocean was to safeguard the supply of Persian Gulf oil to the US and its allies. This was to be achieved by strengthening the Persian Gulf monarchies and sheikhdoms and by positioning forces to deter and counter any Soviet threat from landward to seize the oilfields.

From the 1960s onwards, Britain and the US ensured that as the British Navy withdrew from the Indian Ocean, the American Navy took its place. In the middle of the Indian Ocean, Britain carved out a British Indian Ocean Territory from the Chagos Archipelago to enable Diego Garcia to be leased to the US Navy. The pro-US monarchies in Saudi Arabia and Iran were encouraged to build up their navies.

During the 1970s, the US and Soviet Navies manoeuvred for base and refuelling facilities in the northwest quadrant of the Indian Ocean — Berbera in Somalia on the Horn of Africa, Asmara in Ethiopia in the Red Sea, the island of Socotra off South Yemen, Muscat in Oman, and the island of Masirah off Oman. The US started building up Diego Garcia into a naval base. Neither Navy sought facilities from India. Warships of both navies enjoyed goodwill visits to Indian ports.

By the end 1970s, domestic opposition to the US supported Shah of Iran increased to an extent that a revolution was foreseeable. Nearby in Afghanistan, a pro-communist coup was initially successful but soon encountered opposition. Afghan leaders repeatedly sought urgent Soviet military assistance to suppress the opposition.

In anticipation of a Soviet threat to Western oil supplies from landward, the US had started pre-positioning the wherewithal, on board ships, for military intervention in the Persian Gulf from seaward.

Two separate crises coincided in end 1979. The Shah of Iran was overthrown in a coup. Soviet troops entered Afghanistan to assist the protégé government. Despite Soviet assurances that they had no intent to threaten Persian Gulf oil, the US felt it prudent to deploy, on a regular basis, ships from its 7th (Pacific) Fleet to the North Arabian Sea. A new US Central Command, headquartered in the US, was created for this theatre of operations. Whilst events in Afghanistan were still unfolding, the Iran–Iraq War (1980-1988) erupted. Western navies had to be deployed to escort tanker convoys into and out of the Persian Gulf.

Significantly, this was also a time when relations between India and America showed signs of thawing

following a visit by Prime Minister Mr. Rajiv Gandhi to the US in 1985. A rapport developed between him and President Reagan and Indo–US relations brightened. Successive US Defence Secretaries and US Chiefs of Naval Operations visited India. An Indian Naval Delegation visited the US Navy which was followed by ships visiting each other's ports.

Developments in the 90s

In 1990, Iraq invaded Kuwait. In the subsequent operations to evict Iraq, US warships bombarded Iraq from within the Persian Gulf. With bases in nearby Oman and Qatar and an overwhelming presence in the Persian Gulf, the US Navy had established itself in the Indian Ocean. The dissolution of the Soviet Union in 1991 and the subsequent withdrawal of its Navy from the Indian Ocean further helped its cause.

In the years that followed, turbulence in Afghanistan, a rise in terrorist activities and the lessons that the US learnt in the war against Iraq forced it to review its strategy for the Indian Ocean, but that was in no way an indication of a reduction in presence. To the contrary, it only served to strengthen US resolve to maintain presence in the region.

In the northern Indian Ocean, India began to be seen as the pivotal regional power and her Navy as the pre-eminent regional Navy. Within the Indian establishment, there was a desire to engage with the US Navy that saw some high-level meetings on Confidence Building Measures and culminated with the introduction of the Malabar series of bilateral naval exercises. The exercises, which commenced in 1992, were held again in 1994 and 1995.

In 1995, the US established its Fifth (Indian Ocean) Fleet, headquartered in Bahrain, to conduct operations in the Red Sea, the Arabian Sea, the Persian Gulf and the adjacent land areas. By 2000, the American Navy was the predominant Navy in the Indian Ocean.

In Perspective

By 1995, there were a host of navies trying to exert influence in the Indian Ocean region. Apart from the Americans there were the French, who had the next most significant presence, the British (who though, a considerably reduced lot, retained relevance), the Chinese and the Japanese, who too had begun to show some interest, primarily to protect their own maritime interests.

Most of these forces displayed a long-term perspective about their operations in the region with a consistent and compelling rationale for maintaining presence.

American Naval Presence in the Indian Ocean

The American presence in the Indian Ocean had Diego Garcia[1] at the core of its larger strategy. There were three major considerations for the US presence in the Indian Ocean.

- First and foremost was the American desire to maintain a geo-strategic presence. It was a strategy based on long term considerations and not aimed at immediate objectives or securing access to oil (as was generally believed to be the case).[2]
- The second reason was to protect its vital interests in the region. Having made heavy investments over decades to safeguard their key interests in the Indian Ocean, the US positioned its forces in a manner to maintain and reinforce presence in the Persian Gulf. The US Fifth Fleet clearly intended to remain in the area with a huge intervention capability pre-positioned in Diego Garcia.
- The third reason was conceivably to do with the new threat of terrorism that the Americans faced in the 90s. By maintaining presence, they aimed to root out non-state terrorist outfits and strangulate their access to funds and arms.

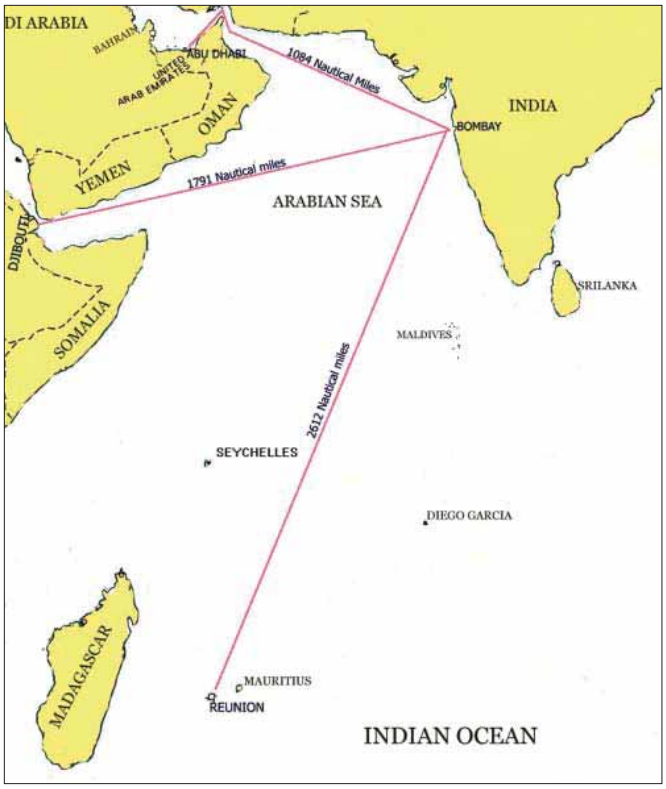
French Naval Presence in the Indian Ocean

France saw its perceived commitment to its 'Overseas Territories' in the Indian Ocean — Djibouti and the Island of La Reunion as overriding and catered for the defence of her island territories and erstwhile French colonies (which also had a considerable majority of French speaking people) in the Indian Ocean, by maintaining a substantial naval presence.

A very substantial proportion of France's oil supplies came from the Persian Gulf. France considered her naval presence necessary to guard her oil routes. To appreciate how important the region was in her plans it may be useful

1. Refer to Reference Notes 'Diego Garcia'.
2. Mr. John Lehman, the Secretary of the Navy enunciated the American Doctrine towards the Indian Ocean in his report for Fiscal year 1987 to the US Congress:-

   "We no longer depend on West Asia and the Gulf for our vital energy needs. Oil from this area now forms less than 5 percent of our total oil imports. Today the United States has an Indian Ocean orientation at least equal to our involvement with Europe in war. We plan to deploy two Carrier Battle Groups (CBGs) and one Battle Ship Group to operate in the Indian Ocean".



Djibouti and La Reunion Islands with reference to Mumbai

to highlight that during the Iran–Iraq war is 1980–88, it formed a multinational force with USA and Britain that opposed the threat of closure of the Straits of Hormuz and the consequent disruption of oil supplies.

France also considered her presence in Djibouti as a stabilizing force in the conflict between Somalia and Ethiopia in the 1980s, and saw itself as a significant equalising agent.

Chinese Naval Presence in the Indian Ocean

In the early 90s, there were strategic drivers for China's presence in the Indian Ocean.

- **Need to Secure SLOCs.** China was investing heavily to develop markets in Central Asia, Africa and South America and needed to secure the SLOCs to ensure the uninterrupted flow of raw materials from Africa and finished goods to its key export markets.
- **Constant Energy Supply.** China's growing economy needed to ensure uninterrupted energy supplies. To secure themselves against disruptions through the sea route, the Chinese were in the process of developing overland pipelines[3].

Japanese Naval Presence in the Indian Ocean

After World War II, Japan's security policy had been based on five basic tenets:-

- A commitment never to develop nuclear weapons.
- Civilian control of the military.
- An exclusively defence oriented military strategy.
- Dependence on the US–Japan Security Treaty.
- Ensuring the security of oil supplies.

Japan got its oil supplies from the Persian Gulf through the Indian Ocean, the Straits of Malacca and the South China Sea. The country was totally dependent on imports for its oil and gas supplies. This overwhelming reliance on oil and gas imports required secure shipping lanes.

The nation had so far desisted from becoming a military power that could be perceived as a threat by neighbouring countries. It focused its military effort on self-defence and sea-lane protection and eschewed the development of a stand-alone military capability that might provoke regional arms races. Japanese law also banned participation in collective security measures. For these reasons, there had hitherto been no Japanese Naval presence in the Indian Ocean[4]. In light of the prevailing circumstances, however, it made sense for it to gradually build up a Naval presence in

3. If the Strait of Hormuz closes, oil and gas could come by pipeline to Gwadar and thence by tankers to ports in China. If the Strait of Malacca closes, tankers could bring oil and gas via the Bay of Bengal to Sittwe port on Myanmar's northwest coast and thence by pipeline to southwest China. Should an international consortium share the cost, a canal across the Isthmus of Kra (if Thailand agrees) would dispense with the need to transit the Strait of Malacca — tankers could cross from the Andaman Sea into the Gulf of Thailand and thence through the South China Sea to ports in China. For the longer term, China has invested in trans-Asian pipelines and offshore and onshore fields in many countries across the globe.

4. In 1992, Japan adopted a law enabling Japan's Self Defence Force (SDF) to participate in UN Peacekeeping Operations. It was argued that peacekeeping operations belonged in the international security category and not in the category of military contributions. The peacekeeping role enabled the role of Japan's Self Defence Force (SDF) to be changed from 'forces devoted strictly to assuring Japan's own self defence' to 'forces that would share the tasks of assuring international security'.

   But in recent years, Japan has come under growing pressure from the United States to assume a greater security profile. It is also taking initiatives to promote a multilateral security dialogue as typified in ASEAN through the ASEAN Regional Forum (ARF). An important example is the first visit in 15 years by a Japanese Prime Minister to Myanmar in 1999. Myanmar's southern coast opens both to the Bay of Bengal and the western end of the Straits of Malacca, the region's most important trade route.

the Indian Ocean. In line with its new strategy, the Japanese Navy began to participate in the safeguarding of SLOCs and in undertaking patrols and peacekeeping duties.

Conclusion

The Indian Ocean remained a hub of major military activity in the 90s, primarily because of its strategic positioning on the map that resulted in a majority of the world sea traffic — both in terms of energy trade and goods shipping, passing through its waters. It was an area inherently given to competition and rivalry. Navies of all hues vied with each other for 'presence' and 'control'. The 'symbolism and status' of controlling the waters of the Indian Ocean was also a significant factor. For the Indian Navy, presence on the Indian Ocean was a new reality that it needed to cater for in its future plans.

In February 2001, Japan announced that it was considering deploying ships to patrol the Straits of Malacca where shipping is plagued by piracy. Japan has also proposed that forces from Malaysia, Indonesia, Singapore, South Korea and China patrol the waterways.

After 9/11, Japan joined the US war against terrorism and enacted a new Anti-Terrorism Law. This enabled the Japanese Navy, in November 2001, reportedly for the first time since the II World War, to dispatch a group of three ships, two destroyers and a support ship, to the Indian Ocean to support the US Navy's operations against Afghanistan.

3

The Development of The Navy, 1947–1990

Overview

In the ensuing text, the following words are interchangable:-

- Russia, Union of Soviet Socialist Republics, USSR, Soviet Union and after 1991, Confederation of Independent States (CIS).
- America, United States of America, USA and US.
- England, Britain, United Kingdom and UK.
- Bombay and Mumbai, Cochin and Kochi, Madras and Chennai, Visakhapatnam and Vizag, Calcutta and Kolkatta.

The Navy

The Indian Navy traces its beginnings to the Indian Marine raised by the East India Company (EIC) at Surat in the 17th Century. After acquiring Bombay, the EIC moved its headquarters on the Western Coast from Surat to Bombay. The Indian Marine also moved to Bombay. In 1892, the 'Royal' Indian Marine was constituted with a strength of 240 British officers and 2000 Indian sailors. The Royal Indian Navy (RIN) was formed in 1934. The RIN functioned under the C-in-C in India who was one of the four members of the Governor General's Council, as the War Member. Sea power was strictly kept on a tight leash from England with the 'distant fleet' ensuring that Britain's Navy ruled the waves.

An overview of the Indian Navy's development from 1947 till 1990 shows peaks and troughs directly related to the 1947–1990 Cold War between 'capitalist America' and the 'communist Soviet Union'. The relationship between these super powers had a direct influence on the acquisitions and evolution of the Indian Navy:

- 1947 to 1957, when Britain sold second hand warships of 1940s vintage (rendered surplus after the end of the 1939–1945 World War) to her erstwhile colonies as part of the plan for the defence of the 'British Commonwealth' against the Soviet Union. During the World War itself, confrontation with the Soviet Union was foreseeable. In due course, the US armed Pakistan in return for the grant of airbase facilities at Peshawar for U2 aircraft to spy on the Soviet Union.
- 1957 to 1959 when the Indian Navy initiated steps to cope with United States aid to the Pakistan Navy.
- 1963 to 1965 when, after China aggressed into India's northern land borders in 1962, Pakistan initiated its anti-India strategic relationship with China. The 1964–69 Defence Plan was formulated to counter a two-front threat from Pakistan and China. The Defence Plan envisaged the creation of a fleet and associated infrastructure for the eastern seaboard and induction of submarines and aircraft. After America and Britain declined to provide what the Navy wanted, the Navy turned to Russia for its acquisitions. The embargoes imposed by America and Britain during the 1965 Indo–Pakistan war spurred the Navy's drive for self-reliance. Indigenously constructed frigates started entering service.
- 1973 to 1975, when the lessons of the 1971 Indo–Pakistan war led to bigger and better naval acquisitions from Russia. In the 1974–79 Defence Plan, Indian warship designers successfully integrated Russian and European systems into indigenous frigate hulls.
- 1976 to 1990, when several new classes of indigenous warships entered service with a mix of the latest Russian weapon systems and indigenous and European equipment. Construction of submarines, design of the indigenous aircraft carrier and of future destroyers commenced.

The geo-strategic changes between 1962 and 1990 and their impact on the Navy are described in greater detail.

China's Invasion in 1962 and the 1963–64 Defence Review

The Chinese aggression into India's northern and northeastern land borders in 1962 inflicted humiliating military reverses. It led to a comprehensive review of national security based on the premise of continuing hostility from both Pakistan and China.

To enable the Army to concentrate its resources on the land borders with Pakistan and China, it handed over to the Navy the responsibility for:-

- Garrisoning and defence of the Andaman and Nicobar (A&N) Islands. This would also counter Indonesia's substantial naval build up that had commenced in 1958 with Russian assistance.
- Coastal Defence.

The 1963 Review recommended that the Navy should have a Fleet in the Arabian Sea and in the Bay of Bengal with requisite base and logistic support facilities. It accepted the acquisition during the 1964–69 Defence Plan of additional ships, submarines and aircraft. The requirements were projected to America, Russia and Britain. In 1964, high-level Inter Service Defence Delegations visited these countries. Only Russia was willing and able to meet the Navy's requirements. At Britain's behest, India delayed acceptance of the Russian offer because, in the strategic context of the Cold War, Britain did not want to cut off its naval relationship with India.

The Changeover to Russian Naval Acquisitions

In 1965, a combination of events precipitated India's decision to acquire the ships and submarines that Russia had offered in 1964, the acceptance of which had been kept pending.[1]

- In April, Pakistan intruded into Indian territory in Kachch.[2]
- In May, Britain informed India that due to acute financial difficulties, and having already extended credit for the indigenous Leander Project to help construct frigates in Bombay, it was unable to extend further credit for a submarine to be built in a British shipyard.[3]
- In June, Indonesian naval intrusions increased in the Nicobar Islands.[4] The Navy recommended to the Government an immediate increase in naval presence in the Bay of Bengal to deter such intrusions.

Britain's inability to extend credit to build a submarine (and its inability, earlier expressed, to meet the Navy's requirements for ships) and the need for increased naval presence in the Andaman and Nicobar (A&N) Islands precipitated the decision to accept the offer of ships and submarines that the Soviet Union had made in September 1964.

In September 1965, an agreement was concluded for the acquisition from Russia of four submarines, a submarine depot ship, five Petya class submarine chasers, two Landing Ships Tank (Medium) and five patrol boats, all for deployment in the Bay of Bengal and the A&N Islands.

Britain sought and was given assurances that Russian naval assistance would not compromise the security of their Leander Project. Russia sought and was given similar assurances regarding the security of their naval equipment.

In the context of Cold War realpolitik, both Britain and America were fully aware, and had reconciled, that their refusal to meet India's requirements would compel India to turn to Russia. It took 40 years for the wheel to turn full

---

1. The Navy too had been diffident, and reluctant, to sever its connection with Britain's Navy and wanted to await Britain's final response regarding financial assistance for constructing in Britain an Oberon class submarine, identical to those being built for the British Navy. The Oberon design was the latest at that time.
2. Prima facie, the intrusion was to resolve a border claim. Subsequent revelations in Pakistani memoirs revealed that it was a rehearsal for a more aggressive operation planned for taking over Kashmir in August–September of that year.
3. Subsequent revelations indicated that a segment of Britain's Naval hierarchy considered it unwise of India to start a Submarine Arm with an advanced submarine like the Oberon. At another level, there was opposition to the release of the latest submarine design technology in view of the defence relationship that had developed between India and the Soviet Union, as a result of the agreement to acquire Russian fighter aircraft and surface to air missiles for the Air Force. In November 1965, after India had signed the naval agreement with the Soviet Union, Admiral Mountbatten was to write "I have been instrumental in getting almost all of the requirements of the Indian Navy met by the British Government, including the two cruisers, the aircraft carrier, the destroyers, the organisations for building the frigates at Bombay etc. I had even managed to get more favourable terms for the construction of a British submarine but alas it all took so long that this particular transaction fell through." (quoted in Rear Admiral Sridharan's *Maritime History of India* page 429.)
4. Aceh, the turbulent province in the northern tip of Indonesia's island of Sumatra is separated from India's southernmost island of Great Nicobar by a mere 90 miles. This narrow 90-mile gap is a strategic maritime "choke point" where the movement of tankers carrying oil from the Persian Gulf to Japan and China can be disrupted.

circle when the US and India signed the New Framework for the US–India Defence Relationship in 2005, stating, inter alia, that:

"Today, we agree on a new Framework that builds on past successes, seizes new opportunities, and charts a course for the US–India defence relationship for the next ten years. This defence relationship will support, and will be an element of, the broader US–India strategic partnership".

The September 1965 Indo–Pakistan War[5]

Pakistan's propaganda has made its people believe that India provoked the 1965 war when the Indian Army crossed the international Indo–Pakistan boundary on 6th September 1965 and advanced towards Lahore. Pakistan therefore celebrates the 6th of September every year as 'Defence Day'.

Air Marshal Nur Khan, who was Pakistan's Chief of Air Staff in 1965, has exposed this lie on the 40th anniversary of the war. His article in Pakistan's daily newspaper *Dawn* of 6th September 2005, states:

"The war was the result of attempts by the Pakistan Army to push a large number of armed militants into Jammu and Kashmir without even informing the Air Force and the Navy. The coterie of Generals around President Ayub Khan had planned Operation Gibraltar for self glory rather than national interest. Rumours about an impending operation were rife but the Army had not shared plans with the other forces.

General Ayub was told on the second day of the war by the Army Chief, General Musa Khan, that the Army had even run out of ammunition. That was the extent of the preparation of the Army. The information shocked General Ayub so much that it could have triggered his heart ailment which overtook him a couple of years later. The Army suffered heavy losses in the war.

It was a wrong war and they misled the nation with a big lie that India, rather than Pakistan, had provoked the war and that we (Pakistanis) were the victims of the Indian aggression. Since the war was based on a big lie and was presented to the nation as a great victory, the Army came to believe its own fiction and used Ayub as a role model and continued to fight unwarranted wars — the 1971 war and the Kargil fiasco in 1999.

In each of the subsequent wars, we have committed the same mistakes that we committed in 1965. A commission should be constituted to determine why we failed in all military adventures."

Operations Gibraltar and Grand Slam

Pakistan launched its Operation Gibraltar on 5th August 1965. Sixty companies of Pakistani personnel in disguise, armed with modern weapons and explosives, infiltrated across the cease-fire line over a 700-kilometer front from Kargil to Chamb. Their task was to blow up bridges and disrupt movement, to raid supply dumps, to kill VIPs and to cause arson. On 5th August itself, some infiltrators were apprehended.[6] The Indian Army and Air Force reacted forcefully to the Pakistani intrusion. Operation Gibraltar fizzled out.

When Pakistan Army Headquarters found that the tide was turning against them, pressure mounted to retrieve the situation by launching Operation Grand Slam to capture two strategically located Indian towns, Akhnoor and Amritsar, through which essential supplies had to transit on their way to Kashmir and Ladakh. However, this operation required the Pakistan Army to take the perilous decision to cross the international frontier.

On 1st September, a column of seventy Pakistani tanks and two brigades of Pakistani troops drove towards Akhnoor Bridge to disrupt India's supply line from Punjab to Kashmir. The Pakistan Army achieved initial surprise. Intense air battles took place over the next few days.

By 5th September, when the tank columns were barely 20 miles from the crucial Akhnoor Bridge over the River Chenab, the Pakistani tank columns were halted at Jaurian. On 6th December, the Indian Army crossed the

5. The details of the events leading upto, and the naval operations during the 1965 War have been discussed in the earlier volumes titled *Transition to Triumph — History of the Indian Navy 1965–1975* and *Transition to Eminence — History of the Indian Navy 1976–1990*. This volume takes note of the revelations by the Air Marshal who was Pakistan's Chief of Air Staff in 1965 as to why and how Pakistan provoked this war and suffered humiliation. This volume deals with this war as briefly as possible so that the reader can co-relate the persistence of the Pakistani mindset which led to similar humiliation in the 1971 War and again in 1999 in the Kargil War and yet again in 2001 and the early years of this century.

6. In his foreword to Air Marshal Asghar Khan's book *The First Round*, Mr. Altaf Gauhar, then Pakistan's Secretary of Information and Broadcasting states: (Page xii)

   "The truth is that the first four volunteers who were captured by the Indians described the whole plan in a broadcast on All India Radio on 8 August 1965, nearly a month before India crossed the international boundary". On hearing these broadcasts, Pakistan realised that their secret plan was now open knowledge.

international border in a thrust towards Lahore, Pakistan's largest city.[7]

Mr. LK Jha, was the Principal Secretary to the Prime Minister in 1965. He recalled:[8]

"When the conflict started in the Jammu area of Kashmir and their tanks came into our territory where our tanks could not easily go because the bridges were not strong enough, there was a real dilemma. It was still being thought of as a local battle. But we realised that the terrain where we were fighting was one where we were much more vulnerable and communication depended on a couple of bridges. If they were blown up, we just would be completely cut off. And therefore thought turned to using the plan, which had been earlier evolved, for marching into Lahore. But even then, it was a very firm decision that we would not allow things to escalate into a full-scale war. I mean war in the legal sense between India and Pakistan.

The Indian Army crossed the international border at Wagah on the morning of 6th December and headed for Lahore. President Ayub (of Pakistan) went on the air. It was a very, very strong and angry broadcast. Admiral Soman (India's naval chief) thought that the opening of the Lahore front meant that a no-holds-barred situation had come and he, I think, issued a signal that we were at war with Pakistan. This signal had to be countermanded, because we did not want to go to that stage so soon. But still we realised that the Navy had the capability and if the events so necessitated, I don't think there would have been too long a hesitation to use it. But the feeling was strong that if we could contain the Pakistani forces and hold them on land, then perhaps it would be wiser not to get the Navy involved. I knew that the Navy was not happy with this decision because they were very anxious to go into action."

In Naval Headquarters in New Delhi, the situation was quite problematic:

- After the Chinese invasion in 1962, the Army had handed over the garrisoning and defence of the A&N islands to the Navy.
- Between 1962 and 1965, close relations had developed between Indonesia and Pakistan.
- Pursuant to Indonesia's intrusions in the islands in 1964, the best the Navy could do was to show a strong presence in the region with whatever ships were available.
- In August 1965, when Pakistan launched Operation Gibraltar, all the operational ships of the Indian Fleet were in the Bay of Bengal.
- When Pakistan's intrusions started in August and the Navy considered bringing the Fleet back to Bombay from the east, it was told not to get involved.

When the Pakistan Army crossed the international border on 1st September, the Fleet was recalled to Bombay. Ships arrived a week later in ones and twos because of their disparate speeds. The Official History of the Pakistan Navy states:[9]

"On 6th September, the Pakistan Flotilla received the news that the Indian Army had attacked across the international border in the Lahore area and ships sailed for their pre-assigned war stations.

"On the afternoon of 7th September, Pakistan Naval Headquarters directed a task group, comprising the cruiser, five destroyers and a frigate, to bombard Dwarka the same night and added that one or two enemy frigates may be encountered in the area in addition to enemy air threat. The task group refueled from their tanker and arrived off Dwarka at midnight. Dwarka was blacked out and could only be identified on radar… After a four-minute bombardment, the task group withdrew at full speed."

The attack on Dwarka outraged India and left the Navy humiliated[10]. There were questions in Parliament as to where the Navy was and what it was doing. The fact was that the ships of the Fleet had just trickled into Bombay from the Bay of Bengal and were replenishing prior to sortying out on 10th September.

---

7. India had warned Pakistan on several earlier occasions that if it crossed the international border, it would invite strong retaliation. Available information indicates that whilst India's Army Chief had his plan ready to cross the international border towards Lahore, he had not shared this with either the Naval Chief or the Air Force Chief. The Army Chief was in Srinagar on 1st September and arrived in Delhi at midday. A meeting was held in the Army HQ Operations Room attended by the Prime Minister, the Defence Minister, the Finance Minister, the Chief of Air Staff and others. The Army Chief explained the situation, explained the need to open another front to relieve pressure in the Chamb sector and sought the Prime Minister's permission to start his offensive against Pakistan, which Prime Minister Shastri gave. Since the Air Chief was present at this meeting, he would have initiated action to be ready. To date there is no definite information that the Navy was aware of this decision. The Navy had in any case directed the Fleet to return to Bombay from the Bay of Bengal at best speed.

8. *Blueprint to Bluewater* Pages 460 et seq.

9. *The Story of the Pakistan Navy*, pages 216 et seq.

10. Revenge for this outrage was to manifest itself in the 1971 Indo–Pakistan War in wanting the Indian Fleet to bombard ports on Pakistan's Makran Coast.

Until the ceasefire on 23rd September, the Fleet patrolled off the northwest coast of India. No contact occurred with any units of the Pakistan Navy.

The main lesson for the Indian Navy from the 1965 War was that it would have to gear up to deter hit and run attacks and be prepared to deal more firmly with future Pakistani aggression.

The Russian Acquisitions

Russian ships and submarines had been contracted for in 1965. They started arriving in India from 1968 onwards. The 1960s technology in these Russian acquisitions was more advanced than the 1950s technology that had entered service between 1958 and 1961 in the new British frigates.

On the other hand, these Russian vessels and their machinery and equipment had been designed for the Russian Navy — for colder temperatures, less corrosive seas, Russian dietary requirements, Russian naval norms of fresh water consumption/capacity, etc. The number of bunks were adequate for Russian officer and sailor branches and specialisations. The maintenance, refit and logistics procedures conformed to practices in the Soviet Union and so on. There was little in common with what prevailed in the Indian Navy.

Almost as soon as the ships and submarines were commissioned in Russia, the Indian side started suggesting modifications. Interaction between the Navies and with the designers and shipyards in the Soviet Union enabled some modifications to be incorporated before delivery of successive vessels. This positive interaction resulted in the Navy placing orders in 1969 for eight missile boats and in end 1971 for five more Petya class submarine chasers and four more submarines.

By 1971, four submarines, a submarine depot ship, a submarine rescue vessel, two landing ships, five submarine chasers and five patrol boats had arrived and were based in Visakhapatnam (Vizag). To support these acquisitions, work commenced in Vizag on the construction of a new dockyard, having facilities for supporting submarines, preparing their weapons and for training the crews in all the eqipment on board the Russian acquisitions. The construction of new workshops was considerably delayed, however, by the sinking of their floors due to the inability of the local marshy soil to bear their heavy weight. These delays in setting up maintenance and refit facilities seriously affected the operational state of Russian equipment. Though they had been acquired for the Bay of Bengal and the A&N Islands, they had started operating from Bombay as well, where dockyard facilities and experienced personnel were available.

Aircraft for Vikrant

The US Navy's A4 Skyhawks were the only aircraft that could replace the aircraft carrier's ageing British Seahawks within the capabilities of its launching catapult. Efforts to acquire the A4's were politically unsuccessful. The Navy availed of the opportunity to acquire the Seahawks being disposed of by the German Navy. These aircraft arrived in 1968 and were to prove their worth in the 1971 Indo–Pakistan war.

The Seaking Anti-Submarine Helicopters

In 1964, the US had loaned the Pakistan Navy its first submarine, the USS Diablo, which the Pakistan Navy renamed as Ghazi. After the 1965 War, the Pakistan Navy started acquiring modern French Daphne class submarines armed with long-range homing torpedoes. This left no doubt that the Pakistan Navy intended to concentrate its offensive potential in submarines and deploy its surface flotilla defensively.

At this time, the US Navy was developing anti-submarine helicopters equipped with 'dunking' sonar that could be lowered into the sea while hovering and armed with an air dropped, anti-submarine homing torpedo.[11] This innovative combination overcame the hazards that a surface warship faces when combating a submarine. Firstly, being airborne, the helicopter could not be hit by a torpedo fired by a submarine. Secondly, having a sonar device, whose depth under the surface could be raised and lowered to obtain maximum detection range, would deprive a submarine of its ability to evade detection by lurking below the temperature layers of the sea. Thirdly, being armed with a homing torpedo, the helicopter posed a threat lethal enough to deter a submarine from pressing home its attack.

In 1969, approval was accorded for the Navy to acquire from Britain six Seakings and their homing torpedoes. In 1970, an order was placed for their delivery in 1971. The Seakings arrived a few months before the Indo–Pakistan War broke out in December 1971.

The Advent of Anti-Ship Missiles

After the Pakistan Navy's bombardment of Dwarka in the 1965 War, the Navy deliberated on measures for the defence of the Kachch and the Saurashtra coast against

11. Britain was developing equivalent Seaking helicopters for its Navy.

any repeat of Pakistani naval hit and run raids.

In 1968, the Navy obtained approval to acquire missile boats from Russia. In 1969, an agreement was concluded with Russia for the supply of eight missile boats. These boats were sealifted to Calcutta by 1971 from where they were towed to Bombay, where their infrastructure was set up.

The 1971 War

During the months preceding the outbreak of war in December 1971, attention focussed on two aspects:

- The working through of the innovative concept of Fleet ships towing the tiny, limited range but fast and powerful Russian missile boats into the Arabian Sea from where they could be detached, under escort, to carry out a missile attack and to be taken back in tow after the attack.
- To maximise the effectiveness, in tropical hydrological conditions, of the new Seaking helicopters against Pakistan's newly-acquired Daphne class submarines.

The missile boat innovation was successful. The time was too short for the Seakings to be exploited to their full potential.

There was a marked contrast between the type of operations in the Bay of Bengal (Eastern Naval Command) and those in the Arabian Sea (Western Naval Command) during the war.

The Bay of Bengal

In the Bay of Bengal, there was no surface threat. At the very beginning of the war, the submarine threat vanished after the US-loaned, Pakistan submarine, Ghazi, exploded at the entrance to Visakhapatnam harbour whilst laying mines. There was no air threat after Indian Air Force attacks grounded all adversary aircraft in East Pakistan.

Carrier borne aircraft concentrated on immobilising Pakistani vessels and cratering all airstrips, which Pakistani troops in East Pakistan might use to escape capture. Naval aircraft avoided attacking neutral merchant shipping at sea. Ships of the Eastern Fleet enforced contraband control until tasked with an amphibious landing to cut off the land escape routes into Burma.

Pakistan's forces in the east surrendered after a short, sharp campaign of thirteen days.[12] The new nation of Bangladesh came into being.

Perceptions from Declassified American Foreign Policy Documents

In 2005, the US Department of State declassified documents relating to US policy during the 1971 Indo–Pakistan War. The perceptions that emerge from these documents help to understand the actions of the powers involved.

The Nixon Administration had reconciled itself to the emergence of Bangladesh but was apprehensive that after defeating Pakistani forces in the east, India would turn its attention to defeating the Pakistani Army in the west. It therefore sought assurances that this should not happen. It was reluctant to believe the categoric assurances conveyed by India through the Soviet Union and through the Indian ambassador that India 'would not seize West Pakistan territory'.

As regards the Soviet Union, the US felt that it was better that a ceasefire was achieved through the good offices of both the superpowers 'in the interest of world peace' rather than through the United Nations' resolutions which were taking too long to obtain consensus. Whilst both agreed on a quick ceasefire, the US felt that the Soviet Union was dragging its feet in not pushing India hard enough so that Indian forces got more time to conclude operations in the east. The US perceived India as wanting to 'cannibalise' Pakistan by first attacking East Pakistan and then wanting the United Nations (UN) to politically ratify the aggression by accepting that East Pakistan had become the new state of Bangladesh.

For the US, the crumbling of its ally Pakistan was undesirable for two reasons. The Pakistan President was facilitating urgent secret arrangements for the American President to visit China and seek its help to obtain a face-saving exit from the unpopular US involvement in the Vietnam War. Secondly, other allies of the US would lose faith in the reliability of the US as an ally if the US allowed Pakistan to disintegrate.

As a dramatic 'gesture of support' for Pakistan, a US Navy missile equipped task force, headed by the nuclear-powered aircraft carrier Enterprise, was despatched to the Indian Ocean, ostensibly to evacuate American citizens from East Pakistan, but more as a move to 'worry' India.

12. Pakistan's Hamoodur Rahman Commission's Report on the 1971 War mentions that when Pakistan President Yahya Khan asked US President Nixon for assistance, he was told that the quickest way would be for him to accept Israeli Skyhawk fighter bombers. Desperate for any help, President Yahya Khan accepted the offer, but the war ended before these aircraft could arrive.

Russia, as a counter-gesture of support for India, sailed a missile equipped Naval task force from Vladivostok to trail the Enterprise task force into the Indian Ocean.[13]

In the event, American citizens were evacuated by air to India well before the Enterprise task force arrived in the Bay of Bengal. The Nixon Administration was aware of the impending surrender of the Pakistani forces in East Pakistan. The Enterprise task force altered course towards a holding area south of Sri Lanka where it was trailed by the Soviet naval task force. During this period, Soviet Naval Headquarters, in a symbolic gesture, ordered Soviet submarines already assembled in the vicinity of the Enterprise task force to simultaneously surface to let a US Satellite passing overhead take a photograph and let it be known that the Russians were there. A few weeks later, both task forces dispersed.

The Arabian Sea

In the Arabian Sea, the operational situation was different from that in the Bay of Bengal. The submarine, surface and air threats were higher.

The first missile boat attack on Karachi, launched along the coast, was a success — it sank a Pakistani destroyer and a coastal minesweeper. In Naval Headquarters and Headquarters Western Naval Command, however, there was restlessness at the Western Fleet's diversion southward to shake off Pakistani reconnaissance aircraft because this diversion delayed the second missile boat attack that was to be launched by the Fleet from seaward.

After shaking off the snooper, the Fleet regrouped and detached three task units, one to carry out a missile attack on Pakistan naval units off Karachi and the others to bombard ports on Pakistan's Makran coast on the night of 6/7th December. On the afternoon of 6th December, Naval Headquarters intervened to cancel these attacks.[14]

Unknown to the Indian side, however, the Pakistan Flotilla had prudently withdrawn into Karachi harbour, to avoid being damaged by missiles against which they had no defence.

The Indian Fleet planned its next attack for night 8/9th December — a missile boat attack on Karachi and a gun bombardment of Jiwani on the Makran coast to divert attention from the missile boat group. The bombardment group, under the cruiser Mysore, apprehended Pakistani merchant ship Madhumati, south of Jiwani, after she had transmitted an SOS to Karachi. After Madhumati had been boarded and apprehended, FOCWEF called off the gun bombardment of Jiwani as he considered the merchant ship's SOS to Karachi a sufficient distraction for the missile attack group racing towards Karachi.

Once again, the missile attack achieved surprise. One missile set Karachi's fuel storage tanks aflame and another hit Dacca, the Pakistan Navy's tanker, at the anchorage.[15]

These two missile attacks on Karachi resulted in international shipping seeking assurance from the Government of India for safe passage out of Karachi. For all practical purposes, the Western Fleet controlled the sea approaches to Karachi.

---

13. Mr. Anatoly Dobrynin was the Russian Ambassador in Washington in 1971. In his memoirs *In Confidence*, he states: (Pages 236 et seq)

    "On December 10, Nixon asked us to join him in a joint appeal for a complete ceasefire. In a clear attempt to pressure both the Soviet Union and India, Nixon made an extraordinary disclosure to the Soviet leadership. In strict confidence, he had Kissinger inform us that there was a secret protocol in the agreement between the United States and Pakistan (drafted under the Kennedy administration and handed to then President, Ayub Khan, by the US ambassador on 5 November 1962) saying that the American government would support Pakistan against Indian aggression.

    "To build American pressure, Kissinger told Yuli Vorontsov, our able charge d'affairs during my absence in Moscow for consultations, that the American military had already been ordered to start preparations for assistance to Pakistan under the cover of tactical redeployment of its naval forces, including the despatch of an aircraft carrier task force from Southeast Asia. In response, a number of warships from the Soviet Indian Ocean Fleet were sent northward.

    "Kissinger made it clear to us that the United States was mostly concerned about the western section of the India–Pakistan front which, Washington feared, would collapse after Pakistan's defeat in the East. As Kissinger later wrote, he believed Mrs. Gandhi was planning to attack the Pakistan held portions of Kashmir, recover them for India, and thus precipitate through a humiliating defeat, the disintegration of what remained of Pakistan in the West. (In the East, the White House had to accept that the war was as good as won by India.) As part of his manoeuver, Kissinger then asked Vorontsov to assure Moscow that the White House was not in contact with Beijing over the conflict, even though Pakistan was close to China. He simultaneously proposed referring the matter to the United Nations."

14. That very morning a Pakistan Air Force aircraft had mistakenly attacked a Pakistan Navy frigate on patrol off Karachi. India's Chief of Naval Staff assessed that the state of alertness off Karachi signified by this incident warranted a postponement of the missile boat attack speeding to strike Karachi that night.

15. Dacca, being fully loaded with fuel, could not enter harbour as the other ships had done. She therefore anchored amidst the merchant ships at the anchorage.

16. The Pakistan Navy had deployed two of its three submarines in the approaches to Bombay. In early December, one of them had to return to harbour to rectify defects. The second submarine was moved to fill the gap. The exchange of signals were D/F'd.

In the meantime, Naval Headquarters had on 7th December, prodded FOCINCWEST to do something about the Pakistani submarine that had been reliably D/F'd off Bombay.[16]

On 8th December, two frigates, Khukri and Kirpan, sailed from Bombay to 'flush' this submarine away from the Saurashtra coast where ships were assembling for the next missile attack on Karachi.

On the evening of 9th December, the Pakistan Navy's new French-built submarine Hangor torpedoed and sank the frigate Khukri.[17]

A sustained anti-submarine operation over the next four days was unable to prevent the Hangor's escape and return to its base in Karachi.

On the evening of 10th December, a shore based Alize aircraft was sent to probe suspicious activity reported near the Indo–Pakistan naval border off Jakhau. It ended in a fatal chance encounter. The Alize fell prey to a Sidewinder missile fired by a homeward-bound Pakistani fighter aircraft.

As soon as the Pakistan forces in the east surrendered on 16th December, India unilaterally offered Pakistan a cease fire in the west. Pakistan accepted the offer and the war ended on 17th December.

The lessons learnt in the 1971 War were invaluable. Two basic conclusions shaped the Navy's planning for its future warships.

The first conclusion was that large-calibre gun engagements between warships were no longer likely. Anti-ship missiles would dominate future surface warfare. This led to the decision that future ships should be equipped with surface-to-surface missiles and high rate of fire small caliber guns and electronic warfare systems for defence against incoming anti-ship missiles.

To start with, a squadron of eight long range missile boats were acquired from Russia. The next step was to graft a complete Russian missile boat system on to the British frigate Talwar and into a missile coast battery at Bombay.

From 1976 onwards, all the new ships like the 800-ton ocean going Durg class rocket boats, the Rajput class destroyers, the Godavari class frigates, the Khukri class corvettes, and their successors, were equipped with anti-ship missiles, rapid fire guns and active/passive means of electronic warfare as anti-missile defence systems. In due course, the new improved Seakings and the new Sea Harriers were equipped with anti-ship missiles.

The second conclusion was that defence against a modern conventional diesel-electric submarine required a three-dimensional anti-submarine capability:

- In the air — MRASW aircraft and anti-submarine helicopters with better sonobuoys and homing torpedoes.
- In ships — Improving the effectiveness of existing sonars, fitting better sonars and anti-submarine weapons in new ships and improving the prediction of hydrological conditions.
- Under the sea — Acquiring Hunter-Killer (SSK) submarines.

The Defence Reviews after the 1971 War

After the 1971 War, there were two major Defence Review Committees in 1973 and 1975.

The first Committee, in 1973, examined the immediate requirements of the three services based on a reassessment of the threat and dovetailed its recommendations with the financial resources likely to be available in the 5th Five Year Plan 1974–79. However, the Arab–Israel war that erupted in October 1973 led to sharp increase in the price of oil. This unavoidable increase in the outflow of foreign exchange seriously dislocated national budgeting and decelerated defence projects.

The Navy, nevertheless, continued its ongoing discussions with Russia so that when times became better, ideas would be clearer about the next series of Russian acquisitions.

The debilitating impact of spiraling inflation in 1974 made it necessary to appoint another high level Committee to examine the 1974–79 Defence Plan, the implementation of the 1973 Committee Report and view the problem of Defence Planning in the wider perspective of the national economy. There was a need to review defence needs in the light of the latest weapon systems that had been fielded in the Arab–Israel War and the need to improve fighting capacity as cost effectively as possible.

The Navy brought to the notice of the Committee that after the 1971 War, the Pakistan Navy had acquired frigates from Britain, missile boats, torpedo boats and patrol craft from China and submarines and Atlantique maritime reconnaissance aircraft from France. In addition, America had lifted its arms embargo on Pakistan in April 1975.

Taking note of this development and the need for

17. This was the first occasion after the 1939–45 World War that a submarine torpedoed and sank a major warship.

defending the offshore oil installations in the recently discovered oil fields near Bombay, the Committee recommended enhanced allocation of funds to support core naval projects. The Government's acceptance of these recommendations underpinned the major acquisitions and modernisations of ships, submarines and aircraft after 1975.

Ship Acquisitions, Modernisations and Conversions between 1976 and 1990

Acquisitions From Abroad

- From Britain — Second-hand aircraft carrier Viraat.
- From Russia — Guided missile destroyers, ocean going 800 ton rocket boats, extended range missile boats, gas turbine propelled missile boats (1241REs), anti-submarine patrol vessels (241PEs), coastal minesweepers (2666MEs), and inshore minesweepers.
- From Poland — Landing Ships Tank.
- From Germany — Fleet Tanker.
- From Korea — Offshore Patrol Vessels.

Indigenous Construction

- 3rd and 4th Leander frigates.
- Improved 5th and 6th Leander frigates.
- Missile Frigates of the Godavari class.
- Missile Corvettes of the Khukri class.
- Offshore Patrol Vessels.
- Landing Ship Tank Large, Cadet Training Ship, Survey ships, Fleet Tug, Seaward Defence Boats, Survey Craft, Torpedo Recovery Vessels, Landing craft.
- Diving Support Vessel as interim Submarine Rescue Vessel.

Modernisations

- Talwar and Trishul were fitted with Russian missiles.
- Vikrant was fitted with a ski jump, new radars, AIO and other facilities to operate the Sea Harrier aircraft and Seaking helicopters.

Conversions

- The late 1950s-vintage anti-aircraft frigates Brahmaputra, Betwa and Beas were converted to the 'training role' to replace the early 1940s-vintage Cauvery, Krishna and Tir.

Submarine Acquisitions and Modernisations between 1976 and 1990

Acquisitions

- 877 EKM 'Kilo' class submarines from Russia.
- Nuclear-propelled submarine, Chakra, on lease for 3 years (1988 to 1991).
- HDW209/IKL1500 submarines from Germany.

Modernisations

- The improvements effected in the VELA class submarines were retrofitted in the earlier submarines.

Aircraft, Helicopter Acquisitions and Modernisations

Aircraft Acquisitions

- From Britain — Sea Harriers to replace the Seahawks, and Islander aircraft.
- From Russia — TU 142 LRMP and IL 38 MRASW aircraft.
- From USA — Pilotless Target Aircraft.
- Indigenous — Transfer from the Air Force of Super Constellation MR aircraft.
  — HJT 16 and Kiran Jet Trainer Aircraft.

Modernisations

- Refurbishment of Alizes.

Helicopter Acquisitions

- From Britain — ASW and Commando Seakings.
- From Russia — ASW Kamovs.
- Indigenous — MATCH and SAR helicopters.

Construction of Major Indigenous Warships

The Leander Frigate Project, which had commenced with the commissioning of the Nilgiri on 23 October 1966, completed with the commissioning of the Vindhyagiri on 8 July 1981. During these fifteen years, six frigates were delivered, an average of 30 months per ship. By the time of the 6th Leander, the indigenous content of bought out equipment had risen to 70%. The 5th and 6th ships had an imported content of only 27% as against 70% in the case of the first frigate.

Considerable confidence was gained by the Navy's weapon planners, architects and shipbuilder teams. This laid the basis for the success in:

- Hybridising Russian, European and indigenous systems in the series of indigenously built warships.
- Induction of the new Sea Harriers, the new ASW/ASV helicopters, the aircraft carrier Viraat.
- New submarines and commencement of submarine construction in India.
- Anti-ship missiles in ships, aircraft, helicopters and coastal defence batteries.
- Improved sonar and sonobuoy systems, and anti-submarine weapons in ships, submarines, helicopters, and MRASW and LRMP aircraft.
- Evolving and validating tactical doctrines for the Navy's unique mix of weapons platforms and weapons.
- Creation and upgrading of maintenance and refit facilities for ships, submarines and aircraft.
- Revitalising Naval Training.
- Building up facilities in the Andaman and Nicobar Islands.
- Synergising Naval R&D.
- Introducing computer culture in all areas of naval activity.

Retrospect

In retrospect, two compulsions had a bearing on the Navy's development. In many ways, they were a blessing in disguise:

- The priority accorded to the Army and Air Force requirements to counter landward threats limited the Navy to a ship replacement programme. The slowed pace of replacement by indigenous construction and acquisition from Russia helped successive inductions to be technologically superior than their predecessors.
- The scarcity of foreign exchange for importing the latest technologies compelled the Navy to innovate and indigenise. The austerity that resulted from these compulsions kept the Navy lean and agile.

The outcome of the 1971 war had given the Navy triumph. The reforms, the consolidation and the shipbuilding achievements between 1976 and 1990 gave the Navy regional eminence.

Ships and Submarines Acquired Between 1947 and 1975

MDL — Mazagon Docks Ltd, Mumbai

GRSE — Garden Reach Shipbuilders and Engineers, Calcutta (erstwhile Garden Reach Workshop (GRW))

HSL — Hindustan Shipyard Ltd, Visakhapatnam

GSL — Goa Shipyard Ltd, Goa

HDL — Hoogly Docking and Engineering Works Ltd, Calcutta

Acquisition	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Delivered	Supplier
Light Cruiser	7000	DELHI	—	—	1948	Britain
Light Destroyer	1700	RAJPUT RANJIT RANA	—	—	1949	Britain
Landing Ship Tank	2200	MAGAR	—	—	1949	Britain
Escort Destroyer	1000	GODAVARI GOMATI GANGA	—	—	1953	Britain
Light Tanker	3500	SHAKTI	—	—	1953	Italy

Acquisition	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Delivered	Supplier
Inshore Minesweepers	120	BASSEIN BIMLIPATAM	New	1952	1954	Britain
Coastal Minesweepers	360	KARWAR CANNANORE CUDDALORE KAKINADA	New	1952	1956	Britain
Light Cruiser	8700	MYSORE	—	—	1957	Britain
Anti-Aircraft Frigates	2250	BRAHAMPUTRA BEAS BETWA	New	1955	1958 1958 1960	Britain
Surface Escorts	2150	TALWAR TRISHUL	New	1955	1958 1959	Britain
Anti-submarine Frigates	1200	KHUKRI KIRPAN KUTHAR	New	1955	1958 1959 1959	Britain
Seaward Defence Boat (for Central Board of Revenue)	63	SUBHADRA SUVARNA SHARAYU SAVITRI	New	—	1957 1958	Italy
Seaward Defence Boats	86	SHARDA SUKANYA	New	—	1959	Yugoslavia
Repair and Store Ship	4600	DHARINI	Second Hand	—	1959	Italy
Seaward Defence Boats MK I	120	AJAY ABHAY AKSHAY	New Indigenous	—	1960 1961 1962	GRW and HDL
Light Aircraft Carrier	18000	VIKRANT	—	1957	1961	Britain
Survey Ship	2800	DARSHAK	New Indigenous	1954	1964	Hindustan Shipyard
Landing Ship Tank (Medium)	730	GHARIAL GULDAR	New	1965	1966	Russia
Patrol Boats	80	PAMBAN PANVEL PANAJI PURI PULICAT	New	1965	1967	Russia
Fleet Tanker	22600	DEEPAK	New	1964	1967	Germany
Inshore Minesweepers	170	BHATKAL BULSAR	New	1961	1968 1970	MDL
Submarines	1975	KALVARI KHANDERI KARANJ KURSURA	New	1965	1967–69	Russia

Acquisition	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Delivered	Supplier
Submarine Depot Ship	5900	AMBA	New	1965	1968	Russia
Anti-Submarine Vessels	1000	KAMORTA KADMATT KATCHAL KAVARATTI	New	1965	1968–69	Russia
Seaward Defence Boats	150	AMAR AJIT ATUL	New	1963	1969	GRW
Missile Boats	180	VINASH VIDYUT VIJETA VEER NIRGHAT NIRBHIK NASHAK NIPAT	New	1969	1971	Russia
Submarine Rescue Vessel	800	NISTAR	Reserved Stock	1969	1971	Russia
Leander Class Frigate	2960	NILGIRI	New	1966	1972	MDL
Anti-Submarine Vessels	1000	ARNALA ANDROTH ANJADIP	1968–69 Reserved Stock	1971	1972	Russia
Fleet Tug	700	GAJ	New	1968	1973	GRW
Anti-Submarine Vessels	1000	ANDAMAN AMINI	New Improved	1971	1973–74	Russia
Submarines	1975	VELA VAGIR VAGLI VAGSHEER	New Improved	1971	1973–74	Russia
Leander Class Frigates	2960	HIMGIRI	New Improved	1968	1974	MDL
Landing Ship Tank (Medium)	1120	GHORPAD KESHARI SHARDUL SHARABH	New Improved	1972	1975–76	Poland

Ships and Submarines Acquired Between 1976 and 1990

Acquisition	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Delivered	Supplier
Leander Class Frigates	2995	UDAYGIRI DUNAGIRI	New	1967 1970	1976 1977	MDL
Missile Boats	255	PRALAYA PRATAP PRABAL PRACHAND CHATAK CHAMAK CHAPAL CHARAG	New	1973	1976–77	Russia
Fleet Tanker	22580	SHAKTI	New	1974	1976	Germany
Ocean Going Rocket Boats	675	VIJAYDURG SINDHUDURG HOSDURG	New	1975	1976 1977 1978	Russia
Coastal Minesweepers	800	PONDICHERRY PORBANDAR BHAVNAGAR BEDI ALLEPPEY RATANAGIRI	New	1975	1977 1978 1979 1979 1980 1980	Russia
Seaward Defence Boats MK II	210	T 51 T 52 T 53 T 54 T 55	New	1972 1972 1972 1980 1980	1978 1977 1978 1982 1982	GRSE
Guided Missile Destroyers	4890	RAJPUT RANA RANJIT	New	1975	1980 1982 1983	Russia
Landing Craft Utility MKI	560	L31 L 32	New	1974	1978 1981	HDL
Landing Craft Utility MKII	560	L 33 L 34 L 35	New	1975	1980 1983 1983	GSL
Improved Leander Class Frigates	3040	TARAGIRI VINDHYAGIRI	New	1970	1980 1981	MDL
Survey Ships	1930	SANDHAYAK NIRDESHAK NIRUPAK INVESTIGATOR	New	1973 1976 1976 1986	1981 1983 1985 1990	GRSE
Torpedo Recovery Vessels	160	TRV A 71 TRV A 72	New	1978	1982 1983	GSL

Acquisition	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Delivered	Supplier
Ocean Going Tug	1630	MATANGA	New	1973	1983	GRSE
Inshore Minesweepers	100	MALWAN MANGROL MAHE MULKI MAGDALA MALPE	New	1981	1983 1983 1983 1984 1984 1984	Russia
Godavari Class Frigates	3610	GODAVARI GANGA GOMATI	New	1978	1983 1985 1988	MDL
Survey Craft (SDB Hulls)	200	MAKAR MITHUN MEEN MESH	New	1979	1984 1984 1984 1984	GSL
Seaward Defence Boats MKIII	210	T 56 T 57 T 58 T 59 T 60 T 61	New	1980	1984 1985 1985 1985 1985 1986	GRSE
Torpedo Trials Vessel	160	ASTRAVAHINI	New	1980	1984	HSL
Landing Ship Tank (Medium)	1410	CHEETAH MAHISH GULDAR KUMBHIR	New	1982	1984 1985 1985 1986	Poland
Submarines (SSK)	1655	SHISHUMAR SHANKUSH	New	1981	1986 1986	Germany
Cadet Training Ship	2650	TIR	New	1982	1986	MDL
Submarines (EKM)	2890	SINDHUGOSH SINDHUDHVAJ SINDHURAJ SINDHURATNA SINDHUKESARI SINDHUKIRTI SINDHUVIJAY	New	1983 1987 1988	1986 1987 1987 1988 1988 1989 1990	Russia
Coastal Minesweepers	880	KARWAR KAKINADA CUDDALORE CANNANORE KONKAN KOZHIKODE	New	1983	1986 1986 1987 1987 1988 1988	Russia

Acquisition	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Delivered	Supplier
Landing Craft Utility MK III	560	L 36 L 37 L 38 L 39	New	1982	1986 1986 1986 1987	GSL
Guided Missile Destroyers	5055	RANVIR RANVIJAY	New	1981	1986 1987	Russia
Landing Ship Tank (Large)	5655	MAGAR	New	1981	1987	GRSE
Aircraft Carrier	28500	VIRAAT	Second Hand	1985	1987	Britain
Fast Missile Attack Craft	500	VEER NIRBHIK NIPAT NISHANK NIRGHAT	New	1984	1987 1987 1988 1989 1989	Russia
Diving Support Vessel	2160	NIREEKSHAK	Second Hand		1988	MDL
Offshore Patrol Vessels	1890	SUKANYA	New	1987	1989	Korea
Anti-Submarine Patrol Vessels	485	ABHAY	New	1986	1989	Russia
Missile Armed Corvettes (Project 25)	1350	KHUKRI	New	1986	1989	MDL

Reference Note

'Looking East' — Past, Present and Future

The Indian Navy's 'Look-East policy' was initiated in the early 90s just after the end of the Cold War, following the collapse of the Soviet Union and was meant to signify a strategic shift in India's vision of the world and India's place in the evolving global economy.

The harbinger of change was none other than the then Prime Minister Narasimha Rao who visited China, Japan, South Korea, Vietnam and Singapore and India became an important dialogue partner with ASEAN in 1992. Then in the beginning of the new century, the policy got an impetus after India became a summit level partner of ASEAN (2002) and got involved in some regional initiatives such as the BIMSTEC[1] and the Ganga Mekong Cooperation.

The Beginning

After the end of the Cold War, think tanks worldwide started re-appraising their country's role in the 'New World Order' and the threat perceptions in the post Cold War scenario. Their introspection of the emerging dynamic in the North Indian Ocean region led them to conclude that India could no longer be considered as a marginal and benign presence and that it could play a stabilizing role in West Asia, South Asia and South East Asia.

In India, there was increased awareness among strategic experts that the disinformation about the Indian Navy expanding out of proportion (to its actual requirements) and the misplaced fears that its acquisitions were not overdue replacements, but aspirational acquisitions to project naval power, could cause unneeded consternation among the world community. India decided to dispel these misapprehensions by letting other navies interact with India's Navy during joint naval exercises at sea.

In 1992, India initiated its 'Look East' policy of closer relations with the nations of South East Asia. The Navy took the initiative to host, every two years, joint naval get-togethers called "Milans", with the Southeast Asian Navies in the Bay of Bengal.

Socio–Cultural and Economic Realities

In relation to India's Look East Policy, it would be interesting to understand the background of the eastern states in terms of their socio–cultural and economic realities that necessitated such a policy.

Peninsular Southeast Asia comprises of Burma, Malaysia and the 'Indo–China' states of Thailand, Laos, Cambodia and Vietnam. Off the mainland are the islands of the Indonesian archipelago and the island city-state of Singapore. The cultural development and the social, religious and artistic roots of this entire region can be traced back to the shaping force of ancient India. In the centuries BC, Indian traders used to cross the Bay of Bengal heading for "Suvarna Bhumi" and onwards towards the Far East. Suvarna Bhumi, literally the 'Land of Gold', was mainland Southeast Asian states of Burma (Myanmar), Thailand, Laos, Cambodia and Vietnam. Because of the types of ships they sailed and the prevailing seasonal monsoons, their journeys east and south required them to stop at ports all along the Indo–China peninsula until favourable monsoon winds enabled them to resume their voyage.

During these sojourns, a process of Indianisation very gradually took place. Probably, Indian princes set themselves up to rule over petty states, marrying into the local hierarchy to legitimise their authority. This formed the cultural base out of which developed the independent kingdoms of the ensuing centuries. Therefore, culturally the people of South-East Asia had an affinity for Indian values and customs and by extension, the Indian people.

The process of colonisation changed the equations

1. The 1998 Bangladesh, India, Myanmar, Sri Lanka and Thailand Economic Cooperation association (BIMSTEC) and the 2000 Mekong Ganga Cooperation Project comprising India, Myanmar, Thailand, Laos, Cambodia and Vietnam, both aim to enhance economic and cultural relations by promoting trade, investment, tourism, communications and transport linkages.

a bit. Burma was colonised by the English, while Laos, Cambodia and Vietnam became dominions of the French. As imperialism expanded in the region, Thailand leaned towards the West. But it was never colonised and to this day remains a kingdom. In the 19th Century, Thailand decided to modernise on the Western pattern. The 1851 Bowring Treaty of Friendship and Commerce with England and similar accords with European countries and the USA helped to modernise administration and improve infrastructure. In the vast expansion of trade and commerce that followed, the Chinese came in to fill the essential roles of labour and middlemen and have since had a great influence over the polity in the country.

South East Asia — The Present

In the latter half of the 20th Century, the colonies became independent. Vietnam, Laos and Cambodia became Communist states and got embroiled in the US–Vietnam War.

Vietnam. For many years, Laos and Cambodia were bogged down in internecine warfare. Vietnam's robust victories over France in 1954, the US in 1975 and China in 1979 gave its armed forces a formidable reputation. Vietnam endured decades of US sanctions with fortitude and dignity. Today, the hardiness of its people, its economic potential and its location has made it a strategic lynchpin in Southeast Asia. Indo–Vietnamese relations have been very fraternal for decades. Regular consultations take place on cooperation in all fields of development.

Thailand. Thailand remained staunchly Western. During the Vietnam War, the US built a large airbase at Udon Thani in Northeast Thailand from where it bombed North Vietnam. It also built the port and naval base at Sattahip in the Gulf of Thailand and its adjacent airbase at U-Tapao from where its maritime aircraft flew reconnaissance missions over the China Sea and the Indian Ocean. The US and Thailand have a bilateral defence pact. War games called 'Cobra Gold' involving US and Thai troops are held every year.

It is important for India to nurture ties with Thailand as it will remain the time-tested anchor of US presence in mainland Southeast Asia. Thailand's Navy has acquired missile-armed frigates from China and the US and is considering the acquisition of a second offshore patrol helicopter carrier and submarines. Thailand aspires to be the centre for trade and investment in the Indo–China region to participate in the economic recovery of Laos, Cambodia and Vietnam.

Burma. Geographically, Burma borders Thailand. There is much historical antipathy between the two nations because Burma had twice captured and ravaged the Thai capital Ayutthaya, first in 1569 and again in 1767. This antipathy has yet to fully dissolve. Until recently, Burma chose to keep alive its land borders with India. There was a problem regarding Narcondam Island, in the north, which Burma appeared to covet, but over the years, things have settled down. In the end 1980s, arms transfers and economic aid increased China's influence and presence in Burma. There is a view that Burma's cordial relationship with China was in exchange for minimal intervention by Communist cadres in its internal affairs. Even so, it is one nation that India will be looking at and seeking to engage.

Bangladesh. Indo–Bangladesh relations have fluctuated with the changes in Governments in Bangladesh. There is a faction that recalls its "historic and fraternal" links with Pakistan and seeks to build closer ties. Then there is one, that seeks closer ties with China and that espouses the fostering of ties with India. Overall, Bangladesh has closer relations with both China and Pakistan vis-à-vis India. The Bangladesh Navy has acquired frigates and smaller vessels from China and from Britain.

Indonesia. Indonesia was colonised by the Dutch and became independent after the 1939–1945 Second World War. As a widely dispersed archipelago, it was conscious of the importance of the sea to its political cohesion, economic advance and national security. The nation first attempted to secure Western assistance for its naval development in the early 50s, without much success. It then turned to the Soviet Union in the late 50s and succeeded in getting the required assistance. By the early 1960s, the Indonesian Navy became the most powerful of all the littoral navies with Soviet supplied cruisers, destroyers, landing ships, missile boats, submarines and naval aircraft.

At that time, Indonesia was in confrontation with neighbouring Malaya and Singapore who were supported by Britain, Australia and New Zealand. Confrontation was something well short of an all out war, so the opposing naval forces were largely "in being". Nevertheless, the British had nothing comparable to match the ship and aircraft fired anti-ship missiles that the Soviets had supplied to Indonesia. This was also the time when President Soekarno wanted the Indian Ocean to be renamed as the Indonesian Ocean and wanted to take over India's Great Nicobar Island, closest to Sumatra. During Pakistan's 1965 aggression against India, he sent a submarine, some missile boats and other military and air force help. They arrived in West Pakistan after the ceasefire. In the thirty years under President Suharto, Indonesia developed rapidly and was ranked among the 'tiger' economies of East Asia. The financial crisis of 1997

led to widespread dislocation from which Indonesia has been recovering steadily.

Malaysia. Spurred by the lessons of its confrontation with Indonesia, Malaysia initially enlarged its defence forces with British help. Its rapid economic development as an East Asian 'tiger' and the expansion and modernisation of the Malaysian armed forces that commenced in the early 1990s, was interrupted by the 1997 financial crisis. Economic recovery enabled resumption of this programme.

Malaysia and the US have a cordial military relationship. US warships routinely enjoy access to Malaysian airfields and ports. US Navy Seals conduct training twice a year and the US Army conducts field exercises with its Malaysian counterparts. After 9/11, Malaysia has extended to the US all the assistance it has asked for in the war against terrorism and all US Air Force requests for flights over Malaysian airspace are routinely approved.

Singapore. Singapore is a rich island nation, 15 miles wide and 25 miles long, located at the eastern end of the strategic Malacca Strait. It can afford, and has, small but very modern armed force to maintain a technical edge over its much larger neighbours — Malaysia in the north and Indonesia in the south — with whom relations have historically been tense.

Singapore has a very close rapport with the US and despite the absence of a formal defence pact, is virtually treated by the US as an ally. Since it does not have adequate airspace for training its pilots, it has an agreement with the US to base its tactical aircraft detachments in the US and, in return, Singapore allows the US to use its military facilities and its naval base. Under the existing technical research and development agreement, Singapore has over 30 cooperative US defence technology projects underway.

With a view to acquire as much high-tech defence technology as possible and cooperate in more sensitive and advanced projects, Singapore is enacting laws resembling the strict export control regime of the US. By doing so, Singapore would reassure the US that its sensitive defence technology will be well protected and could not be sold to third countries. Singapore has already inducted two of its four ex-Swedish Navy reconditioned submarines and has on order 6 submarines. The Indian Navy is aware of its Singaporean counterpart's desire to develop and expand and has shown the willingness to increase engagement to promote cooperation and greater harmony.

The Chinese Angle

There is a view in some circles that India's "Look East" policy was adopted, partially as a response to China's interest in Burma. There may be more than a grain of truth in that assertion, because during the 1990s as China modernised Burma's ports on the Arakan Coast, upgraded its naval infrastructure and supplied frigates and smaller naval vessels, it was natural for a contiguous power like India to feel a bit uneasy. It was disconcerting to note that there was a clear quid pro quo in these dealings as evidenced by Burmese willingness to allow China to build a surveillance and communication facility in Coco Island.

In a wider context of 'security', China has established a significant presence in Bangladesh and in Burma, both of which are located on the eastern side of the Bay of Bengal. India and China maintain a regular dialogue to resolve the boundary problem and both seek to cooperate in as many areas as possible. Yet, it is not clear what China seeks to achieve by its presence in the Bay of Bengal.

Until this clarifies, it is prudent to hedge against the likelihood of an assertive China. The best insurance against Chinese power lies not in fostering or supporting any regional anti-Chinese coalition but rather in India emerging as a strong and independent power on China's periphery, having strong economic linkages with ASEAN.

Towards Enhanced Interaction

Indian Naval Efforts. As a part of the nation's 'Look East Policy', the Indian Navy has made a concerted endeavour to improve relations with eastern navies. Its relationships with Singapore, Thailand and Indonesia have been very cordial. These Navies have been participating regularly in India's biennial 'Milans'. Invitations were sent to the navies of Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia, Singapore and Indonesia. In September 2002, Indian and Indonesian naval ships and aircraft began joint coordinated patrols along the International Maritime Boundary in the Andaman Sea to check poaching, smuggling and narcotic trafficking. Interaction and increased exchanges/exercises between navies would, in due course, help to build up sufficient confidence to institutionalise arrangements for joint regional responsibilities. This has started to happen.

Diplomatic Activity. From the 'diplomatic' point of view, India's Look East policy has succeeded in its objective of establishing closer relations with Southeast Asia. ASEAN–India relations improved after the establishment of the Sectoral Dialogue Partnership in 1992 and especially

since India became a full Dialogue Partner in 1995 and subsequently participated in the ARF in 1996.

Conclusion

The Look East Policy has been underpinned by both security and economic considerations. India's experience in the Bay of Bengal has been that, 'security' in this region requires the whole-hearted cooperation of all the states bordering it. That is why India has sought, during the 1990s, to deepen the quality of its interaction with the countries of Southeast Asia.

After the commencement of the war on terrorism in 2001, security concerns have widened. The recent ASEAN–India Summits have addressed the entire spectrum of trans-national criminal activity, namely trafficking in illegal drugs, people smuggling, sea piracy, terrorism, arms smuggling, money laundering, economic and cyber crime.

India has no territorial disputes with any of the states of Southeast Asia. In the long term, India's independent, non-aligned foreign policy, its acceptance as a stabilising regional power and its preference for strategic independence would benefit this entire region.

Reference Note
Towards Regional Maritime Cooperation

In 1991, the collapse of the Soviet Union ended the Cold War that had started in 1946 between the rival ideologies of capitalism and communism. As did other countries, India re-appraised her role and national interests in the New World Order in which America had emerged as the sole global superpower.

The outcome of this introspection was the need for India to redefine her relationships with the world's major powers, the United States of America, Russia, China, Japan, and Europe, giving primacy to economic relations. Two important facets of India's reorientation were the initiation of the 'Look East Policy' and recognition of the need to forge closer relationships with the Indian Ocean Region (IOR) as a whole, across the entire spectrum of trade, investment, cultural, political, diplomatic and strategic ties.

This introspection also recognised the need for India to play a stabilising role in West Asia, South Asia and South East Asia, as also the need to foster cooperation in other spheres, such as science-and-technology, space, communications, maritime economy, and, security.

The naval aspect of this introspection took note of the deliberate disinformation that had been spread in the late 1980s that the Indian Navy's expansion and acquisitions were driven by an aspiration for power and, therefore, India was a potential threat to the smaller littoral states of the IOR. The motive of the navies who were orchestrating this campaign was obvious — they needed to project an image of an aggressive India to justify their own extant or intended naval force-levels.

Exercises with Other Navies

To dispel these misapprehensions, it was decided to let other navies interact with our Navy during naval exercises at sea. This, it was felt, would be a straightforward way for navies in the Indian Ocean to see for themselves how, within the resources available to it, the Indian Navy was striving to become self-reliant and keep its few vessels equipped with the latest available naval technologies.

During 1991 and 1992, exercises were held with the Australian, American, British and French Navies, followed in 1993, by exercises with the Singapore Navy. Similar naval exercises with the navies of the nation-states of West Asia commenced in 1993, starting with Oman.

By 1992, the USA and India were engaged in discussions on 'Confidence Building Measures' and the bad-mouthing of the Indian Navy abated. In 1992, the Navy Foundation hosted a symposium in Delhi entitled, 'The Indian Ocean — Challenges and Opportunities'. It was attended by naval representatives from Australia, Bangladesh, China, France, Indonesia, Iran, Pakistan, Singapore, UK, and the USA, as also by a number of national and international scholars. The core theme centred on the suggestion that with the emergence of a new world order, adversarial postures ought to be shed and countries of the Indian Ocean Region should come closer for mutual benefit. The idea floated was that of an Indian Ocean Region (IOR) "Panchayat". The term 'Panchayat' is an ancient Indian expression for an in-house community-conclave which, since time immemorial, has regulated and adjudicated the local and internal affairs of rural communities in India. By sharing perceptions, this 1992 symposium helped to dispel most Cold-War misconceptions.

The 'Milan' Series of Sub-Regional Interactions

From 1995 onwards, the Navy took the initiative to foster sub-regional maritime togetherness by organising a set of sub-regional naval interactions that were given the generic name Milan (a Hindi word for 'a meeting') at Port Blair in the Andaman Islands. Held once every two years, successive editions of Milan were held on India's eastern seaboard in 1997, 1999, 2001 and 2003. The 2005 Milan was cancelled after the tsunami of December 2004 but the series resumed the next year (the cycle changing from 'odd-years' to 'even' ones) and were increasingly well attended in 2006 and 2008. In 2006, the presence of a warship of the Myanmar Navy offered tangible evidence that the Indian Navy's initiative had succeeded in drawing out one of the

region's more isolationist countries. Amongst the more consistent participants at recent editions of Milan have been delegates and ships from the navies of Bangladesh, Indonesia, Malaysia, Singapore, Sri Lanka and Thailand. (Interestingly, there has been one edition of Milan — in 1999 — at Kochi, which was attended by ships from Maldives, Mauritius, Oman, Sri Lanka and the United Arab Emirates.)

Over the years, the Milan series of naval interaction has blossomed into a meaningful forum where young and middle-ranking naval personnel are able to exchange professional viewpoints on a number of regionally relevant and common maritime matters, such as 'Search-and-Rescue' and the establishment of Standard Operating Procedures (SOPs) for reliable and effective multi-national communications at sea.[1]

1999 also saw the Indian Navy and the Indian Coast Guard gain international recognition and approbation for their joint anti-piracy operation that led to the interception and recapture of the Japanese-owned merchant ship, the Alondra Rainbow, which had been hijacked by pirates, while carrying 2000 tonnes of aluminium ingots from Indonesia to Japan.

Other global events were causing an incremental shift of world attention towards the spectre of maritime terrorism and trans-national maritime crime, and, as a consequence, were gradually providing increasing impetus to the process of maritime naval cooperation. Perhaps, the most significant factor was the revised thinking that permeated the US Navy in the aftermath of the terrorist attack on the USS Cole while she was at Aden, on 12 October 2000. In overall terms, this enhancement of global interest and focus on maritime matters provided a supportive backdrop against which the endeavours of the Indian Navy to spread its reach within the Indian Ocean, as also to constructively engage other regional and extra-regional maritime powers was far more favourably viewed than before.

The International Fleet Review — 2001

The conduct of the country's inaugural International Fleet Review at Mumbai, in mid-February 2001, was one of the largest peacetime maritime events ever conducted by the Indian Navy. It was a momentous and spectacular display of naval diplomacy and maritime cooperation amongst the global community. The theme, 'Bridges of Friendship' underlined the bonds between navies of the world, 29 of which came together to make this event a major milestone in terms of constructive engagement by the Indian Navy. It served as an unequivocal declaration of intent of a new Indian Navy — competent, confident and ready to take its place on the global maritime stage.

September of that very year saw matters maritime being provided with even greater centrality, albeit for a much grimmer reason, as the USA, reeling from the horror of the terrorist attacks on New York and Washington, launched the ongoing 'multi-national war on terrorism', which focussed global attention upon the ability of terrorists to strike from across the seas. This event forced the USA to recognise the value of regionally powerful navies in ensuring stability.

International Maritime Convention on Maritime Search and Rescue

Exercises with other navies and symposiums were however, not the sole manifestation of India's new thrust towards promoting consensual, cooperative and constructive engagement across the maritime field. In 1979, the International Maritime Organisation (IMO) succeeded in getting the International Maritime Convention on Maritime Search and Rescue adopted. This convention provided the structure for a global Search-and-Rescue (SAR) Organisation, segmenting the oceans of the world into SAR Regions and laying down the guidelines for countries in each region to pool their SAR facilities for mutual benefit. Until 1998, pending the build-up of the Indian Coast Guard's seagoing assets, SAR was the responsibility of the Navy and joint SAR exercises were a feature of joint naval exercises. In 1998, the Ministry of Defence entrusted the responsibility for the coordination of maritime SAR to the Coast Guard. From 1998 onwards, the Coast Guard arranged multilateral SAR exercises that became a regular facet of the process of constructive engagement.

1. In February of 2008, driven by the need to address regional vulnerabilities by capitalising upon regional strengths, the Indian Navy catalysed the launch of what was indisputably the Twenty First Century's first significant international maritime-security initiative — namely, the 'Indian Ocean Naval Symposium' (IONS). Attended by representatives of 35 countries, the regional initiative was able to meet with wide acceptance across the length and breadth of the Indian Ocean. The aim of the IONS is to create, sustain and consolidate a regional security environment in which the comity of nations would be assured that every nation, big or small, would be treated as an equal partner.

Reference Note

History of Early Indian Ocean Trade

As early as 2000 BC, trade and migration networks extended across the Indian Ocean from the Middle East to East Africa, to India and Indonesia and further east.

In the past decade, a series of studies particularly from the University of Bergen, Indian Ocean Studies Project, have viewed the Indian Ocean rim as a global world linked for the past 4000 years through persistent cultural contact. The movements of people, goods and ideas between the port cities of the Indian Ocean led to inter-civilizational encounters and ensuing cultural change.

Material from Tamil and Chinese sources give a new understanding of the early history of the Indian Ocean. From the first century AD, we find networks which closely resemble the later Arab, Chinese, Portuguese and eventually British trade and migration networks.

Arabian

Central to this trade was the flow of commodities — coffee from Yemen, spices from India and South East Asia, slaves from East Africa, dried fish from Shihir and also the considerable business involved in transporting people going on pilgrimage to Mecca.

The emergence of Islam in the seventh century and the subsequent spread of Arab–Islamic culture across the Indian Ocean brought a new dimension and intensity to already established networks. More specifically, the regions to the south and east of Arabia became linked for the first time through a common religion, Islam, and through the adoption of elements from Arab culture. On the eastern shores of the Indian Ocean and deep into Central Asia, Buddhism spreading from India played a similar uniting role. As the Arab-Muslim networks spread, it was not long before Islam started to replace Buddhism in some areas. The establishment of Arab trade posts in seaports around the Indian Ocean was essential. There emerged an Arab diaspora bound together through trade links, marriage ties and travelling students and scholars. The uniting force of the annual pilgrimage to Mecca was an important factor.

The Arab Indian Ocean Trade began with small trading settlements around 800 AD and ended in the 1500's when Portugal invaded and tried to run the trade for its own profit.

African

As trade intensified between Africa and Asia, powerful city-states flourished along the eastern coast of Africa. These included Kilwa, Sofala, Mombasa, Malindi and others. The city-states traded with inland kingdoms like Great Zimbabwe to obtain gold, ivory and iron. These materials were then sold to places like India, Southeast Asia and China. These were Africa's exports in the Indian Ocean Trade. These items were sold at a profit because they were scarce in Asian countries.

At the same time, the East African city-states were buying items from Asia. Many residents of the city-states were willing to pay high prices for cotton, silk and porcelain objects. These items were expensive because they were not available in Africa at the time. These were Africa's imports in the Indian Ocean Trade.

The city-states along the eastern coast of Africa made ideal centres of trade. An important attraction was the gold obtained from inland kingdoms. The gold was needed mainly for coins, although it was also used for works of art, ornamentation on buildings and jewellery.

The city-states were easy to reach from Asia by ship because of the favourable wind and ocean currents. Ships had no trouble docking at the excellent ports and harbours located on the coasts of the city-states, making it easy to unload and load cargo. And merchants, tired after their long overseas journey, enjoyed the fine restaurants, lodging and entertainment offered by the port cities. Finally, East Africa was a peaceful region and the few conflicts that did occur were small and brief. All of these factors created an ideal

setting for import-export companies to conduct business.

Many of the merchants from the Arabian peninsula, India and Southeast Asia stayed in the city-states of East Africa. Inter-racial marriages were not uncommon, and gradually over the centuries, a new and distinct ethnic group developed, known as the Swahili. Today millions of Swahili people live in the nations of East Africa, where the Swahili language is widely spoken, which was a mixture of Arabic, Hindi and Bantu languages.

The Swahili city-states steadily grew and prospered and were a major world economic power by the 1400s. Although the city-states were famous throughout Africa and Asia, no European countries knew of them. One can imagine the surprise, then, of Portuguese Captain Vasco-da-Gama when in 1498 he came upon the bustling port cities of Sofala, Kilwa, Mombasa and Malindi as he sailed up the eastern coast of Africa. He and his crew were welcomed by each of the cities he visited, although neither his ships nor the European items they attempted to trade were of much interest to the Swahili governments.

Da Gama's mission was to find a route to Asia by sailing from Portugal, around Africa, then on to India. European countries had been buying Asian goods for years through more difficult routes. But now the countries of Europe had begun looking for faster, cheaper routes to Asia. Vasco-da-Gama did eventually reach India with the help of a navigator from Malindi named Majid. In 1499, Da Gama returned to Portugal and told the King and Queen, who had sponsored his voyage, everything that he'd seen, including the gold, ivory, porcelain, silk and cotton being bought and sold in the port cities along the eastern coast of Africa.

The Portuguese government took immediate interest in the Swahili city-states. They sent more ships to the eastern coast of Africa with three goals: to take anything of value they could find, to force the kings to pay taxes to Portuguese tax collectors and to gain control over the entire Indian Ocean trade. The city-states had never needed forts or huge armies and were unprepared for the Portuguese attacks. One-by-one, the Portuguese captured the port cities, then wrecked, looted and burned them to the ground. The residents of the cities who were unable to escape were killed. Shiploads of priceless goods were sent back to Portugal. However, the Portuguese attempt to take over and run the Indian Ocean trade was a failure because they were unsuccessful in capturing the choke points of Hormuz and Aden.

During this period, another major trading nation had mastered the Indian Ocean sea routes. The history of China's trade in the Indian Ocean trade is as old as that of India and their abrupt withdrawal is fascinating.

Chinese

Ibn Batuta, the Muslim geographer, who visited China in 1347 recorded a vivid description of the characteristics of the Chinese ships of that era.

"Chinese vessels are of three kinds — large ships called chunks (junks), middle sized ones called zaws (dhows) and small ones called kakams.

The large ships have anything from twelve down to three sails, which are made of bamboo rods plaited into mats. They are never lowered but turned according to the direction of the wind. At anchor, they are left floating in the wind.

A large ship carries a complement of a thousand men, six hundred of whom are sailors and four hundred men-at-arms including archers, men with shields and crossbows, who throw naptha. The vessel has four decks and contains rooms, cabins and saloons for merchants. A cabin has chambers and a lavatory and can be locked by its occupants. They are built of two (parallel) walls of very thick wooden planking; across the space between them are placed very thick planks (the bulkheads) secured longitudinally and transversely by huge iron nails. When these walls have been built, the lower deck is fitted in and the ship is launched before the upper works are finished.

On the China Sea, travelling is done in Chinese ships only. Three smaller ships, the 'half,' the 'third' and the 'quarter' accompany each large vessel."

The similarities in the names and descriptions of Arab and Chinese vessels is strong evidence of the old trading connections between these states.

China's military/maritime Navy can be traced back to the Ming dynasty. In the 14th century, rampant piracy off China's coast had led Chinese emperors to commence the construction of a long north-south inland canal through which merchandise-laden boats could ply between the southern and northern regions. Whilst this canal was being constructed over the decades, armed imperial Chinese ships kept the pirates at bay.

In 1402, the Ming emperor decided to extend his commercial influence westwards into Southeast Asia and the Indian Ocean. During the first century of Chinese Ming dynasty (1368–1644), the government sent out a total of seven voyages into the Indian Ocean and several voyages went as far as the east coast of Africa and the Red Sea. As a result, by 1415 the important trading ports from Japan and

Korea to the east African coast acknowledged the power of the Ming court.

In addition to asserting their power, a major objective of the Ming rulers in building their Navy was to deter the Japanese pirates which were afflicting Chinese maritime trade.

Commanded by Admiral Zheng He,[1] who was known as the "three-jewelled eunuch," these spectacular voyages established, demonstrated, and helped maintain China's political and cultural superiority. Between 1405 and 1434 AD, Zheng He led seven voyages of over sixty ships at a time, the largest and best equipped exploring fleets then known, laden with gold, silk, porcelain and other Chinese wares. During these voyages, unprecedented for that era, he visited Indochina, Java, Sumatra, Ceylon, Calicut on India's Malabar Coast, Hormuz at the entrance to the Persian Gulf, Aden at the entrance to the Red Sea and the coast of East Africa.

These voyages were intended to encourage Indian Ocean kingdoms to come and trade with China and at the same time to discipline private Chinese merchants who belonged to a pirate fringe. This policy was given up in the 1420s when the Chinese capital moved from Nanking to Peking to cope with the Mongol threat in the north.

After the inland canal was completed, water-borne traffic shifted from the sea to the canal route. The fleets built up during Zheng He's voyages were allowed to run down. This coincided with the imperial perception that China was self-sufficient enough to be the centre of the world and that there was no need to interact vigorously beyond its maritime boundaries.

After 1433, the Chinese decided to end the voyages, withdrew their ships, and forbade private overseas trading. This decision is attributed to a few factors. Firstly, dealing with the threat of the Central Asian intruders on the Northern Border consumed military attention and resources. Secondly, with the completion of a long inland canal, coastal trade and the threat of Japanese pirates could be avoided. Thirdly, the Silk Route overland could address the foreign trading requirements of the Chinese. The Chinese decision to end their maritime voyages and scrap the fleet is one of the most important decisions in modern history.

Piracy in the China seas, which had been one reason behind the Chinese voyages into the Indian Ocean, intensified with the northward withdrawal of the Imperial Navy. To counter pirate attacks, the later Mings (1435 to 1644) and the Manchus (1644–1911) tried to insulate China from the sea.

The next significant voyage of Chinese naval ships into the Indian Ocean took place 550 years later in 1985.

---

1 Admiral Zheng He (also known as Cheng Ho) was born in 1371 into a patrician Muslim family. Zheng He was a sixth generation descendant of a governor of Yunnan and grew up fluent in Arabic and Mandarin. Zheng He participated in the military campaigns of his time and studied at Nanjing's Imperial Central College.

Between 1404 and 1430, Zheng He led the Chinese Ming Dynasty's Imperial Treasure Fleets in seven voyages into the Indian Ocean travelling 50,000 kms and visiting 37 countries. During his first voyage in 1405, his fleet comprised 317 ships and 27,870 men, the largest fleet to have sailed the world's oceans up to that point in time. The fleet sailed down the coast from Nanjing, then capital of China, crossed the South China Sea on to Java, Sumatra, Sri Lanka, the west coast of India and then back home, after embarking envoys from the various countries who wished to visit the Chinese court.

By 1420, the Ming Dynasty's sponsored naval explorations began to decline because of the increasing pressure on China's northern border from resurgent Mongolian tribes which resulted in shifting of the capital to Beijing in 1421. Gradually, military expeditions replaced China's Indian Ocean voyages.

During Zheng He's final voyage between 1430 and 1433, his fleet visited ports in the Persian Gulf, the Red Sea, the east coast of Africa and finally the east coast of India where, reportedly, he died and was brought back and buried in Nanjing. Chinese expeditions to the Indian Ocean ceased after Zheng He's death.

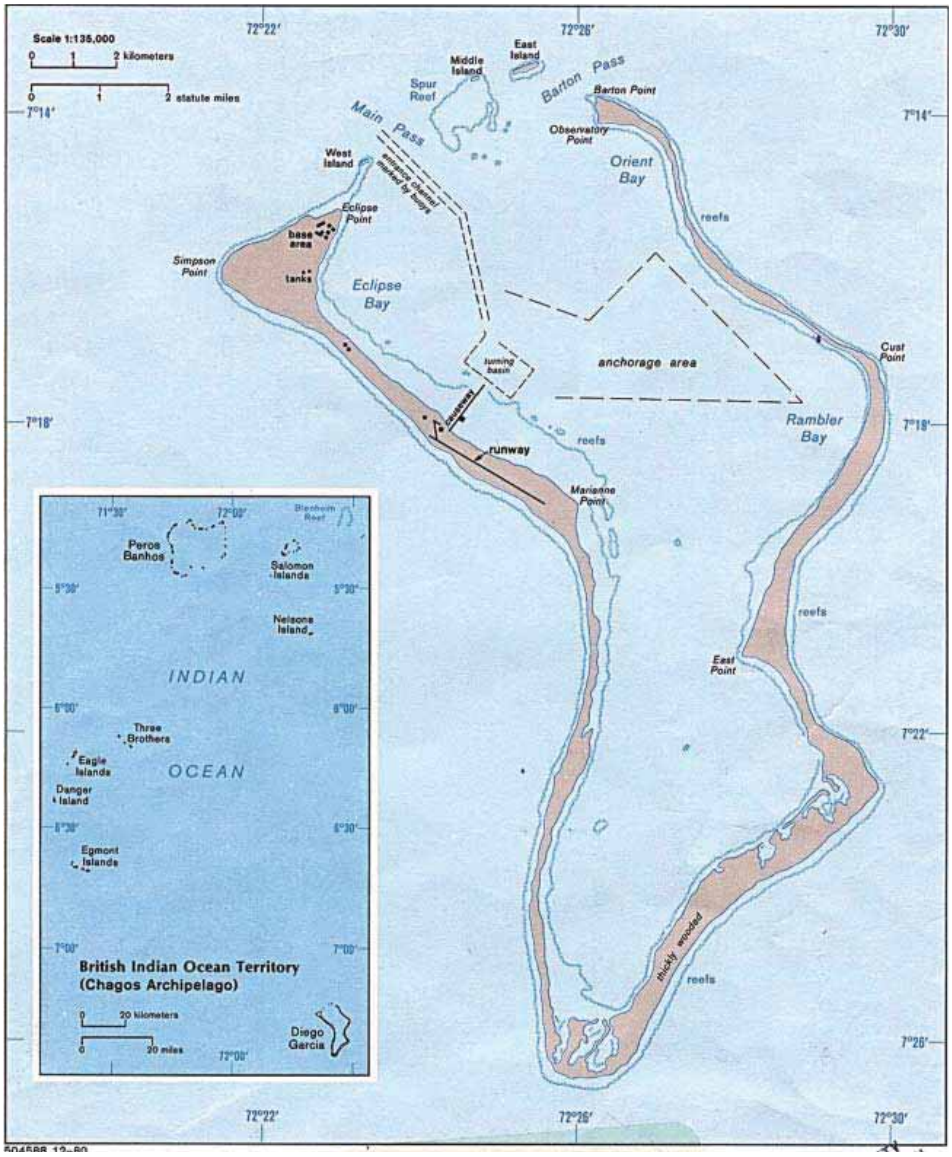
Reference Note

Diego Garcia

Historical Background[1]

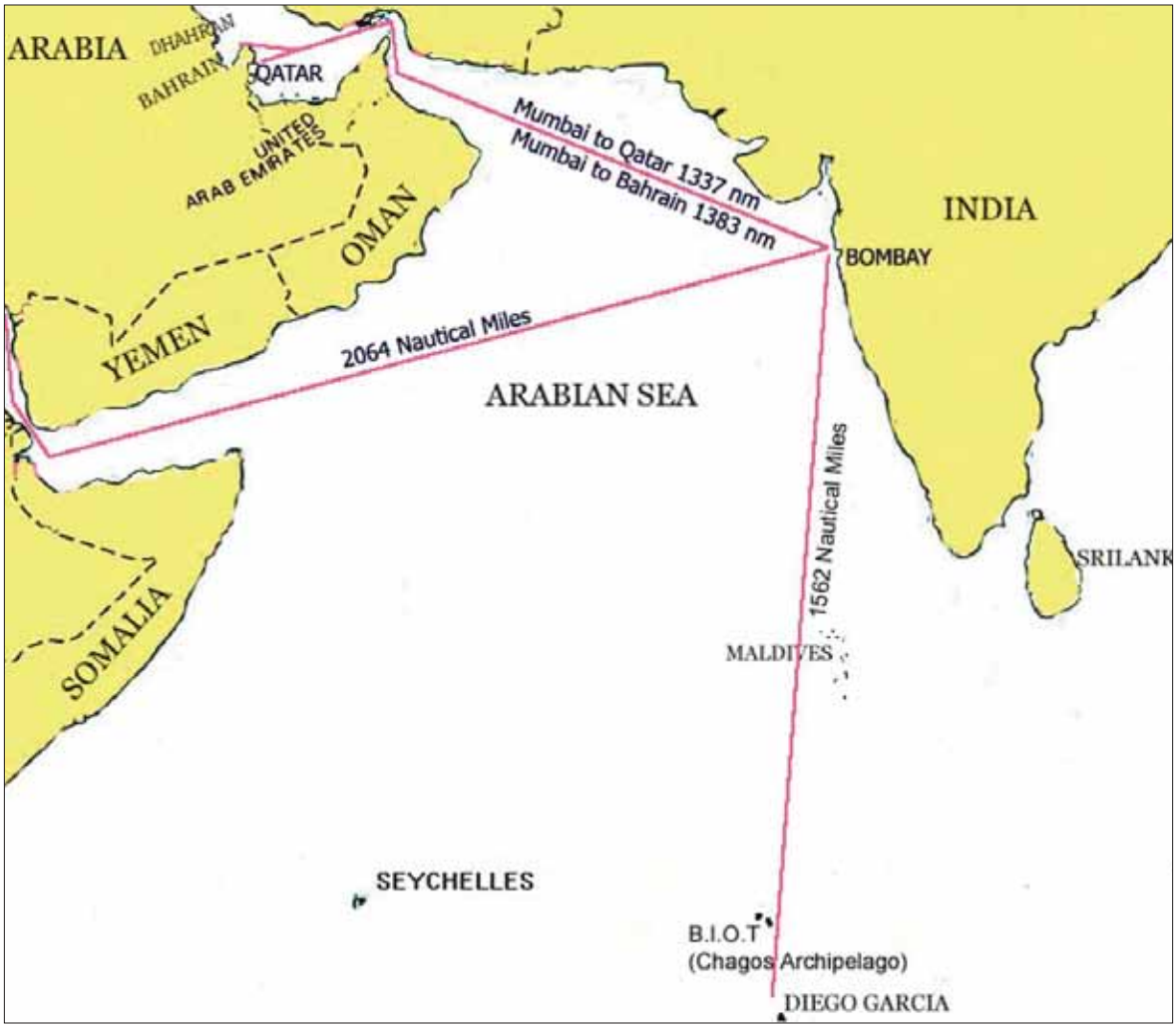
The semicircular Chagos archipelago, a group of islands and coral atolls, is strategically located in the central Indian Ocean, about 1000 miles (1600 km) from the southern tip of India.

Diego Garcia is the largest of the fifty-two islands that comprise the archipelago. It has an area of 44 sq km encircling a V-shaped, 24 km long, 11 km wide lagoon that is open at the north end.



Diego Carcia

1 Material drawn from public domain including Diego Garcia website.



Position of Diego Garcia (as also the 5th fleet base at Bahrain) with reference to Mumbai.

In 1964, Britain decided to start withdrawing its forces from 'East of Suez' and pass on the responsibility for the Indian Ocean to the USA. Diego Garcia emerged as a suitable location for a strategic naval base because:-

- The Chagos Archipelago was situated at the centre of the Indian Ocean.
- It lay out of the path of cyclonic storms.
- There was no likelihood of any local political opposition.

On 8 November 1965, before granting independence to Mauritius, Britain created a new colony named the British Indian Ocean Territory (BIOT), by amalgamating the Aldabra Islands and the Farquhar and Desroches Islands (all of which were purchased from the Seychelles, a British colony) with the Chagos Archipelago (which was formerly a dependency of Mauritius).

Under a bilateral agreement in 1966, the islands of the BIOT were earmarked for defence purposes and the British leased Diego Garcia to the US for an initial period of 50 years, under dual British and US control, as part of their worldwide communication network.

The Development of US Facilities

Construction of facilities commenced in March 1971. A naval communication facility and an 8000 foot runway were commissioned in 1973. By 1974, a ship channel and turning basin was dredged in the lagoon, the original runway was extended to 12,000 feet, new hangars, taxiways and accommodation were constructed and support facilities augmented.

During the 1973 Arab–Israel war, the Organisations of Arab Petroleum Exporting Countries clamped a complete embargo on oil exports to the US because it supported Israel.

By the mid 1970s, the US realised that a permanent naval presence would be necessary for rapid deployment in the Persian Gulf. It decided to further develop Diego Garcia as a basing facility for a US task force in the Indian Ocean.

In 1976, the US Senate opposed this expansion until the President reported to Congress his Administration's efforts to negotiate with the Soviets on de-militarisation and naval arms limitations in the Indian Ocean. The Ford Administration turned down the suggestion on the grounds that negotiations on such matters were not in the US interest while the Soviet Union and its Cuban surrogate were actively engaged in support of revolution in Africa, especially in Angola.

In 1979, the toppling of the Shah of Iran, the success of the anti-American Iranian Revolution and the Soviet intervention in Afghanistan combined to alarm the US about the security of the oilfields in Iran. The US Administration decided to deter any direct intervention in Iran that the Soviet Union might be tempted to contemplate.

This led to the 1980 Carter Doctrine. It created the Rapid Deployment Force in February '80, which subsequently transformed into the Central Command (CENTCOM) in January '83. From then onward, for all practical purposes, the Gulf Region has been under the direct control and protection of the US.

It was decided to further expand the facilities at Diego Garcia to provide support for several pre-positioned ships, loaded with critical supplies for injecting US forces into the Persian Gulf at short notice. By the end of 1980, dredging commenced to expand the berthing facilities.

In 1986, on completion of a $500 million construction program, Diego Garcia became fully operational as a major fleet and US armed forces support base.

After Iraq's 1990 invasion of Kuwait, Diego Garcia provided levels of support, which outstripped earlier contingency planning. With the deployment of a Strategic Air Command Bombardment Wing and other aviation detachments, Diego Garcia became a major US Navy base that launched offensive air operations during Operation Desert Storm that evicted Iraq from Kuwait.

After the terrorist attacks on New York and Washington in 2001, material started being built up in Diego Garcia for the operations in Afghanistan in 2002 and the invasion of Iraq in 2003.

Reference Note

Exercises with Foreign Navies

Month/Year	Exercises Held With/Ships Participated/Location
Oct/Nov 1991	Joint Exercise with visiting Australian Naval Ship Torrens off Port Blair.
Nov 1991	INS Kirpan exercised with RAN ships off West Coast of Australia.
Oct/Nov 1991	Joint exercises with US Navy on limited scale.
23–29 Mar 1992	INS Ganga (Host ship) and Kuthar exercised with FN Ship Aviso Detroyat.
May 1992	MALABAR 92 — Indo–US Exercise off the west coast.
Jan 1993	Western Fleet ships exercised with Oman Navy during their visit to Iran and Oman.
Apr 1993	Eastern Fleet ships exercised with Royal Singapore Navy.
18–19 Jan 1994	MALABAR 94 — Indo–US Exercise off the west coast.
18–19 Feb 1994	RINEX 01/94 — Russia–India Joint Naval Exercises. INS Ganga and Ranvir exercised with Russian Destroyer Admiral Vinogradov in the Arabian Sea.
21–24 Feb 1994	First IN-RSN training ASW exercise. INS Taragiri and Kursura exercised with RSS Victory off Port Blair.
12–19 Jan 1995	Second IN-RSN training ASW exercise. INS Dunagiri and Kursura exercised with RSS Valour and Vigilance at Port Blair.
1995	MILAN 1995 — A get-together of friendly navies of the Bay of Bengal littoral was attended by Naval ships from Sri Lanka, Thailand, Singapore and Indonesia at Port Blair.
21 Nov 1995	MALABAR 95 — Indo–US anti submarine naval exercise with US nuclear submarine on passage from Abu Dhabi to Kuwait.
Nov 1995	SADAKAH 95 — First Indo–UAE exercise. IN ships Ranvijay and Kuthar exercised with UAE ships Das and Murban.
04–12 Mar 1996	Third IN-RSN training ASW exercise. INS Vindhyagiri, Arnala, Saryu and Sindhuraj exercised with RSS Vigour, Vigilance at Port Blair.
27 Mar 1996	INS Gomati carried out Towed Array work-up with US nuclear submarine Birmingham, off Kochi.
26–30 Mar 1996	MALABAR 96 — Indo–US joint naval exercise off Kochi.
31 Mar 1996	Joint exercise of IN ships and Kirans with Singapore navy RSS Vengeance, Courageous and Daring.
20 Feb–30 Mar 1997	Fourth IN-RSN Training ASW exercise. IN Ships Shankul, Sujata and Godavari exercised with RSS Vigour and Victory at Kochi.
14–18 Feb 97	MILAN-97 — Biennial get-together of friendly navies of Bay of Bengal littoral attended by navies of Bangladesh, Indonesia, Malaysia, Singapore, Sri Lanka and Thailand at Port Blair.

04 Mar 1997	Italian Navy ship Bersagliere exercised with an Indian guided missile frigate off Mumbai.
Mar 1997	Joint naval exercises with ships of the US, Australia, Kenya and Singapore Navies.
Dec 1997	Joint naval exercises with ships of US, French and German navies.
13–15 Feb 1998	Joint naval exercise with the Royal Singapore naval ships, off Mumbai.
Feb–Mar 1998	SURAKSHA — Multilateral SAR exercise of IN with navies of Italy, Sri Lanka and Coast Guard of Mauritius.
02–13 Mar 1998	Fifth IN-RSN Training ASW exercise. INS Godavari, Shalki exercised with RSS Valour, Vigilance, Brave and Dauntless, off Kochi.
Mar 98	INS Ganga PASSEX with FN ships Somme, Agousta and Submarine La Praya.
02–03 Jun 1998	INS Ganga and Himgiri carried out joint exercise with the Royal Oman Navy, off Muscat.
04 Jun 1998	BARKAT 98 — IN ships sailed from Shuwaikh and exercised with Kuwait Navy ship KN Al-Sanbouk off Kuwait.
09 Jun 1998	MULAQAAT 98 — IN ships carried out exercises with HMS Oqbah of Saudi Navy during PASSEX after departure from Al Jubayl, off Saudi Arabia.
09–10 Jun 1998	INS Ganga and Himgiri carried out joint exercise with Iran Navy on passage from Bandar Abbas to Mumbai, off Iran.
04–13 Mar 1999	MAITRI — The first bilateral ASW exercise with RSN. INS Gomati, Shankush and TU 142M exercised with RSS Vengeance, Daring and Gallant, off Kochi.
Mar 1999	MILAN WEST 99 — Interaction of littoral navies of the Arabian Sea and Indian Ocean with ships from the navies of Maldives, Mauritius, Oman, Sri Lanka and UAE at Kochi.
Mar 1999	MILAN 99 — Biennial get-together of friendly navies of the Bay of Bengal littoral attended by the navies of Bangladesh, Indonesia, Singapore, Sri Lanka and Thailand at Port Blair.
Mar 1999	IN-FN PASSEX — INS Sukanya and FN Somme off Mumbai.
Apr 1999	BLUE CRANE — A tri-service peace keeping exercise of 14 nations comprising the South African Development Community (SADC). INS Sujata was the command and control platform and IN was the only Navy outside the region invited to participate.
Mar/Apr 1999	IN Ships conducted PASSEX with FN Ships visiting Indian ports in the Arabian Sea and in the Bay of Bengal.
24 May 1999	KAREEB — IN Ships carried out exercises with US carrier task group.
23–24 Aug 1999	IN-FN PASSEX — IN Ships carried out joint exercises with three FN Ships off Mumbai and Goa.
02–06 Mar 2000	IN Ships carried out joint exercises with three FN ships, off Visakhapatnam.
28 Feb–09 Mar 2000	IN Ships carried out joint exercises with two Russian naval ships.
19 Sep 2000	INS Ranvijay exercised with Singapore naval ships.
20 Sep 2000	IN Ships Delhi and Kora PASSEX with two Chinese PLA ships.
25 Sep 2000	INS Delhi and INS Kora carried out exercises with two Japanese naval ships off Port Blair.
25–26 Sep 2000	IN Ships Rajput and Sindhuvir carried out ASW exercise with RSN ships Valiant and Brave.
08 Oct 2000	IN Ships Delhi, Aditya and Kuthar carried out exercises with two Indonesian Ships.

Exercising with Foreign Navies

Enhancing Interoperabilty — Training with Russian Navy

SECTION II

Safeguarding the Sea Lanes

The Emerging Role of the Indian Navy in the New World Order

Preamble

"One mountain should have just one tiger" — Chinese proverb

India's role in the world order has been gradually expanding. From its fledging origins in the early-50s, to the exalted perch at which it finds itself now, there has been a virtual inversion of maritime status and power equations. Historically, Indian maritime forays into the outside world were driven by commerce and culture. There was a strong civilisational element to maritime excursions. Even the culturally affiliated 'Indian' kingdoms that came to be established in Southeast Asia were a result of the strong trade and cultural links shared with their Indian counterparts. The fact that they were completely independent — neither colonies, controlled from India, nor bearing any allegiance to any ruler in India — is illustrative of the 'nuanced' and balanced nature of our naval ambitions.

Contrary to what some western historians would have us believe, there was most definitely a deliberate and well thought out methodology to our maritime endeavours. India doubtless, sought to be a great nation; but not by conquest or plunder — instead by trading and cooperation.

In time, a realisation followed that for trade to flourish it was imperative to ensure safety through the sea lanes. This impelled the Indian Navy into taking a more assertive role in safeguarding the EEZ and SLOCs. In all operations undertaken subsequently, it displayed greater proactivism. It was, however, not in the least hostile or confrontationalist in either intent or approach. On display, was a clear demonstration of the willingness to uphold fundamental principles of peaceful co-existence that was the guiding spirit behind all our maritime engagements.

Strategic Perspective on the Navy's Emerging Role

In the 90s, for the first time after independence, Defence policy focussed on the larger context as to whether the military's role was to defend national territory and sovereignty against external aggressions or to establish a military presence in the region to safeguard national interests?

For the major part of India's post-independence period, the country had opted for an ostensibly defensive posture; the major preoccupation being the goal of rapid socio–economic development of the country and the concern for containing defence expenditure. The deterrent capability of our Defence Services, built up over the years, eroded considerably, even as it resulted in long stretches of comparative peace, enabling the nation to concentrate on its task of technological, economic and social advancement.[1]

It had an inevitable effect on the build-up of naval force levels. Sea control operations, based on the principle of continuously monitoring and controlling activities in a given maritime area over a period of time, required covering a theatre of operation extending over thousands of square kms. With depleted combat forces, it just didn't seem a practical possibility. The navy perceived this as a disabling factor that would have a disrupting effect in its being able to secure the SLOCs (that it saw as a prime responsibility). It, nonetheless, took proactive measures with its existing force strength to ensure that safety in the sea lanes was not compromised.

Operations Undertaken to Safeguard the Sea Lanes

The efforts of the Indian Navy to safeguard the sea-lanes in the 90s decade could be broadly categorised into four types of naval operations — Humanitarian, Low Intensity Conflict (LIC) operations against illegal and undesirable elements, Anti-Piracy and Deterrent.

Humanitarian. The United Nations Operations in Somalia between 1992 and 1994 in which India participated. It was a first for the Indian Navy, to

1. Excerpts from the Estimates Committee Report 1992–93

be participating in an operation of such scale and magnitude.

Low Intensity Conflict (LIC). Three prolonged 'round-the-clock' LIC operations against a mixed bag of malevolents:

- Operation Tasha in the confined waters of the Palk Bay which aimed to interdict the illegal transit of men and material between the LTTE Tamil secessionists in northern Sri Lanka and their sympathisers in Tamil Nadu.
- Operation Swan off the west and northwest Arabian Sea coast of India which aimed to interdict Pakistani terrorists smuggling explosives, weapons and ammunition in fishing vessels to religious extremists in India.
- Operation Leech and its successors in the Bay of Bengal which aimed to interdict the smuggling of weapons, narcotics and explosives from the bazars of Southeast Asia to coastal destinations on the eastern rim of the Bay of Bengal, for onward conveyance and delivery to secessionist militants who were combating Indian troops in the north-eastern states of India.

Anti-Piracy. Operation Rainbow, a joint operation with the Coast Guard in 1999, which resulted in the rescue of the hijacked merchant vessel Alondra Rainbow.

Deterrent. Operation Talwar in June 1999, wherein the Indian Navy enhanced security measures as a result of the Pakistani aggression in Kargil.

Operations Tasha, Swan and Leech demonstrated the ability of the Indian Navy and naval personnel to protect the EEZ not just from an economic but also a security perspective against malevolent forces operating in our territorial waters.

Operation Rainbow marked the first of the Navy's operations against the scourge of piracy, which has reared its ugly head again in the Indian Ocean.

Operation Talwar was the first instance of the Navy supporting land operations in a predominantly territorial war. It also highlighted the effectiveness of Naval deterrence in such conflicts.

The sustained proficiency of our men and the reliability of material as demonstrated in these operations boosted the confidence of the Indian Navy to undertake blue water operations in distant waters.

By 2000, based on the experience in the above operations, India's zone of peaceful maritime influence had crystallised from the distant Horn of Africa to the Strait of Malacca and to the Tropic of Capricorn in the south.

But there was also increased awareness that the mission of the Navy in the future would be defined by a new, more profound consciousness of the seas and the security of the sea lanes; that it would need the revision and redrafting of the framework of the conventional role of the Navy; that new geopolitical realities that shape our world would need careful and thoughtful consideration to truly comprehend the real threats that the future hold for us.

4

Operation Muffet in Somalia 1992 to 1994

Introduction

The Somalia operation between December 1992 and December 1994 was the Indian Navy's first ever overseas deployment in support of United Nations Humanitarian Relief Operations.

In the late 80s, a civil war had broken out in Somalia after a military campaign against the incumbent government, that saw serious clan-based fighting between rival factions and large part of the country being occupied by the forces of dissidence.

In September 1991, severe fighting broke out in Mogadishu, which continued in the following months and spread throughout the country, with over 20,000 people killed or injured by the end of the year. Agriculture was destroyed and it led to starvation in large parts of Somalia. The international community began to send food supplies to halt the starvation, but vast amounts of food were hijacked and brought to local clan leaders, who routinely exchanged it with other countries for weapons. An estimated 80 percent of the food was stolen. These factors led to even more starvation, from which an estimated 300,000 people died, and another 1.5 million people suffered between 1991 and 1992. By 1992, almost 4.5 million people, more than half the total number in the country, were threatened with starvation, severe malnutrition and related diseases. The magnitude of suffering was immense. Some 2 million people, violently displaced from their home areas, fled either to neighbouring countries or elsewhere within Somalia. All institutions of governance and at least 60 per cent of the country's basic infrastructure disintegrated.[1]

The UN Administered Humanitarian Operations

Against this background, in January 1992, the Security Council unanimously imposed a general and complete arms embargo on Somalia. In March 1992, agreements were signed between the rival parties in Mogadishu resulting in the deployment of United Nations observers to monitor the cease fire. The agreement also included deployment of United Nations security personnel to protect United Nations personnel and humanitarian assistance activities.

However, in the absence of a government capable of maintaining law and order, relief organizations experienced increased hijacking of vehicles, looting of convoys and warehouses, and detention of expatriate staff.

Operation PROVIDE RELIEF. The operation began in August 1992, when the White House announced that US military transports would support the multinational UN relief effort in Somalia. Ten C-130s and 400 people were deployed to Mombasa, Kenya during Operation Provide Relief, airlifting aid to remote areas in Somalia, to reduce reliance on truck convoys. The Air Force C-130s delivered 48,000 tons of food and medical supplies in six months to international humanitarian organizations trying to help the over three million starving people in the country.

Operation RESTORE HOPE. Ops Provide Relief proved inadequate in stopping the massive death and displacement of the Somali people (500,000 dead and 1.5 million refugees or displaced). In December 1992, the US assuming the unified command in accordance with resolution 794(1992) launched a major coalition operation, RESTORE HOPE to assist and protect humanitarian activities.

India's Participation in UN 'RESTORE HOPE'

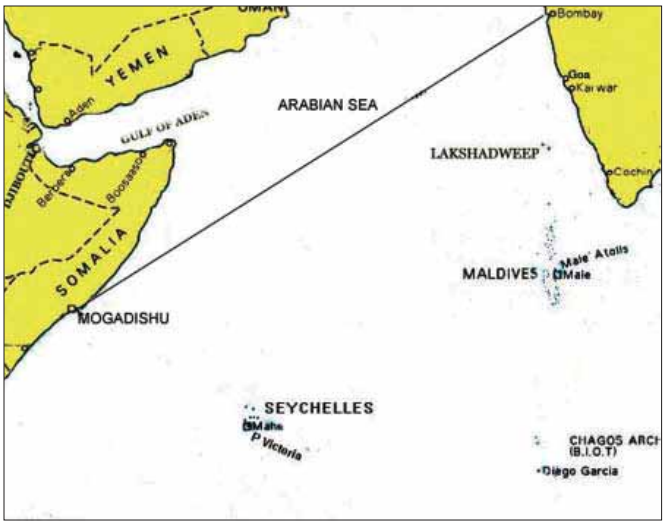
By the end of 1991, the situation in Somalia was grave. The international relief efforts were stymied by the fact that, while food supplies were reaching Somalia, armed gangs of the two warring factions looted food shipments and food convoys and prevented food from reaching the starving. There was urgent need to protect food deliveries from the looting gangs.

An American led multinational force comprising 35,000 troops from several countries was pressed into service. But

1. Refer to Reference Note, 'Background of the Somalia Conflict'.

more assistance was needed and an international appeal was sent out for other countries to join.

In December 1992, India decided to join the United Nation sponsored international effort "Operation RESTORE HOPE". India's contribution was a brigade of about 2000 troops and a naval task group of three ships.



Location of Somalia with Respect to India

The Indian Naval involvement in the UN Operation 'RESTORE HOPE' can be described in three segments:-

- Op MUFFET
- Op SHIELD
- Op BOLSTER

Operation MUFFET

Consequent to the Cabinet Committee on Parliamentary Affairs deciding in favour of participating in the humanitarian efforts, a task force comprising three ships was dispatched to Somalia. IN Ships Deepak, Kuthar and Cheetah constituted the task group and was commanded by Commodore Sampath Pillai who was designated as Commodore Indian Naval Forces (COMINF).

Indian Ships Deployed for Op MUFFET

Ship	**Period Deployed off Somalia**	
	From	To
Fleet tanker Deepak	December 92	Jan 93
Corvette Kuthar (COMINF)	December 92	Feb 93
Landing ship Cheetah	December 92	Feb 93
OPV Sukanya	Feb 93	Mar 93
OPV Subhadra	Mar 93	May 93
OPV Sharda	May 93	July 93
OPV Suvarna	Jul 93	Oct 93

An Indian Liaison Organisation (INLO) was set up with LtCdr Hari Kumar as the first INLO, at the Coalition Joint Task Force (CGTF) HQ located in the US Embassy building to liaise with UNITAF, UNOSOM and NGOs. The team consisted of one officer, three MARCOs and few others. The liaison officer represented the Indian forces at all meetings, intelligence briefings and functions at the CGTF HQ and was the nodal point for liaison between the liaison cells set up by 22 countries.

Instances of Direct Indian Participation

Search and Rescue by Sukanya. On 03 February 1993, INLO was approached by representatives of World Food Programme (WFP) and CARE to intercept a CARE chartered ship MV Remorra Bay which was carrying 350 tons of sugar and 15 tons of wheat flour. The ship had lost radio contact since 28 January 1993 off the coast of Merka. It was a practice of the Masters to unload the aid material at enormous profit at other ports (like Brava, Merca) and blame it on attack in the high seas by pirates. INS Sukanya

sailed with representatives of WFP and CARE to intercept the merchant vessel. At 1715 hrs, MV Remorra Bay was sighted and a Gemini was lowered with an armed boarding party. By then, the merchant vessel had resolved the engine problem that was due to fuel contamination.

Assistance for Humanitarian Aid. UNICEF sought IN assistance for the transportation of humanitarian aid between Mogadishu, Kismayo and from Mombasa. These stores, till then were airlifted and it was found uneconomical. INS Sukanya made two trips to Mombasa (10–20 Feb & 03–11 Mar). In addition, cargo was also carried for the Irish agency CONCERN and for UNOSOM.

Role in Transition from UNITAF to UNOSOM

The IN participation in the UNITAF 'Op RESTORE HOPE' was restricted to patrolling and transporting of UN Stores. The UNITAF operations were terminated on 04 May 1993 (17 December 1992 to 04 May 1993). However, the humanitarian assistance in Somalia continued as United Nations Operation Somalia (UNOSOM).

When UNITAF was handed over to UNOSOM II, the IN was requested for officers to assist the new HQ till permanent staff arrived. This was readily acquiesced and LtCdr NNS Manian, LCdr KK Pandey and LCdr Hari Kumar were assigned to the Transition Headquarters in March 1993. It was the first time in the history of the IN that naval officers wore the Blue Beret and worked on an UN mission.

The naval representation from ashore was withdrawn in June 1993 and the IN ships were withdrawn by end 1993. The performance of the Navy and the troops deployed for 'Operation MUFFET' made a conspicuous geopolitical impact.

Operation SHIELD and Operation BOLSTER

'Operation SHIELD' (06 to 11 December 1994) was the name given to de-induction of troops from Kismayo and ' Operation BOLSTER' (12 to 23 December 1994) concerned the de-induction of troops from Mogadishu.

The De-Induction

By the middle of 1994, the Brigade in Somalia, had completed its tenure of duty, and needed to be de-inducted. De-induction of UN forces and their equipment required offshore and air support, but this was not readily forthcoming. India therefore chartered merchant ships and an airliner.

The Navy deployed two frigates and a tanker for the de-induction operation. Each frigate had two Seaking heavy helicopters. The mission was assigned to the Western Fleet in the middle of November 1994, and the Western Fleet Commander was designated Task Force Commander. Ganga and Godavari sailed from Mumbai on 28 November and Shakti departed 26 November 1994, headed for Kismayo.

Ops — SHIELD

The Indian Navy's mission was "to provide naval presence and terminal support for smooth deinduction of Indian Army troops from Kismayo, Somalia, including Naval Gun Fire Support, where-so-ever feasible". On arrival off Kismayo on 06 December 1994, all helicopters were flown in formation over the town in a show of force. The Naval Task Group was assigned to:-

- Cover the de-induction of 1 BIHAR Battalion Group from Kismayo.
- Provide helicopter support for the evacuation of the rearguard elements.
- Provide air-surveillance and close weapon support during withdrawal of armour from airport to seaport and their loading on merchant ships.
- Provide hospital ship facility on board Godavari.

Phases of De-induction from Kismayo. By 06 December 1994, the 1 BIHAR Battalion, deployed in Kismayo for the UN controlled humanitarian and relief operations, had withdrawn from the town area and had concentrated in three areas namely Kismayo International Airport, Marolles Complex and Kismayo Seaport. The progressive de-induction of the troops began by their airlift to Mogadishu. Equipment packed in containers, along with armour and vehicles were also withdrawn to the seaport.

Phase I — Deinduction from Airport. The first phase commenced on 07 December 1994 with two L-100 aircraft arriving from Mogadishu for de-induction of the bulk of troops. The Battalion Commander of 1 BIHAR handed over the airport to the City Council and the troops guarding the airport, regrouped, and moved cross-country to the seaport. The Naval ships provided NGS while helicopters provided air surveillance and close weapon support all along the route for the withdrawing men and armour. The show of airpower with four armed helicopters providing route cover prevented the Somali militia from closing on the withdrawing troops. While the operation was in progress, two merchant vessels, namely, MV Free Wave and MV Vinnitsa arrived at Kismayo and anchored close to the IN ships.

Phase II — Deinduction from Marolles Complex. The Marolles complex, a facility under the control of Indian troops, was to be handed over to the Somalis. Situated at the northern end of the causeway between the mainland and the seaport, the complex was planned for vacation followed by a quick retreat of troops and armour to the Hamburger Hill/Seaport. As the operation got underway, a large number of armed Somalis converged at the checkpoint of the complex. To prevent any misadventure, all four naval helicopters were airborne and positioned to cover the approaches. Soon after, the Battalion Cdr handed over the Marolles Complex to the representative of the City Council, the armour and troops withdrew to the Hamburger Hill. However, as expected, no sooner had the complex been vacated, the locals broke into the area and looted the place.

Phase III. By the end of the second phase, the equipment of the 1 BIHAR Battalion was accumulated at the Seaport and the 208 troops had fallen back to Hamburger Hill. The third phase began with MV Freewave commencing loading on 08/09 December. The loading of MV Vinnitsa commenced the next day. By 11 December 1994, the vessels had completed loading and set sail for Mogadishu.

Phase IV — Deinduction of Rearguard Troops. Phase IV was the most crucial part of the de-induction since local militia were vying with each other to take control of the seaport and were intent on looting large quantities of fuel and rations of the UNOSOM, which had been abandoned at the seaport. As the two merchant vessels set sail with Indian troops, the naval contingent swung into action. With the MARCOs providing cover on ground, helicopters were stationed over Hamburger Hill and above the Bay (between the mainland and seaport) to provide close weapon support and check infiltration by boats. One Seaking was positioned on Hamburger Hill to transfer baggage of the rearguard, while two others guarded the southwest side of the seaport to ensure safe recovery of the rearguard. At the end of the phase on 11 December 1994, 203 soldiers had been de-inducted to Mogadishu. 'Operation SHIELD' was a success without any casualties.

Op BOLSTER

The task force from Kismayo arrived at Mogadishu on 12 December 1994, by which time the Indian and other UNOSOM troops had concentrated around the Mogadishu airport. The cargo, along with three BMPs of the Indian contingent to be shipped, had already been positioned at the port for evacuation and was being guarded by an Egyptian contingent. As soon as the task force arrived, loading of cargo into the merchant ships began. MV Vinnitsa was the first ship to complete loading on 13 December and soon moved out. MV Freewave completed loading and sailed out on 16 December, while MV Atlantic Lily departed on 18 December. In the meanwhile, units of the task force continued their vigil of the port until the last soldiers were repatriated by chartered ships and aircraft.

The Indian Naval Task Force was providing air cover and patrolling the coastline till the last UN chartered flight left Mogadishu on 23 December 1994. With the departure of the chartered flight, 'Op BOLSTER' was terminated and the Task Group proceeded to sea on 23 December from Mogadishu.

Rear Admiral RN Ganesh, recalls:[2]

"In 1992, the UN Security Council intervened in Somalia to restore order and stability after the severe humanitarian crisis caused by internal war in that country. A multi-national Task force was led by the US (initially named UNITAF and subsequently UNOSOM). The Indian Navy participated in the earlier phase which was mainly a logistic operation.

An Indian Brigade was despatched to Somalia in 1993 as part of the UN Forces to restore stability and the rule of law. The US launched a mission to terminate general Aidid and his senior officers. The mission backfired badly and the notorious "Blackhawk Down" incident resulted in the death of 18 US soldiers and ignominy for the US forces. Within 3 days, America abandoned Somalia. Thereafter, conditions in Somalia deteriorated steadily and the Security Council ordered withdrawal of UN forces from Somalia.

By the middle of 1994, the Indian Brigade, which had completed its tenure of duty with honour, was overdue to be relieved. It was obvious that the withdrawing UN forces would require offshore and air support. But neither relief nor support was forthcoming from the Western members of the UN Security Council.

This was the background against which the Indian Government decided to dispatch a Naval Task Force for the extraction of the Indian Brigade from Somalia. The task was assigned to the Western Fleet in the middle of November 1994 and the Fleet Commander was designated the Task Force Commander. Two FFGs (Guided missile frigates) Ganga and Godavari and a fleet tanker Shakti were selected to form the Task Force, which sailed from Bombay on 28 November 1994 and set course for the West Coast of Africa.

2. Rear Admiral (later Vice Admiral) RN Ganesh commanded the Naval Task Force that was sent to Somalia to de-induct the Indian Brigade.

The Task Force arrived off Mogadishu on the 06 December and established radio contact with the Headquarters of the 61 Independent Brigade. Two Indian battalions, which had been deployed in the interior, had concentrated on Mogadishu, but the 1 BIHAR was still in the Kismayo area, some 250 kilometers to the south. The situation in Mogadishu was under control as the air and seaports were well in the area held by the remaining UN forces. In Kismayo, however, the Indian forces had no support and they would have to be prepared to carry out a fighting withdrawal.

On 06 December, the Task Force arrived off Kismayo. The Brigade Commander and his senior officers were ferried aboard the flagship Ganga for a planning conference. It was decided that 1 BIHAR would withdraw to the seaport under support of a squadron of its T-72 tanks, and with a rear guard of about forty chosen men. The port was dominated by a hill feature (it was called "Hamburger Hill" by the Americans, and was named "Malabar Hill" by the Indian Task Force staff). The rearguard echelon of 1 BIHAR would take position on Malabar Hill and control the access to the port. The Seaking helos from the Task Force would be deployed on armed reconnaissance to keep at bay the pursuing forces of the Somali warlords with their gun-fitted lorries, locally known as "technicals". The electronic warfare capability of the ships was used to intercept messages between the Somali militia and keep track of their location. Meanwhile, the ships of the task force patrolled off the port, keeping the vital positions of the area constantly in their gun sights.

On 11 December, the Battalion withdrew as planned into the seaport and embarked on the Ro-Ro ships that had been chartered for the purpose, along with their vehicles, arms and equipment. At dawn on 11 December, the Indian chartered ship sailed from Kismayo Harbour for Mogadishu and in a swift and smooth operation, the remaining troops were helo-lifted from Malabar Hill in two sorties to the ships of the Task Force, while a third helo orbited overhead providing cover for the evacuation. Operation SHIELD had been completed successfully without a shot being fired.

The Task Force arrived off Mogadishu on the 12 December, and remained till 23 December 1994, when the last soldiers were repatriated by chartered ships and aircraft, and the naval units sailed back to Mumbai.

These operations had a strong impact in international military circles. India, a developing country, had shown the will and the capability to protect its interests across the ocean, off another continent, whereas more developed countries had failed to honour their commitments.

In many ways, Operations SHIELD and BOLSTER heralded a new maturity and purposefulness on the part of the naval and the civilian leadership in the exploitation of sea power in the extended areas of our interest.

The Indian Army succeeded because it went in with its boots on, and did not fight shy of going into the interior where required. The US effort on the other hand had been from the safety of the air and without any forces on the ground they were unable to establish their presence with authority.

The Army were deeply appreciative, however, and there were articles by them of the way our "boys in white" came to rescue them from a sticky situation. The Pakistani Brigade Commander said wistfully to me: "kash hamare navy walon bhi aisa karte!" ("I wish our Navy had also done likewise"). A couple of months later, the Journal of the Royal Artillery published a laudatory article on the important role played by the Indian Navy and the lessons it had for the western powers.

Col Anil Shorey[3] recalls:

"As our time came to return to India after nearly 15 months, the Somali clans grew more and more belligerent throughout the mission area, including Kismayo, the second largest coastal town of Somalia located 240 kilometers southwest of the largest town and capital Mogadishu. The Indian battalion, 1 BIHAR, was deployed there.

As the days for the final de-induction of the Indian brigade drew nearer, units in the hinterland chalked out plans to hand over respective charge to the local Somali authorities. While everything went smoothly in the hinterland, the battalion at Kismayo was not so lucky.

Intelligence reports received by the battalion at Kismayo indicated that some of the Somali clan members intended to coerce 1 BIHAR to leave all its weapons and equipment behind.

In case this was not agreed to, these would be taken by force. With this input, our hopes for a smooth and early exit from Somalia grew dim.

What the Indian brigade needed was a naval task force. But that seemed elusive since many Western countries were more inclined to 'wait and watch' the Somali situation rather than put their fleet to sea for the convenience of Third World contingents.

However, towards the end of November 1994, the Indian Government decided to send a naval force to Somalia.

3. *Sainik Samachar*, March 2006 : Extract of Col Anil Shorey's article in which he recalls the Navy's de-induction of his troops from Kismayo in December 1994.

Accordingly, an Indian naval task force of two frigates and a tanker, reached Kismayo on 6th December. For the officers and men of the Indian brigade, particularly those of 1 BIHAR and an independent squadron of 7 Cavalry (comprising T 72 tanks) based at Kismayo, it was a moment of pride, elation and relief to see their own, impressive and Indian made naval ships coming to assist them during the crucial de-induction.

The Brigade Commander flew into Kismayo from Mogadishu with a few Brigade staff officers. We were airlifted by naval Seaking helicopters to INS Ganga. A coordination conference was held where the operational modalities and support to be provided by the task force were discussed.

Op SHIELD, de-induction of troops from Kismayo started on the following day. The process went about peacefully and the crucial transition of Indian-held UN assets (excluding Indian weapons and equipment) between 1 BIHAR and local Somalis was executed at the Kismayo airport and seaport.

To ensure the safety of Indian troops, the Indian naval fleet provided various types of support — aerial logistics, fire support from integral helicopters, ship-to-shore standby fire support and signal communications.

Around this time reports came in about militant groups, belonging to three different clans, planning to force their way towards the seaport from three different directions. Gunshots could be clearly heard from the direction of Kismayo town. We soon learnt through intercepted wireless communication that Somali clan members were looting, at gunpoint, a Non Government Organisation's warehouse holding food grain.

At the Kismayo seaport, there was no major cause for worry as earmarked Indian troops, supported by tanks of 7 Cavalry squadron, were already deployed at vantage positions. Effective roadblocks had also been set up to ensure a smooth de-induction of Indian troops without external interference. As the de-induction progressed, the tanks and bulk of Indian troops at various check-points were to fall back to the seaport for boarding various ships, leaving behind an effective rear-guard of 40 personnel of 1 BIHAR.

Regular armed sorties of the Indian Brigade's Chetak and the Navy's Seaking helicopters also deterred the belligerent Somali armed factions from coming closer to the seaport. Simultaneously, the Indian naval ships had their weapons trained on to different land objectives and their electronic warfare equipment on board not only jammed militant radio frequencies but also selectively monitored their command and control communication channels, which provided invaluable information to Indian forces.

However, the most striking aspect and the grand finale of the entire Kismayo operation was the rear-guard action performed jointly by the troops of 1 BIHAR and the Indian naval task force.

After ensuring that no interference took place by Somali clan members during de-induction, the 40-odd troops of 1 BIHAR, forming the rear-guard, converged at the strategic Hamburger Hill. This hill overlooked the Kismayo harbour from the north and also the main approach leading to it from Kismayo town. From here, they were lifted by naval Seaking helicopters and ferried to different ships of the task force.

On the night of 11/12 December, the task force weighed anchor and arrived at Mogadishu by the afternoon from where it supported the de-induction of the bulk of Indian troops. By 13 December, the final de-induction by air and sea became effective.

This operation succeeded in sending signals across Somalia and the world that the Indians meant business in preserving the property and integrity of its brigade in Somalia during de-induction. It also proved that India was capable of dealing with such contingencies which earlier had been the prerogative of the US and Western navies".

Operational Significance of the Somalia Operations

Viewed introspectively, from a purely military perspective, the deployments between 1992 and 1994 were significant for several reasons:-

- They validated confidence in the Navy's re-oriented operational philosophy of "Forward Deployment" in blue waters. This was in sharp contrast to the earlier compulsions of being tethered in the vicinity of homeports, to conserve operating hours of machinery/equipment and fulfil the twin objectives of economising fuel costs and lessening the problems of logistic support of imported machinery/equipment.
- The intrepid way the Navy's unprotected helicopters (Seakings and Chetaks) carried out recce and air cover sorties was a revelation. Operating from their mother ships in turbulent winds at anchor, or patrolling close offshore in heavy seas, they also air-lifted troops during the de-induction of the Indian brigade in the very skies of Mogadishu in which Somali militants had shot down well-armed American helicopter gun-ships. Valuable experience was thus gained in operating integral helicopters for prolonged durations daily for air surveillance and recce.

- Equally valuable was the revelation of the ability of ship's and their integral helicopters to operate for several months at a stretch hundreds of miles away from homeport and their shore-based maintenance facilities/expertise. This substantiated the reliability of indigenised naval equipment and machinery. It also corroborated the concepts that underlay the training reforms of the preceding decades.

The sustained proficiency of our men and the reliability of material boosted confidence for the Indian Navy's blue water operations in distant waters. At the same time, it reinforced the vital need of more fleet tankers for such operations.

Lessons Learnt

Despite remarkable gains and the more than significant experience that it offered, there were important lessons to be learnt from the operation:-

- The operation brought home the dependence on tanker support, without which no progress would have been possible.
- The Navy realised that there were serious hazards of using helicopters in prolonged low intensity conflict in heavily congested urban areas.
- The difficulties of coordinating contingency plans between multinational forces assembled for UN Operations were also made clear.

Retrospect

Given the geo-strategic location of the Gulf of Aden through which thousands of merchant ships transit every year, Operation MUFFET yielded valuable insights. India, a developing country, had shown the will and the capacity to share in the protection of its SLOCs in its extended zone of maritime interest across the northern Indian Ocean, off another continent, as part of a multilateral UN task force.

The ability of ships to sustain prolonged operations for two years away from their homeports led introspective planners to conclude that India had extended to cover the SLOCs from the Horn of Africa in the northwest to the Straits of Malacca in the southwest.

From a national perspective, the operation was well received in all quarters. By all accounts the presence of our ships in the area earned considerable goodwill from the local population and facilitated the task of Army de-induction. In fact, the US Secretary of Defence expressed his appreciation and complimented the Indian Navy for their participation in the peacekeeping efforts.

For the Indian Navy, the operation, in its very essence, was a watershed and marked a new beginning for the Service. Apart from being a capability demonstrator and a confidence booster, it heralded the start of an era when the Navy could play a meaningful and effective part in international efforts in support of humanitarian operations. For the sheer range of experience in coordinated international action, that it provided the Navy with, Operation 'MUFFET' remains very significant.

5

Operation Tasha

Background

The Indian Peace Keeping Force (IPKF) was inducted in Sri Lanka in July 1987, as per the Indo–Sri Lanka Accord, to end the ethnic struggle that claimed many lives and ruined the country's economy. Operation Pawan started with the induction of the IPKF on 29 July 1987. The de-induction started in August 1989 and the operation terminated on 24 March 1990. When the last elements withdrew, there still had been no solution to the political problem.

Prior to the withdrawal of the IPKF[1] from Sri Lanka on 23 March 1990, considerable anxiety was experienced by the State Government of Tamil Nadu in respect of likely LTTE activity in the immediate future upon termination of Ops PAWAN. Due to the proximity of the land masses and adjacent common fishing grounds, the Palk Bay and the Gulf of Mannar have been a haven for illegal trafficking of humans and material from both sides. The LTTE exploited this route freely for its logistical requirements.

A formal request was made by the Government of Tamil Nadu to the Ministry of Home Affairs in February 1990 for central assistance through the continuation of Naval presence in the detachment at Rameshwaram and the establishment of a Naval detachment at Point Calimere.

On 30 May 1990, the Central Government ordered the IN and the CG to institute joint patrols to interdict all undesirable activities (including influx of refugees) in the Palk Bay area, in addition to law enforcement tasks already being undertaken. In execution of Government's directive, "Operation TASHA" was instituted on 21 June 1990. The requirement was envisaged by the Navy as a short-term requirement for 3 to 6 months and the expenditure was met from within Naval resources. Accordingly,

- Two Naval Detachments (NAVDETs), each deploying five trawlers hired from trade, were set up at Rameshwaram and Nagapattinam.
- The Naval Air Station which had been earlier functioning at Ramanathapuram (Ramnad) in support of the IPKF operations, was reactivated and operation of both fixed wing as well as rotary wing (helicopters) aircraft recommenced.
- IN and CG ships, operating ex-Visakhapatnam and Chennai, were deployed to provide continuous sea-borne patrol.
- Regular coordination meetings were held with the State authorities and State and Central enforcement, intelligence organisations.

Operation TASHA

An assessment-visit was made by the RM to the Palk Bay in June 1991 and the Government decided to continue the operation for a period of one year. The objectives of the operation were to:-

- Prevent illegal immigration and infiltration of LTTE militants to and from Sri Lanka.
- Prevent smuggling of arms, ammunition and contraband from the Indian mainland to Sri Lanka and vice versa.
- Enforce air surveillance and seaborne patrol to curb activities of Sri Lankan Tamil militants in the Palk Bay.

Patrol activities were coordinated by Naval Detachments on the Tamil Nadu coast. The detachments hired trawlers from the fishing industry, fitted them with machine guns and utilised them for investigating boat traffic across the IMBL. Marine Commandos and a Naval diving team were positioned at selected detachments.

Patrols of the International Maritime Boundary Line (IMBL) in the Palk Bay were carried out by shallow draft, minor war vessels (SDBs and LCUs) of the Navy and by patrol craft of the Coast Guard. Air patrols were carried out by Naval and Coast Guard aircraft and Naval helicopters.

---

1. Refer to Reference Note "Background of the Sri Lanka Tamil Conflict".

Enhancement of Op TASHA

Consequent to the assassination of Shri Rajiv Gandhi, the security situation in the Palk Bay region was reviewed by the state and central government authorities. At the state level, the meetings were convened and chaired by the Chief Minister of Tamil Nadu and the state Government requested for enhancement of assistance for an additional short duration in June 1991.

The surveillance plan envisaged a layered-concept to be executed in tandem with measures adopted by the State Government and involved:-

- Functional division of the Palk Bay region into two operational areas with Nagapattinam as Area HQ, North and Rameshwaram as Area HQ, South.
- Establishment of additional five NAVDETs along the Vedaraniyam/Palk Bay coastline at:-
  - — Topputurai
  - — Kodikkarai
  - — Mallipattinam
  - — Jagathapattinam
  - — Tondi
- Deployment of five trawlers hired from trade and fitted with MMGs, from each of the seven NAVDETs with few armed naval personnel to effect close-coast patrol around the 3-metre depth-contour line.
- Deployment of IN/CG ships along the IBL to ensure that the five-mile "No-fishing/prohibited zone" established by the Tamil Nadu Government remained under surveillance.
- Enhancement of airborne surveillance being mounted from the Naval Air Detachment (NAVAIRDET) deployed at the Naval Air Station, Ramanathapuram (NAS Ramnad). Periodic but random aircraft sorties to be undertaken to cover the area between the 3-metre depth-contour and the IBL, as well as along the IBL.
- Augmentation of the communications network.

The Naval Detachments were tasked to capture, destroy militants at sea in the Palk Bay area and assist the Tamil Nadu Govt to prevent movements of non-bonafide personnel and smuggling of contraband items in the coastal area between Karaikal and Land's End.

The detachments maintained the first barrier, of the three-tier surveillance of the Palk Bay area upto the IMBL, which required most intensive patrols. Each NAVDET maintained the patrol using armed trawlers in its respective area of responsibility along the three to five metre depth contour and upto six NM from the coast.

In a week, approximately 4000 trawlers were investigated and 1500 boarded by all seven detachments. The intensity of fishing operations varied from place to place but had been dense in the area around Rameshwaram.

Operational Constraints

Illegal Influx of Refugees. The escalating conflict between the Sri Lankan Army and LTTE added to the problems of the IN/CG patrols. Indian trawlers got involved in illegal ferrying of Sri Lankan Tamil refugees from Talaimannar to Rameshwaram for monetary considerations. To avoid detection, these trawlers beached at night at Rameshwaram and near Adam's Bridge where the water was shallow and naval boats could not chase them.

With the refugee influx into TN peaking in the mid 90s, the IN and CG patrols were found less effective in controlling the militant ingress along with the refugees since:-

- The SL Tamils caught in the line of fire between the LTTE and SL Army readily fled to Rameshwaram.
- Use of force against civilians during transhipment was not possible.
- Entry of illegal Tamil migrants was accepted on humanitarian grounds.
- The Police presence at the entry points was scanty.
- No effective mechanism was in place to check Indian fishermen involved in smuggling fuel (petrol, diesel, kerosene, urea used for making fertilizer bombs), contraband and human cargo. The apprehended boats were back in business within a short period.

The Kachchativu Problem. Traditionally, fishing by Indian fishermen in the waters of the Palk Bay in and around Kachchativu has remained a bone of contention between India and Sri Lanka for decades. Some fishing boats also indulged in illicit trade and transporting of personnel from Tamil Nadu to across the IMBL. Both these activities led to complaints by Indian fishermen of "harassment by the Sri Lankan Navy". Despite adequate warnings not to cross the IMBL, the fishermen continued to do so. Consequently, an un-stated task of the Navy and the Coast Guard had been to offer some protection to Indian fishermen.[2]

2. Ministry of Defence Annual Report, 1999.

The Naval detachments played an active role in sensitizing Indian fishermen and educating them to desist from crossing the IMBL till such time an agreement was made between the two nations and fishing rights/permits were given. However, economic compulsions force fishermen from India and Sri Lanka to cross the IMBL to fish in each others' territory. These attempts were spotted and foiled by the Naval Personnel on armed patrol in the area.

The Intelligence Problem. The lack of adequate intelligence in effectively combating illicit trade, gun-running and smuggling had been brought out by Mr. MK Dhar, Deputy Director of the Intelligence Bureau:-[3]

"The pitiable condition of cipher breaking capability was exemplified by challenges posed by the LTTE cipher traffic between the island nation and Tamil Nadu. Some Tamil knowing officers laboured exclusively to decipher the traffic in Tamil. But they were incapable of deciphering alphanumeric, numeric and alphabetic and sign ciphers. Much crucial cipher traffic between the LTTE high command and its safe houses in the Southern Peninsula remained unbroken for months together, being tossed over between the IB, R&AW and the JCB.

The precious life of Rajiv Gandhi could have perhaps been saved had the intelligence organisation acquired the capability of breaking LTTE ciphers. Both the IB and the R&AW did not have powerful first generation computers and required software to break enemy codes."

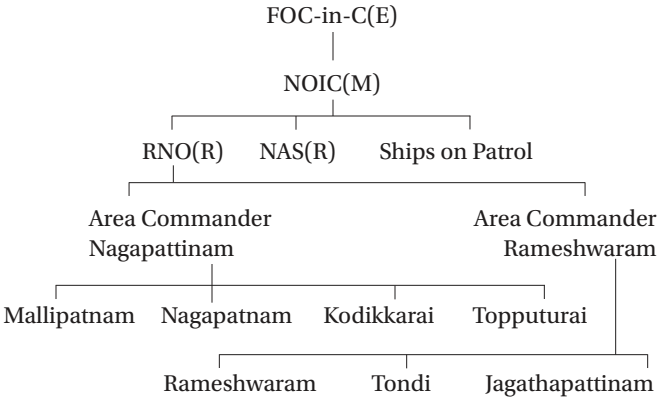
Organisational Structure

The overall operational and administrative control of Op TASHA was exercised by the FOC-in-C East through NOIC (TN) as the Zonal Naval Authority (ZNA). NOIC (TN) exercised its operational control on the NAVDETs through the Area Commanders, North and South. INS Adyar provided administrative support.

A post of Resident Naval Officer, Ramanathapuram, RNO(R) was created in 1996 and few officers and sailors were positioned under him. The RNO(R) was initially positioned at Ramanathapuram and functioned under NOIC (Chennai).

The Palk Bay from Rameshwaram to Nagapattinam was divided into two areas, with each area under the control of Naval Detachment Commanders at Rameshwaram and Nagapattinam. Area Headquarters, Nagapattinam exercises coordination control over Thopputurai, Kodikkarai and Mallipattinam detachments while Area Headquarters, Rameshwaram exercises coordination control over Jagathapattinam and Tondi Detachments.

The Command structure in 1993 was:-



Major Anti Smuggling/Gun Trafficking and Operations

Major search operations for large LTTE gun running vessels bringing military supplies from Europe and South East Asia have resulted in their capture.

Apprehension of MV AHAT. Based on intelligence inputs in early January 1993 on the likely landing of arms and ammunition by an LTTE ship near Mullaitivu on the North East coast of Sri Lanka, ships were deployed to apprehend the contraband carrier. The ship was detected on the night of 13/14 Jan 93 by CGS Vivek approx 400 nm SE of Chennai and was directed to proceed towards Chennai escorted by Kirpan and Vivek. On 16 January 1993, Ahat was observed to be on fire. While the crew members were recovered from the sea, it is believed that the hardcore LTTE members, including Kittu, perished in the conflagration. The crew were handed over to the police authorities in Visakhapatnam and subsequently to the CBI Special Investigation Team.

Operation 'Grey Hull' — November 1991. Based on intelligence reports on an attempt to land a consignment of arms and explosives in the northern Sri Lanka coast for the LTTE, coordinated scouting patrols by IN and CG ships and aircraft commenced. On 06 Nov 91, two small vessels were detected and tracked by CG Dornier aircraft 10.5 miles east of Karaikal. Upon being sighted, these vessels acted in a suspicious manner and headed seaward on an easterly course. Warning shots were fired across their bows but the vessels did not heed it and continued on their course.

3. *Open Secrets—India's Intelligence Secrets Unveiled*, 2005, pp 425 and 426.

IL 38 and TU 142 maritime patrol aircraft were deployed from Goa to augment air surveillance. INS Saryu was redeployed from its Palk Bay patrol to intercept and apprehend these vessels. INS Kirpan from Visakhapatnam and SDB T-60 from Chennai with Marine Commandos embarked were sailed to assist Saryu. After a long chase, the vessels were finally intercepted during the night of 07/08 Nov by INS Saryu. At first light, on 08 Nov, the vessels were boarded 180 miles from Chennai and the crew taken into custody.

The larger vessel Tonga Nova was on a regular supply mission since Mar 91. The last port of call of the vessel was Singapore where it had embarked cargo from MV Mondovian and the items were bound for Jaffna. A large quantity of thermocole floating in the area indicated the dumping of contraband items, arms and ammunition. The apprehended vessels were taken under tow to Chennai by Saryu assisted by Kirpan and SDB T-60. During the tow, the unmanned smaller vessel sank due to excessive ingress of water.

Capture of MV Mariamma. In Mar 1995, the Eastern Naval Command conducted a joint operation with the Coast Guard and was successful in locating and intercepting the LTTE supply vessel MV Mariamma. Eventually, the crew was forced to abandon and scuttle the ship to avoid being captured.

Op Bingo. On May 3, 1999, the Indian Navy participated in another joint operation with the Coast Guard in 'Op Bingo' to intercept a LTTE vessel, Showa Maru.

Long Term Effects on Naval Forces

Operation TASHA launched in 1990 continues till date. The Naval Wing of the LTTE has been vying for recognition in the North and North East waters of Sri Lanka. The acquisition of increasingly sophisticated equipment and the continuing enlargement of LTTE activities and their overseas network in Europe, South East Asia, including collaboration with ISI for shipping military equipment/ stores has kept the operation growing in size and demanding heavier investments and manpower.

Due to prolonged operation, the ships and aircraft deployed in the operation had been utilised at a rate far more than originally anticipated, resulting in premature maintenance and replacement. Small patrol craft on continuous patrol were particularly effected.

The detachments were manned by personnel drawn from various units on a temporary basis for periods ranging from two to six months initially. With escalation in surveillance activities, the strength of detachments had grown to more than 600. Gradually, a part of the personnel were posted on a permanent basis to have continuity in the operations and for administrative convenience. Subsequently, the number of personnel has been scaled down.

Future of Op TASHA. OP TASHA has been a long haul with its termination depending on the uncertainties in the neighbourhood. The Naval Detachments, though temporary in nature at inception, have acquired more or less a permanent stature. The TN and Pondicherry administrations on the other hand, have been proposing for additional detachments, whereas the Navy has been keen to handover the surveillance activities to the Coast Guard and Coastal Police set ups and concentrate on high seas.

6

Operation Swan on the West Coast

Background

The landing of contraband by smugglers and infiltration by anti-national elements from the Persian Gulf and from Pakistan, on the coasts of Gujarat and Maharashtra had been going on since the 1950s. It used to be dealt with by Navy-manned vessels of the Central Board of Revenue with representatives of the Customs, Excise and Police embarked.

Consequent to the apprehension and subsequent interrogation of anti-national elements associated with the bomb blasts at Bombay in March 1993, intelligence revealed that there was a likelihood of arms and explosives being landed from seaward along the Gujarat, Saurashtra, Maharashtra and Konkan coasts. The contraband was likely to originate from the Gulf or Pakistan. Further investigations revealed that the possible landing sites extend between Jakhau and Vengurla.

Operation SWAN

At the request of the Ministry of Home Affairs, joint Indian Navy–Coast Guard coastal surveillance commenced in April 1993. The task of the operation, code-named "Operation SWAN", was to prevent fishing trawlers from landing explosives, weapons and other contraband, on the west coast between the Indo–Pakistan IMBL on the Gujarat coast and Goa.

Surveillance

The surveillance activities were carried out by the Flag Officer Commanding-in-Chief, Western Naval Command supported by the Central Intelligence Agencies — the Intelligence Bureau (IB) and the Research and Analysis Wing (R&AW) for internal and external intelligence respectively and the State Governments.

Surveillance units were deployed in three echelons and operated under the control of Flag Officer Commanding-in-Chief, Western Naval Command:-

- An outer layer of surveillance using Dorniers and surface units of the Indian Navy and Coast Guard, in selected areas.
- An intermediate layer using ships of the Navy and Coast Guard and hired ocean going trawlers between 25–50 nm from the coast.
- Patrolling in the shallow waters upto ten miles from the coast by small, shallow draught ships and small hired fishing trawlers.

Sanitised Zone. A five mile sanitized zone was implemented on the Indian side of the Indo–Pak IMBL upto a depth of 40 nm seaward and no fishing activity was permitted in this area. The fishermen were informed by the State Governments and the sanitised area was enforced by the Coast Guard. Air patrols were used to supplement the barrier patrol along the sanitized zone.

Naval Detachments. In the first instance, twelve detachments were set up along the coast between Jakhau and Vengurla. The detachments consisted of minimum number of naval personnel supported, whenever possible, by either the customs or the police. Each of the detachments were provided with three trawlers for patrolling, fitted with LMG.

The deployment of trawlers for surveillance of close coastal areas was necessitated because ships could not operate in shallow waters due to draught constraint. Moreover, IN/CG Ships were not always available on account of their deployment for other tasks and exercises.

The hired trawlers also provided an element of camouflage and concealment as they easily passed off as normal trawlers engaged in routine fishing activity and were able to monitor all activities in the surrounding areas without arousing suspicion. The ocean going trawlers were hired from Fisheries Survey of India, and the coastal trawlers from trade.

The naval detachments were set up in Gujarat and Maharastra and placed under NOIC (Saurashtra) and FOMA respectively:-

Under NOIC (Saurashtra)	Under FOMA
Mandvi	Tarapore
Vadinar	Bombay
Veraval	Murud
Jaffarabad	Srivardhan
Valsad	Dhabol
	Jaigarh
	Malvan

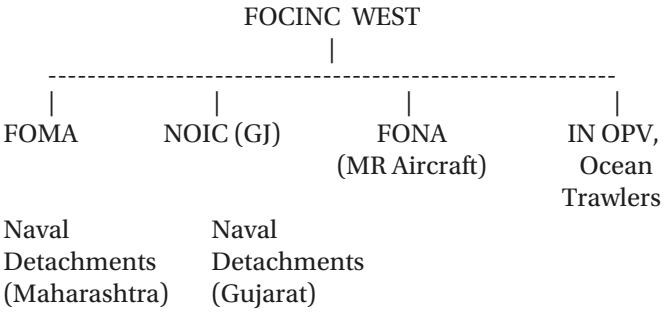
ONGC Patrol. The trawlers on patrol within the oil fields, operating under the control of FODAG were also warned to be vigilant against vessels likely to be involved in smuggling of arms and explosives.

Co-ordination Committees. State Governments had been instructed to convene Coordination Meetings at the State capital level chaired by the Chief Secretary and attended by reps of the Civil administration, Police, Customs, DRI, Central Police Force, IB, Ports, Navy and Coast Guard. District level meetings were also convened with representatives of the above agencies. These coordination meetings provided intelligence, communication and logistics support to the operation.

By 1997, the twelve detachments were increased to twenty two detachments along the coast between Jakhau and Vengurla assisted by the customs and the police. The Naval Detachments were located at:-

Under NOIC (Saurashtra)	Under FOMA
Jakhau	Dahanu
Mandvi	Vasai
Rozi	Bombay
Salaya	Murud
Okha	Shrivardhan
Dwarka	Dabhol
Porbandar	Ratnagiri
Mangrol	Malvan
Veraval	Devgarh
Diu	
Jaffarabad	
Hazira	
Daman	

Command and Control. The Command and Control of the operation is as follows:-



With the onset of monsoons, the joint coastal patrol (JCP) by Navy, Police and Customs personnel was usually suspended by early June every year. The Naval Detachments located at Dahanu, Vasai, Murud, Srivardhan, Dabhol, Ratnagiri and Deogarh were manned during the monsoon also.[1]

Sagar Rakshak Dal. To involve the coastal community in monitoring activities, Sagar Rakshak Dal was implemented in July 1999. The Navy was instrumental in the implementation of Sagar Rakshak Dal in 263 coastal villages under the supervision of Maharashtra Police. The aim of the scheme was to enhance the ongoing coastal security surveillance along the Maharashtra coast. A naval training team comprising of two Marathi speaking senior sailors was constituted for training more than 1000 SRD (Sagar Rakshak Dal) members between July and August, 1999 in the five coastal districts.

Intelligence Aspects

Much later, in 2005, Mr. MK Dhar, a former Joint Director of India's Intelligence Bureau provided insights on why, despite the resources deployed for surveillance, the exchange of information that prevailed during Operation SWAN was so inadequate.[2]

"Police investigations into the Bombay serial bomb blasts and subsequent events brought out a naked truth: the prime intelligence agencies of the country did not have any idea whatsoever about the coastline of India — from Gujarat to West Bengal, which enjoined the key security regions in Pakistan, the Maldives, Sri Lanka and Bangladesh. The coastline was open to threats from the Arabian Sea, the Indian Ocean and to the Bay of Bengal.

"The Coast Guard in its present form protects the territorial waters of the nation and prevents smuggling and

1. Ministry of Defence Annual Reports, 1999.
2. *Open Secrets — India's Intelligence Unveiled,* 2005, Chapter 31 titled 'Terror Strikes Back'.

poaching activities. It, however, paid more attention to the blue waters. It did not maintain regular vigil on the shallow waters and the minor ports and unspecified shallow landing sites. It was not designed to carry out the sieve work to filter the flourishing dhow traffic between India, Pakistan and the Gulf destinations.

"We began a task of carrying out a systematic study of the major and minor ports along the entire coastline, recorded and unrecorded landing sites, creeks and inlets. Simultaneous studies of the population and political complexities were taken up. Several smuggling cartels and criminal gangs were identified and modus operandi of transportation mechanism between the coastal areas and hinterland niches of the smugglers, hawala operators and the underworld gangs were charted out.

"There was initial resistance from the IB units in the coastal states. In most cases they did not have the workforce. More importantly, they had no training in generating maritime intelligence that affected the shallow waters and connected the external inimical forces with the internal saboteurs..."

"By end 1993, the State governments had some rudimentary shallow water patrol system, though it was pitiably inadequate. The Coast Guard too had diverted some attention to the shallow waters for a while. But the police efforts more often ended in futile chase as the slow moving dhows were no match for GPS arid Satellite Communication-fitted fast boats used by the smugglers. Most of the times, the police used rented dhows belonging to fishing magnates. The intricate linkages between the fishing-boat operators and the smugglers often defeated the secrecy part of police operations.

"In fact, there is a case for creation of a Central Coastal Security Force, appropriately equipped with modern boats and communication and surveillance equipment. It should be de-linked from the BSF, the Coast Guard and the state police. It may be mandated to have regular liaison with the Coast Guard and other land based enforcement units. There is an urgent requirement of involving the State police machineries and upgrading their capability to guard the vulnerable pockets along their respective coastlines. I hope the security planners will pay adequate attention to this requirement before another catastrophe hits the nation".[3]

Future of Op SWAN. The operation that commenced as a support to the State Governments has extended the Naval resources to a greater extant than anticipated since the operations have only scaled up. The Navy has been recommending that coastal surveillance be taken over by the respective state governments and Coast Guard so that the Navy could look towards blue waters.

3. The above excerpts substantiate the long pending proposals of the Navy for a closely networked organisation to safeguard maritime security.

7

Operation Leech, February 1998

Anti Gun-running Operations in the Andaman Sea

Background

When the British subdued northeast India and Burma, there existed already a large number of ancient ethnic/tribal entities/groups who on historical grounds had been seeking separate political and territorial identity. Over the centuries the peoples constituting the ethnic tribes had spread across the prevailing administrative borders in India's north-eastern states. Adjoining northern Burma there were the Nagas, the Mizos, the Manipuris, the Tripuris and the Bodos. In Burma, there were the Karens, the Kachins and the Arakanese. After India and Burma became independent, these ethnic groups, instead of joining the mainstream, succumbed to the temptation of secession and insurgency. Both countries were confronted with the intractable problem of pacifying/subduing secessionist movements in mountainous and deeply forested terrain which favoured the insurgents; this intractable problem was compounded by two other factors. The insurgents needed an uninterrupted supply of arms and ammunition which in turn needed an uninterrupted inflow of money to pay for the arms and ammunition.

Geographically, India's northeast region sits on the western corner of Burma's "Golden Triangle", one of the two largest opium producing regions in the world. The 2003 INCB[1] report ranks Burma as second to Afghanistan in opium production and states that more than 70% of the amphetamines available worldwide are produced in countries around the Golden Triangle, particularly Burma. The demand for narcotics in the developed countries generated a thriving narcotics trade, the profits from which enabled the insurgents to pay for the arms and ammunition.

The situation was further complicated by the actions of newly independent Communist China and the proliferation of communist inspired and/or communist supported insurgencies in this already troubled region.

Commencing 1966, (when the first batch 'Naga Army' reached China through Burmese territory for training) China trained several batches of Naga, Mizo and Manipuri insurgent leaders and provided sanctuary, weapons and training to an entire generation of Burmese Communist insurgents. The insurgents received most of their weapons from China. As the Chinese weapons were carried back by the insurgent groups through Burma, India started cultivating Burma's Kachin insurgents to deny the north-eastern insurgents the corridor to reach China.

In 1968, the Burmese Communists launched a fierce offensive in the border regions to expand their liberated areas. By then the Naga and Mizo insurgents had started using Burmese territory for safe havens and for reaching China. While Burma needed Indian support to cope with the China-backed Communists and other ethnic insurgents, India needed Burmese support to block the North Burma corridor used by its own insurgents to access Chinese training and weapons.

In the early 1980s, China stopped supporting the insurgent groups of Northeast India and of Burma, and the latter turned to the black markets of Southeast Asia for weapons. The long conflict in Vietnam had created a thriving arms bazar.[2] Soon thereafter, the insurgent groups from the Northeast gained access to this black-market through different sources. Most of the weapons were received in Thailand, loaded in ships and brought to the coast of Bangladesh to locations like Cox's Bazaar, from where they would find their way into Northeast India through land routes, with insurgents doubling as porters.

As the Indian Army tightened its grip in the north-eastern states, the insurgents moved their bases to Burma to obtain safer training and regrouping havens where new recruits could be taught guerrilla warfare and to which active guerrilla units could retreat when under pressure.

---

1. The International Narcotics Control Bureau Global Report.

2. The LTTE was the first to access this arms bazaar through the 'Karikal Muslims' (who hailed from the Tamil-speaking French dependency of Karikal) and had settled down in Indo–China during French rule.

Relations between Burma and India improved in the mid-nineties. In the end 1990s, military-to-military relations improved dramatically. India and Burma signed an agreement for 'increased cooperation to tackle cross-border terrorism and drug trafficking.'

After this agreement, Burmese troops attacked insurgent bases. In February 1998, India obliged Burma in Operation Leech by apprehending a large contingent of Arakan insurgents and their leaders in the Andaman Islands.

Operation Leech in 1998

Operation Leech was the overall name for operations in the Andaman Sea. Prior to Operation Leech, the gun-runners and drug-traffickers used to be handed over to the Governments of Burma and Thailand who would send their vessels to collect them.

In 1997, the objective of Operation Leech was more focussed and better networked. However, a small cyclone compelled the postponement of the 1997 operation to 1998.

Official Statements

The gist of the First Information Report (FIR) filed in Port Blair by the Deputy Naval Provost Marshal on 18th February 1998 states:

"Hard intelligence was received that a consignment of arms, ammunition and equipment was being brought by some foreign nationals to Landfall Island in trawlers/speed boats. They were reported to be of Southeast Asian origin. Intelligence sources intimated that the purpose of bringing arms, ammunition, stores and equipment to Landfall Island was to subsequently tranship them illegally to terrorist/ militant outfits in the northeast states of India via Cox's Bazaar in Bangladesh.

A joint tri-service operation was launched on 9th February 1998 to apprehend the smugglers along with their arms, ammunition and equipment. Coast Guard and Police also participated in the operation.

The operation progressed successfully and resulted in the capture of 73 foreign nationals. Six foreign nationals tried to escape into the adjoining area while opening fire on our troops. Our troops immediately responded in self-defence and fatally injured six of them whilst in the water. They were seen disappearing in the sea and are presumed dead. After a search, none of the six bodies could be recovered.

The 73 arrested men were handed over to the civil authorities. The arms, ammunition and equipment were retained for further investigation".

The 1998 Annual Report of the Ministry of Defence stated:-

> "Naval forces successfully undertook major operations in the Andaman Sea against gunrunners and narcotic dealers and apprehended a number of militants along with large caches of arms and ammunition. Some of the major operations were: -

- **Operation Leech** between 9th and 11th February 1998. The forces involved were Vindhyagiri (Naval frigate), Saryu (Naval offshore patrol vessel), two naval Landing Craft Utility, Coast Guard Ships Vivek and Lakshmibai, Naval Islander aircraft, Coast Guard Dornier aircraft, Army elements from 3 Madras and Air Force MI 8 helicopters.
- **Operation Poorab** between 29th May and 2nd June 1998.[3] The forces involved were Saryu (Naval offshore patrol vessel), Kirpan and Kuthar, Coast Guard Ships, LCU 34, 35 (two naval Landing Craft Utility), Naval Islander aircraft and Coast Guard Dornier aircraft.
- **Operation Hibiscus** between 9th and 17th August 1998. The forces involved were Khanjar (Naval

corvette), Himgiri (Naval frigate) Saryu (Naval offshore patrol vessel) and Kuthar.

Prima facie, Operation Leech was just one of many operations. However, it attracted widespread media attention.

The following information was given by the Defence Minister Shri George Fernandes in a written reply to Shri Ramjivan Singh and others in the Lok Sabha on November 28, 2002:

"A combined service operation (Operation Leech) was undertaken in February 1998 to intercept arms deliveries meant for Indian insurgent groups in the northeast. In this operation, 73 foreign nationals were apprehended and 138 weapons along with a large quantity of ammunitions were recovered.

On the basis of certain information and in view of the possible international ramifications of this operation, it was considered desirable that investigations into this episode be carried out by a Central Investigating Agency. Accordingly, CBI was directed to take over the investigation. The investigation is still on.

However, as no evidence could come forth during the investigation against 37 fishermen, a report under Section 169 Criminal Procedure Code was filed by the CBI and the fishermen were discharged by the Chief Judicial Magistrate on May 07, 1999. The remaining 36 militants who were lodged in jail in Port Blair were released from judicial custody on October 14, 1999. They are at present lodged in a building in Port Blair as they do not have any travel documents.

The investigation by the CBI is continuing."

Eventually, Human Rights advocates petitioned the judiciary for the release of the insurgents. In 2004, the Supreme Court issued notices to the CBI and the Andaman and Nicobar Islands Administration to file their replies.

For the foreseeable future, the security of India's north-eastern states requires that insurgents, militants and secessionists be denied use of Myanmar's thickly forested, hilly, porous frontiers for smuggling arms and ammunition into India.

The main entry point for smuggled arms and narcotics was, and still is, Cox's Bazar on the Bangladesh coast, where anti-Indian organisations have set up an inter-linked network for supply of weapons to insurgents and terrorists.

As in the case of Operation Tasha on the southern seaboard and Operation Swan on the western seaboard, Andaman Sea operations like Leech will remain a continuous activity.

3. According to a newspaper report, "On 31 May 1999, the Indian Armed Forces, in Operation 'Poorab' had intercepted two more Thai vessels with 50 kilograms of heroin along with another large consignment of weapons headed for Cox's Bazar, the destination for all consignments meant for Pakistan's Inter Services Intelligence for onward despatch to the United States of America and the other flesh plots of the West, where just a kilogram of heroin can get upto a million dollars, so essential for financing Pakistan's arms purchases. From Operation Leech on 11 February till April 1998, five consignments of arms meant for the insurgents in north-east India, went through from Ranong, on the Thailand–Myanmar border to Cox's Bazar".

8

Operation Rainbow — November 1999

Operation Rainbow was a joint operation between the Indian Navy and the Coast Guard which resulted in the seizure of a hijacked merchant vessel Alondra Rainbow on 16 November 1999, 450 kms off the coast of Goa.

MV Alondra Rainbow, an 8900-tonne Japanese cargo vessel was carrying 7000 tonnes of aluminum ingots from Kuala Tanjung in Indonesia on 22 October 1999 to Milke in Japan. Soon, a ten-member gang of masked Indonesian pirates armed with guns and swords overpowered the crew of two Japanese nationals and 15 Filipino seamen. The crew was left adrift in an open raft on 29 October and was rescued by Thai fishing boats off Phuket Island on 08 November.

The Piracy Reporting Center of the International Maritime Bureau had sounded an alert providing a description and photograph of the vessel world over. A reward of US $200,000 was announced for information about the vessel. The Indian Navy received an intelligence report on the 13 November and passed it on to the Indian Coast Guard.

The Coast Guard deployed two patrol vessels and mounted an air search. It received a message from a merchant vessel, MV AI Shuadda through the Piracy Reporting Centre, Kuala Lumpur of sighting of a ship that looked like MV Alondra Rainbow, 60 miles south-west of the Southern tip of India headed north-west. The patrol vessels intercepted this vessel whose name was freshly painted over to read Mega Rama, reflagged under Belize registration. Despite repeated requests on radio, the vessel maintained radio silence and refused to permit examination. It disregarded warnings to stop, crossing the Lakshadweep islands at a speed of eight knots. CGS Tarabai fired at the vessel, but failed to stop it. Firing continued for two days and the speed of 14.5 knots proved too much for the Coast Guard vessels.

The Indian Navy was called in for additional firepower to stop the vessel. INS Prahar, a fast Missile Attack Craft (1241 RE) of a top speed of 40 knots, which was on deployment in the Arabian Sea was directed on 15 November 99 to intercept the pirated vessel. The Western Fleet already at sea, detached INS Gomati, the Flagship and INS Delhi to assist the operations.

When the pirates continued to disregard warnings and the gunfire across its bows, Prahar opened fire with its 30 mm guns and later with its heavier 76.2 mm main gun. On 15th November, the pirates decided to scuttle the ship and opened the sea chest valves in the engine room. “If the pirates had their way, they would have scuttled the ship to destroy evidence,” said Commodore Taneja.[1]

The vessel with pirates onboard was apprehended on 16 November 1999 and the pirates were taken into custody. Diving and repair teams from the naval and coast guard ships boarded the vessel to effect salvage of the vessel. It took naval divers ten hours to locate the valves, by then under twenty feet of water, and close them to stop further flooding. Additional pumps and salvage equipment were transferred to assist the salvage teams.

On 17th November, the vessel was taken under tow and arrived at Mumbai on 20th November.

Rear Admiral JS Bedi, the Chief of Staff in Headquarters, Western Naval Command recalls, “It was a well-coordinated operation between the Navy and Coast Guard. It started as a Coast Guard operation, but since their own assets were not in a position to handle it, the Navy stepped in and later handed the vessel back to them.”[2]

---

1. http://www.expressindia.com/November 17, 1999.
2. Ibid

9

Operation Talwar during the Kargil War in 1999

Preamble

Of the four wars since Independence, the three-month Kargil war, in 1999, waged by the Indian Army to repel Pakistani intrusions into Indian Territory, was the longest. The mindset that underlay Pakistan's repeated, almost obsessive, military misadventures prior to Kargil was marked by 'hatred' and 'mistrust'. It resulted in three fierce and intense conflicts in 1947, 1965 and 1971. But despite its earlier experiences with its traditional adversary, nothing that preceded the war had prepared the Indian Army for the horror that lay ahead.

In May 1999, Pakistani intruders crossed over the Line of Control and occupied peaks that were vacated by the Indian Army during the winter. Pakistan moved in troop formations close to the LoC and the International Border and supplemented the irregulars with regular soldiers from its Army. By the time Indian Forces realised the extent of the infiltration, the intruders had already established a firm hold over most peaks along the LoC. Not to be outdone, the Indian Army moved in to take control of the situation. But it had misread the gravity of the incursion and initially suffered heavy losses. It took a coordinated operation on the part of the three services to bring the perpetrators to heel. More importantly, the operation became a living testimonial of the grit, courage and valour displayed by the Indian Army in the face of impossible odds. Expectedly, it extracted a heavy cost, both in terms of resources expended and casualties suffered to evict the enemy from the occupied posts.

Genesis of the Conflict

The genesis of the conflict in Kargil dates back almost 40 years to the creation of the 'Mujahideen' — a Muslim guerrilla group formed to counter forces of occupation in Afghanistan. In 1979, the Soviet Union had sent its Army and Air Force into the country to prop up the protégé Communist regime that was struggling against an American supported, anti-Communist rebellion by devout Muslim elements. The Soviet military intrusion was viewed by the Americans as a geo-strategic threat to its interests in the oil-rich Persian Gulf. It decided to give a fitting response to the Russians by ensnaring them in a 'Jihad', a religion-driven holy war, by fundamentalist Muslim 'Mujahideen' trained in guerrilla warfare, putatively to confront the Russian troops. To achieve this objective, America co-opted the Pakistan Army's Inter Service Intelligence (ISI) organisation to set up camps to transform into Mujahideen, the youth that had been indoctrinated in "Madrassas" (traditional Muslim theology schools) and provide those being trained in Pakistani camps and ethnic Afghan factions with money and weapons.

By the early 1980s, America and Pakistan had trained huge numbers of Mujahideen for the war in Afghanistan. These fighters provided the Russians with stern resistance, literally taking the fight to the enemy camp. Unable to prevail against the Mujahideen, Russia, in 1985, decided to withdraw from Afghanistan.

The success of the American plan in driving out the Russians from Afghanistan could be seen as policy triumph, but as time was to prove, it was only a tactical victory and a rather facile one, because in the 'Mujahideen' the Americans had created a monster they could not control. Its rise, as a potent force, was eventually to result in fateful consequences, not just for America, but also for the South West Asian region as a whole.

The reasons for America's inability to predict the disastrous ramifications of their actions in Afghanistan were many:-

- The Americans had not accounted for the fact that the Russian withdrawal would leave vast numbers of battle-hardened Mujahideen in its wake. Abandoned by their masters, these rustic and ruthless warriors spread out across South West Asia and other parts of the Muslim world, driving religion-based, anti-government Islamic movements. From the creation of the dreaded 'Al Qaeda' movement, to insurgencies in Russia's Chechnya, terror cells in the Philippines and Indonesia, to fanning separatist fires in India's province of Jammu and Kashmir, Mujahids stamped their presence with disdain, creating fear and

apprehension among the political establishments in the affected countries.

- Nothing that the Americans could do was enough to stop Pakistan's Madrassas and the training camps from continuing to churn Mujahideens. They had not anticipated that it would spawn a negative and belligerent mindset.
- The Russian withdrawal had left behind huge amounts of money and military equipment, weapons, ammunition and explosives in the hands of the diverse tribes and ethnic Afghan factions that had fought against the Russians. The merchandise was all there to now use on a new adversary.
- The operation left behind an economic affiliation between the poppy/opium growing interests in Afghanistan and the global narcotics trade, the profits of which would recurrently provide the money to fund ongoing insurgencies and the procurement of weapons, ammunition and explosives.

Not surprisingly, Pakistan was quick to seize the opportunity of using its 'strategic asset', rendered redundant in the aftermath of the Russian withdrawal, against India. For long, Pakistan had waited for an opportunity to get even with its arch-rival. Having suffered a humiliating defeat in the 1971 war and piqued by the Indian Army's pre-emptive occupation of the commanding heights in the Siachen glacier, Pakistan laid in wait for an opportunity to avenge its disgrace. Acutely aware of the inability of its Armed Forces matching India's might in a conventional war, it decided to launch a proxy-war, adopting a strategy of "bleeding the enemy by a thousand cuts".

The Pakistani Army put its malevolent strategy into effect by instigating, training and arming insurgents in Kashmir, Punjab and in India's restless northeastern states. To supplement the homegrown insurgents in Kashmir, armed, battle hardened Mujahids, now in search of another 'Jihad' were diverted to intensify the militant-terrorist activities. A massive infiltration process got underway, wherein huge numbers of armed insurgents crossed over the Indian side. Their aim was to destabilise the Indian establishment. They planned to do it by creating unrest and formenting trouble, with the larger political objective of weakening the Indian security structure and undermining its political establishment.

The insidious operation, spearheaded by the Mujahideen, initially met with much success. Pakistan found it propitious to siphon off money and weapons, still pouring in from America, ostensibly for the anti-Russian jihad, and used it to step up insurgency in Kashmir. But gradually, the Indian security forces came to terms with the threat and started dealing with it effectively. By the mid 90s, the electoral process had resumed and it only helped further improve the law and order situation. Another few years down the line, the tide had firmly turned in favour of the Indian establishment. By the late 1990s, most people of Kashmir, disenchanted with prolonged militancy, were helping Indian security forces identify militants. It was a blow for Pakistan that now desperately searched for a means to re-energise the militancy.

In May 1998, India and Pakistan conducted nuclear weapon tests. India's increasingly stern responses to the ongoing Pakistan-instigated cross border terrorism triggered international anxieties of a nuclear confrontation in the sub-continent. Pakistan decided to make the most of these fears to bring international pressure to bear on India to resolve the Kashmir issue. It didn't turn out the way Pakistan was hoping for. While sanctions were slapped against both India and Pakistan, the limitations were largely of a 'deterrent' nature and the International community did not make any overtures to either of the countries to solve their political or territorial problems. Time was running out for Pakistan and it decided to launch an operation in Kargil.

Prelude to the Conflict

In Pakistan, the civilian Prime Minister had successfully removed from office the President, the Chief Justice and the Army Chief. He replaced the latter with Pervez Musharraf, an ace General who had served in the Northern Areas for several years, commanded the Special Services Group in Siachen and who, in his earlier appointment as the Director General of Military Operations, had first advocated the 'Kargil Plan'. The growing anti-militancy mood in Kashmir and the ambition of two key Pakistani personages, the Prime Minister and the Army Chief, combined to seek a decisive resolution of the Kashmir issue by launching the Kargil Operation.

In February 1999, Pakistan launched Operation Badr in Kargil — an operation whose concept, according to a Pakistani source, had taken shape as early as 1987.

The Conflict[1]

The Line of Control near Kargil is marked by intermittent posts that are separated by very steep, heavily snowed,

1. Excerpts from the 'The Kargil Review Committee Report'.

avalanche-prone mountainous 'gaps' of 10 to 45 kilometres. In winter, the terrain in these gaps is impassable. By an unwritten concord between the local Indian and Pakistani military commanders, every year, between November when winter started and May when winter ended, Indian and Pakistani troops used to leave these gaps "un-held".

Pakistan's plan was to stealthily infiltrate troops, masquerading as Kashmiri freedom fighters, through these unheld gaps and by the spring of 1999 be well dug-in in Indian territory. The plan counted on a normal winter and on achieving tactical surprise that would enable the infiltrators to consolidate along the heights above Kargil before the Indian side could react.

Pakistan hoped that its surprise intrusion in Kargil, followed by India's strong reaction, followed by Pakistan's threat of using nuclear weapons would precipitate international intervention to force India to accept an early ceasefire and negotiate a new Line of Control in Kashmir. Should foreign intervention take too long to materialise, Pakistani troops would stay where they were till October when the next winter set in. Thus they would continue to dominate the Kargil and adjacent sub-sectors bordering the national highway from Srinagar to Leh along which all supplies were transported to the entire Ladakh region.

Meanwhile, the ongoing high-level political interaction about a negotiated peace had culminated in the invitation by Pakistan's Prime Minister to India's Prime Minister to visit Lahore in February 1999. It became known later that at the very time that the Prime Ministers were discussing peace in Lahore, (later called the Lahore Process) intruders had already started crossing surreptitiously into India.

To achieve surprise, Pakistan camouflaged its moves. To the infiltrating troops, the intrusion was explained as a reply to India's capture of Siachen in 1984, the aim now being to establish a new Line of Control.

The Intrusion [2]

In end January/early February 1999, reconnaissance parties comprising officers of the Pakistan Army's well-acclimatised Northern Light Infantry and Special Service Group (SSG) commandos started crossing at unguarded points along a 200 kilometre segment of the 740 kilometre-long Line of Control. By end February, they established a first line of administrative bases across the Line of Control within a limited distance. There was heavy snowfall in March. They moved forward in April. The bulk of the troops entered Indian territory, by late April and moved up a further two to three kilometres. To avoid detection by Indian Army Aviation helicopter patrols and to achieve surprise, they took great care to move only in the un-held gaps between the Indian posts. The Pakistani intrusion was first noticed by Kashmiri shepherds on 3rd May and reported to the nearest Indian Army unit in that sector.

The Confrontation[3]

The first confrontation between the two armies took place on May 2, when Indian troops bumped into Pakistani position in the Shyok Sector. The second encounter took place with freedom fighters in the Battalik sector on May 7. The Indians suffered heavy casualties. Alarm bells started ringing at the Indian high command when another skirmish took place with the 'freedom fighters' in the Dras sector on May 10, 1999. India reacted by bringing its Air Force into action. Helicopters sorties were flown to ascertain the ingresses made by the freedom fighters.

India's Reaction to the Intrusion[4]

It took some days to determine the sheer dimension and extent of the intrusion. By 11th May, reports by Indian Army Aviation helicopters and Indian Army foot patrols led to the assessment that armed "infiltrators" had penetrated through the hitherto "mutually agreed unguarded gaps" between the Indian defended areas to depths of 5 to 9 kilometres and occupied some of the commanding heights above the strategic National Highway 1A that connected Srinagar to Leh. It was still not clear whether the "infiltrators" were Mujahideen 'freedom fighters' or 'Pakistani troops'.

As a precautionary measure, the Army, Navy and Air Force were placed on high alert. But even as late as 15th May, the intrusions were still being described as 'large scale intrusions by Pakistani infiltrators'.

By 17th May, evidence increased that the intruders had occupied not just the heights overlooking the National Highway at Kargil — they had also occupied the heights in the gaps between the Indian defended areas in all sub-sectors of the Kargil sector. The Air Force launched photo recce sorties. Discussions commenced on whether air power should be deployed and of Pakistan's likely response. After 20th May, the 'infiltration' assessment was

2. Excerpts from the 'Kargil Review Committee Report.'
3. Pakistan's Army Chief General Pervez Musharraf's book, *In the Line of Fire.*
4. Excerpts from the 'Kargil Review Committee Report.'

upgraded to "armed intrusions by 250 to 300 intruders".

On 25th May 1998, the Army launched Operation 'Vijay', the Navy Operation 'Talwar' and the Air Force Operation 'Safed Sagar', after the Cabinet Committee on Security approved operations in Kargil with the use of air power. The Armed Forces were, however, to adopt a posture of deterrence vis-à-vis Pakistan and air strikes against the intruders had to be restricted to the Indian side of the Line of Control. The Army started moving its defensive and offensive formations in the Western and Southern Commands closer to the Pakistan border to deter Pakistan from escalating the conflict and prevent it from focussing solely on Kargil.

From 25th May onwards, the Air Force struck the bunkers on the mountain tops, where the Pakistani intruders had dug in. On 28th and 29th May, the Air Force lost a Mig 21 fighter, a MI 17 helicopter to Pakistani shoulder-fired, anti-aircraft Stinger missiles, and a Mig 27, which crashed due to technical problems. Thereafter precision-guided bombs from Mirage aircraft attacked the bunkers from ranges beyond the reach of shoulder-fired, anti-aircraft missiles.

In the first three weeks of June, despite losses, the valour and grit of Indian troops was on full display as they climbed vertical cliffs in the face of withering fire by well dug-in intruders, succeeded in forcing the intruders to withdraw from their bunkers on the mountain tops.

The Pakistanis began voicing threats implying the use of nuclear weapons. India interpreted the threat as a Pakistani gambit to invoke international mediation. Then, in the 3rd week of June, reports appeared that Pakistan had ordered the deployment of missiles capable of carrying nuclear warheads.

On the battlefront, the war continued unabated. The intensive firepower of Indian artillery, along with precision strikes by Indian Air Force aircraft and a fierce determination by the Indian troops to take the war to its logical end, evicted the Pakistani intruders from post after post. Faced with international diplomatic isolation and economic pressure, Pakistan started seeking a face-saving exit from the looming rout in Kargil.

The Pakistan Prime Minister flew to America. Under pressure from the American President, he declared the unconditional withdrawal of Pakistani troops from Kargil.

Though the war ended formally on 16th July 1999, it took another ten days to evict those intruders that had failed to withdraw.

The Indian Navy's Operations

As soon as the infiltration was assessed as an "armed intrusion" on 20th May, Naval Headquarters issued its first signal to the three Naval Commands to "enhance security measures". Western Naval Command swung into action and swiftly deployed the following units:-

- A Leander class frigate on a barrier patrol off Dwarka.
- Two missile boats at Okha — one on patrol off Okha and the other berthed alongside in Okha at one hours notice.
- Dornier aircraft on surveillance patrols over the sea west of Saurashtra, outside Pakistan's Air Defence Interception Zone (ADIZ).

On 23rd May, Naval Headquarters issued a directive to:

- Prevent sneak attacks along the Gujarat Coast.
- Ensure security of offshore assets.
- Counter enemy pre-emptive measures.
- Monitor the movements of Pakistani naval forces in the North Arabian Sea.
- Expedite ongoing 'Short Refits' of major combatants to maximise operational availability.

Following the directive, Western Naval Command sailed ships from Mumbai on 22nd May, to protect offshore oil installations from clandestine underwater attacks. Concurrently, aerial surveillance was increased off the coasts of Maharashtra and Gujarat to forestall surprise Pakistani intrusions from seaward.

By 25th May, the entire Western Fleet had sailed from Mumbai to the North Arabian Sea as a precautionary deployment to increase surveillance and adopt a deterrent posture. The next day, anticipating an escalation in tensions, Naval Headquarters initiated action to:-

- Make major combatants operational by end June 1999.
- Make naval missiles operational.
- Maintain tight control over forward deployed forces to avoid trigger-happy misadventure.

By 27th May, the Navy had deployed a guided missile destroyer off Saurashtra and positioned additional Dornier aircraft at Daman to augment surveillance. Ships and aircraft of the Coast Guard were placed under naval

command to augment coastal surveillance and defence of offshore assets.

On 29th May 1998, the Navy informed the Cabinet Committee on Security that units of the Eastern Fleet would be joining the Western Fleet by early June. Ships from the Eastern Fleet arrived in combat ready condition, in Kochi, in the first week of June. The press media printed photographs of missile-armed ships berthed alongside in Kochi enroute to join the Western Fleet. These were picked up and reproduced in the newspapers of the Persian Gulf.

On the diplomatic front, the Foreign Minister of Pakistan came to Delhi to discuss the lowering of tension. The talks failed. Naval Headquarters directed the Fleets to "enhance the level of preparedness". Pakistan Naval Headquarters, sensing trouble, put its ships on high alert and directed them to "to keep well clear of the Indian Navy".

By the second week of June, the conflict had reached a fever pitch. The Joint Western and Eastern Fleets commenced exercises to check the Navy's readiness for an all-out conflict. The Pakistan Navy dispersed its ships away from Karachi to its ports on the Makran Coast — Ormara, Pasni, Gwadar and Jiwani. Pakistan Naval ships started escorting tankers bringing oil from the Persian Gulf.

Two weeks later, after Pakistan announced the deployment of missiles capable of carrying nuclear warheads threatening India with nuclear strikes, Indian missile armed ships responded by moving closer to the Pakistan coast. National and international media were informed that the Navy was on full alert. The message to be conveyed to Pakistan was not to escalate in Kargil or extend it to the sea. The Pakistan Navy however, went to full alert, launched additional surveillance sorties along its coast, all the while remaining clear of Indian naval ships and aircraft. Karachi Port was placed on full alert.

On 30th June, India's Amphibious Brigade started moving westwards from Port Blair to Goa. The presence of Indian Naval ships played on the Pakistan Navy's apprehension of oil supplies from the Gulf being disrupted. Sensitive about the vulnerability of these oil supplies and aware that a naval engagement might expose its fuel storages in Karachi harbour and also its sea lanes to naval attack, the Pakistan Navy prudently escorted its oil tankers along the Makran Coast. The Indian Naval ships, however, did nothing to escalate tensions. In the ensuing operations, Indian naval ships arrested a North Korean ship that was carrying missile components to Pakistan.

By 2nd July, with Pakistani troops being evicted from their bunkers in Kargil, Pakistan started seeking a way to end the intrusion.

On 4th July, under pressure from the American President, the Pakistan Prime Minister declared the unconditional withdrawal of Pakistani troops from Kargil. The Indian Navy was soon asked to terminate its operations. On 14 July 1999, the Prime Minister, Mr. Atal Bihari Vajpayee declared Op TALWAR a success.

The Indian Navy's participation in the Kargil was hailed nationally and much talked about in international circles. The Pakistani media was abuzz with reports of how close the Indian Navy was to establishing a total blockade of its port of Karachi.[5] Whatever the truth of these reports, the fact is that the Navy's sterling action of imposing presence and exerting pressure yielded the desired results. Tactically too, for the force, the operation had many positives. It was the first time that its operational units had prepared for action at such short notice. Its ships were armed to the teeth and deployed in heavy numbers in enemy territory, even though technically, it was a less than war situation. The force carefully reassessed, revised and calibrated its rules of engagement to address the sensitivities of the situation — by manoeuvring and positioning the fleet in a manner that brought pressure on the adversary without escalating tensions into a full fledged war. It gave a good first hand experience to commanders in operational and tactical command of the tricky nuances of combat posturing without the formal announcement of a war.

Coast Guard Participation

The Indian Naval operations would not have succeeded without the Coast Guard's significant contribution. A number of Coast Guard ships and air assets of Coast Guard Air Station Daman were placed under the Navy for protection of sensitive areas and surveillance of the international maritime border off the West coast. The deployment lasted 184 ship days with aircraft flying over 220 sorties across the Arabian Sea, logging a total of 452 hours.

Analysis of the Operation

In the aftermath of the war, the Government of India constituted a committee to review the events leading up to the Pakistani aggression in the Kargil District of Ladakh in Jammu and Kashmir and recommend measures to safeguard national security against such armed intrusions.

5. One report suggested that the Indian Naval contingent of 30 ships poised for strike outside the Karachi harbour shook the Pakistani establishment impelling into announcing a retreat.

The Kargil Review Committee presented a comprehensive report of the shortcomings that led to the conflict. The Committee in its report has very perceptively outlined Pakistan's motives for the war.

- **At the Strategic Level.** Strategically speaking, Pakistan needed to internationalise Kashmir as a nuclear flashpoint requiring urgent third party intervention. It sought to alter the Line of Control and disturb its sanctity by capturing unheld areas in Kargil and also achieve a better bargaining position for a possible trade-off against the positions held by India in Siachen.
- **At the Military/Proxy War Level.** From a military point of view, Pakistan aimed at interdicting the Srinagar–Leh road by disrupting vital supplies to Leh, specifically in the Kargil sector where the National Highway skirts part of the Line of Control. Such a move, it anticipated, would boost the morale of militants in Kashmir and make the Indian Army withdraw troops from the Valley to Kargil.
- **At the Political Level.** The political objective was for the Army to demonstrate its commitment to the political segment of Pakistan that favoured jihad.

The Pakistani Perspective

The Pakistanis, as in the past, had a quixotic explanation for the Operation, which they saw as a response to India 'creeping forward on the LoC'. General Musharraf, in his memoirs[6] has this to state about Ops Badr:-

There were large gaps between our defensive positions in the Kargil and Dras sectors, making it possible for Indian troops to cross the line too easily. India also brought in and tested special bunker-busting equipment in the autumn of 1998. We knew that the Indian Army had procured large quantities of high-altitude equipment, special weapons and new snow scooters and snowmobiles. India appeared on the verge of an attack across the LoC.

Our sources of information were very reliable. India had been "creeping forward" across the LoC even after the Simla Agreement, which was reached between India and Pakistan after the war of 1971 and defined the Line of Control. India had tested us at Chorbat La, the Qamar sector and Siachen in the Northern Areas. Finally, frequent visits of the Indian defence minister, George Fernandes, to the Siachen and Kargil areas during the summer and autumn of the 1998 suggested that India was considering more offensive operations.

The assessment of the GHQ staff and Rawalpindi Corps fit the logic of the situation. It was appropriate to allow the Rawalpindi Corps to prepare and present the FCNA plan of the defensive manoeuvre in the Northern Areas so as to deny any ingress across the LoC. A plan calling for plugging the gaps — ranging from nine to twenty eight miles (fifteen–forty five kilometres) — between our positions was formally presented and approved towards the middle of January 1999. Rawalpindi Corps and FCNA were to execute it.

The terrain and weather were forbidding. The operation had to be undertaken by limited forces, and security was crucial. Any leakage of information would have set off a race to the watershed, as had happened at Siachen. The terrain and resources were to India's advantage, for such a race. Our information therefore was shared on a "need to know" basis. Second line forces under the FCNA, called Northern Light Infantry, composed of locals of the area, were to occupy the forward positions. The troops were given special instructions not to cross the watershed along the LoC".

Post War Retrospect

General VP Malik in his book *From Surprise to Victory* writes:[7]

The proxy war in Jammu and Kashmir had been initiated by Pakistan soon after the Soviet withdrawal from Afghanistan in the late 1980s. By working in collusion with the Central Intelligence Agency (CIA) of the United States of America, Pakistan's Inter-Services Intelligence (ISI) and the Army had gained valuable experience in waging guerrilla warfare. The ISI stepped up its efforts to subvert Kashmiri youth towards the end of the 1980s. Many young men were covertly infiltrated to Pakistan Occupied Kashmir through a porous LoC for religious indoctrination and arms training as were done in Afghanistan. These trained militants started pouring back into Kashmir.

The period from 1987 to 1989 saw a spurt in violence, prolonged strikes in the Kashmir Valley and attacks on political leaders, the police and paramilitary forces. Over the years, many militant groups mushroomed. Of these, a majority were pro-Pakistan.

The Army and paramilitary forces carried out protracted operations from 1990 onwards to effectively contain terrorism and to create a safe atmosphere for the initiation of the political process.

6. *In the Line of Fire*, Page 88–90.
7. *Kargil — From Surprise to Victory* by General V P Malik, India's Chief of Army Staff 1997–2000. Harper Collins & India Today, 2006.

Before Kargil, Pakistan had assumed that due to prolonged and excessive involvement in anti-terrorist and anti-insurgency operations in Punjab, Jammu and Kashmir and northeast India, the Indian Army was tired and not in a shape fit to fight; that its weapons and equipment were getting obsolete as no modernization had taken place for more than a decade; and that there was an acute shortage of officers especially at the junior levels. While addressing troops of Pakistan Army 1 Corps on 29 October 1998, General Pervez Musharraf declared: 'Don't be carried away by the rhetoric of the Indians whose armed forces are totally exhausted and whose morale is at its lowest.'

Brigadier Shauqat Qadir (one of the very few writers on the Kargil war from Pakistan), explained the mindset inside the Pakistan Army before initiating the conflict in Kargil, has stated:[8]

In 1998–99, there was a growing concern in the Pakistani establishment that the Kashmiri cause was losing its international salience and the waning militancy in Jammu and Kashmir needed to be rejuvenated. The military operation, under the garb of a Mujahideen operation, would create a military threat that could be viewed as capable of leading to a military solution, so as to force India to the negotiating table from a position of weaknesses.

Given the total ratio of forces for India and Pakistan, which was about 2.25:1, the (Pakistan) Military Operations concluded that the initial Indian reactions would be to rush more troops to Indian-held Kashmir, further eroding their offensive capabilities against Pakistan. As a consequence, they concluded that it would not undertake an all-out offensive against Pakistan, since by doing so it would run the risk of ending in a stalemate, which would be viewed as a victory for Pakistan.

Pak military strategy for the limited offensive was that by July [1999], the Mujahideen would step up their activities in the rear areas, threatening the Indian lines of communications at pre-designated targets, which would help isolate pockets, forcing the Indian troops to react to them. This would create an opportunity for the forces at Kargil to push forward and pose an additional threat. India would, as a consequence, be forced to the negotiating table...

Gen Malik writes, *"Ever since the map delineation was done as per the Simla Agreement, the Indian and Pakistani Armies have, by and large, maintained the sanctity of the LoC. There has been considerable misunderstanding in the public mind about the gaps in the defences of 121 (I) Infantry Brigade. All defences in the mountains inevitably have gaps in between. It is neither physically possible nor tactically desirable to cover the entire length of any border with manpower.*

The deployment by the defender is, therefore, based on the heights that dominate these roads or tracks, or where these may be constructed as part of the attacker's plan. The strength of troops in such deployments depends upon the terrain conditions and relative strength of the enemy in the sector. The aggressor is thus forced to attack and clear these (defender's) deployments and, in the process, the defender also gets a chance to move his reserves.

Gaps between such deployments are either held thinly, or only patrolled, but must be kept under constant surveillance. Our (and Pakistani) deployment all along the LoC and the AGPL was (and is) based on such a threat perception. This pattern of deployment with long gap between defences was followed on either side of the LoC.

Regular patrolling in the sector, which would have ensured that troops were trained to operate in inclement weather and would have inculcated the determination and the will to accomplish missions despite harsh and difficult battle conditions, was conspicuously absent in this formation. It is evident that patrolling had been relegated to the level of routine activity. One can conclude that our most important and dependable means of surveillance was not conducted and supervised properly.

Even after the intrusion had been detected, the Brigade Commander did not realize the seriousness of the situation. He dismissed the intruders as a handful of militants and tasked the units accordingly.

Those responsible for safeguarding this sector considered 'that the threat was limited to infiltration of jehadi militants along with heavy firing to interdict the road'. They also felt that 'the intrusion of the type that ultimately occurred was considered unlikely'.

There is no military justification for such conclusions. If the militants could infiltrate, so could the regular Army personnel. 'Attack by infiltration' is a tactical technique in mountain warfare usually taught in the Army training establishments. The element of surprise comes from actions that are not anticipated. It appears that the local commanders' obsession with jehadi militants made them neglect this aspect.

General Pervez Musharraf and his team gambled on pulling off a 'Siachen type operation', i.e., pre-emption or occupation of tactically important heights before the adversary got to know what's happening.

---

8. 'An Analysis of the Kargil Conflict 1999', RUSI Journal, Whitehall, London, April 2002.

Admiral Sushil Kumar, the Chief of Naval Staff during Operation Talwar states:[9]

"I was officiating as the Chairman of the Chiefs of Staff Committee (COSC) since General Malik, the Army Chief was abroad on an assignment. The reports that first came in were quite vague and hazy. They alluded to some sort of border incursion having taken place on the Line of Control (LoC) with Pakistan. There was also a report that an Army patrol had not returned and shepherds having seen strangers on our side of the LoC. Despite the foggy nature of these reports, the Army was understandably very concerned and the Vice Chief (of the Army) requested the Air Force for air effort by way of reconnaissance and armed sorties. The Air Chief at this stage quite rightly advised that hastily inducting the Air Force into operations may needlessly raise the threshold of the confrontation. At that stage, it did seem only a minor border incident.

By the time General Malik returned from his assignment abroad, it became clear that the incursion in the Kargil sector was not a mere border incident...It was at this stage that the three services decided to put our operational forces on high alert.

When the Chiefs of Staff Committee met, I told General Malik and Air Chief Marshal Tipnis that while they were going ahead with greater mobilisation to meet what now appeared to be a bigger threat, the Navy would galvanise action to ensure that the maritime front is not exposed. While the Pakistan Army had managed to surprise us on land, they must not surprise us at sea.

Our intention was to carry out a swift forward deployment to seize the initiative at sea...We realised that our forward deployment had the desired effect when we learned that Pakistanis had frantically started escorting their oil tankers at sea, for that indeed was their lifeline.

By the middle of June, tension was mounting... The situation looked as though it might escalate beyond Kargil. The Navy's operational commanders re-appreciated the situation and decided to prepare for a larger conflict. We mobilised the Navy's Eastern Fleet in full strength and swung it around into the Arabian Sea. And so, as the operations in the Himalayan heights at Tololing and Tiger Hill reached a crescendo, the Navy remained poised with both fleets in full readiness.

As we approached what seemed like the 'Precautionary Stage' of war, operational instructions were issued to our forces, and the Navy defined the rules of engagement for our fighting units. This was a very important threshold for us. Our forces were deployed with missiles fully armed and ready for action. The codename assigned was Operation Talwar.

It was around this time that Pakistani generals started resorting to threats of nuclear retaliation...By the end of June 1999, war with Pakistan seemed imminent. At a crucial tri-service meeting, Gen Malik turned to his Commanders and said "You better prepare for war, be it declared or otherwise." We in the Navy were already at action stations.

Here I must add that while we were well prepared, we had our fingers crossed. Our warships were absolutely defenceless against the Pakistan Navy's deadly Harpoon and Exocet missiles. It was a very serious vulnerability and we were sure to suffer loss... There is always the fog of war and the enemy may not entirely be aware of the opponent's strengths and weaknesses...

We had deployed in preponderant strength and our strike forces were aggressively poised. It had the desired effect. We knew that the Pakistan Navy had gone on the defensive when we monitored a special message from the Pakistan Naval High Command to all their warships 'remain in harbour'. That signal said it all. At the COSC meeting that day, I informed my colleagues that the Indian Navy had achieved what it had set out to do. We had seized the initiative at sea.

Tri-service cooperation had many facets during the Kargil operations and the Navy was able to chip in where needed. The Navy's squadron of specially equipped electronic warfare aircraft operated extensively along the Line of Control in support of land operations. Specialist hydrographic survey teams of the Navy were also conjoined with the Army's artillery batteries to pinpoint gun locations.

Undoubtedly, students of military history will always remember Kargil as an operation conducted in the snowy Himalayan heights where the Indian Army and Air Force brought glory to the country.

The role of the Indian Navy may yet remain unspoken and silent. But that is the way navies operate anyway, over the horizon and unseen. Perhaps, that's the reason why the Navy is called the 'Silent Service'.

Retrospect

The Kargil episode was a seminal chapter in India–Pak relations. It severely dented the nascent thawing of relationship between India and Pakistan, which had taken

9. The excerpts are from his article in *FORCE* magazine of December 2006.

its first tentative step with the famous 1998 visit to Lahore of Prime Minister Vajpayee. The entire peace process got derailed and almost two decades later, the damage has still not been fully repaired. It served as a rude wake up call for the nation's intelligence organisation that was jolted out of its slumber. It was a timely reminder that the wily, troublesome neighbour could never be taken for granted. For the Indian Army, it was a period of trial, but despite the irreplaceable human losses, it turned out to be a glorious chapter in its history. The Navy acquitted itself with honour during the operations. It was swift in its reaction; prompt in formulating plans and displayed great clarity on the nature and conduct of operations.

In its aftermath, a Committee was formed to go into the reasons for the incursion. The Kargil Review Committee made several far reaching recommendations. It included ramping up intelligence, forming a comprehensive national security set-up, procuring latest weapons, etc. Some of the recommendations have been implemented; some await execution.

In retrospect, perhaps, it was a lesson well learnt.

10

The Navy's Participation in the Expeditions to Antarctica

Preamble

The continent of Antarctica comprises one tenth of the earth's land surface. The Antarctic seas comprise one tenth of the world's oceans. It is estimated that Antarctica's six million cubic miles of ice amount to 70% of the world's fresh water and more than 90% of the world's ice. The thickness of ice varies from a few metres near the continental shelf to a maximum of 4,776 kms near the South Pole.

The first recorded contacts with Antarctica date from the 1780s. Serious investigations began after the sixth International Geophysical Congress in 1895, which urged the promotion of Antarctic Research. Within 20 years, the South Pole had been reached; Amundsen became the first person to reach the South Pole on 4th Dec 1911. In subsequent years, scientists began to explore the interior of Antarctica.

At the conclusion of the International Geophysical Year (1957–58), the 12 nations that had participated in Antarctic work formally recognized the cooperative spirit of the venture by drafting the Antarctic Treaty in 1959. They agreed that "Antarctica shall be used for peaceful purposes only" and "banned any measure of a military nature."

India launched its first Antarctic Expedition in December 1981. It was admitted to the Antarctic Treaty on 19th August 1983 and soon thereafter obtained Consultative Status on 12th September 1983. It was admitted as a member of the Scientific Committee on Antarctic Research (SCAR) on 1st October 1984 and became a member of the 'Convention on the Conservation of Antarctic Marine Living Resources' in 1986. It ratified the Environment Protocol to the Antarctic Treaty in 1997.

The broad objectives of India's Antarctic Research Programme have been to foster and promote scientific studies in atmospheric sciences, geology, geophysics, meteorology, biology, oceanography, geomagnetism and study of the ozone hole.

Specifically, Indian Antarctic Research covers the following long-term scientific programmes/activities: -

- Ice-ocean atmosphere system in Antarctica and the global environment.
- Antarctic lithosphere and Gondwanaland reconstruction.
- Framework for delineating plate tectonic processes.
- Assessment of mineral resources and hydrocarbons. The Global Positioning System (GPS) in (India's Research Station) Maitree has helped scientists to postulate that the Indian tectonic plate is moving around 5 cms northward and north-eastward every year.
- Antarctic ecosystems and environmental physiology.
- Solar terrestrial processes.
- Innovative technologies for support systems.
- Environmental impact assessment.
- Generation and structuring of databases (geological, topographic, thematic mapping, ecosystem changes, environmental parameters and health care).

In addition to regular annual expeditions, India launched an expedition to the Weddell Sea in 1989 and an expedition to Krill in 1995.

The Department of Ocean Development under the Ministry of Science and Technology plans India's Antarctica expeditions. Organisations that have participated in these expeditions include Geological Survey of India, Survey of India, National Geographical Research Institute, India Meteorological Department, National Institute of Oceanography, Physical Research Laboratory, National Physical Laboratory, Indian Institute of Geomagnetism,

National Remote Sensing Agency, Defence Research and Development Organisation, Oil and Natural Gas Commission, VSNL, BSNL, Indian Institutes of Technology, the Indian Navy, Army and Air Force and the Department of Ocean Development.

From 1992–93 onwards, an 'Antarctic Research Centre' has been functioning in Goa.

The Navy's Involvement in Antarctic Expeditions

The Navy's involvement commenced with the first expedition in 1981–82 and continued till 1994–95. During each expedition, the naval contingent comprised the following:-

- A helicopter detachment of two Chetaks. Since Antarctica has no roads, most movements of personnel and stores between the expedition ship and the camps had to be done by helicopter.
- Communication personnel who provided round the clock communication with India, during the expedition and also for the 'wintering' team who stayed behind in Antarctica during the Antarctic winter from March (when the expedition ship leaves for India) till December (when the ship returns with the next expedition).
- Meteorological personnel for weather prediction, for briefing pilots on weather conditions and for research.
- Naval cooks, both for the voyage to and from Antarctica and for the wintering team.

In the initial years, the Navy also provided a medical team to deal with medical emergencies. From 1994 onwards, a small naval survey team has participated when required to carry out 'Bathymetric Data and Sounding' surveys on behalf of the International Hydrographic Organisation (IHO).

India's Antarctica Expeditions

The width of the ice belt around Antarctica ranges from 600 km to 3000 km. The ice starts melting in November; rapid melting commences in December and continues till March. Freezing of the sea commences in end March and the area covered by pack ice increases, until by October it is more than double the area of Antarctica. It is during the period between November to March each year that specially designed expedition ships can reach the Antarctic coast. The mobility of the pack ice, under the pressure of the ships' momentum, allows ships to penetrate it.

The expeditions are conveyed by 'special expedition vessels of the highest ice class' under the system of uniform time charter. Such ships have a double skin, a heated hull, a bow thruster, extremely large (fuel) bunker capacity, modern communication systems, a helicopter deck, air-conditioned accommodation for 100 expedition members, 25 ton cranes, and box-shaped holds that are used as hangars or for cargo.

The stores carried by each expedition include fuel, food (from India's Food Technology Research Institute, Defence Food Research Laboratory, MAFCO and Modern Food Industries), construction material, spares for vehicles, clothing, camping equipment, hydrogen gas cylinders, medical supplies, LPG cylinders, scientific equipment, communication equipment, etc.

The expedition ship departs from Goa in end November/early December. After a few hours halt in Mauritius to stock up provisions, it reaches Antarctica in end December. It starts on the return journey in early March, spends a day in Mauritius and arrives Goa in end March/early April.[1]

Of the 70 to 75 days that each expedition can stay in Antarctica, over half is afflicted by storms, blizzards and very strong winds. The effective working season is only 30 to 40 days. The pace of activity perforce has to be hectic.

After arrival at the pack ice (which is formed from the freezing of the sea surface), facsimile charts and route reconnaissance flights by helicopters help to navigate the ship through the pack ice until the ship reaches the 'fast ice' where it berths alongside the approximately 9-metre high Antarctic ice shelf near Latitude 70° South and Longitude 12° East. Immediately after arrival, helicopters start ferrying personnel and stores to the permanent station in the interior.

Helicopters are used also for ferrying personnel and stores to the scientific teams in the various temporary camps, for aerial and photo reconnaissance, for casualty evacuation and for medical support, for landing on icebergs and for assisting the scientific teams operating in hilly, rough and icy terrains.

The 1st Expedition started from Goa in December 1981. It set up a base camp near the ice shelf and carried out air surveys for a suitable site for constructing a permanent

1. From the 20th (2000/01) Expedition onwards, expeditions departed from Cape Town in South Africa, instead of from Goa because it reduced the journey time to Antarctica from 25 days to 9 days.

research station (later called Dakshin Gangotri) where a small team could spend the winter. The 2nd Expedition ferried the material and stores required to construct Dakshin Gangotri. The 3rd Expedition commissioned Dakshin Gangotri. From the 3rd Expedition onwards, the Navy established and maintained permanent wireless communication with New Delhi. The 8th expedition of 1988–89 found that Dakshin Gangotri was getting submerged in ice. The 9th expedition commissioned India's second permanent station "Maitree" in an ice-free area near a freshwater lake.

There were other Antarctic Research Stations in the area where India set up its camps: -

Country	Remarks
Soviet Union	The Novolazerskaya camp was the nearest, 10 km from Dakshin Gangotri. Its runway, which could land Russian IL 14 aircraft, was 6 km away from Dakshin Gangotri.
East Germany	George Forster camp was sited on the periphery of Novolazerskaya.
West Germany	George Von Neumayer camp.
Britain	Halley camp.
South Africa	SANE camp.

Charting of Antarctica Waters

In 1995, India became a member of the Permanent Working Group on Co-operation in Antarctica, an organisation set up under the aegis of the International Hydrographic Organisation in Monaco.

This working group identified the bathymetric charting of Antarctic waters as one of its goals and requested national hydrographic organisations to contribute appropriate national resources to this programme. The waters around India's permanent station Maitree had not been charted. No other country volunteered to chart this area. Since the Russian Antarctic Station, Novolazerskaya, was located just a few kilometres from Maitree, it was decided that the charts of this area would be produced jointly by India and Russia.

Commencing with the 14th Expedition (December 1994 to March 1995), a small Indian Naval Hydrographic Team of one to two officers and one or two sailors has participated in Antarctica Expeditions:-

— To collect hydrographic data for delineating the ice shelf and co-producing with Russia, two INT navigational charts to cover the sea approaches to the land route to India's permanent Antarctic Research Station at Maitree.

— To collect oceanographic data for the Navy.

Chronology of Expeditions 1989 till 2007

Expedition	Gist of Expedition/Objectives and Naval Participation
9th 1989–90	As soon as the final transfer of stores from Dakshin Gangotri to Maitree was completed in end January 1990, the new, indigenously designed, permanent land station Maitree was established in the Schumacher Ranges at Lat $70^0$46' South, Long $11^0$44' East, 70 kms from Dakshin Gangotri. On 25 February 1990, Dakshin Gangotri was decommissioned as a permanent base and converted into a supply base cum transit camp. The India Meteorological Department discontinued observations from Dakshin Gangotri and established a full-fledged Meteorological Observatory at Maitree to study ozone depletion in the Antarctic spring and solar radiation. The First Weddell Sea Expedition surveyed the area east of Berkner Island for a future station. The hazards of operating single-engined Chetak helicopters in Antarctica's sub-zero conditions for exploratory missions that were increasingly distant from the base camp led to the decision that only twin-engined helicopters should be sent on future expeditions.
10th 1990–91	The Dakshin Gangotri site continued to be used as a supply base and transit camp. The expedition's geo-chronological studies assessed the age of rocks as 850 million years.
11th 1991–92	The scientific objectives of the expedition were studies in geology, geo-physics, geo-magnetism and biology.
12th 1992–93	Air Force helicopter participation ceased.
13th 1993–94	As a result of blizzard damage, the expedition vessel had to call at Durban in South Africa for repairs. In view of the time required for repairs, expedition members were flown

back to India. This gave rise to the idea that it would be more economical in time and money for expedition members to embark and disembark in South Africa instead of in Goa. This was implemented from the 19th expedition onwards.

14th 1994–95 The objectives of the expedition were to establish the Laser Heterodyne Experiment to study the ozone profile; geological mapping of the Orvin II mountains and glaciological studies.

For the first time, a naval survey team of an officer and a sailor from the Naval Hydrographic Office was included, to carry out a survey of the approaches to Maitree.

15th 1995–96 No Naval participation.

16th 1996–97 Commercial helicopters from Pawan Hans were hired to carry out the functions earlier performed by naval helicopters. A three-member Naval Survey Team participated in this expedition. Its task was to survey Antarctica waters and collect physical and oceanographic data of naval interest.

17th 1997–98 An Indian Navy team participated in the Geological Survey of India's oceanographic cruise.

18th 1998–99 Commercial helicopters from Pawan Hans were again hired and the Naval Survey Team participated in this expedition.

19th 1999–00 For the first time, the expedition was launched from Cape Town on 10 December 1999. No naval participation. The expedition assessed that lake sediments dated back to 10,000 years.

20th 2000–01 The Naval Survey Team continued Bathymetric Data and Sounding surveys on behalf of the IHO.

Meteorological data was collected for developing a database and correlating with other data.

At three locations, current direction and speed, water temperature, salinity and velocity of sound were recorded using a Smart Acoustic Current Meter. Ice shelf delineation was undertaken by helicopter.

21st 2001–02 The Naval Survey Team of a Lt Cdr (Hydro), Lt Cdr (Metoc) and one survey sailor continued Bathymetric Data and Sounding surveys on behalf of the IHO.

Helicopter support was provided by a New Zealand firm.

22nd 2002–03 The Naval Survey Team continued Bathymetric Data and Sounding surveys.

23rd 2003–04 For the first time the expedition was led by the Geological Survey of India. It recommended the site for India's third permanent station in the Larsemann Hills in position 69° degrees 24'28" South, 76° 11'14" East.

24th 2004–05 The Naval Survey team surveyed the area around Leningrad Skij.

The 24th Antarctica Expedition was the longest summer expedition totalling 97 days away from port.

25th 2005–06 This first expedition to the Larsemann Hills was carried out by the Naval Survey Team. For the first time, boat soundings were carried out in Antarctic waters using a multibeam echo sounder to collect bathymetric data. The aim of the check survey was to determine whether the Expedition ship could safely navigate the channel leading to the location envisaged for the New Station at Larsemann Hill.

26th 2006–07 The Naval Survey Team participated in the 26th Expedition. Current direction, speed and sound velocity observations were carried out at one location in Leningrad Skij. Sounding was carried out in Prydz Bay at Larsemann Hills. A new GPS station was established. Coast lining station in the Larsemann Hills was also conducted.

A Medical Officer accompanied the 26th Expedition to study: -

— Psychological and behavioural changes due to prolonged social isolation.

— Heart rate variability.

— Changes in lung capacity volume.

— Hypothermia, sleep pattern in Polar Regions.

— Haemoglobin variation in extreme cold.

MAITRI — India's Permanant Winter Station at Antarctica

'Polar Bird' — Carrying the Antarctica Expedition Team

11

Defence of Offshore Hydrocarbon Assets

(Note : Refer to chapter titled "Coast Guard")

The First Offshore Discoveries

The Oil and Natural Gas Commission (ONGC)'s activity in the continental shelf off Bombay started in 1963. Between 1964 and 1967 promising oil and gas deposits were located in an area 75 to 100 miles northwest of Bombay. This area was named Bombay High.

The worldwide financial crisis due to 1973 Arab–Israel War spurred the urgency to develop Bombay High. Drilling commenced and oil was struck in 1974. A year later, another oil-bearing reservoir was struck at a depth of 1300 metres. ONGC intensified its surveys. These led over the years to the discovery of oil and gas fields that were named Heera, Panna, Ratna, Neelam, Mukta, Bassein and Daman. The installation of offshore platforms commenced in 1976.

The discovery of fields at Daman and Tapti led to the labelling of the 'Western Offshore Region' comprising the Bombay High and the Tapti fields. The 'Eastern Offshore Region' comprises the Ravva oil field, PY 1 and PY 3. The fields in the Andaman Offshore Region have yet to be developed and named Estimates of Offshore Hydrocarbon Reserves.

At the time of writing:-

- Our offshore hydrocarbon resources are estimated to be over 33,000 million metric tons.
- Offshore oil production is 66 % of total domestic production.
- The replacement cost of offshore infrastructure is Rs. 200,000 crores. Current investment is Rs. 25,000 crores.

The Defence of Offshore Assets

The magnitude of capital investment and the serious consequences of interruption in offshore oil and gas production compelled continuous protection of these costly offshore economic assets.

During peacetime and during hostilities, the offshore installations are vulnerable to clandestine terrorist attack, to suicidal ramming by ships and to damage inflicted by small craft loaded with explosives. During hostilities, installations can be damaged by weapons launched from a submarine, a warship or an aircraft. The protection of these assets therefore require:-

- Constant all-round surveillance by patrol vessels and by reconnaissance aircraft.
- Instant response to limit damage and resume production.

The Coast Guard Act was enacted in 1978. It enjoined the Coast Guard to 'ensure the safety and protection of offshore terminals, installations and other structures and devices'

An Offshore Security Coordination Committee was established in 1978 to coordinate the responsibilities between the ONGC, the Coast Guard and the Navy for the safety and protection of offshore installations. In 1983, an Offshore Defence Advisory Group (ODAG) was constituted under a Rear Admiral (FODAG) to plan and advise the Navy and the ONGC on the security and defence of the Bombay Offshore infrastructure.

In 1985, approval was accorded for the resources required to counter the peacetime threats to the installations in Bombay High which, in view of the increasing number of oil and gas fields, came to be called the Western Offshore Region.

Provisos in the UN Convention on the Law of the Sea regarding "Safety Zones around Offshore Structures"

After the first (1958) United Nations Conference on the Law of the Sea, the 1958 Geneva Convention on the Continental Shelf had provided for a safety zone of 500 metres around offshore structures and installations in which appropriate measures could be taken to ensure the safety, both of navigation and of the offshore structures and installations.

At the third (1972 to 1982) United Nations Conference on the Law of the Sea, India had stated that considering the size and speed of modern tankers and the time taken to stop or divert such huge vessels, a 500 metre safety zone was totally inadequate. India therefore advocated enlarged safety zones around oil installations and structures. This suggestion found place in the 1982 Convention on the Law of the Sea but in a modified form. The Convention incorporated an enabling provision "allowing a coastal state to promulgate safety zones in excess of 500 metres around artificial islands, installations and structures, if authorised by generally accepted standards or as recommended by the competent international organisation".

India issued two Gazette Notifications in 1986 declaring a 'Restricted Zone' of 500 meters around each of our offshore oil installations.

However, the issue of a Gazette Notification on an "Exclusive Zone for Offshore Oil and Gas Installations in the Maritime Zones of India" is still under consideration. This exclusion zone would be an area of 500 meters radius around every offshore oil and gas installation that projects above the sea at any state of tide. Vessels other than Indian Naval ships and Indian Coast Guard ships would not enter the zone.

Vessel Traffic Separation Scheme

The Western Offshore Region straddles the customary shipping route into Bombay Harbour. To avoid shipping inadvertently colliding with offshore installations, a Traffic Regulatory Scheme was promulgated in 1985. It required vessels destined for, or departing from, Bombay to follow 'recommended routes'. Since these were 'recommendatory' rather than mandatory, these routes were not always followed.

Before a mandatory Vessel Traffic Separation Scheme can be promulgated, the International Maritime Organisation (IMO) has to approve the Directorate General of Shipping's proposal for a scheme that satisfactorily reconciles complex issues like traffic density, area involved, effect on rights of safe navigation on the high seas, etc. This proposal is still under preparation.

Legislation on Suppression of Unlawful Acts

In December 2002, Parliament passed a Bill on the Suppression of Unlawful Acts against Maritime Navigation and Fixed Platforms.

Resources for the Protection of Offshore Assets

After studying how other nations were dealing with the threats to their offshore installations and considering the nature of the threat in our environment, forces were built up for protecting our offshore installations. These included radars, Offshore Patrol Vessels (OPVs), maritime patrol aircraft, and helicopters to fly in Marine Commandos of the Quick Reaction Force.

Offshore Developments in the 1990s

By the early 1990s, Bombay High's annual production, in round figures, was over 20 million tons of oil and over 3 lakh tons of LPG, the latter flowing through undersea pipelines to terminals on the mainland.

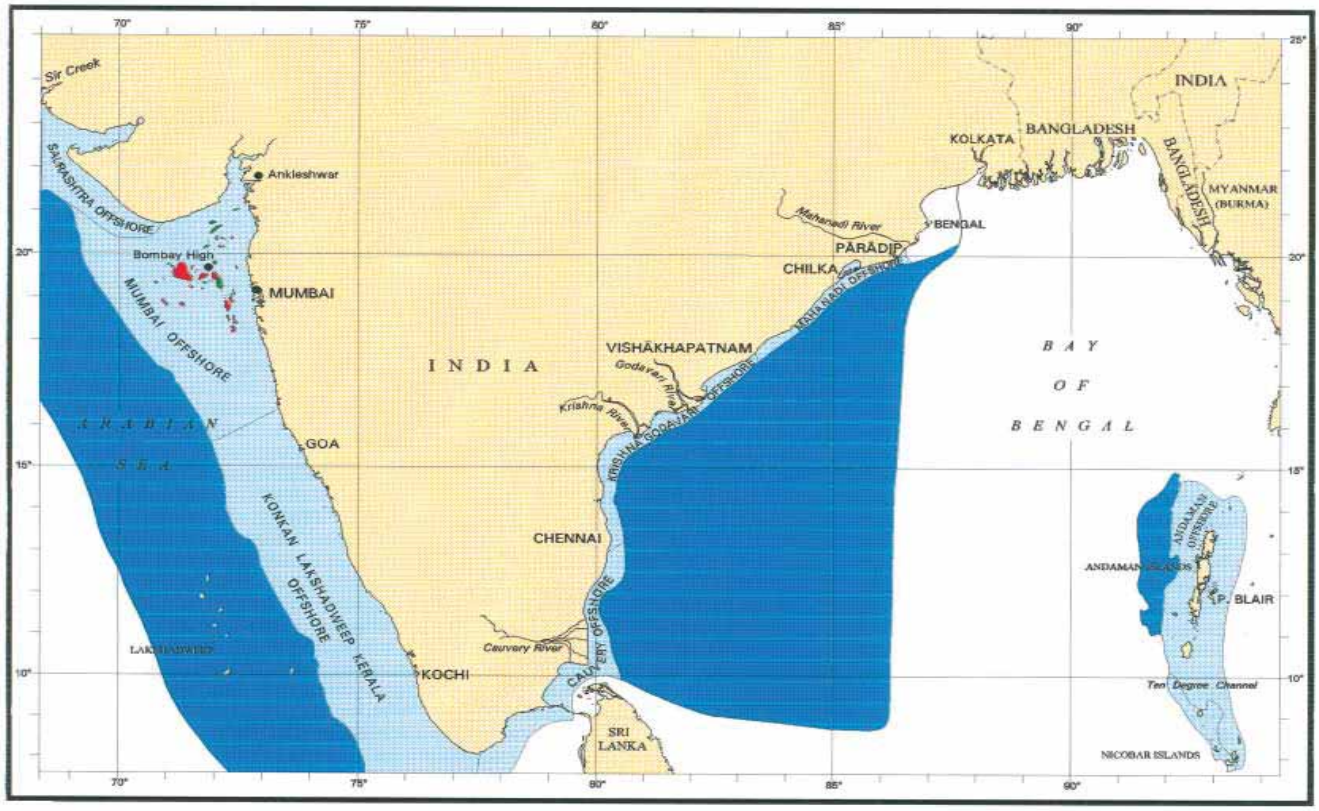
As part of the economic liberalisation reforms of the 1990s, private oil companies, both Indian and foreign, (the latter through joint ventures with the national oil companies), were permitted, to explore new oil and gas reserves, develop proven reserves, lay pipelines and establish refineries.

By the mid 1990s, systematic surveys confirmed that India's continental shelf had potentially rich oil and gas resources in the Palk Bay between India and Sri Lanka and the Cauvery and Krishna–Godavari river basins, and gas reserves in the Andaman Offshore in the Bay of Bengal.

The extension of offshore activities to both coasts and into deeper waters increased ODAGs responsibilities.

In 2002, FODAG was re-designated as FODAG and 'Adviser Offshore Security and Defence' to the Government of India. Offshore Defence Advisory Cells were established at Visakhapatnam and New Delhi.

INDIA'S 0FFSHORE OIL BASINS



COLOUR CODE

: Offshore Oil Basins on the Continental Shelf.

: Deep Offshore beyond 200 metres depth (1.35 million Square Kilometres).

The Position Today

Offshore installations include process platforms, well platforms and well-cum-process platforms. Pipelines on the seabed carry oil and gas from the well platforms to the process platforms and from there to onshore terminals. The overall position is:-

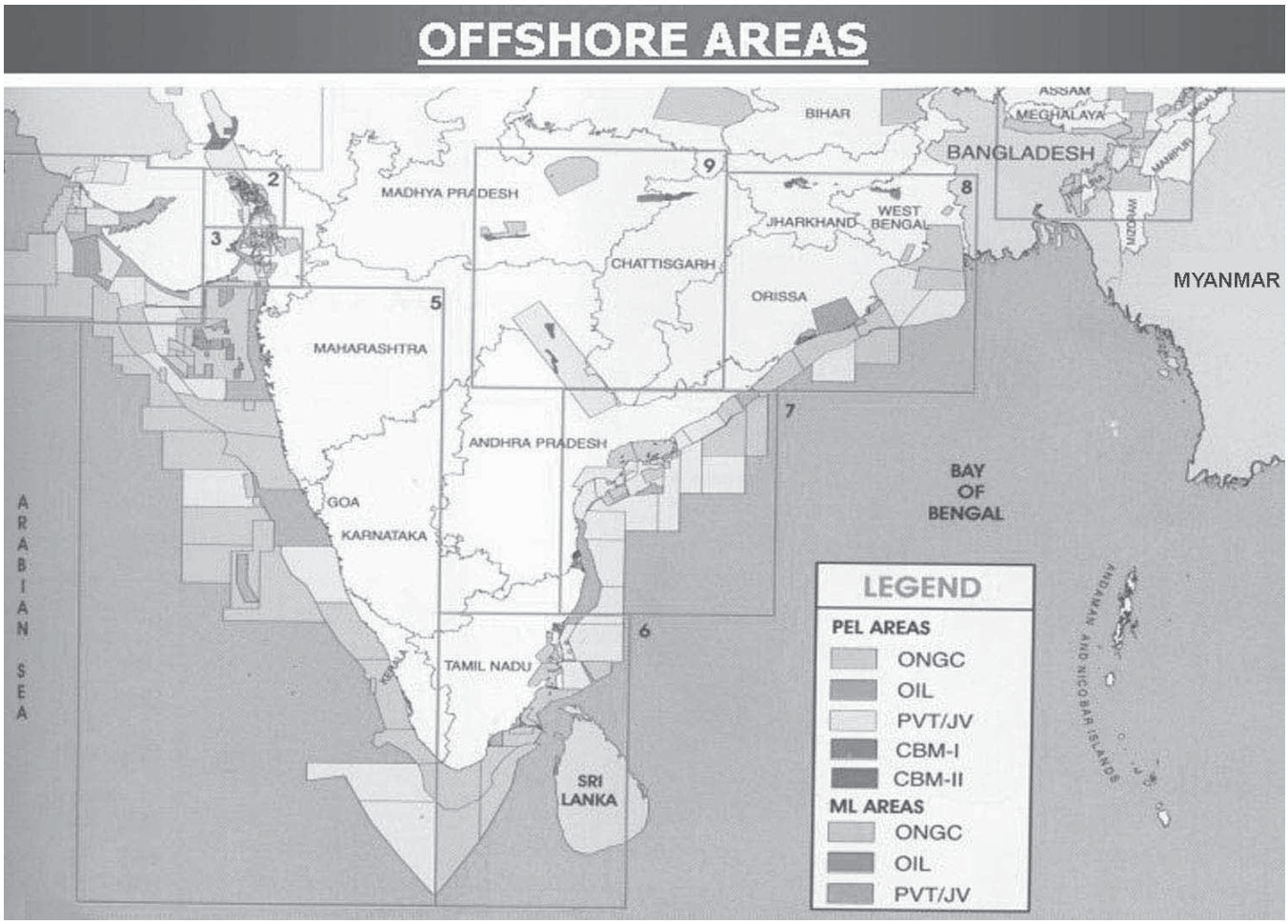
Offshore Region	Western	Eastern
Process Platforms	28	13
Well Platforms	31	
Well-cum-Process Platforms	05	
Pipe-line Network	3200 km	
Major Offshore terminals	02	

The New Vessel and Air Traffic Management System (VATMS)

The existing radar surveillance network has been replaced by a new state-of–the-art, integrated Vessel and Air Traffic Management System (VATMS) to provide continuous sea and air surveillance for the entire Western Offshore region. A similar system is planned for the Eastern Offshore Region.

The system comprises primary sea surveillance radars integrated with aircraft identification secondary radars, meteorological sensors, communications and computerised displays:-

— Transponders fitted on helicopters will identify



Map of Offshore Exploration Areas

those helicopters that have been security cleared for operation in the region.

— Communication with vessels located in surveillance zone will be through a VHF network.

— Command and control will be exercised from Offshore Control Centers on the platforms and the Onshore Control Centre at HQ ODAG.

— The ONGC's existing SATCOM/Microwave network will integrate the radar stations and assist data transfer.

— The VATMS Training Simulator, located in HQ, ODAG will train personnel and rehearse procedures.

As has become standard procedure, the Navy, the Air Force, the Coast Guard and the ONGC regularly conduct exercises to keep up-to-date the contingency plans for the defence of offshore assets.

12

The Marine Commandos

The Marine Commando Badge

Marine Commandos are highly trained, elite 'Special Naval Forces' and can be recognised by their maroon berets and the commando badge over their name tally.

Preamble

The need for Marine Commando (MARCOS) was first accepted in 1985 for the defence of offshore assets in Bombay High against clandestine attacks. The commandos' task was to evict terrorists who had already taken over an oil production platform. Sanction was accorded for the raising of an "Indian Marine Special Force (IMSF)" and for commando version helicopters to fly them swiftly from Bombay to Bombay High.

Within two years their initial role widened. In end July 1987, the commandos accompanied the Indian Peacekeeping Force (IPKF) to Sri Lanka to deal with the secessionist LTTE's marine elements that were operating in the shallow lagoons around Jaffna.

In 1989, the IMSF was renamed as the Marine Commando Force (MCF) and INS Abhimanyu became the parent (HQ) naval establishment for Chariot and Marine Commando operations. Abhimanyu is under the operational control of Flag Officer Maharashtra Area, who is responsible for the defence of Bombay.

In 1992, MARCOS East was formed and based at Vizag.

In order to infuse young blood, a voluntary category of commandos was introduced in 1995, termed as MARCO (General Duties) in addition to the existing MARCO (Advance) category who serve for 3 to 5 years.

The initial sanction for the IMSF was 38 officers and 373 sailors. In 1999, after seeing the effectiveness of the MCF in Operation Vijay during the Kargil war, sanction was accorded for an additional company of 29 officers and 246 sailors.

MCF Organisation

The MCF is organised as MARCOS East based at Vizag and MARCOS West based at Mumbai to cater for special operations on the Eastern and Western seaboards. In addition, one small MARCO unit has been based at Port Blair to meet the Special Ops requirements in the Andaman and Nicobar Command.

To develop combat efficiency, the Special Forces of various Navies were studied. The Prahar concept was introduced in 1992. A Prahar consists of 8 commandos.

After qualifying as MARCOS, officers and sailors remain in the MARCO sub-cadre for 3 and 5 years respectively.

Role and Training

The roles of the MCF are:-

- To conduct clandestine, surveillance & reconnaissance missions/operations and combat maritime terrorism.
- To support amphibious operations and special force missions.

Training

MARCOS undergo 10 weeks basic training in INS Abhimanyu followed by a three week Basic Para course at the Army's Para Training School at Agra. They also undergo a basic Combat Divers course. Basic training includes handling of arms, ammunition and explosives, unarmed combat, close quarter battle, jungle warfare tactics, para-jumping, kayaking, photography, ship intervention drills, hostage rescue, and recapture of offshore installations, SAS/SBS and chariot operations.

On completion of basic training, MARCOS join designated 'Prahars' for 'on job' and vertically specialised advanced training in:-

- The language and culture of likely adversary areas, to enable them to operate and survive behind enemy lines.
- Sniper competence and training on shoulder-launched missiles, MMGs, etc.
- Sky diving with water-para jump capability.
- Counter insurgency.
- Making Improvised Explosive Devices (IEDs) with readily available items.

For special operations on land, MARCOS are required to be deployable from the sea and from the air. In the advanced phase MARCOS are trained in beach, coastal, riverine and jungle warfare. Candidates for advance training must have qualified in static line and freefall. The MCF is one of a handful of units in the world that is capable of para-dropping into the sea with full combat load and equipment.

Interaction with Other 'Special Forces'

In the initial years, a few officers underwent the Explosive Ordnance Disposal (EOD) training in the United States. In 1996, MARCOS trained with SEALS of the US Navy and acquired capability for water-jumps-at-sea.[1]

To keep themselves combat ready, MARCOS participate in joint exercises and training with foreign and Indian Army Special Forces.

Deployments between 1991 and 2000

1991 **Operation Tasha.** Two Prahars were deployed off the southern Tamil Nadu coast to interdict LTTE infiltration and the smuggling of arms and ammunition.

1992 **Operation Zabardust.** MV Ahat, an LTTE vessel smuggling arms and ammunition was intercepted off Madras by MCF personnel. They boarded the vessel and captured all the mercenaries before LTTE sank the vessel.

1993 **United Nations Operation in Somalia.** Four teams of MARCOS were deployed off Mogadishu in support of the Indian contingent in Somalia. The team provided Maritime Special Ops support to the Naval Task Force.

1995 **Operation Rakshak.** Two to four teams of MARCOS are deployed round the year in Jammu & Kashmir, at Wular Lake. This 250 square km lake, surrounded by mountains, was being used freely by militants to reach Srinagar, saving them from having to travel 100 kms through the mountains. In 1995, a team of MARCOS was positioned at the lake and within weeks, militant activity on the lake ceased.

In subsequent years, in addition to meeting the requirement of deterring militants from using the Wular Lake, MARCOS started operating on land and Prahars killed several militants and recovered a large quantity of arms and equipment.

1999 **Kargil War.** MARCOS assisted army operations during the Kargil war.

1. Water-para-jump is a mode of injecting Special Forces. Each MARCO sky-dives from a distance, glides into shallower waters close to his target area and infiltrates inshore. In 1998, MARCOs carried out the first water-para-jumps off Goa. Today MCF is the only force in India that has this capability.

   In 2002, MARCOS also acquired combat free-fall capability when a team of two officers and two sailors completed training in Australia.

13

Goodwill Visits to Foreign Ports

From 1991 onwards, the Navy's goodwill visits have usually been dovetailed with either Passing Exercises called 'PASSEX' or structured 'Joint Exercises' or participation in 'Fleet Reviews' of navies of the countries being visited.

During naval goodwill visits, the professional regard which navies give to each other depends to a large extent on the impression that its naval units make in the matter of behaviour, courtesy, discipline, smartness, turnout, and efficiency of personnel, as also the modernity of equipment and showcasing of indigenous technological capability. During the decade of 1991–2000, India and her Navy reached out to regional maritime neighbours. The Navy's ships, submarines and aircraft and their personnel have, without exception, enhanced the regard in which India is held.

Ports Visited by Fleet Ships and Submarines

Ships	**Country & Ports Visited**	**Year**	**Remarks**
Aditya	Indonesia, Pusan, Jakarta	Sep–Oct 2000	—
Agray	Poti (Russia), Port Said (Egypt)	Feb 91	Homeward after Commissioning
Akshay	Poti (Russia)	Jan 91	Homeward after Commissioning
Alleppey	Male (Maldives)	Dec 90	—
Cheetah	Mogadishu (Somalia)	Dec 92–Feb 93	United Nations Peace-keeping Operation in Somalia (Ops Muffet).
Delhi	a) Malaysia (Langkawi) b) Singapore c) China (Ho-Chi-Minh City) d) South Korea (Pusan) e) Philippines (Manila) f) China (Shanghai) g) Japan (Sasebo) h) Indonesia (Jakarta)	Nov–Dec 97 Sep–Oct 98 Sep–Oct 2000	Participation in Langkawi International Maritime & Aerospace Exhibition (LIMA 97). Participation in South Korean Fleet Review at Pusan to celebrate 50th anniversary of Republic of Korea. Exercise Poorvamukh/Goodwill visit.
Deepak	Somalia (Mogadishu)	Dec 92–Jan 93	United Nations Peace-keeping Operation in Somalia (Ops Muffet).
Dunagiri	a) Singapore b) Indonesia (Jakarta) c) Thailand (Bangkok) d) Malaysia (Penang)	Dec 94–Jan 95	Goodwill Visit.

Ships	Country & Ports Visited	Year	Remarks
Ganga	a) Malaysia (Penang)	May 90	Participation in International Royal Fleet Review to celebrate 50 years of Royal Malaysian Navy.
	b) Iran (Bandar Abbas) c) UAE (Dubai) d) Oman (Muscat)	Jan 93	Goodwill visits to Persian Gulf.
	e) Somalia (Kishmayo, Mogadishu)	Nov–Dec 94	United Nations Peace-keeping Operation in Somalia.
	f) Oman (Muscat) g) Iran (Bandar Abbas)	May–Jun 98	Goodwill Visit.
Godavari	a) Somalia (Kishmayo, Mogadishu)	Nov–Dec 94	United Nations Peace-keeping Operation in Somalia,
	b) Oman (Muscat) c) Iran (Bandar Abbas) d) Qatar (Doha)	Nov 96	Goodwill Visit.
Gomati	a) Sudan (Port Sudan) b) Egypt (Port Suez through Suez Canal, Alexandria, Port Said, Djibouti)	Oct–Nov 95	Goodwill Visit.
	c) Israel (Haifa, Safaga Eilat)	Mar 2000	First goodwill visit to Israeli ports.
Himgiri	Iran (Bandar Abbas)	May–Jun 98	Goodwill Visit.
Jamuna	Muscat & Off South East Coast of Oman	Aug–Sep 93	Survey of Oman Coast in part a) Ras Abu Daud — Ras Ash Shajar b) Ras Ash Shajar — Wadi Haidha
Jyoti	Indonesia	Aug–Sep 96	Homeward after commissioning in Russia.
		Sep–Oct 98	South Korean Fleet Review at Pusan.
Khanjar	a) Abu Dhabi	Mar 95	International Defence Exhibition.
	b) Indonesia (Jakarta) Japan (Tokyo) China (Shanghai, Ho-chi-Minh City)	Aug–Sep 95	Participation in Indonesian Fleet Review at Jakarta to celebrate 50th Anniversary of Indonesian Independence.
	c) Brunei (Muara) Cambodia (Sihanoukville) Malaysia (Port Kelang)	Oct–Nov 96	Goodwill visits.
	d) Singapore, China (Ho-chi-Minh City) Indonesia (Pusan Chinhae) Philippines (Manila)	Sep–Oct 98	Participation in South Korean Fleet Review at Pusan to celebrate 50th anniversary of Republic of Korea.
	e) Bangladesh (Chittagong)	Nov 99	Goodwill Visit.

Ships	Country & Ports Visited	Year	Remarks
Khukri	a) Malaysia, Penang, Labuan	May 90	Participation in International Royal Fleet Review to celebrate 50 years of Royal Malaysian Navy.
	b) Iran, Bandar Abbas, Dubai, Muscat	Jan 93	Goodwill visit.
	c) Turkey, Istanbul, Izmir d) Yemen, Aden, Port Suez, Port Said	Nov 96	Goodwill visit.
	e) Bangladesh, Chittagong	Nov 99	Goodwill visit.
	f) Thailand, Bangkok g) Malaysia, Port Kelang	Apr 2000	Goodwill visit.
Kirpan	a) Singapore, Jakarta, Port Kelang , Bangkok, Penang	Dec 94–Jan 95	Goodwill visit.
	b) Langkawi	Nov–Dec 97	LIMA 97.
	c) Singapore	May 99	IDEX 99.
Kora	a) Abu Dhabi	Mar 99	Goodwill visit.
	b) Shanghai, Sasebo	Sep–Oct 2000	Goodwill visit.
Kursura	Singapore, Jakarta	Dec 94	Goodwill visit.
Kuthar	a) Mogadishu	Dec 92–Feb 93	United Nations Peace-keeping Operation in Somalia (Ops Muffet).
	b) Kuwait, Bahrain, Qatar	Dec 93	Goodwill visit (Ops Bargad).
	c) Abu Dhabi, Kuwait, Dubai	Nov 95	Goodwill visit .
	d) Pusan, Jakarta	Sep–Oct 2000	Goodwill visit.
LCU L-34	Phuket	Nov 96	Goodwill visit.
Mahe	Male	Dec 90	Goodwill visit.
Mahish	a) Jakarta	Nov 90	Goodwill visit.
	b) Phuket	Nov 96	Goodwill visit.
Matanga	Port Louis	Dec 2000–Jan 01	To escort CGS Vigilant from Port Louis to Mumbai.
Mulki	Male	Dec 90	Goodwill visit.
Mysore	a) Port Suez, Port Said, Cadiz b) USA Norfolk, New York, Boston, Portsmouth c) Portugal, Lisbon d) Germany, Bremerhaven e) France, Toulon	Jun–Aug 2000	To participate in the International Navies Review at New York in July 2000.
Nilgiri	Jakarta, Singapore	Oct–Nov 90	Goodwill visit.

Ships	Country & Ports Visited	Year	Remarks
Pondicherry	Male	Dec 90	Goodwill visit.
Rajput	a) Singapore, Ho-Chi-Minh City	Sep–Oct 98	Goodwill visit.
	b) Ho-Chi-Minh City, Singapore Straits, Malacca Straits.	Sep–Oct 2000	Goodwill visit.
Rana	a) Chittagong	Nov 99	Goodwill visit.
	b) Bangkok, Port Kelang	Apr 2000	Goodwill visit.
Ranjit	a) Port Suez, Istanbul, Izmir, Port Said, Aden,	Nov 96	Goodwill visit.
	b) Kuwait c) Saudi Arabia, Al Jubayl	Jun 98	Goodwill visit.
Ranvijay	a) Abu Dhabi, Kuwait, Dubai	Nov 95	Goodwill visit.
	b) Abu Dhabi	Mar 99	Goodwill visit.
Ranvir	a) Kuwait, Bahrain	Dec 93	Goodwill visit.
	b) Safaga, Eilat	Mar 2000	Goodwill visit.
Saryu	Jakarta, Manila, Tokyo, Shanghai	Aug–Sep 95	Participation in Indonesian Fleet Review at Jakarta to celebrate 50th Anniversary of Indonesian Independence.
Savitri	Muara, Sihanoukville	Oct–Nov 96	Goodwill Visit.
Shakti	a) Kishmayo, Mogadishu, Mombassa.	Dec 94	UN Peace-keeping Operations Somalia.
	b) Dubai.	Nov 95	Goodwill visit.
	c) Istanbul, Izmir, Port Said, Aden, Muscat, Bandar Abbas, Doha, Aden.	Nov 96	Goodwill visit.
	d) Abu Dhabi.	Mar 99	Goodwill visit.
	e) Safaga, Eilat	Mar–Apr 2000	Goodwill visit.
Shalki	Abu Dhabi, Dubai, Kuwait	Nov 95	Goodwill visit.
Shankush	Muscat, Bandar Abbas, Doha	Nov 96	Goodwill visit.
Sharda	a) Male, Somalia, Mombassa	May–Jul 93	United Nations Peace-keeping Operations in Somalia.
	b) Mombassa, Diego Suarez	Oct 96	Goodwill visit.
Sindhuraj	Port Kelang	Oct–Nov 92	Goodwill visit.
Sindhu-rakshak	St Petersburg, Kiel, La Corunna, Tangier, Alexandria, Port Said, Djibouti	Dec 97–Mar 98	Homeward after commissioning in Russia.

Ships	Country & Ports Visited	Year	Remarks
Sindhuratna	Muscat, Bandar Abbas, Kuwait, Al Jubayl	May–Jun 98	Goodwill visit.
Sindhushastra	St Petersburg, Kronstadt, Kiel, La Corunna, Tangier, Alexandria, Port Said, Djibouti	Aug 2000	Homeward after commissioning in Russia.
Sindhuvijay	Abu Dhabi, Dubai	Nov 95	Goodwill visit.
Sindhuvir	Singapore	Sep–Oct 2000	Indonesian Armed Forces day at Jakarta.
Subhadra	a) Mogadishu, Jilli	Mar–May 93	United Nations Peace-keeping Operations in Somalia.
	b) Port Sudan, Port Suez, Alexandria, Haifa, Port Said, Djibouti	Oct–Nov 95	Goodwill visit.
Sukanya	Mogadishu, Kishmayo, Mombassa.	Feb–Mar 93	United Nations Peace-keeping Operations in Somalia.
Sujata	a) Port Louis, Durban, Cape town /Simonstown b) Kenya, Mombassa	Apr–May 99	Goodwill visit.
	c) Diego Suarez, Port Victoria	Sep–Oct 99	Goodwill visit.
	d) Jiddah, Port Victoria	Sep–Oct 2000	Goodwill visit.
Sutlej	Muscat	Dec 93–Feb 94	Survey of Oman Coast.
Suvarna	a) Masan, Manila, Penang	Jun 90	Homeward after commissioning in South Korea.
	b) Mogadishu, Bossasso	Jul–Oct 93	United Nations Peace-keeping Operation in Somalia.
	c) Muscat, Bandar Abbas, Doha	Nov 96	Goodwill visit.
	d) Kuwait, Al Jubayl	May–Jun 98	Goodwill visit.
Taragiri	Singapore	Oct 92	Goodwill visit.
Udaygiri	Male	Jun 91	Disaster Relief Mission 'Op Madad.'
Viraat	Abu-Dhabi	Mar 99	Goodwill visit.

Goodwill Visits By Cadet Training Ships

Ships	Country & Ports Visited	Year	Remarks
Krishna	a) Naples, Alexandria, Djibouti	Sep 95	Homeward after commissioning in the UK.
	b) Mombassa, Diego Suarez, Port Louis	Oct 96	Goodwill visit.
	c) Yangon, Chittagong	Mar–Apr 98	Goodwill visit.
	d) Port Louis, Port Victoria, Male	Sep–Oct 98	Goodwill visit.
	e) Penang, Belawan	Mar–Apr 99	Goodwill visit.
	f) Diego Suarez, Port Victoria, Dubai, Kuwait	Sep–Oct 99	Goodwill visit.
	g) Penang, Belawan	Apr 2000	Goodwill visit.
Tir	a) Port Hedland, Fremantle	Apr–May 90	Goodwill visit.
	b) Chittagong, Langkawi	May–Jun 92	Goodwill visit.
	c) Port Louis, Dar-es-Salaam	Apr 93	Goodwill visit.
	d) Bangkok	Oct 93	Goodwill visit.
	e) Male	Oct 95	Goodwill visit.
	f) Dar-er-Salaam, Maputo, Capetown/Simonstown.	Mar–Apr 97	To participate in the South African Navy's International Fleet Review celebrating its 75th Anniversary
	g) Yangon, Chittagong	Oct 97	Goodwill visit.
	h) Port Louis, Port Victoria	Sep–Oct 98	Goodwill visit.
	j) Chittagong	—	Goodwill visit.
	k) Port Louis, Port Victoria, Male	—	Goodwill visit.
	l) Penang, Belawan	Mar–Apr 99	Goodwill visit.
	m) Dubai, Kuwait, Jiddah, Port Victoria	Apr 2000	Goodwill visit.

14

Visits of Foreign Naval Ships 1991–2000

Nationality	Name of Warships	Ports Visited	Dates
USA	Ford	Mumbai	23–24 Jan 91
Russia	Borodino	Mumbai	28 Feb–04 Mar 91
Australia	Torrens	Off Vizag	Nov 91
Egypt	Afar	Mumbai	11 Feb 92
Oman	Al Mabrukah	Mumbai	15 Feb 92
France	Aviso Detroyat	Mumbai	23–29 Mar 92
Oman	Al Jabbar, Al Mussandam	Mumbai	23–26 Nov 92
Portugal	Sagres	Mumbai	19 Dec 93
Oman	Al Mabrukah	Mumbai	06 Jan 94
South Africa	Drakensberg	Kochi Mumbai	23–26 Feb 28–30 Mar 95
Japan	Katima, Setoyuki	Mumbai	17–21 Jun 95
USA	John S McCain, Ingersoll, Pecos, Birmingham	Off Kochi	26–30 Mar 96
Italy	Bersagliere	Mumbai	04 Mar 97
France	Lafayette, Vendemiaire	Goa	18 May 97
Argentina	Libertad	Mumbai	19 Jun 97
France	Tappe	Mumbai	30 Dec 97–02 Jan 98
Britain	Nottingham	Kochi	10–12 Jan 98
USA	Comstock	Port Blair	19–20 Jan 98
France	Somme, Surcouf	Mumbai	23–28 Jan 98
Singapore	Valiant, Valour, Brave, Dauntless -do-	Port Blair Kochi	25–27 Feb98 02–13 Mar 98
Iran	Kharg	Kochi	02–06 Mar 98
Britain	York	Kochi	08 Apr 98

Nationality	Name of Warships	Ports Visited	Dates
Indonesia	KRI Kakap	Port Blair	24–29 Apr 98
Sri Lanka	Jayasagra	Port Blair	25–28 Apr 98
Bangladesh	Shaikat, Shaheed Ruhul Amin	Port Blair	25–29 Apr 98
Singapore	Sovereignty	Port Blair	26–29 Apr 98
France	Floreal	Goa	13–18 May 98
Britain	Grafton	Goa	26 Jul 98
Australia	Adelaide, Hobart, Westralia	Chennai	16–20 Oct 98
Australia	Hobart, Westralia	Goa	23–26 Oct 98
Australia	Adelaide	Kochi	23–25 Oct 98
France	Bougainville, Rare	Goa	25–28 Oct 98
Britain	Grafton	Goa	06–10 Nov 98
France	Surcouf	Goa	12–17 Nov 98
France	Floreal	Mumbai	26 Nov–03 Dec 98
Britain	Boxer	Kochi	06 Feb 99
Egypt	Sharm-el-Sheikh	Mumbai	05–08, 12–15 Mar 99
Britain	Boxer	Kochi	03 Apr 99
Britain	Glasgow	Kochi	04 Apr 99
France	Floreal Somme, Lafayette	Kochi Mumbai	06–12 Apr 99 07–11 Jun 99
Italy	Vittorio Veneto	Mumbai	26–30 Jul 99
Thailand	Latya	Mumbai	16–20 Sep 99
Malaysia	Laksamana Mohammad Amin, KD Laksamana Tanpusmah	Mumbai	16–20 Sep 99
France	Var	Goa	Oct 99
Britain	Sutherland, Newcastle	Mumbai	05–09 Jan 2000
France	Foch, Duquesne, Jules Verne, Tourville	Mumbai	24–28 Feb 2000
Singapore	Victory, Valiant, Fearless, Brave	Port Blair	28 Feb–09 Mar 2000
France	Var, Tourville,Blaison Blaison	Vizag Kochi	02–06 Mar 2000 17–20 Mar 2000
Thailand	HTMS Tha din Daeng	Mumbai	06–10 Mar 2000
Japan	Kashima Yugiri	Mumbai	07–10 May 2000
Turkey	TCG Turgutreis	Chennai	12–14 May, 25–27 Jun, 12–14 Jul 2000

Nationality	Name of Warships	Ports Visited	Dates
Portugal	NRG Commandante, Hermengildo Capelo	—	28 Jun–01 Jul 2000
France	Var, Nivose	Mumbai	03–06 Jul 2000
Japan	JDS Shikishima	—	Nov 2000
Britain	Scott	Goa	17–22 Nov 2000
France	Lieutenant de Vaisseu le Henaff	Kochi	22–24 Dec 2000

Reference Note
Indian Ocean Deep Seabed Mining

The Mineral Potential

First discovered by a British naval ship HMS Challenger between 1872 and 1876, polymetallic nodules are a rich source of high grade metallic ores. They are found in abundance on the floor of the world's oceans, at depths between 3500 metres and 6000 metres. The abundance varies from ocean to ocean:-

Ocean	Area covered with nodules
Pacific	23 million sq. kms
Indian	14 million sq. kms
Atlantic	8 million sq. kms

Average Metal Content of Nodules

The porous nodules contain 25% water. Their average metal content is 22% manganese, 1% copper, 1% nickel, 0.15% cobalt and minute quantities of titanium, molybdenum, barium, vanadium, cadmium, zinc, iron and lead.

It has been estimated that there are 0.15 trillion tonnes of nodules in the Indian Ocean. However they lie outside India's Exclusive Economic Zone. Their successful exploitation will depend on technological development, geological and environmental factors, metallurgical factors and legal and political factors.

The International Seabed Area

In 1970, the drafters of the Laws of the Sea Convention had proposed that the deep-sea areas beyond national jurisdiction be held in trust of the United Nations as the "Common Heritage of Mankind"[1] and the resources be developed by a United Nations Enterprise. This idea was not accepted by most nations. A compromise was therefore made with respect to deep-sea mining with certain concessions to nations that had already made an investment in exploration.

India's interest in deep seabed mining had evolved from its long-term requirements for manganese, nickel, cobalt and copper.

In the early 1970s, a systematic study of the ocean floor had revealed that about 14 million square kilometres in the middle of the Indian Ocean had mineral nodules, mainly manganese of different sizes and quality.

The Allocation of India's Seabed Mining Site

The 1982 UN Convention on the Law of the Sea (UNCLOS) prescribed a regime for the International Seabed Area and granted India, France, Japan and the Soviet Union 'pioneer status' for seabed mining. India was the only claimant in the Indian Ocean. The condition for qualifying as a pioneer investor was that the nation should have spent $30 million on deep-sea mining. India qualified by demonstrating her capability to extract nodules from the seabed.

On the basis of the initial delineation, a 'prospective area' covering 3,00,000 square kilometres was allotted. India surveyed and mapped this area. The richest segment in the site had a density of up to 30 kilograms of nodules per square metre.

After half of the allotted area was surrendered to the International Seabed Authority, the Preparatory Commission for the International Sea Bed Authority (ISBA) allotted to India's Department of Ocean Development (DOD) a 150,000 square kilometre area

1. The essence of the 1982 (UNCLOS III) regarding this concept is that the deep seabed and its natural resources are 'The Common Heritage of Mankind' and that exploitation of those resources shall be carried out for the benefit of mankind as a whole, taking into particular consideration the interests and needs of the developing countries.

in the Central Indian Ocean Basin to carry out seabed exploitation activities for the recovery of polymetallic nodules. The area is located about 2,700 km from Goa (1080 nautical miles south of Cape Comorin, the southern tip of India), and within 1000 kilometres of the US naval base at Diego Garcia. It lies between the latitudes of 10° and 16° degrees South and the longitudes of 73° and 79° degrees East.

Survey of the Site

The survey for mapping and detailed bathymetry of the pioneer area was subsequently strengthened by the use of a multi-beam swath bathymetric system (hydrosweep) on the DOD's Oceanic Research Vessel (ORV) Sagar Kanya. Environmental data, baseline oceanographic data on physical, chemical and biological map parameters was also collected.

Detailed sampling was carried out at 2500 locations. Over 250 tons of nodules were collected and supplied to various laboratories for extractive metallurgy programmes. In the area allotted to India, resources translated into 607 million metric tones of manganese, copper, cobalt and nickel nodules.

Development of Seabed Mining Technology

Research & Development on the design concepts of seabed mining technology had been entrusted to Chennai's National Institute of Ocean Technology (NIOT) and other organizations in the public and private sectors.

Five pilot plant campaigns were completed at the National Metallurgical Laboratory, Jamshedpur and the Regional Research Laboratory, Bhubaneswar for obtaining material and energy balance under the Extractive Metallurgy Project. A joint workshop has also been held with the United Nations Industrial Development Organisation (UNIDO) on Marine Industrial Technology for developing marine non-living resources.

India has developed expertise in metallurgical processes and has established at Hindustan Zinc Limited at Udaipur a pilot plant for extracting metals from nodules. A nucleus has also been established for developing a test mining system.

India's potential capabilities in deep seabed mining have been recognised. Norway, Finland and Japan have offered assistance for jointly developing a test mining system.

India's Department of Ocean Development is the nodal agency for implementing the deep seabed-mining programme. It has drawn up a long term plan to fulfil its obligations as pioneer investor and reach the stage for seeking production authorisation as quickly as possible.

Reference Note

Assistance Rendered by the Navy in Peace Time

Naval Assistance to Ships in Distress at Sea

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Oct 91	German Sailing Vessel Kurland	Rendered assistance to restart engines	Off Kochi	Matanga
Sep 92	MV Modison	Rendered assistance	Off Vizag	Saryu
Jan 93	CG Dornier	Salvage Operation	North of Paradip	Nireekshak
Jan 93	MV Ahhat	Salvage Operation. Suspected LTTE carrier	Off Chennai Coast	Kirpan, CGS Vivek
Jun 93	MV Ravidas	Rendered assistance	Off Tuticorin	Sutlej
Jun 93	MV Firomina Harvest	Search & Rescue of drifted ship, Fire fighting Assistance.	Off Mumbai Floating Light	Subhadra
Jul 93	Norwegian Ship MV Bremer Handel	Carried out repairs on its main Switch Board	—	Sharda
May 94	MV Coleroon	Rescue of crew	Off Chennai	Taragiri
Jun 94	MV G Mother	Salvage operation	Off Diu Head	Ganga, Ranjit
Jun 96	Oil Rig Sagar Vijay	Oil Rig broken her anchor due to storm, Personnel rescued	Off Mumbai	Naval helicopters
Jun 96	Ukranian ship MV Romeshka	Rescue of the entire crew of grounded ship	Off Mumbai	Naval helicopters
Jun 96	Brazilian Cargo MV Tupi Bezois	Rescue of crew of grounded vessel due to cyclone.	—	—
Jun 96	MV Mariner II	Rescue of Captain, 8 Pakistanis, 3 Bangladeshi, 4 Indians onboard the vessel which was grounded due to cyclone.	—	Naval Helo
1997	MV Sea Express	Evacuated 19 crew members of flooded Jamaican Ship	—	Naval Helo
Jun 98	MV Roshni	Salvage operation	Gulf of Kutch	Matanga, Godavari

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Dec 98	MV Bhoruka II	Salvage operation	Off Port Blair	Savitri
Apr 99	MT Manpool	Rescue of 39 crew of sinking ship Collided with MV Hyundai	Dondra Head/ Malacca Strait	Khukri
Apr 99	Oil & Natural Gas Commission boat	Render assistance to sinking work boat	Off Krishna–Godavari Basin	Kirpan
Nov 99	MV Alondra Rainbow	De-watering & salvage escorted to Harbour	Off Mumbai	Prahar, Delhi, Gomati, CGS Tarabai
Nov 99	MV Western Trust	SAR, crew evacuated & airlifted to Kunjali	Off Mumbai	Godavari, Chetak Helos

Search and Rescue (SAR) Operations

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships / Aircrafts
Jan 91	Pinaki Sail Boat (Sail Expedition)	Search & Rescue	Off Kolkata	Kirpan
Apr 91	Fishing Boat	Search & Rescue	Off Mumbai	Kunjali Helo
May 91	Okha Port Authority	Diving assistance for salvage of tug	—	Veer/Nirghat
Jun 91	MV Najid II	Search & Rescue	Off Vizag	Rajput, Vindhyagiri
Jul 92	MT Voo Shee II Taiwanese tanker	Evacuating an injured Taiwanese Sailor	Off Bombay	—
Aug 92	Police Commissioner	Search & Rescue	—	CCDT (Kochi)
Sep 92	DC Kottayam	Search & Rescue	—	CCDT (Kochi)
Mar 93	DC, Ernakulam	Search & Rescue	—	CCDT(Kochi)
Feb 94	Principal of Soba	Search & Rescue	—	CCDT
Sep 94	Fishing boat	Search & Rescue of fishermen	Off Veraval	Matanga
Nov 94	DC Ernakulam	Search & Rescue	—	CCDT (Kochi)
Feb 95	Police Commissioner Ernakulam	Search & Rescue	—	CCDT (Kochi)
Mar 95	DC Ernakulam	Search & Rescue	—	CCDT (Kochi)

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Apr 95	DC Kottayam	SAR of sunken autorickshaw and 04 Persons.	Thodupuzha River.	CCDT (Kochi)
Jun 95	DC Alleppey	Rescue of 04 trapped fishermen	Thumbeli	CCDT (Kochi)
Jul 95	MV Maratha Challenger	SAR. Two survivors rescued & air-lifted to Bombay	Off Dabhol	Ranvijay, Subhadra, Sea King Helo
Jul 95	DC Ernakulam	Search & Rescue	—	CCDT (K)
Aug 95	DC Kottayam	Search & Rescue	—	CCDT (K)
Nov 95	Andhra Pradesh	Search for fishermen	Off Gopalpur	ENC Ships
Nov 95	Fishing Boats	Search & Rescue	Off Gopalpur	Arnala
1995	Japan Naval Ship Kashima	Search of a missing naval cadet from Ship	—	Ranvijay, Subhadra & 2 Sea King Helo
Jan 96	Salvage of PNS Gazi	Salvage operation. Debris salvaged & displayed for public.	Off Vizag	CCDT(V)
Apr 96	Sikkim Govt	Rescue assistance	—	—
May 97	ONGC Dolphin Helicopter	Search and rescue of one dead body and pieces of wreckage.	West of Mumbai Harbour	—
Jun 97	MV Arcadia Pride	Rescue of 13 persons of sunken ship, 9 persons rescued & 4 bodies recovered.	Off Mumbai	Naval Helicopters
May–Jun 1998	Kandla	SAR in Gulf of Kutch	Gulf of Kutch	Godavari
Oct 98	Maharashtra	Rescue of coal miners from Wardha river	Ambernath	CCDT(B)
Dec 99	DC Ernakulam	Search & mark a sunken mooring Buoy	Ernakulam Channel	CCDT (K)
Jan 2000	DC Ernakulam	Search & Rescue	—	CCDT (K)
Jan 2000	DC Kollam	Search & Rescue	—	CCDT (K)
Apr 2000	DC Kollam	Search & Rescue	—	CCDT (K)
Apr–Jun 2000	DC Ernakulam	Search & Rescue	—	CCDT (K)
Jul 2000	DC Idduky	Search & Rescue	—	CCDT (K)
Aug 2000	DC Trivandrum	Search & Rescue	—	CCDT (K)
Aug 2000	DC Wayanad	Search & Rescue	—	CCDT (K)
Sep 2000	DC Ernakulam	Search & Rescue	—	CCDT (K)
Sep 2000	DC Ernakulam	Recovery of dead body	—	CCDT (K)
Sep–Dec 2000	DC Ernakulam	Search & Rescue	—	CCDT (K)

Medical Assistance and Evacuation

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Apr 92	Civilian patient	Evacuation from merchant ship MV Harmann	Off Kochi	Garuda helo
Oct 92	Civilian patient	Evacuate a crew member who had suffered a heart attack from Bahamas registered tanker MT Star India.	Off Cochin	Chetak Helo
Jul 93	Civilian patient	Evacuation from merchant ship MT Red Sea Poineer	Off Kochi	Garuda Helo
Aug 93	Civilian patient	Evacuation from merchant ship MT Amazon Glory	Off Kochi	Garuda Helo
Jun 95	Civilian patient	Evacuation from merchant ship MV Eredine	Off Kochi	Sharda, Garuda Helo
Jul 95	Civilian patient	Evacuation from merchant ship MV World Prime	Off Kochi	Garuda Helo
Jul 95	Civilian patient	Evacuation from merchant ship MV Daphne	Off Kochi	Garuda Helo
Jul 97	Nicobar Island	Medical Camp	Bangla Village Theressa Island	Godavari
Sep 98	Civilian patient	Evacuation from merchant ship MV Blue Symphony	Off Kochi	Garuda Helo
Oct 98	Civilian patient	Airlifting of a mother & new born baby of MV Pearl of Abu Dhabi	—	—
Jan 99	Civilian patient	Evacuation from merchant ship MV Al-Shamiah	Off Kochi	Sutlej Helo

Cyclone, Flood and Earthquake Relief

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Jun 91	Male	Disaster relief mission	Male	Udaygiri
Aug 91	Andhra Pradesh	Flood Relief	Guntur, East Godavari & Vizag Port	CCDT(V)
Nov 91	Tamil Nadu	Flood Relief	—	CCDT(V)
Feb 92	Andhra Pradesh	Rescue Ops	Yarada (Vizag)	321(V) Flt Dega
Nov 92	Tamil Nadu	Cyclone Relief	Madurai (TN)	CCDT(V), Rajali
Nov 93	Tamil Nadu	Flood Relief & Rescue of marooned Villagers	Near Madurai	Agrani
Jul 94	Orissa	Flood, medical relief food drop & evacuation of personnel	Orissa coast Chandipur	Chilka, Dega helos

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Jul 94	Orissa (Berhampur)	Assistance after flood	—	CCDT (V)
Jun 96	Western Coast	Search & rescue post cyclone	—	Western Coast ships & air-Crafts.
Jul 96	Uttar Pradesh Govt.	Rescue assistance	—	—
Nov 96	Eastern Coast	Search and rescue post-cyclone.	—	Eastern Coast ships & aircrafts
Jun 98	Gujarat	Cyclone relief & Rescue. Restored essential services & communication links of port.	Off Kandla, Gulf of Kutch, Porbandar	Matanga, Godavari and Helo
Sep–Oct 98	West Bengal, Bihar	Flood, medical relief & rescue. Food distribution & diving assistance.	Malda (WB) Samastipur (Bihar).	Netaji Subhash, INHS Nivarini
Sep 98	Andhra Pradesh	Flood Relief & Rescue Operation	Vijaywada	CCDT (V)
May 99	Gujarat	Cyclone relief & rescue	Gujarat coast	Taragiri
Oct–Nov 1999	Orissa	Flood relief, food drops, airlift of medical Teams, diving assistance & opening of Paradip Port.	Orissa coast, Paradip Port	Rajput, Gharial, Sharabh, Ghorpad, Savitri, Nirupak, Sandhayak , Helos & Divers.
Nov 99	Orissa	Cyclone Relief	Orissa	INS Rajali
May 00	Civilian Community Relief	1000 barrels of water for drought.	Pipanav	Shakti

Maintenance of Essential Services

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Dec 92	United Nations	UNITAF forces deployed in Somalia for peace keeping operations. Provided maritime logistical support for providing relief in that country.	Off Somalian Coast	Deepak, Kuthar, Cheetah, Sukanya, Subhadra, Sharda, Suvarna
1993	Union Nations	Operation Muffet in supporting of Indian contigent in Somalia. The team provided Maritime special Ops support to the Naval Task Force.	Off Mogadishu, Kismayo	Ganga, Godavari & Shakti, four teams of Marcos.

Firefighting Assistance

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Nov 91	ONGC OSV's, MSV's Lakshmi	Firefighting assistance	Off Mumbai	Sukanya
Nov 91	MV Zakir Hussain	Firefighting assistance	Off Mumbai	Kunjali helos, Matanga
May 94	MV Arti	Firefighting assistance	Off Andaman Nicobar Islands	LCU 33
Sep 97	HPCL Complex	Firefighting assistance	Visakhapatnam	ENC units
Jun 98	ESSAR Oil Refinery	Firefighting assistance	Near Jamnagar	Valsura

Naval Aid to Civil Authority

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Feb–Mar 1992	MV Ramanujam	Escorting from Rameshwaram to Talaimanar and back for refugee transfer.	Palk Bay	Karwar, Meen
Dec 92	MV Dhruvak	Towing from Angria Bank to Mumbai.	Off Mumbai	Matanga
Jan–Mar 93	UNICEF	Carriage of humanitarian aid for UNICEF.	Mogadishu Kisimayo, Mombasa	Kuthar, Cheetah, Sukanya, Deepak Subhadra, Sharda, Suvarna
Nov 93	Superintendent Port Trust, Kochi	For cleaning of transducers of Sagarsampada.	Off Kochi	CCDT (K)
Jan 94	Superintendent, Port Trust, Kochi	To recover dredge grap dropped alongside BPT Jetty.	Kochi	CCDT (K)
Mar 94	DC, Palghat	Removal of 08 tons temporary bulk from Malampuzha dam	Malampuzha, Kerala	CCDT (K)
Jul 94	Govt of Orissa	Flood relief. Distribution of food and medicines.	Jagat Singhpur	02 Officers, 45 Sailors
Jul 94	Superintendent Port Trust, Kochi	For cleaning the berthing hawser from propeller.	—	CCDT(K)
Aug 94	West Bengal	For locating & recovering a passenger launch. Recovered 20 bodies and wreck.	Namkhana, Hoogly river	—
Oct 94	Mumbai Customs Department	Recovery of silver Ignots	Mumbai	CCDT(MB)
1995	Jammu & Kashmir	Operation Rakshak: Deployed round the year. Militant activity on the lake ceased.	Wular Lake	2–4 Teams of MARCOS.
Jul 95	DC Trivandrum	Recovery of 3 dead bodies	Vizhinjam	CCDT (K)
Sep 95	Dy. Conservation Officer	Inspection of Hooper door and attached wire rope.	Kochi	CCDT (K)

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Jan 96	DC Malappuram	Clearing of live bombs (Ammunition)	Malapuram river	CCDT (K)
Mar 96	Addl. Commissioner Customs	Recovery of dumped contraband items	Off Kaup light at Mangalore	CCDT(K)
Mar–Apr 97	ONGC	Saturation dives for survey of underwater oil pipelines	—	Nireekshak
1998	Jammu & Kashmir	Operation Vijay–Triangulating positions of Pakistani Artillery	—	—
1998	DC, Ernakulam	Survey of grounded ammonia barge	Ernakulam Channel	CCDT (K)
May 99	West Bengal	Recovery of fallen bus in Bhagirathi river	—	Netaji Subhash
Sep 99	Andaman & Nicobar Administration	Aid to civil administration to disperse unlawful activity, road blockade. Situation brought under control, Flag march conducted.	Port Blair	Jarawa
Dec 2000	MCGS Vigilant	Towing from Mauritius to India	—	Matanga
Dec 2000	DC, Idukki	Measuring the depth of water of dam and find out the nature of river bed.	Mullaperiyar dam	CCDT (K)
Nov / Dec 02	Princes Royal	Archaeological excavation	Off Bangaram	Nireekshak

Assistance by Naval Diving Teams

Month & Year	Assistance Rendered to	Nature of Assistance/Location	By Naval Ships /Aircrafts
Feb 91	Tamil Nadu	Removal of wreck from Marina Beach	CCDT (V)
Feb 91	Customs	Recovery of Silver	CCDT (V)
Apr 91	DRDL	Salvage of Akash missile	CCDT (V)
Jun 91	West Bengal	Metro Railway	CCDT(V)
Jun 91	Orissa Govt	At Hirakund Dam	CCDT(V)
Jul 91	Assam Govt (Dibrugrah)	Recovery of dead body	CCDT(V)
Aug 91	Andhra Pradesh (Guntur)	Recovery of dead body	CCDT(V)
Aug 91	Andhra Pradesh (Rajmundhry)	Pushkar Mela	CCDT(V)
Sep 91	Chokani Shipping	Assistance to Floating Dock	CCDT(V)
Sep 91	Kerala PWD	Vazhani Dam	CCDT(K)

Month & Year	Assistance Rendered to	Nature of Assistance/Location	By Naval Ships/Aircrafts
Dec 91	NOIC (WB)	Diamond Harbour for President visit	CCDT(V)
Mar 92	ISRO	Recovery of Prithvi	CCDT(V)
Apr 92	Kerala	Assistance to Cochin Port Trust	CCDT(K)
Jun 92	Kerala	Assistance to Southern Railway	CCDT(K)
Jul 92	Andhra Pradesh (East Godavari)	Recovery of bus/body	CCDT(V)
Sep 92	Andhra Pradesh	Recovery of dead body	CCDT(V)
Feb 93	Regional survey	Underwater photo and Seabed samples	CCDT(V)
Feb 93	DC, Alwaye	Diving assistance	CCDT(K)
Mar 93	AF 5 Wing	Recovery of PTA	CCDT(V)
May 93	Andhra Pradesh	Recovery of dead body from well	CCDT (V)
Aug 93	Andhra Pradesh (Kurnool)	Recovery of dead body from river	CCDT (V)
Jan 94	NOIC (WB)	Ganga Sagar Mela	CCDT (V)
Jan 94	West Bengal	Recovering of two sunken passenger boats off Sagar Island near Baratola.	Netaji Subhash
Mar 94	DC Alwaye	Life Guard duties on occasion of Mahasivaratri	CCDT (K)
Apr 94	Andhra Pradesh	Recovery of dead body from East Godavari River	CCDT (V)
Apr 94	Revenue Officer	Rescue cover for boat race	CCDT (V)
Sep 94	Orissa (Gopalpur)	Assistance after flood	CCDT (V)
Jan 95	NOIC (WB)	Ganga Sagar Mela	CCDT (V)
Feb 95	SP Ernakulam	Life guard duties on occasion of Mahasivatri at Alwaye	CCDT (K)
Jul 95	NOIC (AP)	Recovery of dead body from dam	CCDT (V)
Aug 95	Andhra Pradesh, South East Railway	Recovery of dead body	CCDT (V)
Oct 95	Andhra Pradesh	Recovery of dead body, Rishikonda Beach	CCDT (V)
Nov 95	Andhra Pradesh	Recovery of dead body, Yarada Beach	CCDT (V)
Jan 96	NOIC (WB)	Ganga Sagar Mela	CCDT (V)
Feb 96	Orissa	Recovery of Seabed sample, RRL Bhubaneshwar	CCDT (V)
Sep 96	Hyderabad	Ganesh Visarjan	CCDT (V)
Jan 97	NOIC (WB)	Ganga Sagar Mela	CCDT (V)
Mar 97	Andhra Pradesh	Visakha Festival	CCDT (V)
Sep 97	Andhra Pradesh	Recovery of dead body from Krishna river	CCDT (V)
Jan 98	Assam	Brahmaputra Beach Festival	CCDT (V)

Month & Year	Assistance Rendered to	Nature of Assistance/Location	By Naval Ships/Aircrafts
Feb 98	Orissa	Recovery of dead body from river at Sambalpur	CCDT (V)
Feb 98	Orissa	Recovery of Seabed samples	CCDT (V)
Sep 98	NOIC (WB)	Recovery of Seabed samples	CCDT (V)
Oct 98	Indian Railways	To rescue passengers of Konkan Express	—
Nov 98	NOIC (WB)	Ganga Sagar Mela	CCDT (V)
Nov 98	Orissa	Recovery of Tug	CCDT (V)
Jan 99	Orissa	Recovery of dead body after floods	CCDT (V)
Mar 99	Orissa	Recovery of Seabed Sample, RRL Bhubaneshwar	CCDT (V)
Nov 99	Orissa	Lakshya Trials	CCDT (V)
Jan 2000	NOIC (WB)	Ganga Sagar Mela	CCDT (V)
Sep 2000	DC Alleppy	Life saving cover for Mahatma Gandhi Boat Race	CCDT (K)

Apprehension of Poaching and Smuggling Trawlers

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Nov 91	LTTE Boat Tonga Nova	Ops Gray Hull: Apprehended & escorted to Chennai	Off Pt. Calimere	Kirpan, Saryu, SDB T60
Dec 91	MV Subhan Allah	Apprehended & escorted to Mumbai	Off Mumbai	Godavari
Jan 93	MV Ahat	Op Zabardarst — Capture & boarding - LTTE leader Sadasivan Kittu was on board.	Off Chennai	Kirpan, CGS Vivek
Apr 93	MSV Jay Dariyalal	Operation SWAN. Apprehended & escorted to Bombay	—	Sharda
Dec 97	Burmese Trawler	Apprehended & escorted to Port Blair	Off Andaman Nicobar Islands	LCU 34
Feb 98	Thai trawler	Apprehended & handed over at Port Blair	Off Port Blair	Saryu
May 98	Deep Sea Sri Lankan trawler	Apprehended & handed over to Coast Guard	Off Port Blair	Saryu
Jun 98	Two trawlers	Apprehended & handed over at Port Blair (Carrying RDX & explosive ammunition)	Off North Andaman	Kirpan, Kuthar, Saryu
Jan 99	3 Burmese Boats	Apprehended & handed over at Port Blair	Off Andaman & Nicobar Islands	LCU 36
Feb 99	Blue Marine, Sri Lankan	Apprehended & handed over to Naval Detachment, Minicoy	Off Minicoy	Sujata
Mar 99	MT Mariamma	Intercepted & handed over to Cost Guard at Chennai	Off Chennai	ENC joint ops with Coast Guard

Month & Year	Assistance Rendered to	Nature of Assistance	Location	By Naval Ships/ Aircrafts
Mar 99	3 Burmese dinghies	Apprehended & handed over to Local Police	Off Andaman & Nicobar Islands	LCU 36
May 99	Showa Maru	Intercept LTTE Vessel Showa Maru—Ops Bingo	—	IN, CG Ships
Aug 99	Thai Trawlers	Apprehended & H/O to Local Police	Off Andaman & Nicobar Island	LCU 33
Oct 99	86 poachers, 09 dinghies	Apprehended and handed over to local police	Off Andaman	Guldar, LCU 36
Nov 99	MV Alondra Rainbow	Apprehended the ship that was taken over by Pirates. Dewatering & salvage, escorted to harbour — Ops Rainbow	Off Goa	Gomti, Delhi, Prahar & CGS Tarabai
Dec 99	11 Burmese poachers & 4 dinghies	Apprehended & handed over to local Police	Off Andaman Nicobar Island	LCU 34
Jun 2000	Sri Lanka	Rescue of Shri MN Bhakta Ex-MP held hostage by Sri Lankans	Op Sahayta	—
Dec 2000	10 poachers & 1 dinghy	Apprehended and handed over to local Police	Off North Andaman	Trinkat

Naval Assistance to an Indian Merchant Vessel at Sea

A Naval Relief and Rescue Operation

Reference Note
Background of the Sri Lankan Tamil Conflict

From the time of its independence in 1948, the security dilemma of Ceylon (later renamed Sri Lanka) has been 'fear of Big Brother India'.[1] The Sinhalese, despite constituting 80% of the population, viewed the Tamil segment of its population not as a minority but as part of the demographic 'presence' of the millions of Indian Tamils of Tamil Nadu. They perceived Tamil Nadu as the natural support base of the Sri Lankan Tamils and were constantly apprehensive of India dismembering Sri Lanka under political pressure from Tamil Nadu. This underlay the reluctance of the Sinhalese-Buddhists to respond to Sri Lankan Tamil demands for devolution of power and for being acknowledged as a distinct ethnic group within the Sri Lankan polity.

The JVP (Janata Vimukti Peramuna), a radical political movement, was made up of those Sinhalese Buddhists who were both anti-Tamil and anti-Indian. In 1971, it tried to topple the government to 'save their country from 'eastern imperialism and Indian expansionist designs'; it cut off all communications with the rest of the world.

Naval Assistance in 1971

In April 1971, Sri Lanka requested India's help to quell this uprising. The Indian Navy was tasked with preventing merchant ships (suspected to be North Korean) from ferrying arms to the insurgents.

Ships of the Western Fleet patrolled Sri Lanka's west coast, remaining out of sight. A frigate entered Colombo harbour to act as communication link. Naval ships from Visakhapatnam patrolled Sri Lanka's east coast, also remaining out of sight. After a few weeks, the crisis blew over and ships returned to their base ports. This was the Navy's first ever deployment in support of a foreign policy decision to respond to a neighbour's call for help.

In 1972, Sri Lanka changed its constitution. It stressed the special position given to Buddhism, asserted Sinhala Buddhist culture and weakened protection for the minorities. These policies confirmed the Tamil feeling of being treated as second-class citizens and that their future lay in the creation of a separate state, to be carved out of northern and eastern Sri Lanka, where they could have Tamil as a language and Hinduism as a religion.

From 1972 onwards, the Tamils started resorting to violence. The failure of repeated efforts to meet Tamil aspirations was aggravated by economic problems and rising unemployment all of which helped the rise of assertive and aggressive Tamil militancy, spearheaded by the Liberation Tigers of Tamil Eelam (LTTE), led by V Prabhakaran. The emergence of militant Tamil separatist movements sharpened Sinhalese apprehension of Indian intervention in support of Tamil militancy.

Alarmed over these mushrooming militants and their growing popularity amongst the Tamil masses, the Sri Lankan Government rushed through a legislation in 1978, banning the LTTE and the main militant organisations that were carrying out assassinations, ambushes and forcible collection of money.

For India, the political implications of Sri Lankan policies had, by 1980, become quite vexed. On the one hand, the people of Tamil Nadu had a strong sense of Tamil political and cultural identity. During the 1970s, there were insistent demands by the political leaders of Tamil Nadu that India should intervene in Sri Lanka, militarily if necessary, to ensure the safety of the Sri Lankan Tamils and to compel the Government of Sri Lanka to modify its policies on the treatment of its Tamil minority. On the other hand, it was undesirable to interfere in the internal affairs of Sri Lanka and their legitimate reactions to Tamil militancy.

---

1. Reportedly, after Sardar KM Pannikar pointed out that Ceylon had to be an integral part of India's Indian Ocean defence, Ceylon thought India was a hegemon and entered into a defence agreement with Britain ceding Trincomalee to the British Navy.

Moreover, the cultivation by Sri Lanka of security and intelligence connections with Pakistan, Israel and the US began to be perceived by India as strategically disadvantageous to her interests.

India's decision to be supportive of the cause of Sri Lankan Tamils was based on these political compulsions and strategic perceptions.

Developments Between 1983 and 1987

In mid 1983, Sri Lanka commenced intensive security operations against the Tamil militants. The latter reacted with ferocity. Sri Lankan retribution was swift; it took the form of widespread anti-Tamil riots throughout the length and breadth of Sri Lanka, particularly in Colombo. Over three thousand Tamils were slaughtered, thousands of Tamil homes were destroyed and nearly 150,000 Tamils fled to refugee camps. The Sri Lankan Government declared a state of emergency.

This large-scale massacre led to several developments. Over 100,000 Tamils sought refuge in Tamil Nadu. Tamil militant youth groups established bases in Tamil Nadu and selected militant cadres were armed and trained. The Government in Tamil Nadu demanded immediate Indian involvement to stop the genocide of brother Tamils. It precipitated India's involvement in Sri Lanka's ethnic strife. From 1983 onwards, India tried to bring the two sides together.

The Sinhalese-majority Government concluded that it could not contain Tamil militancy with its own resources and started looking for external support. It signed informal, confidential agreements with the Governments of the United States and Britain to bring their warships into Colombo, Trincomalee and the Gulf of Mannar. The frequency of visits by the warships of these navies increased between 1983 and 1987. It also invited British mercenaries and Israeli intelligence agencies into its intelligence services and sought assistance from Pakistan to train its Home Guards and its Navy.

In October 1983, the USA offered to assist in obtaining Israeli arms supplies and intelligence support for Sri Lanka and, as a *quid pro quo*, Sri Lanka should provide strategic intelligence gathering facilities against India in Sri Lanka's Voice of America (VOA) broadcasting station.[2] Sri Lanka also preferred the USA for the contract to repair and restore the 'Trincomalee Oil Tank Farms'. India had bid for this project, but despite being the most reasonable price offered, the Sri Lankan Government, preferred to give the contract to a consortium of companies led by the United States. India took the view that this provided the potential for an American strategic naval presence based in the sheltered deep-water harbour of Trincomalee, which for decades had been an important naval base of the British Navy. Viewing all these developments with concern, India conveyed its disquiet to Sri Lanka.

In 1984, the Indian Navy started patrolling the Palk Bay to prevent violation of the International Boundary Line (IBL) by fishermen of either country and to prevent harassment of Indian fishermen by the Sri Lankan side. The demarcation, in 1976, of the maritime boundary in the Palk Strait and the Gulf of Mannar helped to reduce tension but had not entirely removed it, partly because of the vexed problem of Katchchativu.

In 1985, India arranged a conference in Bhutan, attended by all the militant groups and Sri Lankan representatives, to discuss a document, jointly prepared by the Indian and Sri Lankan Governments and the Tamil leaders, for meeting their political and constitutional aspirations. When its recommendations were about to be adopted, the Sri Lankan President backed out due to domestic political opposition.

Meanwhile, the LTTE had continued to grow in stature and strength. Jaffna came under LTTE domination. With the civil administration totally paralysed and the Sri Lankan Armed Forces (SLAF) confined to camps along the coast, the LTTE virtually ran a state within a state.

The Accord of July 1987

Between January and May 1987, in preparation for a major offensive against the LTTE with the aim of retrieving control over Jaffna, the SLAF placed the Jaffna peninsula under siege. Fierce fighting ensued in which most of the LTTE casualties were caused by artillery fire and aerial attacks by aircraft and helicopters. What hurt the LTTE and the local population was the economic blockade that snapped electricity supply, running water and denied entry of supplies and medicines. The mass exodus to India increased.

Diplomatic initiatives failed to ease the blockade for supply of essential medicines and food supplies. The Indian Government tried to send supplies and medicines by sea for distribution to the population of Jaffna. Ships of the Sri Lankan Navy stopped a convoy of fishing trawlers,

2. Reportedly, Sri Lanka authorised the Voice of America broadcasting against the Soviet Union and offered the USA to avail of the facilities at Trincomalee.

flying white flags with a Red Cross, led by Coast Guard Ship Vikram. To avoid an incident, the convoy returned home without unloading its relief supplies.

On 4 June 1987, transport aircraft of the Indian Air Force airdropped supplies over Jaffna.[3] The Sri Lanka Government called the air dropping a violation of international law. International concern for the people of Jaffna, and the low-key response to these objections and to Sri Lankan requests for assistance, induced Sri Lanka to halt the SLAF offensive.

Seeing the writing on the wall, the Sri Lanka Government sought discussions with the Indian Government. The outcome was the Indo–Sri Lanka Accord that was signed on 29 July 1987.

For Sri Lanka, the Accord sought to end the ethnic struggle that had claimed countless lives, damaged property and ruined its economy.

For India, whose armed forces were committed on its Western and the Northern borders, the Accord sought:-

- To safeguard the security of its southern seaboard.
- To subsume secessionist tendencies in Tamil Nadu and Punjab.
- To avoid the acquisition by foreign powers of footholds in Sri Lanka.

Sequel to the Accord

Indian Prime Minister Rajiv Gandhi and Sri Lanka President Jayawerdene signed the Accord on 29 July 1987 in Colombo. The signing of the accord was followed by violent upheavals in Sri Lanka by the JVP. Sri Lanka immediately sought India's military assistance to stabilise the situation and safeguard Sri Lanka's unity and territorial integrity.

In the early hours of 30 July 1987, the Navy commenced the induction of the Indian Peacekeeping Force (IPKF) into Sri Lanka. The induction was by specific invitation. Its arrival was welcomed both by the SLAF and the Tamil population, but not by the Buddhist population.

During the next two months, the LTTE, which had initially been associated with the discussions that preceded the signing of the Accord, became increasingly reluctant, and eventually refused to surrender all its arms. It felt that the Accord would not be honoured by the SLAF. The LTTE decided to fight the IPKF.

In the ensuing months, the IPKF found itself bogged down in a guerrilla war in terrain in which the LTTE had the advantage. Overcoming suspicions and despite difficulties, the IPKF succeeded in establishing peaceful conditions in the Jaffna peninsula and the Eastern province.

The common perception among the Sinhalese soon became that the IPKF was a threat to the sovereignty of Sri Lanka. In the Sinhala areas, the JVP triggered an insurrection that sought to "save the country from an unholy trinity of American imperialism, Indian imperialism and Tamil expansionism".

The Buddhist clergy also resented the Accord. In their view, the Accord had betrayed the Sinhala people by conceding too much to the Tamils and allowing the Indians to enter the island as a peacekeeping force.

In January 1989, Sri Lanka elected a new President whose views were decidedly anti-Indian. Between February and May 1989, the JVP again went on the rampage. Leading a coalition of Buddhist monks and students, the JVP launched a nationwide agitation against the IPKF and against the Government. Seizing the opportunity, the LTTE sought talks with the Sri Lankan government. The tables turned. The SLAF joined hands with the LTTE and transferred weapons and ammunition, which the LTTE desperately needed to fight the IPKF. Anti-Indian propaganda spread. The majority Sinhala community, the minority Sri Lanka Tamils and the Sri Lanka Government all developed an aversion for the IPKF. The new President confidently called for the withdrawal of the IPKF.

Operation Pawan had started with the induction of the IPKF on 29 Jul 1987. The de-induction started in August 1989 and by October 1989, the bulk of the IPKF had withdrawn. The operation terminated on 24 March 1990, when the final contingent of the IPKF sailed out of Trincomalee on board ships of the Eastern Fleet. When the last elements withdrew, there still had been no solution of the political problem.

3. It was anticipated that India's effort to send food by sea to blockaded Jaffna would be opposed by the Sri Lanka Navy. When the flotilla wisely turned back rather than fight its way through, the decision was taken to air drop supplies into Jaffna. This had a significant effect on expediting the Indo–Sri Lanka Accord of July 1987.

Reference Note

Background of the Somalia Conflict

Two ancient nations, Ethiopia and, Somalia, substantially comprise the Horn of Africa, which occupies an extremely important strategic location. Somalia's northern coast lies along the southern approaches to the Strait of Bab-el-Mandeb and dominates the route from the Persian Gulf through the Red Sea and the Suez Canal to the Mediterranean Sea.

Somalia has had a long and turbulent history. Because of its strategic location, astride the sailing ship route between the Mediterranean Sea kingdoms of Europe and the coastal kingdoms of China and India across the Indian Ocean, it controlled the trade between the Red Sea ports and the rich city states on the east coast of Africa.

During the 18th and 19th Centuries, there was British Somaliland, French Somaliland and Italian Somaliland. Britain, France and Italy fought incessantly over territory.

The deep-water port of Kismayo in southern Somalia was founded in 1872. It was occupied by the British in 1887 and from 1927 to 1941 was part of Italian Somaliland. Berbera is a deep-water harbour on the Somali coast of the Gulf of Aden lying opposite the southern Yemen city of Aden.

On July 1, 1960, by agreement with the UN Trusteeship Council, Somalia was granted independence.

Political Background

The political culture of Somalia was predisposed by competition among a number of clans and clan-based factions. Although Somalis had received their primary political education under British and post-war Italian tutelage, the anti-Imperialist parties threw their lot in with the Soviet Union and the People's Republic of China. By the middle of the 1960s, the Somalis had formal military relationships with Russia, whereby the Soviet Union provided extensive material and training to the Somali armed forces.

Muslim Somalia and Christian Ethiopia were traditionally hostile neighbours. America had been sending substantial military aid to Ethiopia whose southern region, Ogaden, had a substantial Somali population. The Somalis became jaded of the Anti-American indoctrination by the Russians. During the final years of the Cold War, America gave Somalia substantial humanitarian and military aid and in return obtained use of the naval facilities at Berbera, previously a Soviet naval and missile base.

New opposition movements — each drawing support from a different clan emerged in the late 1980s. The dissident Somali National Movement continued its military campaign against the Barre government, capturing parts of the north. The civil war intensified and Barre was forced to flee the capital in January 1991. After the fall, Mogadishu's warlords began fighting one another creating a humanitarian disaster.

Sequence of Events Leading to the Battle of Mogadishu

After the 1991 revolution, the clans coalition divided into two groups. One was led by Ali Mahdi, who became president; and the other, by Mohammed Farah Aidid. In total, there were four opposing groups which continued to fight over the domination of Somalia.

In June, a ceasefire was agreed, which these groups failed to hold. A fifth group, seceded from the northwest portion of Somalia, renaming it the Somaliland Republic.

In September, severe fighting broke out in Mogadishu, which continued in the following months and spread throughout the country, with over 20,000 people killed or injured by the end of the year. These wars led to the destruction of agriculture of Somalia, which in turn led to starvation. The international community began to send food supplies, but vast amounts of food were hijacked and brought to local clan leaders, who routinely exchanged it with other countries for weapons. An estimated 80 percent of the food was stolen.

From November onwards, there was heavy fighting in the Somali capital of Mogadishu between armed elements allied to General Mohamed Farah Aidid and Mr. Ali Mohamed Mahdi, the appointed "interim President", and other factions. There was conflict in Kismayo also and in the north west, local leaders were pushing to create an independent "Somaliland". The fighting between the clans and sub-clans along with serious drought proved disastrous for the population at large. Overall, an estimated 300,000 people, including many children died. Some 2 million people were violently displaced from their homes and fled either to neighbouring countries or elsewhere within Somalia.

Against this background, in January 1992, the Security Council unanimously imposed a general and complete arms embargo on Somalia. On 17 March, the Council urged the continuation of the United Nations humanitarian work in Somalia and appointed a Coordinator to oversee the delivery of humanitarian aid. On 27 March, agreements were signed between the rival parties in Mogadishu resulting in the deployment of United Nations observers to monitor the cease fire. The agreement also included deployment of United Nations security personnel to protect United Nations personnel and humanitarian assistance activities.

United Nations Operations in Somalia I (UNOSOM I), April 1992 to March 1993

On 24 April 1992, the Security Council adopted a resolution to establish UNOSOM I. By June, the principal factions had agreed to the deployment of unarmed but uniformed United Nations military observers. The observers from Austria, Bangladesh, Czechoslovakia, Egypt, Fiji, Finland, Indonesia, Jordan, Morocco and Zimbabwe served under Chief Military Observer, Brigadier-General Imtiaz Shaheen of Pakistan.

Meanwhile, conditions within Somalia continued to deteriorate. The Security Council approved the establishment of four operational zones — Berbera, Bossasso, Mogadishu and Kismayo — with increase in the authorized strength of UNOSOM to 3,500. In September, it was agreed to further add three logistical units, raising the total authorized strength of UNOSOM to 4,219 troops and 50 military observers. The first group of security personnel arrived in Mogadishu on 14 September 1992.

Growing Difficulties. Continuing disagreements among Somali factions on the United Nations role made effective UNOSOM deployment countrywide impossible. On 28 October, General Mohamad Fahrah Aidid declared that the Pakistani UNOSOM battalion would no longer be tolerated in Mogadishu. He also ordered the expulsion of the UNOSOM Coordinator for Humanitarian Assistance. General Aidid objected to United Nations control of the airport whereas Mr. Ali Mohamed Mahdi wanted UNOSOM to take full control of the port. Subsequently, General Mohamad Aidid's forces shelled and shot at UNOSOM forces controlling the airport and Mr. Ali Mohamed Mahdi's forces shelled ships carrying food as they attempted to enter Mogadishu port.

In the absence of a government to maintain law and order, relief organisations experienced increased hijacking of vehicles, looting of convoys and warehouses, and detention of expatriate staff.

Operation Provide Relief began in August 1992, with the US military transports supporting the multinational UN relief effort in Somalia. When the situation further deteriorated, on 3 Dec 1992, the Security Council adopted a resolution and authorised the use of "all necessary means" to help create a secure environment for the delivery of humanitarian aid in Somalia.

Unified Task Force (UNITAF)

Operation Restore Hope. On 4 December 1992, the United States responded to the Security Council resolution with a decision to initiate Operation Restore Hope, under which the United States would assume the unified command of the new operation. The first elements of the Unified Task Force (UNITAF) came ashore on the beaches of Mogadishu without opposition on 9 Dec 1992.

The United States forces secured the airfield at Baledogle and seized Baidoa in Dec 1992. The United States Central Command followed a four-phase programme to realize the objectives of securing major airports and seaports, key installations and food distribution points, and providing open and free passage of relief supplies, with security for convoys and relief organisations and those supplying humanitarian relief.

Transition from UNITAF to UNOSOM II

UNITAF had deployed approximately 37,000 troops in southern and central Somalia, covering approximately 40 per cent of the country's territory. The presence and operations of UNITAF had a positive impact on the security situation in Somalia and on the effective delivery of humanitarian assistance. However, a secure environment had not yet been established and incidents of violence continued. There was still no effective functioning government in the country, no organized civilian police and no disciplined national army.

On 3rd March 1993, the Security Council recommended for effecting the transition from UNITAF to UNOSOM II, the latter endowed with enforcement powers to establish a secure environment throughout Somalia. The new mandate also empowered UNOSOM II to assist the Somali people in rebuilding their economic, political and social life, through achieving national reconciliation so as to recreate a democratic Somali State. UNOSOM II took over from UNITAF in May 1993.

The Battle of Mogadishu

The Battle of Mogadishu was fought on 3rd and 4th October 1993 in Mogadishu between forces of the United States and Somali guerrilla fighters (loyal to warlord Mohamed Farrah Aidid).

A Division of Delta Force and Army Ranger teams executed an operation which involved travelling from their compound on the outskirts of the city to capture leaders of Aidid's militia. The assault force composed of nineteen aircraft, twelve vehicles and 160 men. During the operation, two US UH-60 Black Hawk helicopters were shot down by rocket propelled grenades and three others were damaged. Some of the wounded soldiers were evacuated, but others were trapped at the crash sites. An urban battle ensued throughout the night. Early the next morning, a joint task force was sent to rescue the trapped troops. They assembled some 100 vehicles, including Pakistani tanks, Malaysian Condor armoured personnel carriers and were supported by US A/MH-6 Little Bird and MH-60 helicopters. This task force reached the first crash site and led the trapped soldiers out. The second crash site was overrun; the lone surviving American was taken prisoner, but later released.

It was estimated that approximately 1000 Somali militiamen and civilians lost their lives in the battle, with injuries to another 3000 to 4000.[1]

The operations of the US Special Forces in Somalia will always be overshadowed by the events of 3rd and 4th October 1993, when they found themselves in the fiercest urban fire. The US troops were finally withdrawn by March 1995.

Events leading up to the De-induction

During the two years between 1993 and 1995, when the UN operations lasted, about 50,000 people were killed in factional fighting, and an estimated 3,00,000 died of starvation as it became impossible to distribute food within areas of the war-ravaged nation.

Continuing violence and the shooting down of two US helicopter gunships in Mogadishu, in 1993, and desecration of the bodies of dead UN and US servicemen led the UN leaving Somalia in 1995. When the UN withdrew in 1995, having suffered significant casualties, order still had not been restored.

The Battle of Mogadishu led to a profound shift in American foreign policy, as American politicians became increasingly reluctant to use military intervention in Third World conflicts, failing to assist in the halt of the genocide in Rwanda in 1994, and affected America's actions in the Balkans during the later half of the 1990s. President Clinton preferred to use the "air power alone" tactic and hesitated to use US ground troops in fighting Serbian military and para-military ground forces in Bosnia in 1995 and in Kosovo in 1999, out of fear of losing American soldiers in combat, as well as fear of repeating what happened in Mogadishu in 1993.

1. The book *Black Hawk Down: A Story of Modern War* estimated more than 500 Somali militiamen dead, and more than one thousand wounded. More definitely, 18 American soldiers died, and 73 were wounded (another American soldier was killed in a mortar attack a day later). One Malaysian soldier died, and seven were wounded; two Pakistanis were also wounded.

SECTION III

Consolidating Force Capability

Enhancing the Navy's Capability to Fulfill its Emerging Role

Preamble

"There is nothing more common than to find considerations of supply affecting the strategic lines of a campaign and a war"

— Karl Von Clausevitz

Overview

Apart from the ability to deter aggression and inflict damage in war, operational combat preparedness involves, in almost equal measure, achieving satisfactory results in a conflict that might have been thrust by the adversary. From a naval perspective, such readiness depends on a combination of having the right combat capabilities (of warships, submarines and air defence systems), timely logistical support and an appropriate level of training.

The Navy's operational preparedness saw some extraordinary peaks and troughs during the 90s decade. The failed monsoons of the late 1980s imposed serious resource constraints; Iraq's invasion of Kuwait in 1990 raised oil prices and the collapse of the Soviet Union in 1991 led to shortage of spares. Growth gathered momentum in the second half of the decade till US-led sanctions against India's nuclear weapon tests in May 1998. Their cascade effects seriously interrupted the Navy's plans and jeopardised naval preparedness.

The seriousness of the situation was well summarised by then CNS Adm VS Shekhawat who recalled in an interview after his retirement that the situation was so grim that in ten years not a single ship had been ordered. In this scenario, the Navy embarked on a major path of indigenous production. It all culminated in the late 90s in project sanctions for the indigenous production of guided missile destroyers and frigates, missile armed corvettes, fast missile attack craft, landing ships, survey ships, tankers and diverse smaller ships. Therefore, viewed in the overall context of bleak scenario that existed at the start of the decade, the Navy's achievements in the field of warship design and production were quite significant.

The decade saw a notable shift in preference for Commercial Off the Shelf (COTS) equipment. But that aside, self-reliance continued to progress, wherever cost effective and resulted in successful production of equipment for a large number of ship, submarine and aircraft systems. More significant, perhaps, was the enormous success of innovations at the working level to remedy complex defects and restore operational worthiness.

Enormous synergy was generated by the interchange of talented young naval architects between ship design assignments in the Directorate General of Naval Design and assignments as naval overseers in the warship building yards to oversee the construction of the ships that they had helped to design. This synergy helped Mazagon Docks, Garden Reach and Goa Shipyard to acquire the confidence in "hybridising," that was to become standard practice in Indian naval warship building.

The foundation for the growth of the Indian Naval fleet during the period 1991 to 2000 was facilitated by certain favourable circumstances in the preceding years:-

- **Defence Reviews by the Apex Committees in 1973 and 1975.** The growth between 1976 and 1983 had been the result of the recommendations of these reviews, which led to the acquisition of Russian guided missile destroyers, ocean going rocket boats, minesweepers, MRASW aircraft and ASW helicopters.
- **Design of the Godavari Class Frigates**. These Russian acquisitions coincided with the redesigning of the frigates that would follow the sixth and last of the Leanders. This redesign process led to the Godavari class frigates fitted with Russian weapon systems.
- **Alignment and Co-operation**. The growth of the Naval fleet was greatly helped by an extraordinary working relationship between the Navy, the Ministry of Defence and the Prime Minister's Office and between the three service chiefs. It led to the swift acceptance of the British aircraft carrier Hermes. The need to replace the ageing Russian acquisitions led to sanctions for the acquisition of better submarines, fast missile attack craft, anti-submarine patrol vessels, landing ships and maritime reconnaissance aircraft.
- **Confidence in Indigenous Design & Production Capability**. The success of implanting Russian weapon systems in the Godavari class frigates, synergised with the momentum that had built up

in the indigenous warship-building programme, imparted a confidence in the capability of the Navy's Design Organisation. The warship building yards had began to press the Ministry of Defence Production for long-term orders to keep their workforce gainfully employed.

- **Russian Assistance for Indigenous Warship Production**. Russia continued to offer India its latest weapons for installation in Indian built hulls. There was willingness from the Russian side to assist indigenous warship production also.

These factors laid the framework for the growth of the fleet, especially through indigenous design, hybridisation and production.

Consolidation of Capabilities

The decade was significant for the consolidation that the Navy undertook to enhance its Force Capability. In this, it was assisted fortuitously by the dissolution of the Soviet Union and the ensuing perestroika, which resulted in significant Russian acquisitions.

Besides acquisitions, tremendous progress was made in the indigenous design and production of warships. There were significant modernisations and service life extension programmes undertaken to keep equipment in Indian ships abreast of latest advancements in technology.

Submarine warfare and anti-submarine tactics also underwent a metamorphosis in the 90s. With changes in the command and control of the Submarine Arm, induction of the Sindhughosh class of submarines, and the genesis of the discussions with France for the joint production of the Scorpene, the process of giving the arm a complete 'make-over' got underway.

The combat capability of the air-arm too grew steadily. New sensors, simulators, weapons and aircraft were inducted to make sure the Navy kept pace with technology. Three new naval air stations were commissioned which made coverage of sea areas by maritime reconnaissance more complete. The Viraat and Vikrant saw their capabilities upgraded while the first steps were initiated for acquisition of the Russian aircraft carrier Gorshkov (Vikramaditya), and the construction of the indigenous aircraft carrier project.

Maintenance, Repair and Refit Facilities at the Naval Dockyards at Mumbai and Vishakapatnam and the Naval Ship Repair Yards at Kochi and Port Blair improved by leaps and bounds. Naval maintenance capacity faced serious challenges as a result of non-availability of spares occasioned largely due to factors beyond the control of the Navy. But despite the financial crisis and sanctions post 'Nuclear Tests', the naval maintenance, repairs and refit capacity rose to the occasion admirably. The decade also saw the Navy build its third Naval Base at Karwar. It was another landmark achievement signifying the service's expanding infrastructure and growing operational plans.

The Navy also for the first time seemed to move towards creation of a viable logistical framework. Timely logistic support, an imperative for operational readiness, is an extremely complex and expensive task. The creation of the Logistics Cadre in the late-80s was soon followed by a series of steps in the 90s to improve the logistics organisation. Not the least of these, was the convening of the Logistic Delegations (LOGDELs) that helped make a breakthrough in the procurement of spares from Russia and Ukraine in the mid 90s. The Navy achieved a significant milestone in the creation of the Integrated Logistics Management System (ILMS) that provided it with a state-of-the-art Logistics Management System.

The contribution of Research and Development to naval self-reliance also deserves special mention. The defence laboratories INPL (later renamed NPOL), NCML and DRDO contributed singularly to the goal of self-reliance and indigenisation notching many firsts in development of underwater equipment and Anti-Missile Defence (AMD) systems.

Retrospect

This period is notable for the tremendous strides the Navy took towards self-reliance. The Navy's quest for indigenous construction, which started almost thirty years ago, was a long and arduous one. But it bore the results that we sought. Even so, there was an effort to maintain an optimum balance between indigenous production and the foreign acquisitions, the latter ensuring periodic infusion of new technology. The Navy acknowledged the fact that warship and submarine building yards could not deliver vessels in the numbers required to make good the depletion in naval force levels and factored that in its plans for acquisitions. It proved to be the key to the sustenance of force levels.

Traditional Indo–Russian cooperation remained important for India as it helped close the defence technology gap. Significantly, in a departure from earlier practices, the service looked at enhanced technology transfers from the US, UK, Germany, France, Japan and Israel. The intent was clear — the Navy was focused on narrowing critical gaps in its strategic technology. The reformulation of strategy objectives and consequent redrafting of staff requirement parameters was in itself a remarkable accomplishment.

15

The Russian Acquisitions

Overview

The collapse of the Soviet Union resulted in a nightmare for its arms clientele, in terms of spares support. The Soviet Union, during the Cold War era, had perfected dispersion and alternative manufacturing facilities of its defence industry across the length and breadth of their territories, although there were concentrations in certain industrial belts.

In their controlled economy, they could draw from one or more sources and meet the requirements of their customers.

The manufacturers/OEM's on the other hand did not have any insight into where their product went. This ensured stringent Central Control, as even raw material supplies and output were monitored. Thus, when the break-up took place, they were blinded by the stark realities of not only paying for raw materials, that they had to acquire but were also unable to market their products, except through the Russian interface agency like RVZ. This forced them into diversifying quickly into alternate consumer products. However, since their economy had been hit, there were few buyers for these products. The respective Governments of the newly constituted CIS Republics attempted to bale them out and in the bargain also obtain (hard currency) revenue from end users. There was poaching on all sides, but the main players were in the Russian Federation, Ukraine and Byelorussia.

In this situation, efforts were made to source spares even directly from the Russian Navy and the Shipyards, who it was believed were also in financial doldrums, but had stockpiled spares. Although, there was optimism in this approach, few purchases actually fructified through these means.

However, by the mid 1990s, Indo–Russian and Indo–Ukrainian naval interaction gradually adjusted to the restructured economies.

In 1994, India and Russia signed an agreement on long-term, bilateral, military–technical cooperation till the year 2000. By the end 1990s, contracts had been negotiated for the new Project 1135.6 Krivak II class missile frigates (Talwar class) and an upgraded missile-capable submarine, the Sindhushastra of the Sindhughosh class.

By 2000, the new Russian Administration had stabilised the situation and, with the coming on line of new oil and gas resources, the Russian economy began to revive.

Indo–Russian Defence Cooperation

The Restructuring of the Russian Military Industrial Complex

Until 1990, India's defence interaction used to be with the Soviet Ministry for Foreign Economic Relations and its two departments, The General Engineering Department (which dealt with the supply of ships/submarines/aircraft) and The General Technical Department (which dealt with infrastructure).

For licensed production, there was direct interaction with the concerned Soviet ministries like Shipbuilding, Aviation, etc for which high level bilateral working groups met periodically to resolve problems. During the process of economic restructuring (and as the place of the Soviet Union was taken by the Russian Federation), the functions of the GED and GTD were merged into a single organisation — Ms Rosvoroozhenie (RVZ) to start with and from 2000 onwards by Ms Rosoboronexport as the Russian Government's 'corporation' for export of armaments.

During the Cold War, the Soviet Union's Military Industrial Complex (MIC) not only had to meet the demands of the Warsaw Pact countries — it was also a major exporter of armaments to friendly countries. After the Cold War, with the Russian Armed Forces being cut back, Russia's MIC had to depend on exports to survive. It had to compete for exports with the USA, Britain and France. It decided to adopt new ways to survive. Some of these were:-

- To capture and retain markets by exporting state-of-the-art systems, much as it had been doing with

India in the preceding decades. In 1996, a former Director General of Rosvoroozhenia stated:-

"If previously the Soviet Union did not deliver, as a rule, the newest models of arms to other countries, today Russia sells modern high tech models. Also, these deliveries are occurring simultaneously with the introduction of these weapon systems in Russia's armed forces. This is an important difference between Russia's export policy and US policy. The United States often sells other than the best systems abroad, and most often sells either used arms or arms which have been in their arsenal for many years".

- To sell to countries that did not buy from Western countries or could not do so because of Western sanctions or who did not relish embargos.
- Collaboration with well-established West European companies for the joint development, production, marketing, sales and distribution of armaments.
- Offer and cooperate in licensed production, servicing of old and new arms and equipment and training of personnel.

Indo–Russian Defence Cooperation after the Cold War

After the emergence of the Russian Federation, India and Russia signed in 1993, a 20 Year Treaty of Friendship and Cooperation, replacing the Indo–Soviet Treaty of 1971. This was accompanied by the signing of the Bilateral Defence Cooperation Agreement for the period 1994 to 2000, covering the sale and production of Russian armaments and spares.

In 1997, the two sides signed a Military Technical Cooperation Agreement and extended bilateral defence cooperation till 2010. In 1998 and 1999, this cooperation programme was extended to cover new areas like Anti-Ballistic Missile Systems and joint R&D of new weapon systems, like the 'BrahMos' (Brahmaputra–Moscow) supersonic, anti-ship cruise missile, a fifth generation jet fighter, advanced electronic warfare equipment, aircraft engines and marine propulsion systems.

Indo–Russian Financial Transactions

The financial transactions with the Soviet Union were historically based on Rupee–Rouble agreements with Credit terms and Contracts negotiated at "friendship prices".

After 1991, the erstwhile financial arrangements for Defence trade between India and the USSR had to be renegotiated with Russia and the new Confederation, the CIS. Commercial and contractual terms and conditions needed to be re-negotiated in a manner that would help minimise the problems that had been experienced.

During negotiations, it became clear that the changes taking place in Russia and the CIS were likely to entail increasing demand to supply equipment against hard currency or on "cash and carry" basis, particularly for those items that were required urgently and where the Navy had to deal directly with the OEMs. Under these circumstances, it became all the more important that a much bigger thrust be given to the indigenisation of Naval equipment.

The Early 90s

Despite the changing political scenario in the Soviet Union, a succession of visits by high ranking Naval, Army and Air Force dignitaries in the Soviet defence hierarchy was perceived as an indication of avoiding a disconnect in the Indo–Soviet defence relationship.

In response to the concerns raised by the Indian side in 1991, it was assured that all cooperation would be on the erstwhile credit terms and that a preliminary decision had been taken by the Soviet Government to adopt a positive approach for supply of new hardware and future defence cooperation.

To avoid delays in the delivery of spares and stores, which were critical for the Indian Navy, the Russian side was asked to consider the transfer of spares from those ships/submarines, which were being phased out of the Soviet Navy. The Russian side indicated that a list of such systems and equipment had been handed over to their Ministry of Foreign Economic Relations, to facilitate them being handed over to the Indian side.

In late 1991, the first high ranking Russian delegation post the dissolution indicated that for the first time since 1929, five-year plans had been dispensed with. The Central Planning Authority had lost its pre-eminent position and nothing had replaced it. In such a scenario, they were not in a position to respond with certainty to Indian requests for future acquisitions. The fall of the Communist Party had denuded the Government ranks of a committed cadre of people who had performed the task that other countries entrusted to permanent bureaucracies.

The Indian side was cautioned that future defence supplies were unlikely to be on credit and they have started with a new system of pricing products, comparing them with western origin equivalents. The Republics of the CIS had been given more rights to control the production in their plants, factories and shipyards. Proposals could only be formulated after the restructuring of the Soviet economy was over and the Indian side should therefore be patient.

In 1992, it was communicated that Russia would not be in a position to resume or offer defence credits to India. As 80% of the industrial units manufacturing naval equipment were located in Russia and the remainder in Ukraine and other Republics of the CIS, the Indian Navy's budgeting was impacted.

The Russian side also stated that the non-availability of credit, shortage of raw materials, power cuts, industrial unrest, etc, may lead to disruptions in supplies of equipment and spares. Therefore, the development and supply of spares and equipment for the Indian Navy was unlikely to be completed before 1994.

Overall, the early 90s were an extremely difficult period. The difficulties faced by the Russian side coincided with the financial crisis in India. The Navy struggled to keep the Soviet acquisitions in fighting trim. All new inductions were placed on hold. Efforts were made at various levels to establish direct relationships with the OEMs.

Situation in the Mid and End 1990s

The gradual restoration of economic normalcy in Russia led to an improvement in the situation. The mid 90s were noteworthy for the deputation of successive logistic delegations (LogDels) to the CIS. The delegations comprised representatives of the MoD, Finance and NHQ that were empowered to negotiate contracts directly with the Russian OEMs. In due course, by the end 90s new contracts were concluded for the following:

Ships

- Three 3840-ton Krivak II class missile frigates later designated as the Talwar class.
- Technical assistance for the weapon systems to be supplied for the ships being constructed in India — Project 15 Delhi class destroyers, Project 16A Godavari class frigates, Project 17 Shivalik class stealth frigates, Project 25A missile corvettes, Project 1241RE gas-turbine propelled missile boats and Project 71 Indigenous Aircraft Carrier.
- Acquisition in 1995 of INS Jyoti, a second hand merchant tanker after conversion to meet naval requirements for replenishing ships at sea.

Submarines

- Acquisition of two Project 877 EKM Sindhughosh class submarines of which one, later named Sindhushastra, with capability to launch missiles from its torpedo tubes.
- Medium Repairs cum retrofitment of tube launch missile capability in some of the earlier Project 877 EKM.
- Commencement in India of Medium Repairs of 877 EKMs.

Aircraft & Helicopters

- Upgradation and modernisation of the LRMP TU 142 aircraft, to provide air-to-surface missile capability.

Note: During this period negotiations also commenced for the acquisition of the second-hand aircraft carrier Gorshkov and its carrier borne MIG 29 K aircraft.

Infrastructure for Maintenance, Repair, Overhaul and Refit of Russian Acquisitions

To support the new acquisitions from Russia, contracts were concluded for establishing the necessary infrastructure to support these locally:-

- At Visakhapatnam — For ships and submarines & Mumbai
- At Kochi — For inshore minesweepers acquired earlier
- At Goa — For MRASW aircraft and ASW helicopters
- At Arakkonam — For LRMP aircraft

Agreements to Support New Commercial Arrangements

Despite the progress made in the mid 90s, product support, documentation, and training for the new acquisitions remained problematic. As a response to their new economic environment, it was felt that the RVZ seemed to be more focussed on concluding major acquisition contracts, than resolving product support issues that the Indian side considered important.

There was, therefore, a greater focus and attention to these issues by the Indian side during further interactions. Steady efforts were made to put in place framework agreements for product support and formulation of model contracts to address product support issues, and at the time of signing future contracts, to contractually bind suppliers in more specific terms. Effort was made to use the Russian side's keenness in progressing acquisition projects as leverage in eliciting the required response for product support issues.

In October 1997, the 1994 Indo–Russian Protocol on Long-term Bilateral Military–Technical Cooperation was extended till 2010.

In 2000, India and Russia signed the Declaration of

Strategic Relationship. The Declaration's clause relating to Defence stated the objectives as "Consolidating defence and military–technical cooperation in a long term perspective" and "deepening service-to-service cooperation." An Inter Governmental Commission on Military and Technical Cooperation was set up, co-chaired by the Deputy Chairman of the Russian MIC and India's Defence Minister. There were two working groups under the Commission — one headed by the Defence Secretary to deal with military–technical cooperation and the other headed by the Secretary Defence Production to deal with co-production of ships, aircraft, tanks, etc. In the years since 2000, the thrust has been more in the direction of joint production, joint research and joint development of new projects.

In the same year, an Indo–Russian Inter Governmental Commission on Military–Technical Cooperation was set up. An Inter-Governmental Agreement (IGA) signed in October 2000 agreed in principle for the acquisition, after refit of 'Admiral Gorshkov'[1] with the naval version of the MIG 29K, Kamov 28 Anti-Submarine helicopters and Kamov 31 Airborne Early Warning helicopters, the final contracts for which would be negotiated separately.

In Perspective

Russian and Indian Defence Industries

Discussions with Russian participants after an Indian Defence Review seminar on "Reforms in Russian and Indian Defence Industries" revealed issues of significance:-

Implications of dealing directly with Russian (OEMs). Whilst discussing the possible reasons for the unusual number of MIG 21 accidents, one Russian view was that whilst it may have been cheaper during the restructuring of the Russian economy, for India to have bought urgently required spares directly from the Russian OEMs, the OEMs as they were then, were not really in a position to 'assure' the quality of their spares. On the other hand, when spares are acquired through a Government 'corporation' like Rosoboronexport, the latter is duty bound to vouchsafe the quality of the spares. The un-stated implication was that the MIG accidents might possibly have been the result of sub-standard spares procured directly from OEMs.

In his address to the seminar, the Deputy Director of Rosoboronexport stated:-

> *"In accordance with the new Decree of the President of the Russian Federation, certain enterprises may be granted the right of direct deliveries of spare parts to foreign customers. The specific list of such enterprises will be made known to the prospective customers in due course of time."*

Implication of Procuring through Rosoboronexport. In dealing with the Soviet Union, there were 'friendship prices'. Given the rigorous financial scrutiny of Indian defence procurement, dealing with a commercially driven corporation like Rosoboronexport entails payment of an overhead charge. This addition to cost leads to the temptation to deal directly with OEMs.

It seems prudent to explore, in consultation with Rosoboronexport, the 'quality assurance' of future Russian OEMs. On an analogous basis, for example, when ordering spares for the Mirages or the Jaguars, one presumes that European OEMs assure the quality of their spares.

Economic Order Quantity. The Deputy Director of Rosoboronexport also addressed the issue of Economic Order Quantity:-

"A programme was launched to reform and restructure the Russian defence industry and to mobilise part of it for civil production purposes. However, the implementation of the programme is going to take a long time and requires solution of other related problems. We have many relatively small enterprises making components and spare parts, which are used in various weapon systems. Most of the enterprises are unprofitable and sustain losses because the required quantities of the components are small. And it is difficult to shut them down because they are the sole manufacturers possessing unique technology and equipment."

India has experienced similar difficulties when trying to indigenise Russian spares. Indeed, the problem of spares from the Soviet Union, and later from Russia, regularly attracts the attention of senior levels on both sides. Despite the best intentions, a satisfactory solution has yet to be found.

---

1. Admiral of the Fleet of the Soviet Union, Admiral Sergei Gorshkov had done more than any other Soviet leader to assist the development of the Indian Navy for twenty years from the mid 1960s to the mid 1980s. The submarines and anti-submarine ships of the 1960s were followed in the 1970s by missile boats, MRASW aircraft, missile corvettes and minesweepers, followed in the 1980s by missile destroyers, hunter-killer submarines and LRMP ASW aircraft and the lease of a nuclear propelled submarine.

   It is fortuitous that the largest and most powerful warship to be acquired by the Indian Navy bears his name until she is commissioned.

INS Delhi (D61) — Missile Destroyer with Seaking

Firepower of INS Mysore — Missile Destroyer

INS Khanjar (P47) — Project 25 Missile Corvette

INS Kulish (P63) — Project 25A Missile Corvette

INS Brahmaputra (F31) — Missile Frigate

INS Jyoti (A58) — Fleet Replenishment Tanker

16

Warship Production and Acquisition

The Navy's achievements in the field of warship design and production have been noteworthy. In the twenty five years between 1965 and 1990, shipbuilding metamorphosed from a nascent, adjunctive activity to a central, transformative movement that revolutionised the service. From building boats in the early 50s, the Navy came to designing and building state-of-the-art warships by the late-90s. The tiny 'Central Design Office' that was designing yard craft, blossomed and transformed into the Directorate General of Naval Design that was designing aircraft carriers, destroyers and numerous types of large auxiliary and minor war vessels.

Warship production and acquisition during 1991 to 2000 covered a wide field of activity and envisaged large and ambitious ship building projects. This chapter deals with the generic and chronological aspects of warship design and construction and also lists down the ships designed and constructed during this period.

Background

The Directorate of Naval Construction (DNC), when first established in the 1950s, was responsible for all aspects of naval construction — policy, planning and hull maintenance. As the sole repository of expertise, not only was it responsible for the design and construction of ships but it was also the nodal agency at Naval Headquarters for the acquisition and induction of ships from abroad.

In 1965, the overseeing of the construction of frigates being built in Mazagon Docks was entrusted to the DNC. In 1968, the management of the Russian acquisition programme was hived off from DNC and entrusted to a new Directorate of Acquisition Project (DAP). In 1969, the Frigate Cell of DNC became the Directorate of Leander Project (DLP). In due course, DLP became the Directorate of Naval Ship Production (DNSP) and today is known as the Directorate of Ship Production (DSP).

A major objective of the 1969–74 Defence Plan was self-reliance in the field of warship design and warship production. Accordingly, the indigenous construction of frigates, patrol crafts, submarines, minor war vessels and auxiliaries had been accepted in this plan.

In 1969, there was an acute shortage of naval architects and specialist constructer officers. The Navy did not have either adequate experience or capacity to undertake indigenous design of the range of ships and craft envisaged in the plan. In its proposal to the Government for a full-fledged Directorate of Naval Design (DND), Naval Headquarters envisaged induction of foreign warship designers on loan with assurance of back up from their parent organisations.

In 1970, the Design Cell of DNC hived off to become the Directorate of Naval Design (DND). From the outset, DND was conceived and created as an integral part of Naval Headquarters. This ensured close interaction with all the professional directorates in NHQ at all levels, while functioning under the scrutiny of the Naval Staff. In later years, DND was upgraded to become the Directorate General of Naval Design (DGND).

In 1985, the Directorate of Naval Construction (DNC) was renamed Directorate of Naval Architecture (DNA).

The Warship construction undertaken in the 70s and 80s provided the Dockyards and Naval Architects with the experience and confidence to undertake larger and more ambitious ship building projects of the 90s. Considerable experience was also acquired in the hybridisation, retrofitting and modernisation of earlier acquisitions .

In the 70s, while the indigenous industry could muster the capability to build the hulls and propulsion machinery, the weapons and sensors had to be still imported from different countries. However, in that era, there was no single organisation in the country, either in the services, DRDO, academia or industry, which could be entrusted with the responsibility of integrating these weapons and sensors sourced from diverse origins into a cohesive combat system. To fulfill this challenging responsibility, a new organisation named Weapons & Electronics Systems Organisation (WESO) was created in 1978 under the Ministry of Defence, specifically for system integration on board Godavari class frigates. WESO delivered sterling

results in this unprecedented task and today these ships are living examples with a powerful combat system indigenously stitched together from Russian weapons, Indian sensors, an Italian CAIO and an American Data Bus — all integrated seamlessly as per System Integration blueprint developed by WESO. After the success demonstrated through the P-16 project, the Government had no second thoughts in according a permanent status to this establishment and thus in 1985, WESO transformed into the Weapons & Electronics Systems Engineering Establishment (WESEE).

While the core business of WESEE in the initial stage was System Integration, in 1986, the establishment spearheaded the maiden attempt in the country to develop Command and Control systems. In 1989, WESEE also began work on developing indigenous Data Link system to network the ships and aircraft at sea. In hindsight, it can be safely concluded that the formation of WESEE was a pivotal decision, without which the indigenous capability to build warships could not have grown to the spectacular level that the Navy is proud of today.

Indigenous Warship Design after 1990

By the mid 1980s, the Directorate of Naval Design (DND) had completed the design of the Project 15 (Delhi class destroyers). There was a lull period till 1992–93. In the early 1990s, DND had retained two distinct profiles of warship design. These either had the Leander frigate lineage (Project16-Godavari class) & Project 16A (Brahmaputra class) or had a Russian Rajput class destroyer (Project-15) ancestry.

The lull period after the P-15 design provided the time to evolve a distinctively home-grown appearance to DND's designs, beginning with Project 17 (P-17) frigates in 1994. Several external factors contributed fortuitously in making the P-17 design, a watershed in the DND's history. These were:

- The liberalized means of communication that facilitated swift and easy communications world wide.
- The access through Information Technology to higher levels of technology & improved software tools for the warship designers.
- The demands of the naval staff for enhanced performance in terms of sea keeping, endurance, stealth and survivability.

The cumulative effect was that DND's designers were inspired to evolve a design which would have many path breaking approaches in conceptualising a truly indigenous platform that could blend together the best of technologies available worldwide.

The indigenous design of Project 17 (Shivalik class stealth frigates) was followed by P-15A, the modified Delhi class with much improved stealth features, the ASW corvette (P-28) with stringent underwater noise requirements and the largest of them all, the Indigenous Aircraft Carrier (P-71). The Project 17 design ushered in several new and improved design concepts and technologies such as the Total Atmosphere Control system for the ship's air conditioning which will give a more reliable and user friendly citadel to the users, fire zoning and distributed power supply systems for enhanced survivability and Integrated Platform Management System, Integrated Bridge System, Indigenous Combat Management System and shipwide data networks bringing in much automation and efficiency in ship operations.

Rear Admiral (Retd) JJ Baxi, one of the pioneers of WESO recalls the several organic elements which contributed to the success of the Navy's projects:-

"First and foremost, amongst the three services, the Indian Navy has shown the greatest determination to be self-sufficient and self-reliant. And this was by a genre of people over generations, not merely by one individual.

Secondly, by creating the Directorate General of Naval Design within Naval Headquarters, we got an agency, manned by officers on deputation, responsible for indigenisation, under the direct control of Naval Headquarters, which slowly started to build up complete design and project management skills in-house, within the Navy.

Thirdly, the Navy started inducting naval constructors in uniform. They became a highly specialised cadre, capable of handling all aspects of naval architecture, ship design and ship construction.

On the Mazagon Docks side, the Navy sent some of their best officers and best brains to go into shipbuilding. The best naval technical officers were placed at the disposal of Mazagon Docks to be able to build the ships.

This total involvement of Naval Headquarters in ship design, ship construction, development, inspection and testing, whereby NHQ was itself the vendor and was also the customer, led to a pragmatic approach by NHQ whenever confronted with compromises in the design process.

Right from top level decision makers like DSR and DNP, down to a Lieutenant in the naval architecture branch, everybody learnt to take technological and professional

decisions. A complete, integral, decision making process built up within the confines of NHQ".

Vessels Designed and Constructed During 1991–2000

Landing Ship Tank-Large (LST-L). The first LST(L), Magar, was commissioned in 1987. The second, Gharial, was commissioned in 1997.

Survey Ships. The Sandhayak design built at Goa Shipyard and its survey equipment were improved upon and the first ship of the improved Sandhayak class, Investigator, was commissioned in 1990. It was followed by two more survey ships of the same class, Jamuna commissioned in 1991and Sutlej in 1993.

The design and the survey equipment were further improved upon in the new Darshak class survey ships, Darshak and Sarvekshak, which were commissioned in 2001 and 2002 respectively.

Fleet Tankers. The order for the fleet tanker, Aditya, was placed with GRSE in 1985. However, the 24,000 ton tanker was delayed and could be commissioned only in April 1999. In the interim, a tanker of the Komandarm Fedko class was acquired from Russia on the fast track in 1995. The commercial tanker built by the Admiralty Shipyard, St Petersberg was ruggedized for military applications, christened and commissioned as INS Jyoti in July 1996.

Offshore Patrol Vessels. In 1986, sanction was accorded for seven helicopter-capable ships for patrolling the offshore assets in the Bombay High region. Three of these Offshore Patrol Vessels (OPVs) Sukanya, Subhadra and Suvarna were built in South Korea in 1989–90. The remaining four, Savitri, Saryu,[1] Sharda and Sujata were built in Hindustan Shipyard to the Korean design and delivered between 1990 and 1993.

Licensed Production of Project 1241 RE Gas-turbined Missile Craft. The Navy's requirement of missile craft by 1990 was twenty. Accordingly:-

- Five were acquired from the Soviet Union between 1987 and 1989.
- Discussions commenced with the Soviet side in 1982 and 1983 for the licensed production of the remaining fifteen boats in Indian shipyards, with the weapon and propulsion packages being supplied by the Soviet side. It soon became clear that it would not be possible for all fifteen boats to be produced by 1990. The plan for licensed production was therefore scaled down to six boats by 1990 and the remaining nine by 1995.
- Indigenous production was to be shared between Mazagon Docks and Goa Shipyard. MDL delivered a boat each in 1991, 1992 and 1994. GSL delivered five boats, starting 1993.
- In the 1990s, due to financial stringency and cost escalation, it was decided not to build any more 1241 REs after 2002. Of the fifteen boats originally envisaged for indigenous construction, only eight were eventually built.

Brahmaputra (P-16A) Class Frigates. While the Godavari class was the cornerstone project of DGND in many ways, the Brahamputra class frigates, made at GRSE, were even more contemporary frigates of their times. These ships were designed in the early nineties. However, due to certain weapon issues delivery of the three ships Betwa, Brahmaputra and Beas could materialise only post 2000.

Delhi (P-15) Class Destroyers. Delhi class, perhaps the finest in its class world over was designed in the early nineties. Three ships of this class Delhi, Mysore and Mumbai, built by MDL, joined the Naval fleet in 1997, 1999 and 2000 respectively. INS Delhi's ability to withstand the extreme cyclonic weather in South China Sea without any damage was a true testimony to the emerging design prowess of the Indian Navy.

Indo–Soviet Interaction in Indigenous Warship Design and Production

The first step in "licensed production" was taken in the new 400-ton, gas-turbined missile boats of Project 1241 RE.

The next step, again in consultation with the Russian Ministry of Shipbuilding and their Ship Design Bureau, was the installation of more modern systems in the new Corvettes of Project 25, the new Destroyers of Project 15 and frigates of Project 16A, the successors of the earlier Godavari class guided missile frigates. In due course, similar consultations took place for the follow on Corvettes of Project 25A and the follow on Destroyers of Project 15A.

By 1987, it became clear to both the Soviet and the Indian sides that the expanding scope of cooperation in shipbuilding required monitoring at high levels to avoid delays in construction. There was need to ensure that agreements and protocols were signed at the right time, to ensure that orders were placed and deliveries effected to

1. Later Saryu was gifted to the Sri Lankan Navy and is now called the Sayura.

Mazagon Docks, Goa Shipyard and Garden Reach at the right time.

The Joint Indo–Soviet Working Group on Shipbuilding (JISWOG) was set up to streamline the process. It was chaired jointly by the Deputy Minister of Shipbuilding of the USSR and India's Secretary of Defence Production to deal with licensed production of 1241 REs and the design assistance for the fitment of Soviet systems in the indigenous hulls of Projects 25, 15, 25A, 16A, etc.

The first meeting of the JISWOG was held in New Delhi in Mar 1988. Thereafter meetings were held every six months, alternately in Russia and India, in which the Chairmen of the Indian Defence shipyards and their counterparts from Soviet factories participated. In due course, the JISWOG's terms of reference were expanded to include discussion of product support problems for ships and equipment that had already been supplied.

After 1991, the JISWOG was renamed as JIRWOG and after a few years was reconstituted as the Indo–Russian Inter Government Commission (IRIGC).

Project 1135.6 Ships. The Indian government signed a contract with the Russian government for acquisition of three Project 1135.6 Krivak class frigates on 17 Nov 1997. The ships were designed by the Severnoye Design Bureau and built at the Baltiski Zavod in St Petersberg.

Aircraft Carriers. A MoU was signed in December 1998, between the Indian and Russian Governments for refurbishment of the aircraft carrier 'Admiral Gorshkov' and its subsequent transfer to the Indian Navy. The Kiev class carrier earlier named Baku was to be christened 'Vikramaditya' on joining the Indian Navy.

Fast Attack Crafts. Seven Super Dvora Fast Attack Crafts ex Ramta, Israel, were inducted in the Navy between 1998–2005 out of which five were built at GSL under a ToT programme.

Four Trinkat class Fast Attack Crafts were designed and built by GRSE with the first Trinkat being commissioned in Sep 2000 and Tarasa commissioned in 2001.

Warship Modernisations and Service Life Extension Programmes

The concept of modernisation and preservation of ships, as followed by all advanced navies, started as early as the 1970s in the Indian Navy. However this assumed a greater urgency in the decade of the 90s.

The resource crunch resulted in reduced acquisitions and under-utilisation of our shipyards. At the same time, the enhanced threat assessment based on acquisitions of advanced equipment by neighbouring countries, necessitated action.

Confronted with an ageing fleet with obsolete equipment and a reduced combat edge to meet contemporary threats at sea, Naval Headquarters took an intense look at the mid life refit and modernisation plans of ships, submarines and aircraft. The intent was two fold:-

- To keep the equipment in Indian Naval Ships abreast of the latest advances in technology.
- To extend the service life of the ships/submarines/ aircrafts and thereby conserve precious national resources that would otherwise be spent on acquiring their substitutes.

A detailed analysis was made on the residual life of ageing ships along with recommended measures for upgrades and maximising longevity of platforms, bearing in mind the cost effectiveness and availability of suitable substitute equipment.

The principle adhered to was that ideally a ship's mid life update should coincide with its medium refit as also the investment in the upgradation should ensure her combat worthiness for at least another 10 years or more. Whilst the Navy could not afford to modernise all its ships, it took a conscious decision to modernise the ones which mattered most.

To effectively retain the combat edge, systematic mid life updates (MLU) and Service Life Extension Programmes (SLEP) were planned. This ensured that not only did the platform get an extended lease of life, but also that they were retrofitted with modern weapons and sensors so that these were able to accept advances in technology and operate effectively in a contemporary environment.

The major modernisations of this decade were of:-

- The Aircraft carrier Viraat.
- The fitting of the Brahmos missiles in the first ship of the Rajput class.
- The retro-fitment of Tube Launched Missiles (TLM) in the Sindhughosh class submarines acquired from the Soviet Union.
- The modernisation of HDW 1500 class submarines acquired from Germany, manufactured and modernised in Mazagon Docks.
- The MLU of Russian reconnaissance aircraft IL 38 and TU 142.

The mid life update/service life extension programme of platforms already in service was attempted in an institutionalised manner. The modernisation plans were included in the budget of the relevant plan period. The aim was to ensure focussed upgradation of our platforms to meet contemporary challenges at sea and remain abreast of technological advantages.

Retrospect

In recent years, two developments have overlapped. India has become a cost-effective manufacturing location at a time when India's Army, Navy and Air Force are poised to commence their modernisation and transformation for future warfare.

This overlap and the daunting cost of future combat systems make it timely to consider a new approach to warship production and life cycle management of the defence acquisition process in general and warships in particular.

The Life Cycle Costing Dilemma. To do this, it is imperative to definitively ascertain the better system of determining cost — the most economical bid or the total ownership cost? The most economical bid is usually easier to calculate, but it is rarely a true representation of what it is likely to cost to operate a system over its expected life. Our own experience, as well as other studies, have shown that most costs are expended during the "operations and support" phase of an operating system, which is not catered for in the 'Most Economical Bid'. So, evidently, the total ownership cost is a more reliable datum, even though it may be an infinitely more complex figure to calculate.

The Life Cycle Management Dilemma. The second dilemma is that of life cycle management. Effective life cycle management demands assurances that the pipeline of spares and equipment necessary to support a defence system is maintained throughout its intended operating life. No nation wants to be "held hostage" by any OEM or other nation during the life cycle support phase.

There are three facets of this dilemma:

- Firstly, sanctions such as those imposed in 1998 after our nuclear tests can severely impact force capability and preparedness.
- Secondly, the collapse of the supply line like when the Soviet Union dissolved, could have a similar crippling effect.
- Thirdly, how does one assess the cost/benefits/ reliability of an assurance of uninterrupted supplies from a potential vendor?

It is something that planners need to implicitly factor in, while taking decisions of undertaking shipbuilding projects.

Affordability and Self-Reliance. The other major predicament is that of assessing affordability of acquisitions and weighing them against indigenous building ability. In earlier years, competing goals used to make decision making and total life cycle management somewhat difficult. But it is gradually becoming possible to reconcile both objectives.

- **The Goal of Self-Reliance.** Earlier, the question used to be whether we should create and prop up our own defence industry despite the fact that more readily available, less expensive and/or better defence products were available from elsewhere. Greater self-reliance is now well within reach if we can synergise "joint ventures" and "offsets" with our "cost advantage"
- **Affordability.** It has not been the practice for an Army, Navy and Air Force Staff Requirement to stipulate either the cost of acquisition or the cost of life cycle management. However, the daunting costs of future systems like "network centric capability" make it timely for Service Headquarters to consider involvement in such complex cost estimates.

The highlighting of risk is particularly crucial in full developmental programmes like tanks, aircraft, ships and submarines — the Main Battle tank and the Light Combat aircraft are case in point.

'Affordability' has to be balanced with stated capabilities and the cost of options for meeting those capabilities. The objectives must be described in terms of capabilities that will result in the best value for money.

Joint Ventures and Offset Clauses

Joint Ventures. As Brahmos has shown, there is great strength in cooperative efforts in research and technology development and production efforts. On the other hand, as the Trishul SAM Project has shown, developing national-level niche capabilities requires time and funding — both of which carry an element of risk and over-runs.

Offsets. *The Defence Procurement Procedures are being revised annually. One of the recent clauses introduced is the offset clause on all contracts above Rs 300 crores. Transfer of Technology for maintenance infrastructure to an Indian public or private firm will be applicable where equipment is bought from foreign vendors. In connection with offsets in defence deals, a recent media report stated,*

"Under the new arms acquisition guidelines, all defence deals worth over $70 million will be used as offsets. This requires foreign vendors to buy defence or procure other specified equipment locally from Indian suppliers."

With this offset policy in place and foreign corporations vying to co-produce defence equipment in India, the Ministry of Defence should take the initiative to become the "facilitator" for both the DRDO and the Indian Defence Industry (public and private). Foreign collaborators should be leveraged to transfer the technologies that can help India become an export hub for Defence production.

Competitive Consortia for Warship Production & Warship Export

At present, warships are inducted from two sources: those designed in-house and built by Government shipyards and those imported when force levels fall.

The per-unit cost of a warship increases remorselessly year after year. The primary causes are the long gestation period between design and delivery, the changes in choice of equipment during the gestation period and the high cost of systems having the latest technology. Over time, the high unit cost limits the number of ships that can be acquired.

With the production of defence equipment opening up to the 'private sector', innovative frameworks like "Competitive Consortia" can develop competition within the parameters of the prevailing regulatory policies and create an industry where naval ships can be cost effectively produced both for our own requirements and for export.

In the past 40 years, the Navy has developed unique expertise in electrically and electronically integrating warship equipment, regardless of its origin — be it Russian, European or indigenous. Secondly, the Navy has acquired invaluable experience of building warships for tropical conditions, typical of the northern Indian Ocean (high temperatures, high humidity and warm, highly saline, highly corrosive seas).

These conditions are totally different from those for which European and American shipyards build their navy's ships. The successful operation of Indian built warships in tropical conditions makes them uniquely suitable for export to countries in the Indian Ocean. This particular aspect will make joint venture even more attractive to a foreign partner, allowing beneficial two-way technology transfer.

The time has therefore come for an active Public Private partnership in the design and production of Naval warships, which capitalizes on the experience and progress made thus far.

Overview of Ship Inductions 1991–2000

The table below summarises the induction of ships during this period, and as is evident indigenous production replaced imports in a very significant manner.

Type	Acquisitions	Indigenous production
Fast Missile Attack Craft 1241 RE	Five ex Russia	Six (3 ex-MDL, 3 ex-GSL)
Anti-submarine Vessels 1241 PE	Four ex Russia	—
Offshore Patrol Vessels (OPVs)	Two ex South Korea	Four ex-HSL
Cadet Training Ship	One (second hand) ex Britain	One
Fleet Tankers	One ex Russia	One ex-GRSE
Project 25 Guided Missile Corvettes	—	Three ex-GRSE
Guided Missile Destroyers (Project 15)	—	Two ex-MDL
Guided Missile Corvettes (Project 25 A)	—	One
Guided Missile Frigate (Project 16 A)	—	One ex-GRSE
Landing Ship Tank–Large (LST-L)	—	One ex-GRSE
Sail Training Ship (STS) Tarangini	—	One Ex-GSL
Survey Ships	—	Three ex-GRSE
Marine Acoustic Research Ship (MARS) Sagardhwani	—	One ex-GRSE

Fast Attack Craft (FAC)	—	One
Extra Fast Attack Craft (XFAC) T 80, T 81	—	Two
Diving Support Vessel, Nireekshak		One

Details of Ships Inducted

Induction	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Commissioned	Supplier
Missile Armed Corvettes (Project 25)	1350	KUTHAR KIRPAN KHANJAR	New	1982	1990 1991 1991	GRSE
Offshore Patrol Vessels	1890	SUBHADRA SUVARNA SAVITRI SARAYU SHARDA SUJATA	New	1987	1990 1990 1990 1991 1992 1993	South Korea South Korea HSL HSL HSL HSL
Anti-submarine Patrol Vessel	485	AJAY AKSHAY AGRAY	New	1986	1990 1990 1991	Russia
Fast Missile Attack Craft (Project 1241 RE)	500	VIBHUTI VIPUL VINASH NASHAK VIDYUT PRAHAR PRABAL PRALAYA	New	1985 1985 1988 1989 1988 1989 1999 1999	1991 1992 1993 1994 1995 1997 2002 2002	MDL MDL GSL MDL GSL GSL MDL GSL
Survey Ships	1930	INVESTIGATOR JAMUNA SUTLEJ DARSHAK SARVEKSHAK	New	1985	1990 1991 1993 2001 2002	GRSE
Marine Acoustic Research Ship	2050	SAGARDHWANI	New	1988	1994	GRSE
Submarines (SSK) (HDW 1500)	1500	SHALKI SHANKUL	New	1981	1992 1994	MDL MDL
Cadet Training Ship	2950	KRISHNA	Second hand	1994	1995	Britain
Diving Support Vessel	2160	NIREEKSHAK	Second hand		1989	MDL
Fleet Tanker	40000	JYOTI	Second hand	1995	1996	Russia

Induction	Standard Displacement (Tons)	Name	Vintage	Year Ordered	Year Commissioned	Supplier
Extra Fast Attack Craft (XFACs)	60	T 80 T 81 T 82 T 83 T 84	New	1997	1998 1999 2003 2004 2004	GSL
Landing Ship Tank (Large)	5600	GHARIAL	New	1987	1997	GRSE
Sail Training Ship	420	TARANGINI	New	1994	1997	GSL
Submarines (SSK)	2890	SINDHURAKSHAK	New	1997	1997	Russia
Missile firing Improved 877 EKM		SINDHUSHASTRA	New	1997	2000	Russia
Missile Destroyers (Project 15)	6700	DELHI MYSORE MUMBAI	New	1986	1997 1999 2001	MDL MDL
Missile Corvettes (Project 25 A)	1350	KORA KIRCH KULISH KARMUK	New	1986	1998 2001 2001 2004	GRSE MDL GRSE GRSE
Missile Frigates (Project 16 A)	3600	BRAHMAPUTRA BETWA BEAS	New	1986	2000 2004 2005	GRSE
Fast Attack Craft (FACs)	260	TRINKAT TILLANCHANG TARASA TARMUGLI	New	1996	2000 2001 2001 2002	GRSE
Fleet Tanker	24600	ADITYA	New	1991	2000	GRSE
Fleet Tug	560	GAJ	New	2000	2002	GRSE
Missile Frigates (Project 1135.6 — Krivak III)	4000	TALWAR TRISHUL TABAR	New	1997	2003 2003 2004	Russia
Landing Ship Tank (Large)	5500	GULDAR	New	2005	2006	GRSE

17

Project 17 Stealth Frigates

Preamble

Three FP 17 (Stealth frigates) — Shivalik, Sahyadri and Satpura — were sanctioned in 1994, preliminary estimates of Rs. 750 crores each to have a mix of Indigenous, Russian and Western weapons and sensors.

The ship would have a CODOG (Combined Diesel or Gas Turbine) propulsion system and a displacement approx 5500 tons, Length 143 metres, Beam 17 metres with SSMs, SAMs, ASW & indigenous OTO 76mm and OTO MELARA SRGM.

It was anticipated that 3 frigates of Project 17 A would follow P17. Orders were placed on MDL in 1998. The keel of the first ship (Shivalik) was laid in 2001, she was launched in 2003 and is expected to commission in 2009, followed by Sahyadri and Satpura in about 8–10 months intervals.

It was not till the mid 1990s that the Navy could recover from the resource crunch that had, since the mid 1980s, restricted sanctions for warship construction. The then CNS Adm VS Shekhawat recalls:-

"When I took over as Chief (in 1992) I realised that we were reaching a situation where our surface ship numbers were declining very rapidly. Though the ships which we were building, would come out, but nevertheless there would be no significant accretion in force levels. They were simply going to be replacements.

New orders were not forthcoming. In fact, for ten years not a single new ship had been ordered and this was a matter of extreme concern.

Also having been involved in indigenisation in many ways, I felt that we needed to at last start having some standardisation which would ease our logistics problem as well as our maintenance problems and also relieve the training load, if we gradually worked towards standard Indian systems.

And so we worked out what was eventually to be called the "Standard Frigate" which was to be built in numbers over a period of years and just simply be modified and improved as it came along like the European Countries or the Americans did.

It was given the project designation of Project 17 and eventually in design it came to be around 5000 tones."

Then Cdr (now Rear Adm) Vaidyanathan was the Project Officer and later Project Director for designing the Project 17 Frigate. He recalls:-

Genesis of Project 17. In 1992–93, the outline Naval Staff Requirements for a new design frigate with CODOG (Combined Diesel or Gas Turbine) propulsion spurred the designers to explore various concepts for the new design. At the same time, the (Project-16A) follow on frigates of the (Project-16) Godavari class were on order on GRSE. Since the Project-16A programme (consisting of 3 ships) was moving slowly at GRSE with even the first vessel far from delivery, there was initially some proposal to convert the 3rd ship sanction of Project 16A to a new class of ship to be designated Project 17 which would have the same weapon package as Project-16A and the new CODOG propulsion (instead of steam). This proposal was, however, soon discarded because a more modern hull form with enhanced stealth and performance was envisaged. Furthermore, Government approval was obtained to seek the latest weapons and sensors from Russia for the new indigenous design.

'Stealth' was then a new domain for our Navy and for the Naval Design Organisation. It was realised that we would need to take some consultancy from abroad for the stealth design of the new frigate. The then Director General RAdm (Later VAdm Nath), in his vision, decided to acquire stealth technology and carry out the Project 17 stealth design inhouse rather than outsource to external agencies. This far sighted decision created the core groups for stealth design capabilities within DND which have now grown into a highly professional and specialist group, which not only carries out stealth design of indigenously designed ships but has also guided and given impetus to the development of stealth materials and signature suppression devices through indigenous R&D. This group

also gave guidance for stealth design (RCS) of the Talwar Class ships.

In the later part of 1993, I, as a Commander, was heading a then small design group designated GTF (Gas Turbine Frigate). But I had a spirited team of officers and there was considerable excitement in churning out different concept options for the Navy's future frigate. The frigate was initially named Frigate 2000, thereafter Frigate 2001 and finally was designated Project 17.

While we were conceptualising different options with different weapon fits and arrangements, we also put in considerable effort in evolving the requirements for the Radar Cross Section (RCS), Infra Red (IR) and Underwater Noise Stealth studies. With liberalised communications and fax facilities more freely available, considerable interaction took place with reputed consultants abroad, which helped immensely in refining the Statement of Technical Requirements (SOTRs) for the external studies. At the same time, the design team set to work on developing the sleek lines of the new hull form. While a new BMT software became available sometime later for the hull lines, much work had already been progressed by then, using the naval architect's traditional battens and lead weights, to evolve the lines of Project 17. Even though this old and traditional method was moving towards extinction with the birth of the Project 17 hull form, it did give that drawing board flexibility to tweak the lines using the drawing office expertise still available for this kind of specialist design work. The concept design options were presented to the naval staff in the first quarter of 1994 and were approved within a few days.

Model Tests. Contrary to earlier practice, where funds for model tests and external design studies became available only after obtaining sanction for a project, in case of Project 17, a separate sanction of Rs 12 crores was obtained for progressing the hydrodynamic model tests, the stealth studies, the wind tunnel tests and the propulsion integration studies by 1995. Having developed the hull form and preliminary propeller design, hydrodynamic model tests were ordered at the Netherlands model test basin — MARIN.

Moving away from past practices, the propeller diameter was chosen to be relatively large in order to be able to churn out over 22 MW of propulsion power through each shaft without early cavitation. In a slight departure from earlier designs, a conscious decision was made in the very beginning to give a relatively sharp turn to the hull sections around the bilge for improved roll damping and have a generally flared hull form for increased stealth and high water plane area for good sea keeping. The model tests of the new hull form began in July 1995. As the project officer of P17, I was deputed to MARIN to participate in the tests and refine the appendages design based on test results. The model tests showed excellent hull performance. The powering results were within 2½% of DND's predictions. The resistance of the appendages was the lowest that one could achieve owing to the designed shaft line with low rake and the flow adapted orientation of the shaft brackets. The sea keeping performance was seen to be exceptionally good meeting the stringent performance envisaged in the Staff Requirements. The roll performance was also exceptionally good and even better compared to some previous larger designs.

The other major thrust area in design was to push up the cavitation inception speed on the propellers to a much higher level well, above 20 knots.

Moving away from past practices, prospective shafting and propeller suppliers were invited to present competing designs for the high performance propellers based on the model test data that was furnished to them and the preliminary DND propeller design. This proved to be a very cost-effective strategy as all three competing suppliers put in their own resources to evolve a high performance propeller to meet the cavitation and other requirements of the SOTRs. Some suppliers even carried out iterations of design at their own cost in order to bring their design on par with the best that was revealed in the propeller model tests.

This strategy for propeller design and ordering has now become Standard Operating Procedure (SOP) for all current and future indigenous warship projects.

Propulsion System Integration (PSI). While the choice of CODOG propulsion with American LM 2500 Gas turbines (GTs) and French Pielstic diesel engines had been made early in the design, the mounting arrangement for machinery and disposition of propulsion engines between the engine rooms was still undergoing iterations. The base line design of the propulsion system was developed by the design group and it was decided to seek consultancy for developing the Propulsion System Integration (PSI) while undertaking a comprehensive underwater (acoustic) noise study for the new design.

Sufficient distance between the shaft lines was maintained to allow for accommodating the acoustic enclosures for the diesel engines should the noise studies so necessiate. The PSI studies were ordered on M/s AIstom in early 1998 and the propulsion design was finalised in

end 1998 after the noise studies. The American sanctions following our Pokhran nuclear explosion tests in 1998, raised some concerns about the eventual availability of the LM 2500 GTs from General Electric of USA, that were to be assembled by M/s HAL, Bangalore.

The process of getting export clearance and other formalities delayed the ordering of the GTs to 2000. The double helical gearbox of Renk with resilient mounts was produced with some indigenous content by M/s Elecon. As regards the machinery control system, it was initially envisaged as an Integrated Platform Management System (IPMS). However, due to the decision of the Directorate of Marine Engineering and the Directorate of Electrical Engineering (DEE) to independently pursue the selection and development of the Integrated Machinery control system (IMCS) and the Automated Power Management System (APMS), the IPMS was split into IMCS and APMS.

Stealth Design. With the aspiration of developing stealth expertise in-house with the help of "limited external consultancies," the Project 17 design group set about making comprehensive SOTRs for ordering RCS (Radar Cross Section), IR (Infra Red) and underwater noise signature studies. The SOTRs were progressively refined through interaction with prospective renowned consultants. RCS and IR signature study consultancies were ordered in mid 1996.

In preparation for the studies my able team member then Lt Cdr Kanagat developed the 3D model of the new frigate in a few possible configurations. Lt Cdr Kanagat and Lt Arjun Banerjee were deputed to Munich, Germany in Oct 1996 to work with the consultants to learn the RCS software and carry out RCS evaluation of the new frigate. Our naval team carrying out the design iterations of the new hull form and superstructure did such a splendid job that the consultants (IABG) were themselves amazed with the considerably low "bare hull" signature achieved. Contrary to earlier designs in which the bare hull contributed over 70% of the ship's RCS, the Project 17 bare hull contributed to less than 1% of the ship's RCS.

The next challenge to the design team was to prevail upon the weapon and sensor suppliers to reduce the RCS of their exposed equipment.

Working with BHEL and OTO Melara of Italy, we succeeded in getting a stealth shield for the 76.2 mm SRGM gun sited in the foxle. The choice of the vertical launch SSM system, which was flush deck mounted helped to reduce the weapon contribution to the ship's RCS. But there was not much joy with the other Russian origin weapons despite a contractual clause calling upon the weapon suppliers to make efforts to reduce RCS of their equipment. While the RCS model of the hull was evolved in DND, the finite element models of the weapons and sensors were received from the weapon suppliers for integration with the model. There were several problems in DND of linking the weapon models with the ship model, but the spirited group of DND's stealth designers worked tirelessly to make such refinements and modifications as were available to the ship designer to reduce the ship's RCS.

The Infra Red (IR) studies were similarly ordered in mid 1996 on WR Davis of Canada. By early 1997, both the RCS and IR hardware and software had been set up in DND (Later, when the teams returned after completion of "on-the-job-training" at the consultant's premises). The Underwater Noise studies were ordered on DERA of UK in 1997 as part of the PSI studies. Another DND team was deputed to UK for the acoustic design studies. Through several iterations of the underwater noise predictions using noise and vibration data of suppliers, the DND design team finally evolved the acoustic specifications for all noise critical equipment in the ship.

Add-on Stealth Measures. While the designers did all that was possible to reduce the ship's RCS, add on measures to reduce IR and noise signatures, were identified and steered by DND for development by NSTL. Notable amongst these was the successful development of the Educator-diffuser device for reducing the IR signatures of the diesel engines and the Radar Transparent Material (RTM) guardrail stanchions for the upper decks to reduce ship RCS. Several other developments such as the ROOT (Radar Opaque and Optically Transparent) material and acoustic coatings were pursued with R&D Organisations.

Weapons & Sensors. There was an initial temptation to go ahead with the weapon package of Project 16A but a new weapon package was sought from the Russians. Although the requirement was discussed with the Russians, in several JIRWOGs, their first proposal was received only in 1998. Thereafter, it took nearly two years to sign the General Contract for the supply of Project 17, weapons, sensors and technical services.

I can still recall the hectic last round of technical negotiations with the Russians in Feb 2000 which lasted for two weeks and we finalised the draft of the General Contract which was officially signed in Apr 2000 in Moscow. The Supplementary agreement for developing the weapon integration was signed later. Only after four interaction meetings between 2000 and 2002, could the major weapon integration drawings be finalised. Subsequently, it was decided to change to the Israeli Barak (PDMS).

This major change compelled putting on hold the design and construction of the ship's aft super structure, having the PDMS weapon complex, till the Barak system along with the target acquisition and fire control radars could be ordered.

During the course of the weapon systems integration there was considerable debate between the designers and the Material branch with regard to the ship's data network and integration of weapon and Navigation equipment with the other systems in the ship.

The Electrical side strongly advocated the use of the ATM based Integrated Ship Data Network (AISDN) to integrate all weapons sensors and communications in the ship, including Navigation equipment.

Considering the developmental risks of a new data network system and bearing in mind the Project 16A time overrun experience with EMCA, DGND recommended stand alone arrangements for the Russian weapon systems and for the Navigation functions, so that while the new system may take its time to mature, the responsibilities of the Weapon suppliers for proving their equipment and of the ship's essential Navigation functions were independently assured.

After much debate and the Russian side's own insistence that they would prefer to ensure their weapon system integration by their own means, the DGND's recommendation was accepted. However, an ATM based AISDN for the communication (internal & external), VCS, Nav Sensors and the CAIO was also decided with the Russian systems interfacing through an interfacing unit.

Hull Structure & Layouts. With the various specialist design studies, wind tunnel tests and hydrodynamic model tests completed by end 1996, the ship design had also progressed to sufficient detail to define the scope of work to the shipbuilder. The hull structure was evolved to give a robust design with all shell and No. 1 deck plating being above 10mm. This avoided the "hungry horse" look of earlier designs with low scantlings. A conscious decision was also made to avoid penetration of frames and beams by more than 50% of web depth for passage of longitudinal as prescribed by NES design guidelines. A somewhat innovative design was followed for the three piece superstructure. Moving away from the earlier practice of using riveted connections for expansion joints to structurally break the span of the superstructure, the Project 17 design uses a physically disconnected but visually integrated design for the middle section of the superstructure. The middle section features a somewhat suspended design with the superstructure sides disconnected from the ship sides of the main hull while supported by bulkheads and funnel structure.

This helped to give a totally covered superstructure within which the boats could be arranged with RCS screens on the sides and could be hoisted for lowering of boats.

CCS Sanction and LOI. The case for CCS sanction was being pursued since 1994. The DND prepared a comprehensive cost estimate for the project which was thoroughly scrutinized by the Government.

Cost Proposals were also invited from MDL for building three ships of Project 17. The CCS sanction for the project was finally received in end 1997 for Rs 2250 crores for the three ships. The Letter of Intent (LOI) for construction of three vessels of Project 17 was issued to MDL in Feb 1998.

Sketch of P17

Ship Construction. Although the major structural drawings were issued to the shipyard well in advance, there was considerable delay in ordering steel. The structural design was carried out by DND on the basis of use of British "B" quality steel with symmetrical "T" sections for the structure. However, the British steel industry had ceased production of T bars and increasingly used commercially available sections. The Navy also had better experience with the Russian steel in the Rajput class destroyers as compared to British steels used for earlier indigenous ships.

A decision was therefore taken to change over to the Russian D40S steel and the associated bulb bar sections to Russian Standard (GOST) specifications for the hull structure. This change consequently required changes to all the hull structure drawings and re-estimation of steel quantities by MDL. The shipyard also had considerable difficulty in ordering the steel as M/s Promety, the steel suppliers were quite rigid in their terms. Eventually, steel cutting and production of the first ship "Shivalik" could commence only on 20 Dec 2000.

18

The Submarine Arm

The badge which submariners of the Indian Navy wear above their line of medals shows one dolphin on either side of the emblem of the Indian Republic — the triple lions atop the Ashoka Pillar.

Preamble

The protection of national sovereignty from seaward aggression requires naval capability below the sea, on the sea and above the sea. Submarines are the primary platforms for capability below the sea.

This chapter starts with an overview of submarine warfare and anti-submarine tactics to help the lay reader to better understand the uphill effort to maintain minimum force levels and several other inter-related developments that affected the submarine arm in the decade 1991–2000. These were:-

- The 1987 decision not to exercise the contractual option to build the 5th and 6th German submarines in Mazagon Docks Mumbai and the consequent cessation in 1994 of indigenous submarine construction for the next several years after Mazagon Docks completed construction of the 4th German HDW submarine.
- The delayed completion by Mazagon Docks of the 3rd and 4th German, HDW/IKL 1500 design, SSK submarines that were eventually delivered in 1992 and 1994.
- The adverse impact of the interruption in the supply of spares after the collapse of the Soviet Union in 1991 on submarine force levels.
- The formulation of a 30 year Plan that would revive indigenous construction, progressively achieve self-reliance to sustain force levels until the first quarter of the 21st Century, and make order quantities of submarine equipment sizeable enough to make it profitable for reputed private sector industry to invest in the submarine production sector.
- The acquisition from Russia in the end 1990s of a submarine capable of launching missiles from its torpedo tubes when submerged followed by the modernisation and upgradation of the earlier EKMs.

Submarine Warfare and Submarine Tactics

Submarines are extremely potent weapon platforms. Their traditional tasks have been to attack enemy warships and submarines. In recent years, submarines have successfully attacked land targets at long ranges with precision guided missiles fired when submerged.

Submarines are designed to minimise the chances of their being detected and, if detected, to withstand anti-submarine attacks. They are equipped with accurate and lethal weapons both for attack and for self defence.

Stealth and Snorting

The modern, diesel-electric propelled 'hunter-killer'

submarine is very stealthy, provided that utmost care has been taken at the design stage to minimise its self noise.

The ocean offers natural visual and electro-magnetic camouflage. By reducing the noise generated by the submarine (self noise) at or below the natural noise of the sea, the submarine can effectively conceal itself in the ocean. Therefore 'self noise' is a critical parameter in submarine design and during construction, periodic refits and overhauls. It has to be rigorously monitored and minimised throughout a submarine's operational life.

Carefully handled, a well-designed diesel-electric propelled 'hunter-killer' submarine can be as quiet as the grave. At low speeds, the soft hum of its electric propulsion power unit is almost un-discernable. Unlike the Cold War nuclear propelled submarine, it has no reactor that requires the support of numerous mechanical sub-systems, all of which are potential noise-makers.

When dived, a diesel-electric submarine is powered by a set of huge electric batteries. Depending on how much battery power is used up (the higher the speed, the quicker the battery runs down); these batteries have therefore to be recharged regularly by diesel generators. Just like a car's diesel engine needs an intake of air, so does the diesel engine of a submarine's diesel generator.

Batteries can be recharged either by being on the surface (more vulnerable) to suck in air or by remaining at periscope depth and sucking in air through a long hollow tube called a 'snort' (less vulnerable). When a diesel-electric submarine comes to periscope depth and raises her snort mast to suck in the air required to run her diesel generators to recharge her batteries, the process is known as 'snorting.'[1]

Even though a submarine's hull is not visible whilst snorting, the submarine is still detectable. The acoustic noise of its diesel engines can be heard by a nearby adversary submarine, if in the vicinity. Its periscope and snort masts that stick out just above the water can be detected on ship and aircraft radar. The ions in the diesel exhaust can be 'sniffed' by detectors fitted in anti-submarine aircraft. There is little a submarine can do about these limitations, except to stop recharging and 'crash dive' every time it detects the radar emissions of an adversary anti-submarine aircraft/helicopter or its passive sonar hears the noise of approaching ships.

The great advantage of a nuclear propelled submarine is that it does not need to come to the surface to recharge batteries because the nuclear reactor heats water to generate steam that runs steam turbines that drive the propeller. Its mobility and endurance when dived have none of the limitations of a diesel-electric propelled submarine. It is, however, noisier and easier to detect.

Technically speaking, during snorting, the submarine is compelled to be "indiscreet" because it has had to shed the invisibility that it had when dived. "Indiscretion rate" is therefore a vital parameter in the design of battery propelled submarines. "Indiscretion rate" is the ratio of the time needed to remain at periscope depth to recharge the batteries and the total operating time. Increasing the capacity of the diesel generators and the capacity of the propulsion batteries can help to lower indiscretion rate and permit longer submerged endurance.

Since recharging batteries exposes the diesel-electrical submarine to detection, "indiscretion rate" (how often a submarine is compelled to be indiscreet) is as vital as 'self noise' in submarine design and in the technology of submarine batteries.

Air Independent Propulsion (AIP) Systems for Battery-Propelled Submarines

Expectedly, enormous research has been undertaken by European submarine construction corporations on 'Air Independent Battery-Propulsion Systems.' Since the end of the Second World War, AIP has developed in four technological options:-

- Germany's Thyssen Nordseewerke (TNSW) developed a closed-cycle diesel engine using liquid oxygen, diesel oil and argon. The same diesel is used as a conventional air-breathing engine for surface propulsion.
- Germany's Howaltswerke-Deutsche Werft (HDW) developed a hybrid fuel cell system. High-speed operations run off the conventional battery, while the fuel cell recharges the battery, and provides energy for low-speed operations.
- Hybrid diesel-electric units propel Swedish Gotland Class submarines, supplemented with Kockum Stirling engines running on liquid oxygen and diesel oil to turn a generator to produce electricity

1. The "snort" is a waterproof hollow tube that can be raised and lowered when at periscope depth, through which air can be sucked in for the diesel engines. Prior to the invention of the "snort", submarines had to be on the surface to recharge their batteries — when their batteries were low, they became very vulnerable to ramming, sudden attack, etc. In effect, the snort enables the submarine to recharge batteries with her hull below the surface and only the top of the snort being visible.

for propulsion and to charge the vessel's batteries.

- The French "MESMA" (Module d'Energie Sous-Marine Autonome) AIP steam-turbine system burns ethanol and liquid oxygen to make steam to drive a turbo-electric generator. The design permits retrofitting into existing submarines by inserting an extra section into an existing hull.

In the early 1980s, the assessment was that these technologies would take time to mature. Navies usually preferred to retain the option for retrofitting an AIP Module into the existing hulls by adding an extra section.

Vice Admiral R N Ganesh, a veteran submariner recalls:-

"It would be erroneous to think that the fitment of an AIP system totally frees the submarine from its dependence on atmosphere. A major shortcoming of AIP systems still is that they are very low-powered. Typically, submarines can only propel at 15 to 20 per cent of their maximum speed on the AIP systems now available. For the kind of tactical mobility that is required in actual combat scenarios, they would still have to rely on their main batteries. The benefit of AIP is significant in the patrol area, when an AIP boat can "loiter" and keep her main batteries fully charged for an encounter with the enemy."

Submarine Tactics

During war, a submarine patrolling in adversary waters comes up near the surface only when it has to recharge her batteries. Even then, it will only do so at night, and for the shortest possible time, so as to minimise the chance of being detected and "localised" for attack.

For successful attack, a submarine relies on concealment and surprise rather than concentration of force. A submarine attack is usually more successful because it detects the ship earlier and can deliver a high weapon-density attack before being detected — this ability provides surprise.

To avoid mutual interference, submarines operate singly. When more than one submarine is deployed in the same adversary region, each submarine is given a specific demarcated area in which to operate.[2]

A submarine stalks its prey just like a cat stalks a mouse. The crux of submarine tactics is to sink an adversary warship, withdraw from the scene and survive the anti-submarine counter attack that is sure to follow.

Should anti-submarine forces succeed in 'localising' a submarine, it either fights like a cornered beast or goes silent and tries to slip away.

Anti-submarine Warfare And Tactics

Sound Propagation under the Sea

Sound is virtually the only form of energy that propagates usefully underwater, where electromagnetic waves, including light, are rapidly attenuated.

The temperature of the sea becomes cooler as depth increases. This change in temperature affects the velocity (and hence the path) of the sound waves transmitted by a sonar. Temperature layers in the sea refract (bend) sound waves much the same way that a prism refracts lighting.[3] As a result, a shadow zone is created which is not insonified by warship sonar. Under these hydrological conditions, by operating in this shadow zone, a submarine can, without being detected, move close enough to confidently fire its torpedoes at its warship target.

The way to detect a submarine lurking in a shadow zone or below a temperature layer is to position an acoustic sensor (like a sonar, or a sonobuoy) or an SSK submarine, in the same shadow zone or below the same temperature layer. Anti-submarine ships achieve this by lowering a large towed sonar dome (called Variable Depth Sonar — VDS) to the required depth whilst maintaining speed. Anti-submarine helicopters lower their smaller sonar dome (called "dunking sonar") whilst hovering above the surface of the sea. MRASW aircraft achieve this by dropping sonobuoys.[4]

In anti-submarine tactics, MRASW aircraft, ASW helicopters, sonar fitted warships and 'hunter-killer' submarines combine their respective capabilities to become a formidable predator team against the submarines which are their prey.

---

2. For a short period in 1942–43, during the World War, German U-boats operated successfully as 'wolf packs' against convoys in the Atlantic Ocean. This was possible because submarines generally operated on the surface and dived only for the attack.

3. Every sea area is subject to its unique diurnal and seasonal effects and also prevalent and changing currents. The combination of these effects causes different temperature patterns at different depths.

4. When an adversary submarine has been 'localised', sonobuoys are dropped in patterns that help to pinpoint the submarine's position and movements. Each sonobuoy floats on the surface and automatically releases a wire which lowers its acoustic sensor to a preset depth. The sensor can be either passive (to detect submarine noise) or it can be active (it transmits sound and awaits an echo from the submarine's hull.). The sonobuoy's radio transmitter sends the data it detects to the MRASW aircraft or the ASW helicopter who processes this data to compute where to drop more sonobuoys and/or its anti-submarine torpedo.

The core of anti-submarine tactics is to compel a submarine, by repeated and intense attacks, to remain dived and thereby exhaust its batteries, reduce its mobility to evade attack and hit it with weapons to force it to surface and surrender.

MRASW Aircraft

Whenever a submarine makes a wireless transmission, it betrays its presence by giving shore-based and ship-based Direction Finding (D/F) equipment an approximate direction of the transmission. If more than one D/F equipment detects a transmission, the position of the transmitter can be triangulated to establish the approximate position from which the submarine had made its transmission. An MRASW aircraft swiftly speeds to that position.

The objective of an MRASW aircraft is to obtain a more accurate position of the submarine. For example, an indication on its detector of the "magnetic anomaly" created by the submarine's steel hull or a "sniff" of diesel exhaust ions from a submarine recharging its batteries or a disappearing radar contact is suggestive of a submarine having crash dived to evade detection. As soon as the MRASW aircraft obtains an initial position, it drops a pattern of sonobuoys to "localise" the contact and, as soon as possible, to attack it with its air dropped homing torpedoes. The MRASW aircraft, therefore, is in the front line of submarine location, detection and attack.

Modern diesel-electric submarines (and their batteries) are designed to minimise the need to snort to a few hours every few days. On the one hand, an MRASW aircraft may choose not to use its radar to detect the submarine's snort mast sticking out of the water because to do so would reveal its presence to the submarine's radar warning device. On the other hand, continuous patrols by MRASW aircraft operating their radar can deny a submarine the freedom to recharge its batteries or by causing it to repeatedly crash dive to evade being "localised". For technical and tactical reasons, submarines dislike such interruptions when recharging batteries.

In rough weather and poor sonar conditions, initial localisation can be poor as searching an area of several hundred square miles is almost like looking for a needle in a haystack.

However, as soon as a submarine has been more precisely localised by the sonobuoys of an MRASW aircraft and accurately tracked thereafter, the aircraft attacks it with its own weapons. Additional MRASW aircraft are summoned to help to maintain pressure on the submarine to compel it to remain submerged and exhaust its battery.

Anti-Submarine Ships and Anti-Submarine Helicopters

As soon as an MRASW aircraft localises an adversary submarine, ships equipped with sonars, anti-submarine homing torpedoes, anti-submarine helicopters on board proceed to the area where the MRASW aircraft's sonobuoy patterns have been laid.

Anti-submarine helicopters can search a given area quicker and, being airborne, they cannot be hit by submarine fired torpedoes. After ascertaining from the MRASW aircraft the progress on localisation, the ASW helicopters either lay their own sonobuoys to re-localise the contact or use their dunking sonar to search. If the sonar search is passive, their sonars listen for tell-tale noise of submarine presence.

If the sonar search is active and a submarine is present, the sonar receives an acoustic echo back from the submarine hull and the submarine can be tracked by sonar transmissions. As soon as the submarine's position and movements are accurately determined, by the helicopter's fire control computer, it releases its anti-submarine homing torpedoes. Helicopter attacks continue until the submarine is either damaged or it surfaces and surrenders because its batteries have exhausted.

A submarine knows when it has been detected on sonar — it can hear the sonar transmissions. It knows it will come under attack. It will try to evade helicopters. When cornered, it may choose to attack the ship because a ship can be instantly sunk by submarine-fired torpedoes.

The role of the anti-submarine ship is to stand-off outside the range of the submarine's torpedoes and keep refuelling and rearming the anti-submarine helicopters until the submarine nears exhaustion. The ship then moves in to fire intensive barrages of anti-submarine rockets and homing torpedoes.

Search and Kill (SSK) Submarines

The advantage of having 'submarines to search and kill' adversary submarines is that both share the same undersea environment to detect and track each other, without being limited by shadow zones and temperature layers. Using active sonar immediately betrays presence. Detection by passive sonar requires extremely high skills in picking up even the faintest noise emanating from the adversary SSK.

SSKs are deployed in areas where there is likelihood of encountering only adversary submarines and there is no possibility whatsoever of own anti-submarine forces mistaking own SSK for an adversary SSK. The contest is between two dived SSKs.

Once the adversary SSK has been detected and tracked and the fire control problem solved, wire guided torpedoes are fired in a way that the adversary SSK would not have time to fire its own wire guided torpedoes in self defence. In effect, this means getting as close as possible to the adversary before firing — but in so doing, it also means that the adversary SSK may hear you and fire its own torpedoes before you. The direction from which the retaliatory torpedoes would come is usually predictable — straight down the direction that the incoming torpedo's homing head starts its active sonar transmissions. At this moment, decoys can be released to seduce the incoming torpedo away.

Submarine warfare and anti-submarine warfare are driven by constantly evolving technologies. With long years of peace interspersed by sharp, short-duration wars, success depends on:-

- Continuous, intensive training of highly motivated /gifted volunteers by highly experienced personnel.
- Sustaining the highest standards of combat readiness of the platforms (ships, submarines, aircraft and helicopters) and their sensors (sonars, sonobuoys, radars and EW sensors) and their weapons (torpedoes, rockets and depth bombs) and weapon control systems.

Developments Between 1991 and 2000

Command & Control of the Submarine Arm

After the arrival from Russia of the fourth submarine in end 1969, all four submarines of the Kalvari class (Russian Project i641, NATO designation Foxtrot class) were constituted as 8th Submarine Squadron and based at Vizag.

The next four Vela class improved versions of the Kalvari class based in Bombay were constituted as the 9th Submarine Squadron.

The first two HDW 1500 design SSK submarines arrived from Germany in 1987 and were constituted as the 10th Submarine Squadron and based at Bombay.

The first four submarines of the Sindhughosh class (Russian Project 877 EKM, NATO designation Kilo class) were constituted as the 11th Submarine Squadron and based at Vizag to facilitate the training of EKM commissioning and replacement crews.

The next four Sindhughosh class Russian 877 EKM submarines that arrived by 1990 were based in Bombay and constituted the 12th Submarine Squadron. The 9th Submarine squadron based in Bombay gradually relocated to Vizag.

The last two, MDL-built SSK submarines joined the 10th Submarine Squadron in 1992 and 1994.

Until INS Vajrabahu was commissioned as the Submarine HQ in Bombay in 1996, the submarines based in Bombay had been administered locally and Submarine HQ INS Virbahu in Vizag dealt with technical matters.

With multiple squadrons being based in Bombay and Vizag, the Commanding Officers of Virbahu and Vajrabahu were initially designated as Commodore Submarines (COMSUBs) East and West and later re-designated as Commodore Commanding Submarines (COMCOS) East and West respectively.

Submarines based in Bombay and Vizag were placed under the operational and administrative control of the respective Cs-in-C, who were designated as Submarine Operating Authorities. The COMSUBs were responsible to their Cs-in-C for the operational readiness of their submarine squadrons and providing them with 'Base' and 'Material' support.

Repositioning of FOSM from Vizag to NHQ

Flag Officer Submarines (FOSM) was constituted in 1987 and located in the Submarine Headquarters in Vizag as the Class Authority for submarines. By the early 1990s, it was found disadvantageous for FOSM to be physically distanced from the decision making interaction that took place in Naval Headquarters pertaining to plans for acquisitions, maintenance, etc

In 1996, recognising the need at NHQ for senior level advice on submarine matters, the post of ACNS (Submarines) was created. There being no other submarine qualified flag officer, FOSM was repositioned in NHQ and ACNS Submarines was tasked to carry out the dual-hatted function of ACNS Submarines and Flag Officer Submarines.

The administration of the Submarine HQ at Vizag was carried out by a Commodore. However, FOSM took all policy decisions.

From 1991, when the Soviet Union (USSR) dissolved until the mid 1990s when the successor Confederations

of Independent States (CIS) stabilised, the delays in the delivery of submarine batteries and 6-yearly Medium Repair (MR) refit kits adversely afflicted submarine availability resulting in prolonged delays in the completion of ongoing MRs. Operational non-availability was aggravated by the bunching up of the mandatory MRs of the new Sindhughosh 877 EKM Russian submarines that had to be inducted in a compressed time period to sustain minimum force levels.

The Problems of Submarine Medium Refits (MRs)

The Kalvari Class and Vela Class Submarines

The crux of the problem was that the new Dockyard that was being constructed in Vizag to maintain and refit the ships and submarines acquired from Russia was nowhere near ready, either in terms of workshops, or of having persons experienced enough to undertake such complex refits. Eventually as shown below, the MRs of these first eight submarines had to be shared between refit yards in Russia and Vizag:-

Russia:	Kalvari (1975–76), Vela (1980–82),	Karanj (1978–79), Vagli (1981–84),	Vaghsheer (1983–85)
India:	Khanderi (1976–81), Kalvari (1984–88), Vela (1993–98),	Kursura (1977–95), Vela (1986–88), Vagli (1997–99)	Vagir (1981–84), Karanj (1988–96),

Of the eight submarines of the Kalvari class, four were decommissioned between 1989 and 2003, giving an average in-service life of 28 years.

Of the four Vela class, two underwent 6-yearly MRs between 1995 and 1999, two were decommissioned after 1997 and two were in service in 2000.

Induction of Russian 877 EKM Sindhughosh Class Submarines

In the late 1970s, the Russian side was requested to suggest replacements for the eight Foxtrot class submarines. A request was also made for Tube Launched Missiles (TLMs) in 1978. The Russian response was that the 877 EKM design was on the drawing board and that TLMs would take some time to develop and be offered. As regards the submarines, India should make up its mind quickly so that its requirements could be bulked with others. It was decided to await a thorough evaluation.

In 1983, an Indian team evaluated the ultra-quiet 877 EKM and concluded that its technology was a generation ahead of the preceding i641s and that its performance as a hunter-killer SSK was comparable to that of the German HDW 1500 SSK design that had been selected in 1981 for indigenous production at Mazagon Docks Ltd in Bombay.

In 1984, a contract was signed for six of these submarines which were later designated as the Sindhughosh class. The seventh submarine was contracted for in 1987 and the eighth in 1988. These eight submarines were commissioned in 32 months between 1986 and 1990. On the one hand, this rapid delivery swiftly restored diminishing force levels. On the other hand, this bunched induction resulted later in the bunching of their MRs, which further overloaded the Navy's Medium Refit capability.

877 EKM Training in Russia

Almost all the officers who underwent EKM training in Russia gathered the impression from their Russian instructors that the EKM's teardrop hull, coated with anechoic rubber tiles to absorb adversary sonar transmissions and muffle echoes and other characteristics were features of a submarine that was supposed to be propelled by a miniaturised nuclear reactor. But during development, either the reactor could not be fitted in the space available or technical problems constrained further miniaturisation and the design reverted into a diesel-electric propelled boat.

This may help to explain why, despite the Russian Design Bureau's awareness of the Indian side's pressing need for greater air conditioning capacity when operating Russian submarines in tropical temperatures, the EKM's inadequacy in air conditioning could not be remedied before the submarines were delivered.

Cdr (later Captain) KR Ajrekar underwent training in Russia and was Commanding Officer of the Sindhughosh, the first EKM. He recalls:-

"The tear-drop hull, being hydro-dynamically the best underwater configuration, the underwater management of the EKM was excellent. The EKM had auto diving control — you could steer the submarine automatically even from the fire control computer. The hydroplanes were located in the mid ships portion where there was no interference with the sonar. The submarine hull was covered with rubber tiles which absorbed the acoustic energy of adversary sonar transmissions. The radiated noise (self-noise) of the submarine was very low.

The sonar could pick up HE at very long ranges. Never before had I picked up those kinds of ranges. In fact, we thought

that we would pick up these ranges only in the Arctic waters of the cold Baltic Sea. However, within a month of arrival in India, extensive sonar trials were carried out and the ranges obtained were just slightly less than what we had obtained in the Baltic. The sonar is excellent, the underwater telephone facility is excellent, and the intercept sonar is very good. In addition, there is mine hunting sonar which is very useful".

In the initial years in India, this class of submarines suffered acute inadequacy of air conditioning. This was progressively resolved by installing indigenous air conditioning in units. The acute shortage of fresh water was also solved by fitting indigenous reverse osmosis plants.

In 1994, the Russian side offered TLM capable submarines. In 1997, orders were placed for two of these submarines. The ninth submarine did not have TLM but was an improved version that had remedied the teething problems experienced in the earlier 8. The 10th submarine had the long awaited tube TLM capability. In due course, most of the initial 9 EKMs were progressively upgraded with TLMs.

MRs and Modernisation of Sindhughosh Class EKMS

In EKM submarines, the periodicity of Medium Refits was five years (instead of six-years as in the case of the earlier Kalvari/Vela class).

From 1997 onwards, EKM submarines started going to Russia for 5-yearly repairs-cum-modernisation. The first submarine to be modernised between 1997 and 1999 was Sindhuvir (commissioned in 1988), followed by Sindhuratna (also commissioned in 1988) between 2000 and 2002 and followed by Sindhughosh (commissioned 1986) between 2003 and 2004.

Submarine Refit, Maintenance & Support Facilities

In Vizag

By 1990, all the workshops required for the 6-yearly MRs of Kalvari and Vela class submarines were nearing completion in the Vizag Dockyard. Four submarines had completed their MRs and two submarines were under MR.

Planning had commenced for augmenting the Vizag Dockyard with facilities for repairing the equipment fitted in the new EKM submarines. In 2001, a new 9-storey EKM Building was completed in Virbahu to accommodate the crew of the Sindhughosh class submarines based in Vizag.

The Matsya chamber of the North Dry Dock was completed in 1990. It was specially designed to be covered to avoid rain disrupting the prolonged work on dismantled submarine hulls undergoing MR.

In Mumbai

The facility for commissioning submarine batteries was nearing completion in 1990. It met the requirements of both the new Russian EKM and the new German HDW submarines based at Mumbai. It dispensed with the need for Russian submarines to go all the way to Vizag to replace their batteries.

As already discussed, the problem of MRs was complex. It was eventually resolved by:-

- Offloading the MRs cum TLM refitment of the Sindhughosh class EKMs to Russia and of the German HDW 1500 SSKs to MDL in Mumbai.
- Creation of MR capability for Sindhughosh class EKMs in Public Sector Undertakings like Hindustan Shipyard in Vizag.

VLF Communications with Submarines at Sea

On 20 October 1990, a Very Low Frequency Transmitting Station was commissioned as INS Kattaboman in Tamil Nadu on the southern tip of the Indian peninsula.

Submarine Depot Ship — Amba

Amba after commissioning in 1968, provided crucial afloat logistic, technical and refresher attack simulator training support to submarines operating with facilities like battery charging, torpedo preparation, HP air recharging and comfortable accommodation for the crews of submarine secured alongside her whenever operating away from their homeport.

In the late 1980s, Amba's technical facilities were upgraded to enable her to provide afloat support to the new 877 EKM Sindhughosh class submarines. She was also made helo capable by strengthening a part of her deck. In 2006, Amba was decommissioned after 38 years of invaluable service to the Submarine Arm.

Submarine Rescue

Between 1982 and 1987, contemporary European Submarine Rescue Vessels (SRVs) had been evaluated for their suitability. Each of these had pros and cons for Indian conditions. A study was also carried out of the utilisation of the US Navy's air-portable Deep Submergence Rescue Vessel (DSRV) rescue system.

The drought following the failure of the monsoon of the mid 1980s and the ensuing shortage of resources compelled postponing the acquisition of a new SRV and intensifying the search for an interim solution.

It so happened that in 1988, Mazagon Docks wanted to dispose of a Diving Support Vessel (DSV) which it had built

for ONGC's offshore oil exploration work. It had a dynamic positioning facility and a recompression chamber. The Navy took this vessel on dry charter and fitted her with the diving bell and other essential rescue equipment removed from the aged 1970s vintage Russian SRV, INS Nistar.

After some years of trials, this DSV was commissioned in September 1995 as INS Nireekshak. Even though she was not a perfect SRV, she was better than the Nistar which was overdue for decommissioning. The roles envisaged for Nireekshak were to facilitate rescue from a submarine in distress and training of saturation divers.

The first wet-mating with a submerged submarine Vaghsheer was achieved off Goa on 05 May 1992 at a depth of 45 metres. The next wet-mating was achieved off Bombay in 2004. Nireekshak's diving bell mated with a submarine bottomed at a depth of 60 feet and successfully transferred crew to Nireekshak.

The concept of free escape from a dived submarine was also validated and consolidated. Escape from a dived submarine was carried out from Sindhuvir. Karanj carried out the maiden successful escape from torpedo tubes.

Tie-Up with the US Navy for Submarine Rescue

The issue of procurement of a Submarine Rescue Vessel (SRV) was initiated in the early 90s. However, the procurement never materialised due to paucity of funds and other reasons. As an interim solution, it was proposed for a five year tie up with the US Navy for hiring of 'Submarine Rescue Vessel Fly Away Kit' (SRKF). In 1997, a US team visited and conducted on site review of three classes of submarines and airports. Further interaction was interrupted by the sanctions imposed by the US after nuclear tests in May 1998. However, discussions were resumed in Feb 1999. The approximate cost estimated for each DSRV rescue operation was Rs 10 Crores.

Nuclear Propulsion for Submarines

The three Year (1988–91) Lease of Russian Nuclear-Powered Submarine INS Chakra

"Nuclear propulsion in India was first mooted in 1967 when a naval officer and a BARC scientist prepared a feasibility report. A more detailed report was prepared in 1971 as the Committee of Secretaries felt that R&D on nuclear propulsion technology was inescapable if India was not to be left too far behind by the end of the century, when atomic energy would be a major source for both propulsion and energy requirements. A small nucleus of engineers was located in BARC as early as 1978."[5]

"Seeing the advent of nuclear propulsion in submarines of other navies, a study was undertaken by BARC to study a nuclear propulsion package for naval ships and submarines. A stage arose when it became necessary to train serving personnel in this very important area of propulsion technology.[6]

"The offer by the Soviet authorities of a `nuclear powered submarine fleet' for the Indian Navy was made by Soviet Marshal Ogarkov during his visit to India in April 1981. The Soviets offered to arrange a two years' training programme for Indian naval personnel, lease one nuclear submarine for five years for practical training and to render technical assistance for creating maintenance facilities in India for nuclear powered submarines. He added that the sale, as also assistance for designing and constructing nuclear powered submarines, could be taken up later".[7]

In his memoirs Defence Minister (later President) Venkataraman has written that:-

"The idea of acquiring a nuclear propelled submarine was floated by me as Defence Minister and after months of bargaining the Soviets agreed. A training programme was arranged for Indian sailors. I had visited the trainees in Leningrad and Riga. I was also happy that the lease amount charged by the Soviet Union was fairly reasonable. The nuclear propelled submarine had the advantage of remaining under water which was not possible for the conventional submarines. It was also proposed at that time that a second nuclear propelled submarine would be built in India. The Atomic Energy were confident of producing an atomic power pack for the submarine.[8]

"An agreement was concluded with the Soviet Union and a team of officers under the supervision of Vice Admiral MK Roy was formed to steer the project. After a rigorous selection procedure, the first batch of the nuclear submarine crews, under the command of Captain S Daniel commenced their training in the USSR. The training was, perhaps, the most thorough and taxing course that any of the Indian submariners, most of whom had over a decade

5. *War in the Indian Ocean* by Vice Admiral MK Roy, Pages 114 et seq.
6. Excerpts from *The Pictorial History of the Submarine Arm* published by Naval Headquarters 1992.
7. *War in the Indian Ocean*, by Vice Admiral MK Roy, pages 114 et seq
8. Former Defence Minister and President, R Venkataraman, in his book *My Presidential Years*, Page 74.

of submarining behind them, had ever undergone. They absorbed the new technology with professional aplomb.[9]

"On September 14, (1987) Vice Admiral Roy, Chief of the Eastern Naval Command conveyed to me the pleasant news that the Government had finally decided to take the first nuclear propelled submarine from the Soviet Union on lease, as purchase would entail acceptance of NPT conditions."[10]

Between 1982 and 1986, the crews were trained in Russia and the shore support facilities were set up in Vizag by 1987.

On completion of the sea training commitment, the nuclear submarine in which our personnel had completed their practical training at sea was commissioned as Indian Naval Submarine (INS) Chakra, after having undergone a refit which was sufficient to see her through the three year period of lease.

Chakra commissioned on 5 January 1988, sailed for India on 15 January 1988 under the command of Captain (later Vice Admiral) RN Ganesh. Except when transiting through shallow waters in the South China Sea, the Singapore Straits and the Straits of Malacca, her passage was submerged. Throughout her passage, she was tracked by Australian and American MRASW aircraft. The frigate Dunagiri rendezvous'd her in the South China Sea to escort her homeward.

On arrival at Visakhapatnam, in February 1988, she was received by Prime Minister Rajiv Gandhi, the Defence Minister KC Pant and the CNS Admiral Nadkarni. After embarking, they were taken to sea for an outing.

Chakra was based in Visakhapatnam where minimum essential maintenance facilities had been created for the lease period. From 1988 onwards, Chakra exercised with our ships in the Bay of Bengal and the Arabian Sea.

"The demise of the Soviet Union coincided with the need for refuelling Chakra which was almost at the end of her lease agreement. It was decided to return the submarine and she departed from Visakhapatnam on 16 December 1990".[11]

On completion of the lease, Chakra sailed for Russia on 16 December 1990 and was thereafter decommissioned in January 1991.

There was speculation in the public domain whether the lease should have been renewed. Admiral L Ramdas, Chief of Naval Staff at the time the lease was terminated said that *"the Indian Navy had learned all it could on that type of boat and, moreover, because other than the lease amount, it costs Rs 150 crores annually for onshore support, and that the whole programme was becoming uneconomical".*[12]

As stated in *The Pictorial History of the Submarine Arm* the Navy had completed its basic objectives of the lease, which were to understand:-

- Nuclear submarine culture and the practical aspects of handling nuclear power plants afloat.
- The tactical aspects of underwater launched anti-ship missiles.
- Anti-submarine operations against nuclear submarines.

Overview of the Submarine Arm 1991–2000

Year	Russian Kalvari & Vela Class	German HDW	Russian EKM	Russian Infrastructure/ Nuclear Chakra
1991	Karanj & Kursura under MRs in Vizag.	—	—	Chakra returned to Russia.
1992	Karanj & Kursura first wet-mating between Nireekshak & Vaghsheer achieved off Goa at 45 metres depth.	Shalki (SSK 3) commissioned.	—	—
1993	Karanj, Kursura, Vela under MRs in Vizag.	—	—	—
1994	Karanj, Kursura, Vela under MRs in Vizag.	Shankul (SSK 4) commissioned.	—	—

9. Excerpts from *The Pictorial History of the Submarine Arm*, published by Naval Headquarters 1992.
10. Former President, R Venkataraman, in his book *My Presidential Years*, Page 75.
11. *War in the Indian Ocean* by Vice Adm M K Roy, page 123.
12. *Nuclear Weapons & Indian Security* by Bharat Karnad, page 654.

Year	Russian Kalvari & Vela Class	German HDW	Russian EKM	Russian Infrastructure/ Nuclear Chakra
1995	Kursura completed MRs. Karanj & Vela under MR. Diving Support Vessel Nireekshak commissioned as Interim Rescue Vessel.	—	—	—
1996	Karanj completed MRs in Vizag. Vela under MRs. Vajrabahu commissioned in Bombay. Kalvari decommissioned.	—	—	—
1997	Vela & Vagli under MRs in Vizag. Vaghsheer decommissioned.	—	Sindhurakshak (EKM 9) commissioned. Govt cleared import of two 877 EKM Submarines from Russia.	—
1998	Vela completed MR. Vagli under MR in Vizag and was completed in 2006.	—	—	—
2000	—	—	Missile-capable (10th EKM) Sindhushastra commissioned.	—

The Submarine Fleet in Formation

Torpedo Loading in INS Sindhurakshak

19

Commencement, Cessation & Resumption of Indigenous Submarine Construction

(Note : Refer to chapter titled "The Submarine Arm")

Overview

The protection of national sovereignty from seaward aggression requires naval capability below the sea, on the sea and above the sea. Submarines are the primary platforms for capability below the sea. The Submarine Arm started with four torpedo-capable Kalvari (Foxtrot) and four Vela (Improved Foxtrot class) class submarines in the early 1970s. The submarine fleet was augmented with 877 EKM (Kilo class) submarines from Russia in 1984 and subsequently with German HDW SSKs.

Meanwhile to fulfil the overall national objective of 'becoming self-reliant' for fundamental naval requirements of which "Submarine Design and Construction Capability", were major requisites, evaluations had commenced to choose the design of a conventional diesel-electric propelled submarine for indigenous construction. The choice was between a Russian design and an European design:-

- **Russian design.** The latest Russian 877 EKM Kilo class design was already being inducted to replace the older Russian submarines.
- **European design.** The American and European literature of that era, driven by the Cold War antagonism between the US led NATO alliance, and the Soviet Union led Warsaw pact alliance, propagated the view that Russian submarines were inherently noisy, whereas European designs were technologically superior and quieter. Since quietness governed detectability in the deadly submarine encounters, comparative technical evaluations and availability considerations narrowed the choice down to the technologically-futuristic Swedish Kockums design and the 1939–1945 World War "proven-reputation" German design of HDW's Type 209/IKL1500.

Within the Navy, views were divided:-

- In one view, indigenous submarine construction should start with a futuristic design.
- The other view, favoured by Mazagon Docks Ltd was that transfer of submarine building technology and transfer of production drawings would be swifter and more manageable with the proven German design.

Reconstructed Chronology of Indigenous Submarine Construction

The inception of the German HDW Type 209/1500 SSK Project has been discussed in the preceding volume. To summarise, in December 1981, separate contracts were signed with the German firm of HDW for:-

- Two submarines (SSKs 1 & 2) to be constructed in Germany. Indian naval designers and overseers as well as officer and sailor submariners, and officers and key personnel from the shipbuilder MDL, would be deputed to Germany to learn submarine construction 'on the job' and absorb transfer of technology.
- Material packages for two submarines (SSKs 3 & 4) consisting of steel sections for fabricating the pressure hull, along with machinery and equipment were to be shipped to MDL for installation /assembly, of machinery and equipment, and sea trials before delivery.
- "Transfer of Design Technology" for which a Design Team of specialist officers (which later became the Submarine Design Group, SDG) was to be deputed to Germany to learn the fundamentals of submarine design from the experienced designers at IKL (which was the design arm of HDW) and concurrently under

their oversight to actually produce the design of a futuristic submarine to meet the staff requirements given to them by NHQ.

- An option to acquire material packages for two more submarines (SSKs 5 & 6) at the same baseline price as the earlier four but to which escalation would be 'addable'. This option was to be exercised within 12 months of contract i.e. by December 1982.

Construction of SSKs 1 and 2 in Germany — 1983 to 1985

The first SSK, INS Shishumar was commissioned in September 1986 and the second one in November 1986. Both were sea lifted to India in early 1987. In MDL, dedicated infrastructure called "The East Yard" was created at a cost of approximately Rs 40 crores, whose pressure-hull fabrication facilities were specific to the dimensions of the IKL 1500 submarines.

The third and the fourth SSKs were to be constructed in MDL. Construction of SSKs in MDL started in end 1984 after the material packages arrived. MDL also experienced teething problems in welding technology which took time to resolve. As a result, MDL's time schedule of submarine construction went awry.

This chapter, discusses:-

- Reasons for the delays in the completion of SSKs 3&4.
- The events that preceded the decision to forego the option to build the 5th and 6th SSKs, in MDL.
- The fortuitous coincidence of unforeseen developments that culminated in the conclusion of negotiations seventeen years later for the construction in MDL of far more advanced French, missile-capable, Scorpene submarines as the first phase of a far-sighted long term "Project for Series Construction of Submarines and Acquisition of National Competence in Submarine Building."

Construction of SSKs 3 and 4 in MDL

The shipping from Germany of the material packages, along with the first set of drawings commenced in January 1982 and went on through 1983.

Construction of the third SSK commenced on 12 January 1984. It took five years for her to be launched on 30 September 1989 and three more years till she was commissioned as INS Shalki (S 46) on 7 February 1992. Construction of the fourth SSK began on 12 September 1984. She was commissioned ten years later as INS Shankul (S 47) on 28 May 1994.

Reasons for Slippages in Construction. The HDW shipyard had estimated that MDL's construction time should be 42 months. But being MDL's first attempt at submarine construction, the Navy hoped MDL would be able to complete the first submarine in 60 to 62 months. However, the first submarine took 100 months to be delivered and the second submarine took more than 120 months.

Neither delays in the arrival of nor disparities in the material packages were causes of delay. Both in Germany and in India, the material packages (i.e. the CKD kits) received by HDW and MDL had been identical.

MDL's workshops were able to successfully carry out the following within indigenous capability:-

— Roll, shape and fabricate the pressure-hull and the non-pressure-hull structures from the plates and sections supplied by HDW.

— Manufacture the hydraulic power packs, the drive gears for the hydroplanes, the rudders, the capstans, the hull valves, the torpedo flaps and guide rails, and the pressure-tight bulkheads.

Yet, there were slippages. The occurrence of delays could be attributed to a variety of reasons:-

- **Conceptual Reasons.** The principle reasons for the delays, it appears, were conceptual. First of all, there was a delay in deciding which particular mark of engine to go in for and negotiating the prices for the engines. Since the contract had already been signed, as usual, the prices increased manifold. For lack of experience, the dockyard had not drawn up a very comprehensive list of extra spares as part of the first contract. The list included in the first contract was just for repairs and onboard spares that were quite insufficient. The dockyard took the precaution of putting its own team to negotiate the prices but since prices had been hiked a great deal, getting enhanced Govt sanctions for the new prices took time.
- **Welding Defects.** The second reason for the delay was the frequent occurrence of welding defects. Because of the difference in temperature and humidity conditions between Germany and India, distortions and weld defects started occurring during fabrication in MDL. These delays chain-reacted with other difficulties like revalidation of expired warranties etc. It took years to sort out these problems.
- **Pressure Hull Issues.** Although the submarine building dock was ready, there were problems about

the welding of the pressure hull. The main problem in welding a submarine's pressure hull is that it has to be welded in segments. They are of a particularly large weight and size steel, and thus require a special technique.

Vice Admiral NP Dutta, Chairman Mazgaon Docks (1977–84), recalls:-

"In the case of surface ships, you examine and check whether the weld is successful. That is not the case in submarine building. Here the rule is 100% X-ray inspection. We had to set up a huge X-Ray facility for taking X-rays of all welds. We found to our horror that the first sections that were welded had a lot of hydrogen bubbles in them. We took it up with the HDW people — they too were perplexed because we had used exactly the same technique as they had done in their HDW yard and yet the results were different. Analysis showed that it was probably due to the higher temperature and higher humidity in Mumbai, as opposed to the temperature and humidity conditions in Germany. So they experimented. All the various experiments meant delay. All those results were rejected. So we had to start anew.

Ultimately, they found that the welding temperature that we were using was in excess of the conditions that were warranted in Mumbai. They had to change the strength of the flow and the angle of impact of the flame. After trial and error, they found the answer but that put us back by a year-and-a-half.

The fact was that we had never built a submarine before. It is really like a small watch but on a much bigger scale. A lot of the work had to be finished and it had to be welded to each other, section by section, and we had problems in that. Ultimately we solved that by producing large-scale models of wood. We paid a great deal of money to produce those models. It took time. We knew that in submarine building, we couldn't take any risk.

In addition to the delays that I have mentioned was the delay in equipment arrival. Since the prices had gone up, negotiations, financial sanctions and placing of orders took time, so the whole schedule went astray".

Rear Admiral DV Taneja, who took over as General Manager of East Yard in 1988, recalls:-

"My joining the dockyard as General Manager (East Yard) was basically because submarine production was running well behind schedule. The facilities had already been set up, I only encountered the difficulties of things either not having been thought of or not done. We were faced with numerous problems.

One was the question of welding in the ambient temperature and the humidity, which existed in Bombay. The procedure recommended by the Germans for heating the electrodes and pre-heating the high tensile steel surfaces, was not succeeding here. We involved our Welding Research Institute, who carried out a number of experiments and we overcame the problem of welding.

Subsequently, it went to such an extent that when we had done the C weld of the various sections of the submarine, the total 6.5 metre diameter welding from outside, inside and all manual welding. In a number of C sections we got zero defects which the Germans had never ever achieved. So, progressively, I think we improved.

Every technician or every worker in East Yard could not have been sent to Germany. Only a certain handful of trades were sent to Germany for training. When I interacted with them, I learnt that they were given more of visual training and not so much "hands on" training. They knew what was to be done, but the skill of hand was not available with them. So we had to develop that, slowly and steadily. A number of times we had to call German people to do the job and for our people to learn with them to be able to overcome their shortcomings. So this was the second problem.

The other problem we faced was that we had got all the material packages in one go. Although it was supposed to be spread over, the spread was very little. In our wisdom, we had decided that if the Germans can make these submarines in 42 months, there is no reason why we Indians cannot make it in 42 months. A number of theories were advanced, we will have more manpower, we will have all three shifts running, etc. They look very good on paper, but they do not work out in practice. We did not have adequate number of people to go into three shifts.

A lot of studies were carried out to ascertain the best that one could achieve in every area of submarine construction, whether it was hull fabrication or fitting out or harbour and sea trials. And we found that we were hovering around 55, 56 or 62% at best in areas where we had already got a lot of experience. The build-period thus changes from 42 months to 78 months.

Taking the facts into cognisance, the time period for submarine construction was revised. But by then almost all of the equipment had come in (except for those with a shelf life) and therefore it all had to be stored. There were unprecedented floods in Bombay in 1985, and a number of equipments were immersed in water. There was the problem of removing them, redoing them, rectifying them and getting their guarantee reinstated, which was done. Then, when it came to the tests and trials, the warranty of every equipment had expired. The

question was whether we get them re-warranted or we go ahead and wherever a problem comes, we tackle it, because the cost of doing everything was becoming prohibitive. It was decided that we would go along and if any equipment failed and did not work, we would attend to it. And that added to time substantially.

The expertise on carrying out trials was also limited, although the crews were made available from SSK 1 and SSK 2; they were not available when the trials of 3 and 4 took place. Therefore, during the trial phase, we allowed ourselves more time, anticipating that failures would occur they would need to be attended to and, in some cases we may even have to get the spare parts from Germany. The submarines were eventually delivered late, I think, in something like 100 to 120 months."

Negotiations for SSKs 5 and 6

As per contract inked on 11 Dec 1981, India had the option to order/buy two more material packages for SSKs 5 & 6 within 12 months i.e. by 11 Dec 1982. For various reasons, NHQ and MoD were unable to exercise the option clause by 1982 and sought, and obtained, extensions from HDW to hold the baseline price.

The fourth SSK of the Shishumar class INS Shankul was launched in early 1991/early 1992. After that the assembly line at MDL lay idle, because the submarine was in water, nearly outfitted, awaiting trials and she was commissioned in May 1994.

MDL delivered SSK 3 in 1992 and SSK 4 in 1994. Their operational performance met the Navy's expectations.

After MDL delivered SSK 4 in May 1994, approval was accorded in October 1985, to commence negotiations for the acquisition from HDW of the material packages for SSKs 5 & 6.

Between 1981 and 1985, NHQ had interacted with HDW on improving the operational capability incorporating changes like a better super-charged diesel engine, better sensors and weapons, substitution of obsolescent equipment etc of the SSKs that would follow SSK 4. By this time, three options had evolved for SSKs 5 and 6:-

- Build both in HDW (Favoured by HDW and those who wanted to upgrade the design with the latest equipment).
- Build both in MDL (Favoured by MDL 'to keep its submarine production line going').
- Build one in HDW and one in MDL (To get the best of both options). The approval accorded was for negotiations to be based on the "one by HDW and one by MDL" option.

In Dec 1985, preliminary negotiations started in Delhi with HDW. The prices quoted had increased by 73% per material package. The increase was due to:

- Cost escalation by 26% and effective cost increase, over and above escalation.
- Additional items, upgrades and onboard spares.
- Smaller order quantity (The 1985 quote was for two material packages and the earlier one was for four material packages).
- Dollar exchange rate became more adverse.
- Higher levels of documentation demanded by the Indian side.
- Losses incurred in the last contract due to rejection of sections as a result of welding problems and price concessions granted during the last contract.

Commodore (Later Vice Adm) AC Bhatia was the Naval Attaché in Bonn. He recalls:-

"The Germans had offered us an option which was to be exercised by December 1982 without any appreciable increase in price. We could not avail of that option clause. When we started negotiations in 1985, linear escalation had lapsed and as a result the jump in price was very big. When I talked to NHQ, they were calculating the Rupee effect, because by now the value of the Deutsch mark had also escalated, so the rupee effect was very much higher.

The Germans had their own side of the story. HDW said, "We kept on reminding Delhi that this option clause is going to lapse. But you were unable to exercise the option. Now we are not bound. We have hundreds of sub-suppliers. They have raised their prices. You have to compensate us for that escalation".

As far as the material package itself was concerned, we had wanted improvements. For example, we wanted upgraded engines from MTU for which some trials had been held. There was also a change in the torpedoes — we wanted a fibreglass propeller for which the cost implications were very high. That was dropped mainly because AEG told us "We have already acquired all the metal propellers. These are yours. We will have to charge you extra for the fibreglass propellers".

Naturally we could not accept this kind of escalation. So all the proposals for upgrades were dropped.

Moreover, the construction schedule in Mazagon Dock had not kept pace with the initial projections. Since construction had not gone as planned, warranties had expired for much of the equipment which was to have been installed. MDL asked HDW to extend the warranties. HDW enquired, "If you have not yet installed the equipments and they have out-lived their warranties, tell us when you expect to install them. These are sub-systems, which we have acquired from others. If we have to extend all the warranties, it entails cost". So part of the problem lay in MDL not being able to keep to the construction schedule.

The price rise was caused not only by the escalation in European cost. It was also our own way of working, losing expertise and thereby extending the duration of construction in Mazagon Docks".

Negotiations to Reduce Costs

The reasons for the increase in price were analysed, item by item. It transpired that part of the increase in cost was a result of the loss that HDW had incurred on SSKS 1 and 2.[1] Some progress was made during these discussions but the gap in what HDW wanted and what the Indian side felt was justified was still too big.

The Ministry of Defence then requested the Indian Ambassador in Germany to hold meetings at Government to Government level[2] and indicated to him a figure, which, if agreed to by the German side, would enable the contract to be finalised. During these discussions in Bonn, it was possible to narrow the gap a little. However, it emerged that there were discrepancies in the contractual process including payment of commissions. The Indian Ambassador in Germany sent a telegram to the Defence Ministry reporting this fact which led to an inquiry.

Dropping of SSKs 5 and 6 and the Discontinuance of Indigenous Submarine Construction

The political storm triggered by the Inquiry took years to die down. The prolonged drought after 1987 and the paucity of resources resulted in the deferment of most naval projects. The induction of SSKs 5 and 6 was not pursued.

MDL's skilled manpower was occupied until SSK 4 was launched. Thereafter MDL re-deployed the skilled manpower to other projects. Many of the best welders went to Australia whose Navy had also commenced submarine construction.

Adm JG Nadkarni, who was VCNS and later CNS during this period, recalls:-

"As far as the SSKs are concerned, I would like to put the record very straight. When the time came for taking up the option of the 5th and the 6th SSKs, various delegations had been to the Soviet Union for negotiating the acquisition of two more EKM submarines. We found that two things had happened.

The first was that at the time when the initial contract was signed, one Deutsche Mark was about three Rupees and the total cost of the two packages that we acquired for constructing SSKs 3 and 4 in Mazagon Dock was 80 crores. When the time came for the option for SSKs 5 and 6 to be exercised, I think the Deutsche Mark was about 18 or 19 Rupees, a six-fold increase.

The second thing was that the Germans had increased the basic price itself in Deutsche Marks. The result was that we found that the two packages alone were going to cost us somewhere in the region of 500 crores and frankly we were not budgeted for such an amount. So, having in the meantime contracted for the 7th and the 8th EKMs from the Soviet Union, the total strength of submarines would have been the same even if we had cancelled SSKs 5 and 6.

Keeping all this in view, I as the Chief of Naval Staff recommended that we do not go in for these SSKs. Unfortunately, as is well known, there was a controversy about the HDW deal and everybody got the impression that we cancelled the 5th and 6th SSKs because of that. It had nothing to do with that whatsoever. As far as I am concerned, it was cancelled mainly due to financial constraints".

From the mid 1990s onwards, NHQ foresaw a serious depletion in submarine force levels that resulted cumulatively from the imminent decommissioning of the old submarines and the backlog that had built up in the Medium Repairs (MRs) of the new 877 EKM submarines.

Several things happened in the next few years:-

- From NHQ's, MDL's, and the Ministry of Defence Production's point of view, it was desirable that MDL's submarine production line recommence construction as early as possible. Implicit sanction already existed for two submarines (SSKs 5 and 6) the option for which had been allowed to lapse in

1. Reportedly, HDW lost DM 30 million per boat due to 20% increase in manufacturing time and due to higher purchase prices.
2. The firm of HDW was owned jointly by the Federal Government of Germany and the Provincial Government of Schleswig Holstein, the state in which the HDW shipyard was located in Kiel.

1987. The Pakistan Navy had inducted American Harpoon missiles and French EXOCET missiles for its ships and submarines.

- Whilst there was no official ban on dealing directly with HDW, in view of the ongoing inquiries on the 1987 allegations of commissions, it did not appear prudent to get involved with HDW in negotiations for material packages for the next two submarines.
- From 1996 onwards, the Russian Amur class design was discussed and evaluated as a possible option for indigenous production in lieu of SSKs 5 & 6. It was found technically acceptable but issues like transfer of design and build technology could not be resolved till 2000.

Commencement of Submarine Construction Project 75

In 1992, NHQ formulated fresh staff requirements for an indigenously submarine design titled 'Project 75'. The rationale was that since the design and technology of the first four SSKs was of late 1970s vintage, the next two should have improved noise reduction and noise signature features and also have tube-launched anti-ship missile (TLM) capability.

The Submarine Design Group (SDG) that had been constituted in NHQ after their return from Germany was tasked to improve the noise reduction features for the same hull form as the earlier four because changing the hull form would entail major changes in design which would result in further delays. The quickest way to resume submarine construction was to continue construction with the HDW design because MDL's pressure hull welding and hull X-ray facilities were specific to the dimensions of the HDW design. Likewise the experience gained by MDL's work-force were on the HDW design. For this reason, the staff requirements for Project 75 had retained the same hull form as the earlier submarines.

As regards the (TLM) being a prerequisite for the Project 75 submarines, the only two countries in the Western Bloc which could have supplied TLMs were the USA and France. There was no likelihood of the Harpoon being obtained from the USA.

Government's approval was therefore sought and obtained to engage the French firm Thompson CSF (TCSF) as consultants to the Indian side and as intermediaries with the French Government and submarine construction firm of DCN to assist in:-

- Facilitating the release of the Exocet submarine-launched TLM. The French appeared agreeable to consider the release of SM 39 provided as a quid pro quo the Navy considered fitment of French combat systems in the two submarines of Project 75.
- Obtaining material packages for Project 75 from HDW.
- Getting HDW to validate the noise reduction design changes suggested by the SDG.

Construction at MDL. Based on the outcome of the initial negotiations with TCSF, NHQ sought government approval to construct two submarines of Project 75 in MDL. CCPA approved NHQ's proposal in January 1997.

Based on this approval, a Letter of Intent was sent to MDL to float a limited global tender soliciting "design assistance and consultancy" for construction of two submarines. MDL floated this tender to four shipbuilders namely; Vickers of Britain, Kockums of Sweden, Rosvoruzhenia of Russia and TCSF of France. It was clearly understood that the selected vendor would only provide consultancy whilst the construction would be done by MDL.

Only France's Thompson CSF responded to this tender. Based on TCSF's offer, technical discussions and negotiations were held between 1997 and 1999. It became apparent in the initial stages itself, that the involvement of and payments to HDW would be considerably larger than had been originally projected in the note to the CCPA, (royalty had to be paid to HDW for access to the original design drawings and for validation of the improved features of noise reduction which the SDG had recommended). It also emerged, that HDW had patent and proprietary rights on the bow section, which housed the torpedo tubes and on the conical tail section.

In June 1998[3], CCS gave approval to continue discussions with TCSF indicating firm costs after completing price negotiations. NHQ was specifically asked to clearly bring out the involvement of HDW in the finally negotiated package.

However, since no commitment in writing was available from the French side on the release of the Exocet SM 39

3. In May 1998, India conducted its nuclear tests. France was one of the countries that did not impose sanctions after these tests. During his visit to France in end 1998, Prime Minister Vajpayee initiated the Franco–Indian Strategic Dialogue. This was followed by the setting up of an Indo–French High Committee on Defence whose objectives included exploring avenues for joint development and production of defence equipment.

missile, no progress was made towards conclusion of a contract.

Release of Exocet SM 39. Between June 1999 and early 2000, the question of the release of the SM 39 missile was discussed at various forums, including the Indo–French Committee on Military Technical Cooperation. The French side wanted that the release of the missile should be linked to their Scorpene offer within the overall enhanced framework of Indo–French naval cooperation and that the Indian Navy should look at the Scorpene design for construction of future submarines. NHQ took the stand that the release of the SM 39 should be without any strings attached. The impasse was eventually resolved at Defence Minister level.

The French government agreed to give a written undertaking for the release of SM 39 TLM without insisting that the Scorpene design should be selected for all future western origin construction. Agreement was reached that the four submarines under Project 75 would be constructed: either 2 of those earlier P75 design along with 2 of Scorpene design or all 4 of Scorpene design. The SM 39 missile would be available in both options. The choice was left to the Indian side. Following this breakthrough, the Ministry asked NHQ to do a cost benefit analysis for both options.

NHQ and MoD officials jointly evaluated the Scorpene offer and came to the conclusion that given the futuristic Scorpene design and issues relating to transfer of technology, technology absorption, obsolescence and future perspective, it would be beneficial to go in only for six Scorpene design submarines under Project 75.

CCS approval for constructing six Scorpene submarines under Project 75 was given in April 2001. The price negotiation committee was then formed under the chairmanship of Additional Secretary, Defence Production. The first round of the PNC with the TCSF (whose name had by now changed to Thales), held in November 2001, was however, inconclusive as there was considerable difference between the cost projected by Thales and what was agreeable to the Indian side, mainly on account of transfer of technology.[4]

4. In June 2001, the formal report of the TEC (Technical Evaluation Committee) recommending selection of the Scorpene design for the Project 75 submarines, was forwarded to the MOD.

20

The Naval Air Arm

Combat Capability of the Air Arm in 1991

In the four decades since independence, the nation's naval air arm had grown substantially to emerge as a prominent fighting force. By 1991, the combat capability of the Air Arm had leapfrogged from the primitive expertise of the 1950s to the cutting edge technology of the 1980s. In step with the increased capability of their sensors and weapons, the tactics and missions of naval aircraft and helicopters began to match those of the advanced navies.

The new sensors fitted were:-

- Dunking sonars in the Kamov and Seaking Mk 42 B helicopters.
- Latest sonobuoys in the Seakings Mk 42 B, the ILs and the TUs.
- Magnetic Anomaly Detectors (MAD) in the ILs and Kamovs.
- ESM in the Seakings Mk 42 B and Dorniers.
- Tail radar warners in the Sea Harriers, the ILs and the TUs.
- Modern radars in all types of aircraft and helicopters.

The new weapons were:-

- French Matra Magic air-to-air missiles for the Sea Harriers.
- British anti-ship Sea Eagle missiles for the Sea Harriers and Seakings.
- Italian A 244 S and Russian anti-submarine homing torpedoes in helicopters.
- Anti-submarine depth bombs in the Kamovs.

Three new naval air stations were commissioned. They added to completeness of surveillance area over sea covered by maritime reconnaissance aircraft. At the older air stations, the Air Traffic Control facilities were modernised and runways lengthened and strengthened to operate heavier aircraft (both by day and night).

The latest simulators were acquired for training Sea Harrier pilots, TU ASW teams and Seaking Mk 42B maintenance personnel.

New aircraft maintenance workshops were set up at Kochi for the Seakings, at Goa for the Sea Harriers, the Russian ILs and the Kamovs, and at Arakkonam for the TUs.

Training syllabii were updated and training facilities expanded. A site was identified at Bangalore for a spacious new Naval Air Technical School to facilitate practical training of air technical personnel at HAL and with the Air Force technical establishments.

Aircraft Carrier Developments

Vikrant and her Air Squadrons

Vikrant with her Seahawk and Alize squadrons were commissioned in 1961. In the forty years that had elapsed since then, both Vikrant and her aircraft had aged considerably. The Seahawks were phased out in 1978. The Alizes, despite their refurbishment, were afflicted by the non-availability of critical spares, which were no longer under production in France. The last launch of Alizes from Vikrant took place on 02 Apr 1987.

Vikrant underwent two modernisation refits — the first from 1979 to 1981 and the second from 1987 to 1989 in preparation for embarking the new Sea Harrier Vertical/ Short Take Off and Land (V/STOL) fighter aircraft and the new Seaking Mk 42B ASW/ASV helicopters that had replaced the Alizes for anti-submarine tasks. The 9¾ degree ski-jump was fitted during the 1987–89 refit and the carrier was declared operational after its successful trials. In 1991, Vikrant underwent a short 6-month refit, which was followed by another 14-month refit from 1992 to 1994. She remained operational thereafter, flying Sea Harriers, Seakings and Chetaks until her final sea outing on 23rd November 1994.

In January 1995, it was decided to keep Vikrant in 'Safe to Float' state. In keeping with that decision, no

more refits/dry dockings were planned. She was laid up alongside and decommissioned on 31 January 1997. This marked the end of a glorious chapter of the Navy, she having seen the transition from conventional carrier-borne aircraft to V/STOL modern technology aircraft like the Sea Harrier.

Subsequently, she was converted into a museum and has remained berthed in the Naval Dockyard in Mumbai, open to the public. In due course, she will be grouted into the sea-bed off the shore in South Mumbai.

Viraat

In 1985, Britain offered India a 40-year old aircraft carrier, Hermes, for outright purchase. By this time, the first batch of the Indian Navy's Sea Harrier fighter aircraft had already been in service for over a year. The Navy had long felt the need for a second aircraft carrier to ensure operational availability of at least one, in a time of conflict. The Navy has undergone the unfortunate experience of not having the carrier available during combat on two earlier occasions. During the1965 War, Vikrant was under refit and in the 1971 War she was afflicted by cracks in her boilers that restricted her speed.

The Navy assessed the magnitude of the refit that Hermes would require. This meant determining the minimum requirements of new equipment and systems that were essential for providing an all weather, day and night capability for air operations, estimating the stowage and supply arrangements (for the new air to surface and air to air missiles, which were entering service) and negotiating how much all this would cost.

In April 1986, an agreement was signed with Britain to acquire the Hermes at a cost of £63 million sterling. This amount included the cost of refit, spares, stores and services. The ship was towed to Plymouth for a 12-month refit.

It was decided that until the new graving dock was commissioned in Mumbai, Viraat would be docked in Cochin Shipyard.

The Hermes was commissioned as INS Viraat in May 1987. She arrived off Bombay on 21st August 1987 where Prime Minister Rajiv Gandhi boarded her, much as his grandfather Prime Minister Jawaharlal Nehru had welcomed Vikrant twenty-six years earlier in 1961.

The Sea Harriers embarked a month later in September. The "White Tigers" were to demonstrate their potential in the ground attack role for the first time on 05 Nov 1987 when they dropped 1000 pound and cluster bombs. Viraat remained operational thereafter.

In 1990 and 1991, for the first time, both Vikrant and Viraat were operational with their air groups comprising Sea Harrier V/STOL fighters and Seaking MK 42B ASW/ASV helicopters.

Viraat's first docking in 1991 was followed by a second short docking in 1995 for repairs. Between October 1998 and April 2001, the carrier underwent refit and modernisation in two phases with an operational cycle in between:-

- **Phase I.** Medium Refit and Dry Docking at Cochin Shipyard from May 1999 to November 2000.
- **Phase II.** The Modernisation Phase at Naval Dockyard Mumbai lasted till April 2001. During this phase, Viraat was fitted with new indigenous air warning and navigation radars, coloured tactical displays, data link, log, echo sounder, communication equipment, upgraded air conditioning and the refurbished Carrier Controlled Approach (CCA) radar that had been re-appropriated ex-Vikrant.

Acquisition Of Russian Aircraft Carrier — Gorshkov (Vikramaditya)

This 44,500 ton, steam propelled Russian aircraft carrier was the second of the series of three 2nd generation aircraft carriers, Minsk, Baku (later renamed Gorshkov) and Ulyanov that the Russians had built to succeed their 1st generation Kiev class carriers. Baku was commissioned in 1987, served in the Soviet Black Sea Fleet and later in Russia's Northern Fleet. She was operational until 1992.

After the Soviet Union dissolved in 1991, Russia started reducing the size of its Navy due to financial constraints and offered the Gorshkov to India. The acquisition of Gorshkov formed part of the joint Indo–Russian Protocol on Military Technical Cooperation signed in December 1994. Reportedly, the financial aspects were unusual — Gorshkov 'as is, where is' would be free; India need only pay for the cost of refit and the aircraft.

The Navy thoroughly examined Gorshkov's material state, assessed the magnitude of the modernisation and refit that would be required and identified the essential requirements of new equipment, weapons and systems.

Of the two aircraft on offer, the Indian Navy after evaluation short-listed the Short Take Off but Arrested

Recovery (STOBAR) MIG 29 K aircraft for the Gorshkov. This aircraft would take off from ski jump just as the Sea Harrier, but land using the arrester wires, like the Sea Hawk. Gorshkov was expected to operate two new types of aircraft.

- MIG 29 K fighter aircraft (quite different from MIG 29B of IAF) armed with the latest air-to-air, anti-ship and air-to-surface precision guided munitions.
- Kamov 31 "Airborne Early Warning" helicopters, in addition to the Kamov 28 ASW helicopters already in Naval service.

As was done for the two aircraft carriers, the Gorshkov would require an extensive modernisation and tropicalisation refit in Russia before she could be inducted into the Navy. Evaluation of the material state of the Gorshkov commenced in the mid 1990s. Nearly 80% of its equipment was to be replaced with modern equivalents; she was expected to serve the Navy for over two decades. The negotiations regarding the costs and scope of modernisation, of refit and of the fitment of the latest sensor and weapon systems took time to resolve.[1]

Indigenous Aircraft Carrier (IAC) Project[2]

The Indigenous Aircraft Carrier project first took shape in 1979 and CCS approval was accorded in May 1999. Discussions on design collaboration were held with shipbuilders in Europe who had built aircraft carriers for their Navies.

In 1988, a design consultancy agreement was signed with DCN of France to teach the intricacies of aircraft carrier design to the team of Indian naval architects. DCN was also required to carry out a technical audit of Cochin Shipyard and identify the facilities that would require to be augmented for constructing the ADS. In 2000, approval was accorded for the ADS to be built in Cochin Shipyard.

Comparison of Aircraft Carrier Features

	Viraat	Gorshkov by 2012/ 2015	ADS/IAC BY 2012
Number of Aircraft	22	30	30
Type of Aircraft	SH + SKG	MIG 29K	SH, MIG 29K, LCA or 4 KA 31 (8) (12) (6), 6 KA 28
Launch	Ski-jump	Ski-jump	Ski-jump
Recovery	Vertical Land	Arrestor Gear	Arrestor Gear
Propulsion	Steam	Steam	Gas turbines
Standard Displacement	20,000	33,200	30,000
Deep Displacement	28,500	45,000	37,500

Sea Harrier Fighter Aircraft

Acquisition and Role of Sea Harriers

V/STOL aircraft had been under development in Britain since the end 1960s for the Royal Air Force. The Royal Navy intended to acquire the naval version, the Sea Harrier. (In July 1972, a Harrier had come to India and landed and taken off from Vikrant to establish, prima facie, that V/STOL aircraft could operate from Vikrant's flight deck).

In the years after 1972, the Indian Navy kept track of the development of the British Sea Harriers. In 1977, the Navy obtained approval, in principle, for the acquisition of the Sea Harriers as replacements for the Seahawks. In 1979, the Indian Navy placed an order for six Sea Harriers and two Sea Harrier Trainers for delivery in 1983.

1. Eventually, in January 2004, the agreement was signed for the acquisition of the Gorshkov and its aircraft code named 'Project 11430'. The ship commenced an extensive four and a half year modernisation refit. During this period, it is envisaged that the aircraft carrier Viraat would be phased out and replaced by the first indigenously built aircraft carrier, the construction of which commenced in 2004 and would be completed in about ten years time.

   Gorshkov and her MIG 29 Ks would fill the gap between the time Viraat being paid off and the first indigenous aircraft carrier commissioned with the capability of operating the MIG 29 Ks in case the development of the indigenous naval Light Combat Aircraft (LCA) is delayed. The delay in the indigenous Air Defence Ship was due to the finalisation of the type, size and weight of aircraft she would operate.

2. For details refer to Chapter "Indigenous Aircraft Carrier (IAC)".

The first three Sea Harriers (603,604 and 605) took off from Britain on 13 December 1983 and after overnight halts in Malta, Egypt and Dubai landed at Goa on 16 December. After a brief maintenance period, the first Sea Harrier landed on Vikrant's deck on 20 Dec 1983.

Three more Sea Harriers (601, 602 and 606) and the first trainer (651) arrived in 1984. With arrival of the second trainer (652) in 1985, the delivery of the first batch of eight Sea Harriers was complete.

Overview of Sea Harrier Inductions

Batch	Contracted	Fighters	Trainers	Delivered
I	Nov'79	6	2	1983
II	Nov'85	10	1	1989–90
III	Oct'86	7	1	1990–92

The second batch of aircraft consisted of 17 flights (607–623 and two trainers 653 & 654) were delivered between 1989 and 1992.

The capability enhancement in the second batch of Sea Harriers included equipping with:-

- The British Sea Eagle anti-ship missile
- The French Matra Magic II, all-aspect, air-to-air missile.
- A wider coverage Radar Warning Receiver (RWR).
- Photo-reconnaissance pod.

Sea Harrier Simulator

The Sea Harrier Simulator was commissioned in the Naval Air Station at Hansa in 1984. It was a six-axis full-motion simulator and provided ab-initio and re-familiarisation training, practicing of emergency procedures, tactical and mission training, simulated instrument flying accident investigation and validation of mission profiles.

In 1998, this simulator was upgraded and re-commissioned by Macmet India, a Bangalore based firm, to cater for the Batch Two Sea Harriers. The upgradation provided:-

- Integration of Blue Fox radar with Sea Eagle and Magic Matra missile delivery capability.
- Day and night visuals.
- Improvements of Electronic Warfare, Record/Replay and incorporation of an instructor's operating-console.

Training of Sea Harrier Pilots

Until 1984, the 'Basic Conversion' and subsequent 'Operational' training of Sea Harrier pilots was carried out in Britain. 'Operational' training commenced in India after the first trainer aircraft arrived in 1984. However, despite the high cost, 'Basic Conversion' training continued to be carried out in Britain because there weren't enough aircraft.

In 1990, the Sea Harrier Operational Flying Training Unit (SHOFTU) was formed within the Sea Harrier squadron (INAS 300), and was allotted three fighters and two trainers, to carry out both 'basic' and 'operational' training.

In 1991, this unit was moved under INAS 551 (the lead-in fighter training squadron) and was christened as INAS 551 B Flight.

After 1996, this flight was informally constituted as a 'Sea Harrier Training Squadron' with an independent Squadron Commander. In addition to training budding Sea Harrier pilots, the squadron imparted technical on-job-training to tradesmen of frontline and second line servicing units. When required, it augmented 300 Squadron with aircraft and aircrew, afloat and ashore. The Squadron was finally commissioned as INAS 552 on 07 Jul 2005.

Upgradation of Sea Harrier Combat Capability

Efforts continued to acquire affordable pulse Doppler radars, longer range 'Beyond-Visual-Range' air-to-air missiles and 'smart' data-links. Discussions on the Limited Upgrade of Sea Harrier (LUSH) commenced in the mid nineties and by 2003, negotiations with HAL (Bangalore) had commenced. Shortly after that, the firm was declared the prime contractor, with IAF and ELTA of Israel being the sub-contractors. The LUSH envisaged a new multi-mode radar, data link and combat manoeuvre monitor and flight recorder along with a Beyond Visual range (BVR) air-to-air missile.

Progressive Upgradation of Sea Harrier Capability

FRS 1. For the air defence role, the first batch of 6 Sea Harriers (equivalent to the Royal Navy's FRS 1) had the Blue Fox radar, the French Magic Matra close range air-to-air missile and a Radar Warning Receiver that gave limited coverage of a hostile radar-fitted aircraft approaching from the stern sector. For the anti-ship/ground attack role, these Harriers could carry 30 mm guns mounted in pods, 68 mm rockets in pods, runway denial bombs, cluster bombs and 1000 pound 'iron' bombs of 2nd World War vintage. The accuracy of weapon delivery was enhanced by the onboard weapon-aiming computer and Head-up-display.

FRS 2. Due to the Royal Navy's financial constraints, its FRS 2 Sea Harriers started entering service only in the end 1980s. At that time, the replacement for the Blue Fox radar, named Blue Vixen, was still under development. The Navy had to decide whether to delay the induction of the batch two Sea Harriers until the better radar was available or to accept the same standard as was fitted in the Royal Navy's FRS 2s, namely the Blue Fox radar but now with two types of air-to-air missiles:-

- The Beyond Visual Range (BVR) missile that had a range of several kilometres.
- The 'All Aspect Air to Air Missile' for close range combat that enabled attack from all aspects, rather than only from behind the target.

The Indian Navy exercised the second option of the 'All Aspect AAM.'

By 1992, the last of the Sea Harriers ordered in the 1980s had arrived. Thereafter, all the earlier Batch 1 Sea Harriers were upgraded, in India, to Batch 2 standard. Further improvements were incorporated. These included better indigenous radar warning receivers, self-protection jammers, Global Positioning System (GPS), etc.

Alize Anti-Submarine Aircraft

The Alizes entered service in 1961 along with the Vikrant. In 1974, the Navy decided to refurbish the Alizes and extend their life into the 1980s.

The performance of refurbished Alize radars and ESM improved, but the accuracy of the sonobuoy monitoring remained sub optimal. As a result, the Alize's ASW role died out. The last launch of Alizes from Vikrant took place on 2 April 1987. Thereafter they operated only from ashore.

The Alizes stopped flying on 12 April 1991 and the Squadron was decommissioned in August 1991. Five Alizes were left of the total of 14 acquired. During the 30 years of the squadron's service, the Alizes had flown 35,912 hours and done 7,144 deck landings. Meanwhile, the ship-borne anti-submarine role had been taken over by the Seaking anti-submarine helicopters.

Maritime Reconnaissance Aircraft

The operational availability of Russian MR Aircraft during the 1990s was afflicted by problems. The collapse of the Soviet Union in 1991 interrupted the supply of critical spares. This to an extent, impelled the Naval Aircraft Yard[3] to expedite completion of its facilities for repair of components. But then there were other issues like the delays in the receipt of aircraft engines after overhaul in Russia. This was partly overcome by the induction of engines ex Russian AN-12s from the Air Force. A third problem was the compulsion of sending aircraft to Russia for overhaul, which the Navy was finding difficult to circumvent. Therefore, until replacements could be identified and acquired, it was planned to extend the life of both these types of aircraft (IL 38s & TU 142s) as long as possible.

Two developments after 1971 had marked the rebirth of the shore-based arm of naval aviation.[4]

- As a lesson of the 1971 War, approval was accorded to acquire three Maritime Reconnaissance and Anti-submarine Warfare (MRASW) Ilyushin (IL) 38s from the Soviet Union in 1975.
- The transfer of the "maritime reconnaissance" role from the Air Force to the Navy and the taking over of the Super Constellation aircraft (Super Connies) in 1976 that the Air Force had been using for maritime reconnaissance.

IL 38s for MRASW (INAS 315)

The first three IL 38s arrived in 1977. It soon became apparent that three MRASW aircraft were inadequate for the extensive sea areas to be kept under maritime surveillance. The Navy's requests to the Soviet Union for five more IL 38s could not be fulfilled because production of the IL 38s had ceased.

Since the three ILs in service fell due for major overhaul in the USSR at the same time, the Soviet side was again urged to release five ILs from their Navy. Eventually, a contract was signed in May 1981 for two more IL 38s and these aircraft joined the squadron in 1983. Overall, a total of five IL 38s were inducted into the Navy.

By 2000, discussions with the Russians on the refurbishment and modernisation of the first three IL 38s to extend their life between overhauls to 15 years had concluded. The programme envisaged an extension of the total technical life by an additional 10 years, as well as a new avionics and a weapons suite.

TU 142s for LRMP (INAS 312)

To meet the Navy's request for more MR aircraft, the Soviet Union offered the Long Range Maritime Patrol

3. NARO was renamed Naval Aircraft Yard (NAY).
4. The amphibious Sealands had been phased out in the 1960s.

(LRMP) Tupolev (TU) 142s in 1984. Eight of these aircraft arrived in 1988.

After the arrival of the first five aircraft, the squadron was commissioned at Naval Air Station INS Hansa on 16 April 1988 and designated INAS 312. The remaining three aircraft arrived between August and October 1988.

In May 1992, the squadron re-located to the new naval air station INS Rajali at Arakkonam on the East coast of India.

The non-availability of spares for the turn round of TUs adversely affected their serviceability. Critical and urgently needed fast moving spares were not being received, whilst many long term ones were procured. An overall review was carried out jointly to arrive at the essential package to be procured by the next naval Logistic Delegation (LOGDEL) proceeding to Russia. Efforts intensified to identity the repair agencies in Russia to offload a large number of rotables awaiting repairs.

The TUs are expected to remain in service till 2015 and no upgrades are planned. They will be replaced by a new LRMP & ASW aircraft by 2012.

The Dornier 228s

The Dorniers were German Maritime Patrol Aircraft (MPA) that the Navy had envisaged as replacements for the Alizes in INAS 310. In 1986, sanction was accorded to acquire 10 Dorniers (3 for observer training, 4 for surveillance and 3 as maintenance reserve equipped with radar and air to surface missiles). Sanction was also accorded for 4 Dorniers, funded by the Ministry of Petroleum, equipped only with radar and IFF transponders (similar to the Coast Guard version) for surveillance around the offshore oil assets of Bombay High.

The drought of 1986, led to financial stringency and for the next few years no foreign exchange could be released to HAL for the Dornier's radars and missiles. HAL postponed the delivery of the Dorniers to 30 months after the release of foreign exchange. Eventually, orders were placed in 1990 on HAL for one 'fly-away' Naval Dornier and 4 Dorniers for Bombay High in which the radars would be retrofitted.

The first naval Dornier from HAL joined INAS 310 on 24 August 1991. The second Dornier arrived later in 1991 and the next two in 1992. The fifth Dornier was delivered fitted with the Super Marec (Maritime reconnaissance) radar. In subsequent years, the remaining Dorniers were retrofitted with this radar during their major inspections by HAL, Kanpur. For the coastal reconnaissance role, ten more Dorniers were acquired, in addition to the five acquired earlier. These Dorniers were progressively fitted with ESM, GPS and sonobuoy systems for surveillance, ASW and EW roles.

Dorniers as Information Warfare Aircraft. The Dornier proved to be an extremely useful and reliable platform in the coastal surveillance and targeting roles. Overall, the Navy had acquired a fleet of 15 Dorniers. In 2004, it was decided to acquire 11 more Dorniers to replace the Islanders in service. On 29 Mar 2005, the CCS sanctioned 726 crores for acquiring 11 maritime surveillance Dorniers with their spares and ground support.

Re-designation of Dornier Squadron. With the fitment of AES 210 radar, SATCOM, Data Link the Dornier squadron was re-designated as IW Squadron in 01 Oct 1998.

Islanders (INAS 550)

In 1972, there was a sharp increase in the requirement for Observer officers. The Air Force was unable to accommodate the Navy's needs. Experience had also shown that the purely navigation oriented training being imparted by the Air Force to Naval Observers had to be supplemented by sorties over the sea. A proposal was initiated to acquire a suitable aircraft for training Observer officers, for coastal reconnaissance and for Fleet requirements.[5]

After comparative evaluation of available options, the British made piston engined, propeller driven Islander (BN2A) was chosen. The first two Islanders arrived in Cochin and joined INAS 550 on 18 May 1976. The remaining three arrived by end 1976.

In 1981, two Islanders of INAS 550 were based at Port Blair for maritime surveillance of the A&N Islands. In 1984, these were commissioned as INAS 318 when the naval air station at Port Blair was commissioned as INS Utkrosh.

By 1995 the Islander aircraft in the A&N Islands had aged and needed replacement. It was decided that the first two of the new naval-version Dornier aircraft would replace the Islanders, which would be operated from the mainland.

In end 1996, six (2T) variant Islanders were acquired for INAS 550. The BN2A Islanders were re-engined with Allison Turbine Engines and rechristened BN 2T.

In May 2000, an Islander Flight was positioned at Naval

5. The Fleet Requirement Unit (FRU) had commissioned as INAS 550 on 17 June 1959. At that time, it consisted of 10 Amphibian Sealands, 10 Fireflies and 3 HT 2s.

Air Station Dega in Vishakhapatnam, after Dorniers were inducted in INAS 318.

Overall, a total of 17 Islanders were inducted into the Navy.

Trainer Aircraft

Kiran Jet Training Aircraft (INAS 551) Eight Kiran Mk II (the armed version) ex-HAL Bangalore joined the squadron between July 1987 and February 1988. These aircraft were used for training jet pilots for frontline squadrons, for meeting fleet requirements like anti-aircraft tracking practices and for consolidation flying of staff pilots. Overall, a total of 23 Kirans were inducted into the Navy.

The Helicopter Fleet

The embarkation of helicopters in ships started in the 1960s with the French Alouette IIIs flying from Vikrant (for the SAR role), from Darshak (for assisting survey work) and from Deepak (for assisting vertical replenishment). This was followed by appointing MATCH Alouette flights in the first four Leander frigates in the 1970s. Subsequently:

- Taragiri and Vindhyagiri were provided with one Seaking each. The Rajput class destroyers from Russia had one Kamov each. The Godavari class frigates of Project 16 had two Seakings each, as did their successors, the Delhi class destroyers of Project 15. The amphibious landing ships, Magar and Gharial, were designed to embark the commando variant Seakings Mk 42 C.
- The Kamov 31 AEW Helicopters were inducted with the entry of the Russian (Project 1135.6) Talwar Class frigates.
- All other frigate sized ships have lighter Chetaks.

The British Seaking Series

The Mk 42s. By 1974, the Navy had acquired twelve anti-submarine Seakings Mk 42s–a batch of six in 1971 and another batch of the same number, in 1974. The first batch experienced numerous teething problems during the 1971 war. It was followed by intensive evaluation and defect rectification in 1972 and 1973. By 1974, when six new Seakings arrived, the repair and test facilities had been set up and expertise had begun to develop, all of which led to a marked improvement in availability and role worthiness.

On 19 Jul 1979, the Seaking Flight and Tactical Simulator (FATS) was commissioned in Naval Air Station Garuda, Cochin.

The Mk 42 As. Three anti-submarine Seakings, Mk 42 A, were acquired in 1980. These had been modified for being hauled down on to the flight decks of the 5th and 6th Leanders, Taragiri and Vindhyagiri, using the Canadian Recovery, Assist, Secure and Traverse (RAST) system.

By 1981, the Seakings Mk 42 which had been in service for ten years, had begun to age and needed replacement. Helicopters were also required for Vikrant and for the three new Godavari class frigates, each of which was designed to embark two Seaking-size helicopters.

The MK 42 B. The Navy's staff requirements stipulated a dual role — anti-submarine (ASW) and anti-surface vessel (ASV). For the anti-submarine role, the requirements were for better dunking sonar, and a LOFAR system to monitor low frequency sonobuoys. For the ASV role, the requirement was for an anti-ship missile.

In March 1982, approval was accorded for 20 ASW/ASV helicopters 6 for the front-line squadron INAS 330, 2 for the Training Squadron INAS 336, 4 for a new squadron INAS 339 for the defence of the Bombay High offshore oil installations, 2 each for the frigates Godavari and Gomati[6] and 4 for Maintenance Reserve and Strike-Off Wastage (MRSOW). In the anti-ship role, the Mk 42 Bs are capable of firing Sea Eagle air-to-surface anti-ship missiles.

Twenty anti-submarine Seakings Mk 42 B were inducted between 1988 and 1992 for the Godavari class frigates, the aircraft carriers Vikrant and Viraat and for the defence of offshore oil installations.

The Mk 42 C. Each indigenous Landing Ship Tank (Large) LST (L) was designed to embark two troop-carrying helicopters. In May 1985, sanction was accorded for three Seakings Mk 42 C for the first LST (L). Sanction was also accorded for three Mk 42 Cs for the Marine Commandos

6. Of these three frigates, only two were expected to be operational at a time.

7. The newspaper *Tribune* of 23 Oct 2006 carried an article titled "Navy to Restore Sea King Choppers".

   The Indian Navy has awarded European aircraft major Agusta Westland the contract to restore to service seven Sea King Mk 42 B helicopters that were stripped to keep the rest of the fleet in service. Their cannibalisation took place from 1998 onwards when the Navy's almost entire fleet of 16 Sea King Mk 42 Bs acquired in 1985 — and four Sea King Mk 42Cs that entered service a year later — were grounded due to lack of spares following US sanctions against New Delhi over its nuclear tests.

   Although sanctions were lifted in 2001, bureaucratic delays led to the US clearing Sea King spares for delivery only in early 2003, a period

defending the offshore oil platforms at Bombay High. These arrived in 1987 and were still in service providing SAR and casualty evacuation.

The Adverse Effects of the US Embargo on Delivery of Seaking Spares[7]

In the mid 1990s, Seaking Mk 42 rotables like transmission and rotor head gearboxes were being sent to Westlands of Britain for normal overhaul. Whilst, these were still under repairs, in May 1998, India's nuclear tests led to the US imposing sanctions and the delivery of spare parts to Westlands were embargoed since the gearboxes were originally of Sikorsky design.

This embargo adversely affected the operational availability of the Seakings Mk 42 B and 42 C. Seven Mk 42 B helicopters had to be cannibalised to keep the rest of the Seakings operational.

Even though the sanctions were lifted in 2001, bureaucratic US procedures delayed the clearance of spares until 2003 and the spares eventually arrived in 2005.

The Russian Kamov Anti-submarine Helicopters Series

Kamov 25s. Kamov 25 ASW helicopters had entered service embarked on board the Russian missile destroyers Rajput, Rana and Ranjit when they were commissioned between 1980 and 1983. Starting Oct 1979, a total of seven KA 25s were inducted.

Kamov 28s. Following the closure of the Kamov 25 production line, Kamov 28 ASW helicopters were embarked in the next two missile destroyers Ranvir and Ranvijay when they were commissioned in 1986 and 1987. The Kamov 28 was heavier than the Kamov 25 and too big to fit into the Kamov 25 hangers of the first 3 destroyers.

Airborne Early Warning Helicopters

With the proliferation of anti-ship missiles in the 1970s, a clear operational need emerged for the Navy to have Airborne Early Warning (AEW) capability. This would increase the reaction time essential for dealing with the hostile platforms before they came close enough to fire their missiles.

Large rotodome fitted aircraft, of the type that the American and the Russian navies had, were neither available nor affordable. An indigenous R&D project to fit a rotodome on an Avro aircraft was unsuccessful.

The Navy pinned its hopes on acquiring AEW helicopters that were then under development. The British Seaking MK 42D turned out to be too expensive. The Russian Kamov 31 was preferred and negotiations were concluded in 1997 for their acquisition. These were inducted with the Talwar class ships from 2003.

Search and Rescue (SAR) Chetaks

The French Alouette III light helicopters, productionised under license by Hindustan Aircraft Limited (HAL) as 'Chetaks', first entered naval service in 1964.

When this squadron was commissioned as INAS 321 on 15 March 1969, it comprised the SAR flights of aircraft carrier Vikrant, naval air stations Hansa and Garuda and tanker Deepak. In subsequent years, flights embarked, whenever required in:

- The old British frigates, Trishul and Talwar after they had been fitted with missiles, and in Brahmaputra, Beas and Betwa after their conversion to the training role.
- New ships like the cadet training ship Tir, tankers, survey ships, landing ships LST(M)s, offshore patrol vessels (OPVs) and Khukri class missile corvettes.

The first four Leander class frigates, Nilgiri, Himgiri, Udaygiri and Dunagiri had each embarked a Multi-role Anti-submarine Torpedo Carrying Helicopter (MATCH). The MATCH was a modified variant of the Chetak and was additionally equipped with Radio altimeter, altitude indicator and a flight stabilisation system. In the last two Leander frigates, Taragiri and Vindhyagiri, the MATCH was replaced by the larger, heavier Seaking Mk 42A helicopters.

Since most helicopter-capable ships were based in Bombay and embarkations were usually of short duration, INAS 321 was relocated to INS Kunjali in Bombay in August 1980.

Chetak SAR Squadron INAS 321. In the early 1980s, HAL indicated that they were considering discontinuing the production of Chetak helicopters. Since the production and delivery of the replacement ALHs would take considerable time, HAL continued production.

---

that impacted seriously on its operational preparedness. Navy officials said work to resurrect the seven Sea King Mk 42B helicopters would commence by the year end in Kochi and completed in 24-36 months.

Agusta Westland, a Finmeccanica company, will provide a specialist team to assist state owned Hindustan Aeronautics Ltd (HAL) that will undertake the repair and overhaul of "rotable" items, including the transmission and helicopter rotor heads in support of this contract. Two years ago HAL and Agusta Westland had signed a contract to jointly repair and overhaul the Navy's Sea King helicopter fleet.

A total of 85 Chetaks had been inducted into the Navy till 2002.

The Indigenous Advanced Light Helicopter (ALH)

The Navy's staff requirements had envisaged a medium sized helicopter that, within an all up weight of about 5000 kgs, (lighter than the 10,000 kg Seaking, but heavier than the Alouette), would permit its role to be changed to carry out anti-submarine (ASW), anti-ship (ASV), commando carrying (Utility) or Search and Rescue (SAR) missions.

The ALH emerged as a multi role helicopter in the 4.5 to 5.5 ton weight class, designed and developed by Hindustan Aeronautics Ltd to meet the specific needs of diverse customers like the Army, the Navy, the Air Force, the Coast Guard and civilian organisations like ONGC, Pawan Hans etc. Its advanced technologies include the Integrated Dynamic System, Hinge-less Main Rotor, Bearingless Tail Rotor, 4-axis Automatic Flight Control System, Full Authority Digital Electronic Control System and 6-axis Anti Resonant Isolation System.

The Navy had some teething problems because of its particular requirement of operating the helicopter on-board ships at sea. The Navy needed a wheeled version rather than the skid. The requirement was to have rotor blades folded to a certain width and the possession of adequate power for operating, hovering and landing. HAL grappled with the problems initially, but by 2000, was well on its way to developing a naval prototype.

Cmde R Sharma was in charge of the ALH Project in 2002. He recalls:

"The ALH Project really started way back in the early 70s when the Government and MOD wanted to have indigenous design and development of helicopters. It initially started as a replacement of the Cheetah and Chetak as a single engine helicopter. However, after the Vietnam and Arab–Israeli wars it was felt at Naval, Air and Army Headquarters that it would be prudent to go for a twin-engine helicopter instead of a single engine helo. Around 1970–71, it was decided to go in for a twin engined helicopter. It was around 1977–78 that MOD started discussion with foreign companies and finally in 1984 that Government sanction was accorded and a contract was signed with Germany's "MBB" which is today renamed "Eurocopter" for designing and developing a twin engine helicopter. At that stage MBB was just a consultant and they continued as consultants till about 1995 and thereafter their contract was not extended because HAL held that they were competent enough to continue with this project.

Whilst the contract was signed in 1984, designing a helicopter was not easy, so we should give credit to HAL for going ahead with it and finally flying the first prototype in 1992. They went ahead with four prototypes — two for the skid version; a third for a wheel variant which was the prototype for the Navy and a fourth one as a civil version. The first Army version flew in 1992 and Naval version in 1995. Series production started in 1996. Today the ALHs with the Army and the Air Force have proven to be very good machines. The Army operated the ALHs in the deserts in Rajasthan, they have twice operated in high altitudes from Leh and what I hear from them is that ALH has proved itself."

The naval version of the ALH was successfully launched from the aircraft carrier INS Viraat and INS Ganga off the Western Seaboard in March 1998.

The naval utility version ALH landed at Garuda in February 2003. The Utility version has a rescue hoist and the ability for medical evacuation by stretcher; it can ferry upto 14 personnel and slither commandos.

Re-basing of Air Squadrons

For constant operational training, the location of INAS 330 at Goa was considered unsuitable. The squadron was rebased at Mumbai where facilities, both ATE and Carrier-borne, are readily available. The INAS 339 squadron which has all its facilities at Goa was moved from Mumbai to Goa.

A detachment of MRASW Dorniers was deployed for operations ex Port Blair/Campbell Bay as and when required. It was proposed to base four DO 228 on acquisition from HAL (K) in 1998. Accordingly, two Dorniers are based in Port Blair on a permanent basis.

Personnel and Training

Command and Control of Aviation Units

Prior to 1986, aviation units like SFNA, NIAT, NAY and NAIS were under FOC-in-C South. Between 1986–92, they were functionally under FONA but administered by FOC-in-C South. With FONA/FOGA being brought under C-in-C West in 1997, it was recommended to revert to the pre-1986 state and bring these units under the C-in-C South.

Accordingly, the following aviation basic training units were placed under the administrative and functional control of HQSNC in Sep 1999:-

- Naval Institute of Aeronautical Technology (NIAT)

- School for Naval Airmen (SFNA)
- Observer School ('O' School)
- School of Naval Oceanology & Meteorology (SNOM)

The Flag Officer Naval Aviation continued to be responsible for:-

- Advice on all aspects of flight safety.
- Provision of air effort pertaining to aviation training conducted at 'O' School.
- Advice to FOC-in-C South on training issues related to Schools except SNOM.
- Provide professional assistance to FOC-in-C South in the conduct of inspection of NIAT, SFNA and 'O' School.

Navy–AirForce–Army Pilot Exchange Programme Throughout the 1990s, the inter-service pilot exchange programme remained as follows:-

	Fixed Wing Aircraft/Helicopters
IN pilots with the AF flying	—MIGs and Ajeets MI 8s
IN pilots with the Army flying	—Air OP Chetaks
AF pilots with the IN flying	—Sea Harriers Seakings & Chetaks
Army pilots with the IN flying	—Chetaks

Development of Aircraft Operating Facilities Ashore

Modernisation of Naval Airfields

In the early 90s, most of the airfields were equipped with vintage communication facilities, ageing navigational aids, non ICAO standard airfield lighting systems and relatively primitive means to tackle emergencies. The non-availability of air route surveillance, terminal approach and precision approach radars, adequate link/parallel taxiways and sufficiently large enough civil dispersals made air traffic management for the air traffic controllers a virtual nightmare. The absence of modern rapid intervention vehicles for deployment in the case of an aircraft emergency, further handicapped the air stations to confidently take on the massive influx of civil flights. The upgradation of the naval airfields to ICAO standards was therefore taken up and continued through the 90s decade.

New Naval Air Stations

With the increasing number of helicopters on board the ships based in Mumbai, it became necessary to have a helipad area from where helicopters could continue flying when ships were alongside. In view of its proximate location, INS Kunjali II became the Navy's helicopter base in Bombay.

Similarly, a naval air station was commissioned at Visakhapatnam as INS Dega in 21 October 1991.

The fifth naval air station, on the east coast of India, was commissioned in 1992 as INS Rajali at Arakkonam in Tamilnadu.

Air Arm Logistics

Spares Procurement

In the late 90s, an analysis of the pattern of spares procurement during the decade, revealed a compliance rate of about 58% for Sea Harriers. In contrast for Russian birds it was 25% for ILs and 45% for TUs and for rotary wing aircraft between 26–38%.

The low compliance rate on the spares front for Russian aircraft was attributable to factors like limited inventory on offer from RVZ, errors induced in demands during transliteration of part numbers first at the unit level and later at NHQ when indenting for the items and lastly difficulties faced by RVZ in expanding vendor base.

Air Stores Management

In 1996, the College of Defence Management (CDM) was tasked by FONA to carry out a project study on the management of air stores and its possible merger with the ILMS. CDM recommended the following:-

- Segregation of air stores.
- Computerisation of air logistics within three years.

The proposal was aimed at providing a terminal to all users of aircraft spares, repair of components and management of information involved with technical support to aviation. Seven software firms were identified to undertake a preliminary study to estimate the budgetary and the overall requirements. The proposed project was estimated to cost Rs 5 crores and was scheduled for completion by end 1998.

Spares Management Action Plan

The action plan evolved to address various issues included fine tuning of the AOG channel, cash and carry purchase of intensive flying items, and a monitoring-cum-control system for rotables surveyed by units to augment the repair load on agencies. The Integrated Air Logistics Management system ILMS (Air), a study commissioned in

early 2000, gave the much-needed impetus to the ongoing process.

Western/Indigenous Aircraft

Procurement through ARD, the only logistics lifeline, commenced in 1995–96. The spares availability position had improved by 2000.

Shortage of ASE and GSE, particularly in respect of Sea Harriers and Chetak aircraft, had imposed setbacks on the production of aircraft from the second line. A dedicated drive was initiated to address this problem in its entirety.

Coupled with the above two aspects were factors like slow turnaround of rotables that were offloaded for repairs on indigenous and foreign repair agencies, long lead time in provisioning of spares and increasingly higher rate of component failures due to equipment obsolescence. Poor product support and falling standards of quality control by the OEMs have become more noticeable in recent times.

Eastern Origin Aircraft

In the case of Russian acquisitions, whilst the earlier inductions had reliably stabilised in their operation and maintenance cycles, the effect of material related aspects had been most pronounced on the ILs.

The slow process of stabilisation of the CIS placed further hurdles in efforts to better exploit the mammoth TU aircraft. Poor standards of quality control during overhaul of aircraft at Russia were a phenomenon causing much concern.

Towards the end of the decade revised LPO contract was signed with M/s RVZ. Also after interaction with Air Force, alternate sources have been initiated to improve availability of spares.

Effect of US Sanctions. The adverse effect of US sanctions on various aviation projects was severe and impacted on their modernisation/maintenance schedule:-

- Sea Kings —Severely affected
- Sea Harriers —JPT/RPM Gauges
- Dorniers —Engines Repair/Overhaul held up
- Chukars —No further support

Aircraft Refit, Maintenance and Modernisation Infrastructure

As part of Project Ashok, a Hydraulic facility was commissioned in Feb 1998, at NAY, Kochi under which 45 Rotables were serviced/repaired with a saving of £1.282 Million (Rs 9 Crores).

An Ejection Seat Facility was commissioned in Oct 1997 under which twelve components were serviced/repaired saving of £25,000.00 (Rs 17.50 Lakhs)

Infrastructure Projects

The major infrastructure projects on the anvil in the later half of the decade were as follows :

- The Sea Harrier third and fourth line facilities for the repair and overhaul of aircraft, engines and their components and the engine test bed were to be set up at Kochi at a cost of Rs 330 crores by 2001.
- Contract for re-engining six Islanders was signed with M/s Britten Norman and the first aircraft was expected to be completed by end 1996.
- The SHR simulator update contract was awarded to M/s Macmet and was planned to be made operational in 1997.

Engine Conversion for INAS 550

Due to the disadvantages/limitations of piston engines of the Islander aircraft, they were being replaced by Turbo Prop Allison engines. The Naval Aircraft Yard, Kochi undertook the task of conversion in April 1996 and the first Turbo Prop Islander aircraft was handed over to INAS 550 on Sept 17, 1996.

Overview of the Growth of the Air Arm 1991–2000

Year	Carrier Borne Aviation	Ship Borne Helicopters	Trainers & Simulators
1990	Sea Harriers and Seaking Mk 42Bs operate from Vikrant. Viraat under refit.	Chetak in Investigator	Sea Harrier Operational. Flying Training Unit Commissioned.
1991	Vikrant operational. Viraat operational after 1st dry-docking in Cochin Shipyard.	—	—

Year	Carrier Borne Aviation	Ship Borne Helicopters	Trainers & Simulators
1992	Vikrant and Viraat operational. 10 Sea Harriers embark Viraat for the first time.	—	—
1993	Vikrant operational. Viraat operational after 2nd dry-docking in Cochin Shipyard.	—	—
1994	Vikrant's final sea outing 23 November 1994. Viraat under refit.		
1995	Vikrant kept 'Safe to Float' alongside. Viraat partly operational. 3rd dry-docking at Cochin Shipyard		
1996	Viraat operational.		
1997	31 Jan 1997 Vikrant decommissioned. Viraat partly operational. 4th dry-docking at Cochin Shipyard.		Simulator upgraded to the standard of the Batch II Sea Harriers
1998	Viraat partly operational. Material state deteriorating.		
1999	Viraat for Mid-life Refit & Modernisation Refit. Dry-docked in Cochin Shipyard, May to Dec 1999.		
2000	Vikrant alongside in Mumbai Dockyard as Museum. Viraat under refit in Mumbai Dockyard till Feb 2001.		

Retrospect. In retrospect, the areas of concern in naval aviation during this period were as follows :-

- Poor serviceability of Seakings, Harriers and LRMPs.
- Spares, that were a problem even before the Pokhran related sanctions came into effect.
- Russian sourcing.
- ASE/GSE for ship borne flights was a concern because the pool was not increasing. Equipment was regularly transferred from one flight to another in a "nomadic migration" pattern.
- The year 1996 registered an upward trend from the dip, which was beginning to take effect due to the infamous FFE crunch and the drying up of supplies from the erstwhile USSR in the early nineties.
- By 1997, naval aviation had stabilised and steadily grown away from the twin trauma of the Russian debacle and the foreign exchange crunch.
- Spares shortages, long lead times and inadequate test benches had resulted in low availability of TUs. Lack of quality control during overhauls in Russia added to our concern.
- The emergency procurement by Logdels had served only as a short-term measure. Low inventory with RVZ, few vendors and low rate of turn around of items from Russia resulted in low ARD satisfaction levels.
- The adoption of ILMS for air stores gave impetus to the ongoing corrective process.
- The effect of recommencement of ARDs in 1995–97, which had been suspended during 1989–95, was expected to yield positive results by the late 90s.
- The following new inductions were planned.:-

— Harrier Trainers (2) — End 2000
— ALHs (20 U+29 ASW) — By 2007
— LCAs — 2007
— KA 31s (4) — 2001
— Lakshya PTAs (5) — from Jul 1999 onwards

21

Indigenous Aircraft Carrier (IAC)

Preamble

The project for an Indigenous Aircraft Carrier took shape in 1979. Under the terms of the Indo–French MOU of 1988, an agreement was signed with DCN of France for assistance by its design group, STCAN, in the concept design of the Sea Control Ship (SCS) and for transfer of technology.

An Indian Naval Design and Liaison Team (INDLT) of Naval architects was deputed to DCN for participating in the design process, for ascertaining the major areas of design work to be entrusted to selected consultants during subsequent stages of design work, and to audit Cochin Shipyard for its capability to build the carrier.

By 1990, the concept study by France's DCN, assisted by the INDLT, had evolved designs for a 25,000 ton catapult version and a ski jump version and confirmed that the carrier could be built in the Cochin Shipyard. The financial crisis of 1991 precluded sanction for a carrier of that size and the next few years were spent in juggling designs for a smaller carrier. The grey area was the type and number of aircraft that the carrier would operate.

In the mid 1990s, Russia offered India the Gorshkov along with the carrier-borne version Mig 29 K. Meanwhile, development had also commenced of the carrier-borne version of the indigenous land-based Light Combat Aircraft (LCA) by the Aeronautical Development Agency (ADA).

These developments helped to finalise the types of combat aircraft that would fly from the ADS. The carrier would embark:-

- V/STOL Sea Harriers already in service.
- Seaking MK 42-B ASW/ASV helicopters, already in service.
- The Russian STOBAR MIG 29 Ks (to be inducted with the Gorshkov).
- The indigenous Naval LCAs (when eventually developed by HAL).
- The indigenous Advanced Light Helicopter (ALH).

The staff requirements were finalised for a gas turbine propelled, 28-knot, 37,000-ton carrier with an angled deck and a ski jump, to operate an air group of 30 combat aircraft and helicopters and manned by 1400 personnel.

CCS approval for IAC was accorded in 2003 and Cochin Shipyard commenced construction in 2005. Meanwhile, the nomenclature of the carrier project had changed from Sea Control Ship (SCS) to Air Defence Ship (ADS) and finally to Indigenous Aircraft Carrier (IAC). The IAC is expected to enter service by 2015.[1]

General Factors Affecting Aircraft Carrier Design

Aircraft carriers are designed for the type and numbers of aircraft to be operated. A Naval carrier borne aircraft have an expected life of 25 years. However, they are designed for a life of atleast 50 years. Aircraft carrier design therefore caters for operating at least two generations of carrier-borne aircraft.

---

1. Admiral Arun Prakash (the then CNS) in an interview that appeared in the *Indian Defence Review*, Oct–Dec 2004, commented on the progress of the IAC:-
   - He said that the design, size and configuration had undergone several changes, the most recent being the need for the ADS to be compatible with the Naval variant of the indigenous LCA. The marine version of the LCA's Kaveri engine was under development.
   - A revised sanction of Rs 3261 Crores was accorded by the CCS in Jan 2003 for ADS of 37,500 tonnes to operate the MiG 29 K and LCA (Navy) fixed wing aircraft as well as the ALH and KA 31 helicopters. In the interim period, the ADS would operate the Sea Harriers and the Seakings.
   - Basic design and hydrodynamic model tests had by then, been completed. Design of internal systems was at an advanced stage.
   - Infrastructure of Cochin Shipyard had been augmented.

An aircraft carrier is a floating airfield. Aircraft are launched from the front end of the flight deck by a catapult; they land by engaging their tail hooks in one of the arrestor wires spread across the rear end of the flight deck.

Naval carrier-borne aircraft are usually variants of Air Force shore-based aircraft. They cost less because of the economies of scale in design, development and production. For special requirements like Airborne Early Warning (AEW) aircraft, a Naval variant has to be developed separately.

To operate Short Take Off/Vertical Landing (STOVL) combat aircraft like the Sea Harriers, it is useful for the carrier to have a ski jump at the front end of the flight deck to assist short take-off, which obviates the need for a vertical take-off. Vertical landing (that uses up more fuel and reduces endurance) dispenses the need for arrestor wires. Dispensing with the catapult and the arrestors reduces the length of the carrier and therefore its tonnage and cost. In this case, the Airborne Early Warning task has to be performed by dedicated AEW helicopters like the Russian Kamov 31.

To operate longer range, heavier armed, combat and AEW aircraft, the carrier needs to have both catapult and arrestor gear–the length of the carrier increases so does its tonnage and cost.

Given the uncertainty as to which type of aircraft would be operating 25 years in the future, carrier design has emerged in three variants:-

- STOBAR — Short Take off but Arrested Recovery. In this variant, the tonnage of the carrier can be kept low by foregoing the catapult and retaining arrestor wires for the aircraft to hook on to for landing. However, it would never be possible to retrofit a catapult.
- CATOBAR — Catapult Assisted Take-Off but Arrested Recovery. In this case, the carrier initially could have ski-jump and arrestors to operate the current generation of aircraft in the STOBAR mode and subsequently retrofit a longer catapult for the next generation of heavier longer-range, better-armed aircraft in the CATOBAR mode.
- The third hybrid variant is a carrier having a STOVL skijump with an angled flight deck, catapults and arrestor wires. This design permits operation of STOVL fighter aircraft and CATOBAR AEW aircraft.

General Features of IAC[2]

The ship has a length of 252 m, max breadth of 58 m, draft of 8 m, depth of 25.6 m and a deep displacement of 37,500 tonnes. The ship will be propelled by four LM 2500 Gas Turbines generating a total power of 80 MW (1, 20,000 HP approx) enabling the ship to do a maximum speed of 28 knots. The ship has an endurance of 7,500 nautical miles at 18 knots and logistic endurance of 45 days. The ship will have a complement of 1600. It can carry a maximum of 30 aircraft and 17 of these can be accommodated in the hangar. Air operations can take place up to sea state 5. The ship will have two tramlines for take off and a landing strip with 3 arrester wires.

Design

The design is being undertaken by the Navy's own Design Bureau. The preliminary design has already been completed and detailed design is in hand. The ship will be built using IHOP (Integrated Hull Outfit and Painting) method using high strength ABA grade steel developed in house between DRDO and SAIL. The ADS will require about 20,000 tonnes of steel.

Contracts

Italian ship design & construction yard M/s Fincantieri has been selected by Cochin Shipyard Ltd to assist in:-

- Integrating the main propulsion system.
- Making the main engine room layouts.
- Preparation of the Build Specification for the ship.

The inputs in respect of MIG-29 K aircraft will be provided by the Russian side who will also assist in the associated design work for aviation facilities such as Flight Deck, Hangar, Aircraft Lifts, Ammunition Lifts, Aircraft Launch & Recovery systems, etc.

The ADS, however, in its conception and final execution of plans, has had an interesting journey. Conceived initially on the lines of a large carrier, plans for its building were scaled down considerably (in the early 90s) when it was re-envisioned as a 'Small Harriers Carrier". This was only to change again in the early years of the next decade. Commodore Jitendran (presently Chairman & Managing Director of Cochin Shipyard where the Indigenous Aircraft Carrier is being built) was associated with the carrier project since the 1980s. He recalls:-

"I joined the Directorate of Naval Design as Deputy Director

2. Extracts from the handout issued by VCNS during a Press Conference in 22 March 2005.

of the Aircraft carrier project in mid 1988. The Navy was then working for a big carrier to operate heavy fixed wing aircraft, above 20 tons All Up Weight (AUW). Being a new dimension, some assistance in the initial design was considered prudent as we had no database. Finally, in Sep 1989, a delegation of four Naval Officers was deputed to France to work along with Ms DCN on a concept design of what was then known as a "Sea Control Ship". This concept design envisaged fixed wing aircraft to be operated from a large carrier with French collaboration.

The concept design was similar to "Charles-de-Gaulle", the French Carrier which was under construction at that point in time in a Naval Yard in the South of France. The main difference was that the French Carrier was nuclear powered, whereas our Indian Carrier envisaged gas turbine propulsion.

We returned from France in Mar 1990. We had a complete concept design which essentially described how the ship would look like, its main features, approximate cost and timeframe to build it in India. A report was also rendered on the augmentation required in Cochin Shipyard to build the ship of that type. This concept design documentation was presented in the Navy and the MoD. The high level visiting French Delegation then gave a very informal indicative price of about Rs 2500 Crores for delivery of the ship in 2002, complete in all respects except for aircraft.

We were told later on that there was a serious financial crisis and that there would be no money for the Sea Control Ship. The delivery cost of Rs 2500 Crores was considered frightfully expensive. Adm Ramdas, took over as CNS and the slogan put out was to achieve "Much more with Much less". This actually applied to the carrier project to a large extent, with the displacement of the ship coming down from 40,000 tonnes to less than 14,000 tonnes of a small Harrier Carrier. The CNS had gone to Italy and when he came back the 14,000 tonne GARIBALDI size appeared appropriate because of the crisis of money. So the design process actually took a U turn and we started to design a ship smaller than the existing INS Viraat.

Later on, the Soviet Union broke up and the carrier project fell into the 'backburner' status. There were a lot of officers who did not support the size coming down so much. There were intense debates about the requirement of fixed wing aircraft. So the project virtually died for a period of about 8 years in the early and mid 90s. In 1998, we started again on designing a much larger ship. There was a focus and resurgence in the thinking that we need to really have a blue water navy with heavier types of aircraft.

There was also a strong feeling that the Harriers would not be the future for "Sea Control" and even though we went ahead with the subdued nomenclature "Air Defence Ship", the ship which we were designing was almost similar in size to the one which we had earlier abandoned but it had added features like ski jump, options to operate aircraft upto 22 tons AUW.[3]

3. The original CCS paper then under process for a smaller aircraft carrier of roughly 24,000 tons was replaced with a revised proposal and CCS sanction for the ADS of 37,500 tons was obtained in March 2003. A Letter of Intent (LOI) was placed on Cochin Shipyard.

   The steel cutting of ADS commenced on 11 Apr 05 and the keel of the ship laid in Oct 07 at CSL. After completion of construction and trials, the ship is scheduled to be delivered in 2015.

22

Maintenance, Repair and Refit Facilities

Overview

The maintenance, repair and refit capacity started coming of age during the last decade of the previous millennium. The rapid pace of the expansion of the Navy placed additional demands on the existing capacity that needed priority upgradation to cater to future demands as the new units aged and required periodical refits.

Both the premier yards, Naval Dockyard (Mumbai) and Naval Dockyard (Visakhapatnam) went through a phase of consolidation. The Naval Ship Repair Yards (NSRYs) underwent an expansion phase. The plans for a NSRY at Karwar were finetuned and the Navy commenced preparations for creation of state-of-the-art facilities at what would become the largest naval base in Asia.

The refits of ships and submarines acquired in the 80s were successfully undertaken in this decade. The naval maintenance capacity faced serious challenges due to non-availability of spares occasioned largely due to factors beyond the control of Navy. The financial crisis and sanctions post 'nuclear tests' combined to pose seemingly insurmountable obstacles to the naval maintenance, repairs and refit capacity, which the dockyards overcame admirably.

The naval maintenance fraternity, slowly but surely, undertook complete refits and repairs in the face of great odds. The refit and repair capacity became quite efficient well before the Kargil conflict and the monumental but silent achievement during the Kargil conflict of sending the maximum number of combatants to sea only underscored this ability.

Naval Dockyard, Mumbai

The growth of Naval Dockyard Mumbai during the post independence era has been synonymous with that of the Indian Navy which initially acquired ships from UK, later from erstwhile USSR and thereafter commenced indigenous ship building. All this ushered in a mix of technologies, which the Dockyard had to cope with. Further, by the end 60s, submarines were inducted from erstwhile USSR which ushered in a new dimension to various repairs technologies. Every class of ship and submarine inducted into the Navy, except LST (L) in end 90s and Jalashwa in 2006 was initially based at Mumbai necessitating the Yard to augment, at least temporarily, some facilities for the technology and equipment of that class.

The Yard, despite a development programme guided by Admiral Grace Committee report (later by Alexander Gibbs report, Jasper report, NIDC report, etc.) could only grow incrementally. However, this growth was upset by a disproportionate increase in the workload with the Navy basing its most potent platforms in sizeable numbers at Mumbai, especially in the aftermath of the 1971 War.

In the 80s and 90s, most of the Naval assets were progressively transferred from Mumbai to Eastern Sea board. Many of the required facilities created were seen as a stop gap arrangement, as a new Naval base was to be operationalised at Karwar. This resulted in partial de-congestion of Mumbai Dockyard which was otherwise struggling to meet the increasing repair requirements of not only Naval assets but also the co-located Coast Guard assets.

Till mid 90s, the Dockyard was mostly undertaking the repairs and refits of Naval and CG assets using in-house resources. With the introduction of NMS in the mid 90s, the yard increasingly offloaded work to private and public sector industries. The trend picked up momentum in late 90s since Coast Guard ships and their refits were undertaken at shipyards/repair yards outside Dockyard.

Major Augmentation during 1991–2000

Keeping up with the technological advancements, setting up of a heavy IC Engine shop became quite critical in late 80s and a Shop was established in the year 1989.

One of the innovative measures implemented in 90s was the establishment of an Integrated Repair Complex (IRC) at the erstwhile electroplating and battery charging facility. The concept of IRC was borne out of the experience in liquidation of Operational Defects (OPDEFs) involving

large number of inter-dependent departments/centres. This interdependence resulted in considerable delay in the rectification of OPDEFS and also affected the refitting activity adversely. The concept of an IRC with minimal facilities and a cross section of manpower to handle multi-disciplinary activities was put into action in 1996 which, enabled the Yard to achieve multi disciplinary jobs in a reduced timeframe.

During the early 90s, it became essential to expand weapon facilities in WECORS for Soviet origin gun-mounts, which were already inducted on board Indian Naval Ships and necessary infrastructure was set up in 1990. With the induction of Towed Array Sonars (Lamproi) onboard Brahmaputra class ships in 90s, facilities to support these new generation systems were set up in WECORS in 1996.

During 1994–95, facilities pertaining to Electrical Power Systems and Electro Chemical Engineering were established. An Electrical Repair shop was set up in 1994 and an Electroplating and LP Battery repairs Shop were established in 1995.

During the 90s, Management Information Systems (MIS) department developed appropriate software applications in house with maximum user participation.

In 1991, an independent NDT (Non-Destructive Testing) cell was commissioned in the Fabrication Department. The facility included provision of magnetic particle tests, Ultrasonic flaw detectors, radiographic equipment, etc. For the first time in multiple docking mode, Sukanya was undocked in the year 1993 from Duncan dock while still retaining Shishumar on the blocks and preventing her from floating by precise calculations of trim and ballast of the submarine and tide conditions.

Multiple Docking

PM Dock

Indigenous Rigid Inflatable Boat (RIB)

The Naval Boat Workshop of the Outfitting department undertook the innovative task of building a 4.7 m Rigid Inflatable Boat (RIB). A prototype was used to manufacture the mould and subsequently the hull was developed. The inflatable collar, made of neoprene rubber, was designed and fabricated in-house, by the Life Raft Repair Centre. Performance trials revealed that the indigenous product was at par with the existing 4.7m boats procured commercially by the Navy.

Repair of Marine Assets

Major repairs to the marine assets such as Cruiser Wharf, jetties, fenders, dry docks, repairs to CG dock and its systems were undertaken through DGNP Mumbai for the first time in 1993–94. The slipway was re-commissioned after extensive overhaul of equipment/machinery.

Work on the new Dry Dock Project commenced with scrutiny of technical specifications to incorporate user requirements. The long overdue repairs to Duncan, CG and Torpedo dock caissons were also undertaken.

The PM Dock was built by M/s Ivan Multinove (PIM) in 1968–69 for the construction of caissons[1] required for the South Break water and deep sea wharf. After the construction of the South Breakwater, the PIM dock was abandoned. In 1998, it was decided to take up repairs/fabrication work to re-commission the dock for undertaking underwater work on the yard craft. The major work for rejuvenating the dock was fabrication of new caisson gate. The entire caisson consisted of an air chamber, scuttle tank, trim tanks on both ends, space for solid ballast and a sealing surface.

Human Resource Management

The rationalisation of trade structure reduced the number of trades from 143 to 112. The trends of manpower wastage were studied and schemes to plan inductions based on perceived future needs were evolved.

The delegation of financial powers under NMS and judicious utilisation of financial resources helped in accelerating the pace of infrastructure build-up, repairs to the marine assets and procurement of essential productivity improvement machines and equipment.

Commissioning of Computerised Attendance Recording System (CARS) and Personnel and Administration Management System (PAMS) proved major milestones towards ensuring a productive environment in the entire yard.

Construction of New Dry Dock

The construction of the New Dry Dock between Inner and South Break Water, originally recommended by Sir

1. The caisson is a box type steel construction with an unique characteristic of having flooding and pumping out arrangements inside the air chamber.

Alexander Gibb in 1950, was approved on 26th November 1985. The North and South wharves on either side of the Dock were also approved on June 1986.

The size of the Dry Dock envisaged in 1985 was increased in Apr 1991 to accommodate docking of INS Viraat and again in early 2000 to accommodate the aircraft carrier Vikramaditya (Gorshkov) and Air Defence Ship under construction at CSL, Kochi, but was still less than the length of 1000 feet (305 m) originally envisaged in 1950. The North and South Wharves would be 155 and 316 m long respectively.

Naval Dockyard, Visakhapatnam

The genesis of the Naval Dockyard, Visakhapatnam was the Boat Repair Shop at HMIS Circars, that was set up in 1940. After independence, the Boat Repair Shop was upgraded to a centre for care and maintenance of ships of the Royal Indian Navy with a 200 ton slipway. In 1953, the Boat Repair Shop was upgraded to a Base Repair Organisation (BRO) and undertook its first refit of an IN Ship (Sutlej) in 1966.

Large scale augmentation of Navy's capability through acquisition of ships and submarines from erstwhile USSR in mid 60s necessitated setting up of a dockyard. A Soviet Technical Team was invited in 1966 to study the feasibility of setting up a Naval Dockyard. The team submitted its report referred as SPR (Soviet Project Report) and the GoI sanction was accorded in 1972 to implement the proposals. Accordingly, CCPA approvals were issued in five phases from 1975 to 89.

Subsequently, Master Plans 1984, 1991 and 2002 were formulated to cater to requirements like additional berthing facilities, augmentation of ship repair facilities, shore accommodation for complement of ships under refit, provision of zonal stores, etc.

Major Augmentation during 1991–2000

The IC Engine workshop set up in 1966 was upgraded in 1970 to undertake overhaul of light diesel engines and subsequently in 1978 for diesel engines installed in submarines and LSTs. In 1983, the same was bifurcated to form a separate GT Repair Bay.

The GTR department created in 1980 was enhanced in 1986 to undertake repair of RG and GTG of Rajput class of ships. A Gas Turbine Test facility set up in 1982 was converted for testing M3E gas turbines fitted on SNFs in 1992.

A Gearing and Shafting Department was created in 1990 for shafting, main gear boxes, CPP systems and bearings of submarine main motors and generators.

The General Engineering shop set up in 1976 undertakes repairs of variety of auxiliary machineries. The facility was augmented in 1992 by setting up a tool room in 1994 and by setting up CNC Machines and 3-D coordinate measuring facility in 1996. The Air Conditioning and Refrigeration Shop was augmented in 1994. A new Integrated Diesel Engine Repair Facility (DERF) was created with a large number of tools, diagnostic and measuring instruments, balancing machines and special stands.

A Machinery Auto and Remote Control and Repair/ Calibration shop was set up in 2001 for undertaking repair and calibration of instruments and control of main propulsion system.

The Electrical Department set up in 1978 was augmented in 1999 by setting up Generator and Motor Test Stations. The existing facilities cater for dynamic balancing of rotors upto 3000 kg/400cm length, HV testing of machines upto 60 KV, shop floor testing of motors and generators upto 2000 KW. The test stands for steering, stabiliser and diesel controls were shifted to Auto Controls Department. Facilities were augmented in 1995 by establishing electroplating and LP battery repair shop.

The Electro Chemical Engineering Shop related to commissioning of submarine batteries/LP batteries providing battery charging facilities to submarine and those of electroplating was set up as part of SPR. The facilities were for commissioning the batteries of Foxtrot submarines. In 1991, an additional commissioning facility for Type 1 batteries of EKM submarines was set up along with its static converter.

Armament Repair Facility

To augment the minimal repair facilities of the BRO, an Armament Repair Workshop was set up in 1970s which catered for repair of Foxtrots, Petyas, LSTs and Depot ships. The armament repair facility for SNFs was set up in 1986 and repair facilities of minesweeping gear was set up in 1991.

The facility was upgraded in 1998 for EKMs, SNMs, P25, 1241REs. The augmentation of non-weapons facility of the yard for repair of 1241REs and 877 EKM was undertaken in 1991. To meet the requirement of new technologies of weapons, sensors fitted onboard ships, the existing PCB repair facilities was upgraded in 1999.

A Degaussing Bay was set up in 1989. It had a capability to treat ships of 6000 tons displacement. The facilities also included a de-perming station, which was capable of pumping DC current of 3500 Amps.

ND (V) presently, has two Dry Dock Complexes. The South Dry Dock consisting of Varuna Dock and pump house was commissioned in 1978. The North Dry Dock consists of Surya and Matsya Dock (covered dock) and pump house. The Dry Docks are integrated with independent systems for LP air, HP air, fresh water, sea water and power supply. With the increase in number of ships, Slipway construction commenced (to facilitate docking of vessels up to 600 tons and accommodate seven ships, two under cover and five in the open) with a target of commissioning the facility by 2001.

The rubber moulding shop set up in 1984 was enhanced with heavy duty mouldings up to 600 tons and mixing mill upto 40 kg. A foundry was set up in 1983 to cater for copper alloys and aluminium alloys of maximum load upto 340 and 25T respectively per annum. The infrastructure provided the capacity for non-ferrous type casting of maximum size of 50 kg. The same was enhanced in 2002 by provisioning of Transfer Moulding Machine, Roll Calendaring machine, Buffing Machine and 50T Hydraulic press.

A paint manufacturing facility for vinyl and HBCR paints was set up in 1990. Since then, various types of heavy-duty marine paints for application on underwater hull of SNF class of ships and EKM submarines have been manufactured in-house. The 'Forge Shop' set up in 1990 catered for an output of 650T of forged pieces and 200 tons of standard products with their maximum sizes being 500 kg and 05 kg. A facility to test tensile strength upto a load of 150 T was also provided.

The Fabrication Shop was originally set up to cater for 65 ships/submarines, with facilities for bending, shearing, pressing, sheet and metal shops, mould loft and plates preservation bay.

Subsequently a 'Hull Repair Shop' was set up in 1999 to cater for additional facilities required for refit of SNFs, 1241REs and EKM submarines. The shop is designed to manufacture structures of Al-Mg alloy and Ti and Steel structures. In 1997, a CNC profile cutting machine was installed, which enabled pre-fabrication of steel and aluminium structures of various thickness and shapes. In addition, a Boat Repair Shop was also set up in 1999.

A Yard Utility Complex was built in 1993. The augmentation of Shore Supply was carried out in 2000 to meet the requirement of Leander, LST and DSV class of ships. A mobile loading device for Diesel Alternator trials was set up in 1991.

The yard has a Central Dockyard Laboratory (CDL) consisting of POL Lab, Gasometry and Metallurgy Lab, NDT and Noise & Vibration Lab. The CDL was upgraded by setting up various latest state of art technologies like X-ray diffectometer, spectrometic oil analyzer, various POL analysis equipment etc subsequently.

A Quality Control Department was formed during the first MR of INS Khanderi in 1974 with a view to give QC coverage for Foxtrot class of submarine. To synergise efforts towards development of the core strength of the dockyard and to achieve ''Training for all', a full-fledged Human Resource (HR) Division was formed in 2003.

A Dockyard Apprentices School (DAS) has been in commission since 1966 to meet the statutory requirement of training designated Trade Apprentices and Non-Designated Trade Apprentices to meet the requirement of ND (V) and other technical establishments of the Command.

A Material Division was established in 1986 for ensuring availability of machinery spares for refits of ships and material requirements of dockyard machineries.

Naval Ship Repair Yard (NSRY), Kochi

The Naval Ship Repair Yard, Kochi is the metamorphosis of Base Engineering and Electrical Workshop set up for supporting the Royal Indian Naval ships during the closing days of the Second World War. The keel for the ship repair facilities at Kochi was laid when the Base Engineering and Electrical Workshop was set up in Mar 1945 with a strength of 32 men. The facilities were meagre and comprised one 178 metre long and 9 metre wide jetty, now known as North Jetty.

The post-independence scenario and the need for attaining self-sufficiency in ship support facilities paved the way for the establishment of Base Repair Organisation at Cochin on 21 Jan 1948 with Lt (E) WT Rodrigues as the first Officer-in-Charge.

Growth. On attaining the status of a BRO, facilities such as a Slipway, Boat Repair Shop and Yard Utility Services were added. Yard craft organisation of the BRO came into existence in 1973, by merging the water transport organisation controlled by INS Venduruthy with the Base Repair Organisation.

In the same year, an Apprentices Training School was also established to train and develop technical competence to meet ship repair requirements.

Inshore Minesweepers Spur Growth. The decision to acquire 1258 E class Inshore Minesweepers and base them at Cochin, in mid 1980, triggered the augmentation process

of the BRO once again and included modifications to the primitive slipway into a modern 150 ton slipway.

Additional facilities like a full fledged FRP moulding and repair shop, Minesweeping Gear Repair Facility, Weapon and Electronics Repair Complex, Auxiliary Machinery and Shafting Repair Shop, Electrical shop with electroplating facility, Machine shop, IC Engine shop, Test House Complex were added.

Transition to Naval Ship Repair Yard (Kochi). While the augmentation was in progress, on 16 Aug 1988, the Base Repair Organisation, Cochin was re-christened Naval Ship Repair Yard, (NSRY) Kochi. An Officer of the rank of Commodore, designated as the Commodore Superintendent, was placed at the helm. The Yard's production facilities encompass all the departments that are required for a Naval Dockyard except for the dry dock.

Weapon Equipment Depot (Kochi)

Weapon Equipment Depot (WED), Kochi was established on 24 Apr 1987 and was located within the premises of Naval Stores Depot (Kochi). The WED warehouse was re-located to Alwaye in 1994. The WED was placed under Naval Ship Repair Yard (Kochi) for administrative control and was directly under HQSNC for functional control. Mother depot for armament spares of 20 MCMS the WED today, also functions as the satellite depot of WED(MB) and WED(V) for providing support to the ship and establishment based at Kochi.

Milestones in the Evolution of NSRY (Kochi)

Mar 1945	Base Engineering and Electrical workshop set up.
21 Jan 1948	Base Engineering and Electrical workshop upgraded to Base Repair Organisation (BRO), Cochin.
1973	Water Transport Organisation of INS Venduruthy merged with BRO Cochin, and re-named as Yard Craft Organisation.
15 Oct 1973	Apprentices Training School set up at BRO Cochin.
1987	BRO augmentation project commenced.
16 Aug 1988	BRO Cochin re-christened as Naval Ship Repair Yard with Cmde BR Menon as the first Commodore Superintendent.
1991	NSRY augmentation project completed.
1996	Modification to slipway completed and slipway re-commissioned.

Naval Ship Repair Yard, Port Blair

In 1973, a Base Maintenance Unit (BMU) was sanctioned with eleven staff to undertake maintenance of three patrol boats. In 1979, the unit was rechristened as a Base Repair Organisation (BRO). Induction of Floating Dock Navy (FDN) in 1987 added a major fillip to the Yard's capabilities. It is the only floating dock of Indian Navy and is capable of docking ships upto 11600 tons. It has all the basic facilities of a dry dock for undertaking refits. The same year also saw the creation of Commander of Yard (COY). With the enhanced role in the refits and repairs of IN Ships based at Port Blair, the Base Repair Organisation was upgraded to a Naval Ship Repair Yard after 12 Nov 1993.

Unlike the Naval Dockyards on the mainland, the Yard possesses limited infrastructure and facilities to undertake major repairs. All work beyond the capacity of the yard is offloaded to local vendors and to OEMs on the mainland. The Yard has 10 bays with installed machinery, each catering to different requirements such as hull, engineering and electrical.

23

Third Naval Base at Karwar

Background

During the 1970s, the conceptual requirement for a 'Third Naval Base' on the West Coast, in addition to Bombay and Cochin, crystallised. The requirements were:

— Large waterfront with sufficient depth of water for anchorage.

— Sufficient contiguous backup area inland for operational, technical, administrative and logistic facilities.

— Exclusiveness for integrated development and security considerations.

— Rail, road and sea communications.

The Choice of Karwar

The locations considered were Ratnagiri, Pawas Bay, Goa, Karwar, Tadri, Mangalore and Tuticorin. The short-listed options emerged as Mangalore, Tuticorin, and Karwar. Karwar emerged as the preferred location.

Karwar was located 80 kms south of Goa and 320 kms north of Mangalore. Its location gave it the benefit of being free from cyclonic devastation. 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. The range of tide was 2.5 metres (7 feet) during spring tides and 1.2 metres (4.5 feet) during neap tides.

Two perennial rivers, the Kalinadi River to the north of Karwar Head and the Gangavalli River to the south, would provide potable water, uninterrupted water supply and had hydel potential. The Kalinadi Hydel Power Project was expected to generate a total of 1316 MW of power in its three phases.

The Karnataka State Government was developing Karwar commercial port in three stages to create an all weather port to handle ships up to 60,000 ton DWT for ore and other general cargo traffic.

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 Third Naval Base was included in the 1980–85 Defence Plan.

Acquisition of Land

The initial projection was to acquire 20,400 acres of land, with an additional 5,000 acres for future development. The bulk was forest land followed by private and revenue land. The Karnataka Government agreed to give the forest and revenue land free of cost but stipulated that private land owners should be fully compensated, including bearing the cost of constructing rehabilitation centres with all essential amenities for villagers dwelling in the areas.

By 1983, the total land requirement was brought down by a re-survey, eliminating inaccuracies in mapping and omitting the forest areas that had earlier been included for security considerations. During the initial period, land acquisition was restricted to 12,354 acres, of which 8,220 acres were to be acquired immediately and the balance later.

Of these 8,220 acres, 5,765 acres were forest land, 2,445 acres were private land and the balance revenue land. The 13 villages located in the private land had to be rehabilitated before the land was acquired.

Laying of Foundation Stone

In 1985, sanction was accorded for Phase I of the project. Due to the enormity of the project and the fact that no Indian firm had undertaken planning and construction of such a major naval base, the Government approved inviting global tenders for consultancy. It was decided also to select a suitable Indian firm to be associated with this work.

For the management of the project, the Government approved the constitution of an Apex Body headed by the RRM, a Project Management Board headed by the Defence Secretary and a Project Management Authority headed by a Director General, (DG) who would be a Rear Admiral.

On 24 October 1986, Prime Minister Rajiv Gandhi, laid the foundation stone for the Third Naval Base and christened it as 'Project Seabird'.

From 1986 onwards, DG Seabird started liaising with the Ministry of Railways for connecting Karwar to their rail network and with the Ministry of Surface Transport to divert National Highway 17 for meeting security requirements.

Selection of Consultants

The first step was to select a suitable Indian consultant to prepare the broad requirements for inviting global tenders and draw up the Detailed Project Definition.

A Committee of Secretaries was constituted to select an Indian firm as consultant. From amongst the various firms that were pre-qualified, the Committee recommended Engineers India Ltd as the prime consultant for the Project. This was approved by the Government.

Along with Engineers India Ltd, a global tender was floated for inviting consultants for planning and designing Phase I of the base. A total of forty-two firms and consortiums responded from all over the world, of which five were short-listed. In consultation with Engineers India Ltd, M/s Regional Engineering Development Consultants of Australia (Redecon) and M/s Netherlands Engineering Consultants of Netherlands (Nedeco) were selected as the foreign consultants.

The main tasks of the foreign consultants were to prepare a Master Plan along with a Detailed Project Report (DPR) for the marine works. The Indian consultants were to prepare a Detailed Project Report for the on-shore works.

Studies, Investigations and Model Tests

Prior to finalising the Master Plan and the Detailed Project Report, all the necessary geo-technical investigations, marine environment investigations, model testing of breakwaters, etc were carried out. The Central Water and Power Research Station Pune conducted the wave and motion studies of the harbour and its configuration; these helped to evolve the design and configuration of the breakwaters to obtain optimal tranquility conditions inside the harbour. The studies for model testing included investigations of prevailing wave, tide and wind conditions, sediment flow, soil testing, etc.

The Master Plan was prepared by March 1990. The Detailed Project Report for the construction of breakwaters, dredging and reclamation was completed in June 1990. Engineers India Ltd submitted the Detailed Project Report for the on-shore facilities in August 1990.

Revised Phase I

Due to the 1991 financial crisis and the shortage of resources the project could not progress further between 1990 and 1994. This pause was utilised to prune down Phase I of the project. In 1995, Government approved the Revised Phase I.

Selection of the Construction Consortium

Since the expertise for constructing breakwaters was not available within the country, global tenders were invited for constructing the marine works, which comprised both dredging and construction of breakwaters. The remaining facilities were to be constructed by a suitable Indian agency, with the exception of the ship lift. The latter was to be undertaken by a foreign firm, as the technology for its construction was not available within the country.

Approval was accorded for the engagement of M/s Redecon and Nedeco as the consultants/engineers for supervising the construction of marine works.

A total of 37 potential builders responded to the global tender. After pre-qualification, seven foreign and seven Indian firms were short listed for breakwater construction and quarrying. One Indian and three foreign firms were short listed for dredging and reclamation work. The Indian firms were pre-qualified only for quarrying activities and the foreign firms for construction of breakwaters. In order to have a single point of contact, the foreign firms were advised to form a consortium with the Indian firms and bid for the marine works.

Redecon and Nedeco prepared tender documents for the execution of the marine works. The consortium of Hochtief of Germany, Ballast Nadam of Netherlands and the Larsen & Toubro of India was selected on the basis of lowest tender.

The Project Management Board approved this tender in April 1998, subject to the condition that the "core area" comprising the three villages of Chendia, Arga and Binaga had been vacated prior to acceptance of tender. The tenders could not be accepted immediately because the Karnataka Government had not been able to vacate the core area.

Rehabilitation of Project-Affected Families

The rehabilitation of the Project-affected families turned out to be a major task. The Karnataka Government had given the forest and revenue lands free of cost. The Central Government had to provide the funds for the rehabilitation of the villagers, provide compensation for private land and for the creation of suitable "rehabilitation centres". The vacation of land was to be done by the Karwar District

authorities. The initial estimate was vacation of 13 villages with about 2900 families. While sanctioning the project in 1985, a sum of Rs 9 crores had been earmarked for this purpose. Due to the delay in execution of the project, only part of the money was paid as compensation to some project-affected families.

In early 1997, when the Karnataka Government was requested to vacate all the project-affected families from the villages, there was serious resistance regarding inadequacy of the rehabilitation package. The Karnataka Government discussed the rehabilitation package de-novo with the project-affected families and in June 1997, suggested an additional requirement of Rs 16 crores. This revised amount was not acceptable to the project-affected families and their agitation continued.

In June 1998, the Karnataka Government was again requested to arrange vacation of the villages in a time bound manner. At this juncture, the Karnataka Government projected an additional requirement of Rs 90 crores. After high-level meetings, the rehabilitation package was revised to Rs. 90 crores in August 1998. This included Rs 2 crores towards a stipend of Rs 1000/- per month per eligible student for pursuing Industrial Technical Institute (ITI) vocational training for a period of two years. It was hoped that ITI training would make these young men employable in the new Dockyard's workshops.

The vacation of the villages and the rehabilitation of villagers commenced in March 1999. At this stage, the project-affected families moved the High Court of Karnataka and also petitioned the National Human Rights Commission. These institutions carried out field investigations and directed certain additional facilities and provisions to be made at the rehabilitation centres. In the interim period, the total number of project-affected families had risen to over 5500. This included about 1000 families who were found dwelling in the villages at the time of rehabilitation. The final rehabilitation package of Rs 127 crores was agreed upon in April 2000. The 13 villages were resettled in seven rehabilitation centres. Of these, three rehabilitation centres were located along the coast for the benefit of fishermen and the remaining four were located inland for agriculturists and other categories. The villages started being vacated in 1999.

Commencement of Works

On commencement of the vacation of the core area, tenders for marine works were accepted; contracts were signed in October 1999. Temporary works started of quarrying and construction of roads. All three villages were finally vacated by September 2000 and works commenced in October 2000 with the commencement of dredging for the breakwaters. 49 hectares of land were reclaimed and 5.14 kms of breakwaters were constructed.

Completion of Phase I

The commissioning of Karwar's naval base, INS Kadamba, on 31 May 2005 marked a milestone achievement in the completion of Phase I. The shiplift's commissioning and construction of civilian dwelling units got delayed due to reasons beyond control. These would be ready by 2006 and 2008 respectively. The first naval ship entered harbour on 14 November 2004 and berthed alongside the 420 metre jetty on Navy Day, 04 December 2005.

The base has a sea front of 26 kms and a total area of 11,200 acres. With its capability for lifting vessels of 10,000 tons displacement, the Ship Lift and Transfer System can lift all the ships and submarines of the Navy except for aircraft carriers and tankers.

Relocation of Men, Material and Ships from Bombay to Karwar

Since it would take time to establish special to type maintenance and repair facilities, the present intention is to base only non-fleet ships like OPVs, minesweepers and survey ships at Karwar. The workshops would be 'generic' rather than 'specific for classes of ship'. As facilities develop, Karwar would start being used by other classes of ships.

Picturesque Location of Karwar

Construction of Naval Facilities

24

Logistics

"Bitter experience in war has taught the maxim that the art of war is the art of the logistically feasible."

— Admiral Hyman Rickover, US Navy

Overview

In every Navy, timely logistic support is imperative for operational readiness. It is also, for every hi-tech modern Navy, an extremely complex and expensive task. In the case of the Indian Navy, logistic problems had started becoming complex from 1960 onwards, soon after the arrival of the eight new technologically advanced frigates from Britain.

Replenishment of Western origin spares posed difficulties,owing to the fact that all financial powers were centralised in Naval Headquarters and the Ministry of Defence (NHQ & MoD). This problem was exacerbated owing to the perpetual paucity of foreign exchange, high costs and long lead times in procurement. Indigenisation became a buzzword, but procedures and test methodologies for stringent Military Specifications (MilSpecs), posed hurdles and resultantly constrained progress.

In the 1970s, the coincidence of three developments strained the pre-1970 logistic system to its limits. These were:-

- The indigenous production of the British Leander class frigates having British and Dutch equipment.
- The arrival of technologically advanced Russian ships and submarines.
- The diversity of equipment being fitted on indigenously constructed ships.

The logistic intricacies of the new Russian inductions had to be dove-tailed, somehow, with the logistic procedures inherited from Britain and were sustaining the second-hand British origin ships of 1940s-vintage. The logistics problems became even more complex after 1976, when Russian and European sensors and weapons started being interfaced with indigenous equipment in the Godavari class frigates.

It was not until the 1990s, when the Navy's computerisation plan had taken root that the devolution of financial powers under the New Management Strategy (NMS) and the Integrated Logistic Management System (ILMS) were able to reduce these problems to manageable levels.

Introduction of the Logistics Cadre

Prior to 1978, the Chief of Logistics (COL) at NHQ, was directly responsible to the CNS for all Logistics and Supply matters. In addition, the Director of the Supply Branch was statutorily responsible for all accounting matters of cash and material to the Financial Adviser Defence Services and to the CNS for personnel administration and discipline of personnel of the Supply Branch. The Naval Store Depots, the Naval Pay Office, the Base Victualling Yards were functionally accountable and responsible to the COL.

The revamping of the Supply functions culminated in 1978 with the abolition of the Supply and Secretariat Branch. Unfortunately, this only served to accentuate the supply branch's problems as it took away the expertise to undertake the supply and logistics functions. It was soon realised that there was a need to bring the specialist officers in logistics functions. As a part of the larger endeavour to restore a degree of specialisation amongst junior officers in supply and logistics functions, the Long Logistics Management Course (LLMC) was introduced in 1981.

A few years later, problems of adequate/effective Material Logistic and Financial Management being faced by the Navy led to an overall review and examination of Naval Logistics by the Indian Institute of Management, Bangalore. In its comprehensive report to the Defence Ministry, the committee recorded that the Material Support and Financial Administration in the Navy were in a virtual mess. This then resulted in the Navy proposing the revival of a specialised group of officers to undertake Materials and Financial Management, Transportation and Civil Works.

NHQ subsequently proposed the formation of initially a Logistics Cadre within the Executive Branch, which after stabilising in two to three years, could convert to a full-

fledged Logistics Branch. The Navy would thus 'recover from the enormous damage done by the overnight winding up of the erstwhile Supply and Secretariat Branch several years ago'. The proposal was approved in July 1989 and the Logistics Cadre came into being.

Professionalising Logistics

At the time of its inception, there was a crying need to professionalise the cadre. One of the issues that the Navy grappled with was the vexed question of whether the logistics functions were to be controlled by the Chief of Material (single point accountability) or if the Logistics function was better controlled by an independent Chief of Logistics (divided responsibility). There were pros and cons for both points of view, but after much debate and discussion, the Navy opted for the former.

So when the Logistics Cadre was created in 1989, a Controller of Logistic Services (CLS) was created in NHQ, to function under the Chief of Material. The Cadre was to have four sub-specialisations:-

- "Material Management" and "Financial Management" which were fairly close to what the erstwhile Supply Branch had been doing earlier.
- The 'Management Information System/Electronic Data Processing (MIS/EDP)' and 'Works Management functions' which were new.

The revamp saw two major duties of the old Supply Branch — Secretariat Duties and Naval Law — being shed. After dropping the 'excess baggage' and with a leaner, fitter and more professional setup the branch was ready to take on long standing logistical issues of supply, infrastructure and management.

Developments (1991–2000)

1991. The Committee on Defence Expenditure (CDE) made recommendations for improving Naval Logistics. The recommendations were made in the backdrop of the dissolution of the Soviet Union and its centralised command economy that had resulted in a disruption of supply of spares, aggravating the cutback in spares procurement that resource constraints had already compelled from 1988 onwards.

1993. The restructuring of the Soviet economy in the end 1980s and the dissolution of the Soviet Union in 1991, was followed by Russia demanding payment in US dollars. The official exchange rate in the erstwhile Soviet Union used to be One US dollar to a rouble. By end 1993, one US dollar was the equivalent of 4500 roubles. This plummeting exchange rate made it difficult to hold the quoted price of spares for any length of time.

The dissolution of the Soviet Union also coincided with a phase when India's Foreign Exchange Reserves were at their lowest-ever levels, a mere $1 billion. India therefore, was not in a position to immediately acclimatise to the changed circumstances, by switching over from Rupee–Rouble agreements to hard currency purchases, as demanded by the Russian Federation. There was thus, a virtual holiday in procurement of spares for the next 3 years, except for critical spares that trickled in through the ship chandler route.

To chart a 'Way Ahead', Naval Headquarters constituted a Naval Logistic Expert Committee(NCEL). Its Report presented a comprehensive analysis of what had be-devilled Naval Logistics in the preceding decades and suggested remedial measures. The NECL identified the following shortcomings:-

- A perceptive decline in central purchase both for initial B&D spares and subsequent replenishment procurement for a variety of reasons leading to greater local purchase.
- Steady decline and long lead time for procurement of imported spares.
- Lack of experience, requisite training and shortage of officers, both service and civilian naval store officers.
- Primitive and inadequate resources and infrastructure provided to the Material Organisations.
- Cumbersome procedures and delays in obtaining sanctions from MoD.
- The attitudinal hiatus between the various agencies responsible for logistics issues at all levels.

The committee attributed the shortcomings to:

- Lack of responsiveness, involvement in the supervisory and the direction level guidance provided by NHQ.
- The degeneration of RPP procedure into a meaningless exercise due to the wide gap between spares projected and actually utilized.
- Lack of scrutiny and built-in accountability in the system that lead to reduced monitoring of demands originating from ships and other units.
- Restrictive governing rules, regulations and procedures in the matter of provisioning, procurement, inspection specifications, payment

procedures, warehousing, transportation, etc.

- The control exercised by MoD and Def (Finance) did not enable regular and proper replenishment due to its unresponsive nature. Delay in decision making resulted in price escalation and were counter–productive.
- The inspection procedure and modalities followed by the DGQA inspection agencies created holdups and increased the lead time for procurement that inhibited reputed manufactures to deal with the Navy.
- Lack of cooperation and positive support from the Indian Industry in providing a reasonable level of product support once they have secured orders for the main equipment.

The Committee submitted recommendations that were of short and medium term nature and recommended few changes in responsibilities and procedures. They recommended that Commands be made more responsible for monitoring the conversion of provisioning reviews into indents and their subsequent materialisation. FOSM was to be involved in initial provisioning and subsequent monitoring of submarine spares. It was recommended that refit of ships offloaded to repair agencies be closely monitored and staff at Command Headquarters augmented for the purpose.

The committee also recommended that MOs undertake procurement of short term requirements through project teams created for the purpose and that accountability of DQAN(D) and DAQ(WP) through one of the PSOs at NHQ to be institutionalised.

On the issue of procurement procedures warranting changes, the committee was of the opinion that delegation of powers to COL for sanction of FE could be increased upto 15 lakhs per item for imported spares. Procedure for "ship alongside spares" on the lines of AOG was to be introduced for urgent operational and refit requirement stores. NMS, it was recommended, be made applicable to MOs. Procurement on PAC basis was to be streamlined.

1994. By 1994, the Original Equipment Manufacturers (OEMs) in the 15 Republics of the former Soviet Union had become loosely independent from the centralised control that used to be exercised by the erstwhile General Engineering Department (GED) and General Technical Department (GTD) of the Ministry for Foreign Economic Relations (MFER). The GED and GTD had transformed into a new entity called 'Rosvoroozhenie' (RVZ) — loosely translated as Russian Armaments.

1995. There was a breakthrough in the procurement of spares from Russia and Ukraine. Following in the wake of an Air Force empowered delegation, two empowered Naval Logistics Delegations (LOGDELs) of May/Jun 1994 and Jul/Aug 1995 were able to conclude contracts with the Russian Original Equipment Manufacturers (OEMs) for a substantial quantum of spares. Each delegation comprised the Joint Secretary (Navy) of the Ministry of Defence, the Additional Financial Adviser and the Assistant Chief of Logistics, as also specialist officers of the technical and Logistics cadres. The LOGDEL's demonstrated a proactive initiative to establish direct one to one contact with the OEM's, limited only by the presence of the Russian interface agency. The initiative could neither be developed further nor exploited fully, owing to the rudimentary financial capabilities of the OEM's in a centrally controlled Banking System. As such, payments could only be effected through the Rosvoroozhenie, who retained a commission and paid the OEM in roubles, at the stipulated Govt rate of exchange.

Procurement through local ship chandlers was restricted to urgent needs for operational ships and, by exception, to those refit requirements where non-availability would delay completion of a refit.

1997. Based on the experience of the earlier two LOGDELs, a third Logistic Delegation (LOGDEL III) went to Russia in Jan–Feb 1997. In due course, deliveries commenced in 1997 of the spares contracted for by LOGDELs I and II.

Reminiscences

During the Annual Logistics Conference 2000 (ALC), the Controller of Logistic Support, Vice Admiral Verghese Koithara recalled:-

"A few years ago, I recall that we were faced with very severe problems, Inventory Management being one of them. The turmoil of the break up of the Soviet Union added to our anguish. But then came in the Navy's own reforms and the way we faced it. ILMS today, I do believe, is an important breakthrough and I congratulate the Logistics branch and the team of dedicated officers and sailors who have put it together.

The NMS, which came alongside the ILMS, gave the Navy the administrative strength to manage our resources, to manage our affairs within the budget. Anybody can manage an organisation if you have unlimited resources, but if the resources are limited, that is where the problems start. Economies of scale, efficiency, and cost effectiveness — these are the important fallouts of the reforms that have come in. There have been many important innovations like

Autopay and Computer Audit; these are important changes that have transformed the face of Personnel and Resource Management".

He added, *"We have progressed in almost all areas — Pay and Allowances, Clothing, Victualling, Stores and Spares Management. The introduction of the ILMS has reached an efficient and responsive system of spares management, and we are still in the process of exploiting its full capabilities. It is not necessary to recount all the accomplishments in Logistics, suffice to say that it has been possible to achieve this progress only by the dedication and professionalism of one and all, associated with these activities".*

He further stated, *"In early Feb this year, when the Annual Refit Conference was being planned, the Director of Logistic Support and I had taken up the issue as to whether the format of the Annual Refit Conference with the Annual Logistic Conference being an add-on was correct or not. After convincing the Chief of Material, who also happens to be the Chief of Logistics, that there was a need for an independent Logistics Conference, the issue was taken up and it was accepted that the Annual Logistics Conference would be de-linked from the Annual Refit Conference".*

In an article for INS Hamla's Logistics Journal of January 2003, Vice Admiral Barin Ghose, Controller of Logistics recalled:-

"Regrettably, this interim approval for two years for the Logistics Cadre to be replaced by an independent Logistics Branch has been glossed over for the past 15 years. Supply functions have thus retained the ad-hocism introduced in 1978. The Logistics Cadre relegated the function to second grade. The Logistics Officer of a ship lost his Head of Department status. Centralisation of activities has neither been enforced nor welcomed.

In the Command Headquarters, the Chief Staff Officer (Personnel and Administration) has been relegated as a functionary of the Chief of Staff. At Naval Headquarters also, the COL has no direct access to the CNS and in fact Supply functions have been bifurcated between the Personnel and Material Branches. This has led to primacy of material logistics being placed on Refit Logistics. Ship-borne logistics was not given importance.

The advisory role on financial matters, especially relating to accounting, has been transferred to the Indian Defence Accounts Service (IDAS). There has also been a total reliance on accounting to the IDAS and loss of interest in Pay and Accounting matters.

There is a common belief that logistics is not a really unique expertise or specialisation and can be performed by any and everybody, whether it relates to Personnel Support or Material Support functions.

The erstwhile Supply officers however picked up the gauntlet and initiated far-reaching changes. The ILMS is the trend-setter for futuristic Material Management Systems, developed and implemented solely by Logistic officers. The limited number of personnel to support the system however deprives the service from fully utilizing the features of the Integrated Logistic Management System (ILMS) and Ships Logistic Management System (SLMS).

Steps have been taken for modernising warehouses and introducing Material Handling Equipment. This has changed not only the face of the depots, but the work culture of the store house staff.

The New Management Strategy (NMS) initially introduced for Logistics Management in 1994 and then extended to other facets of naval administration, led to the devolution of authority and financial accountability to various echelons in the Navy. Once again, the NMS revolutionized the utilisation and authority over the Revenue Budget of the Navy.

On the Personnel Support Systems, two successive Pay Commissions, especially the 5th Pay Commission, brought about far-reaching changes. Once again, there was a lack of adequate and qualified personnel to implement many of the benefits. The recently launched Integrated Pay Accounting and Disbursement System (IPADS) would completely change pay accounting and disbursement in the same manner as ILMS did for Material Management. It would take the Navy from the cash mode of transacting to totally plastic and online handling of salaries and entitlements and do away with genforms".

Retrospect

The Naval Logistics branch has indeed come a long way since its inception in the 70s. Procuring spares in the early 90s was the major issue confronting the cadre ,but it rose to the challenge rather admirably. The decade in essence, was marked by a drive of innovation and morderisation. The ILMS and SLMS, implemented in the late 90s are pioneering developments that have radically altered the manner in which the logistics organisation of the Navy functions. They have brought about an element of 'integration' and 'single point control' in operations, that has greatly eased functioning.

In the NMS, the Navy has a system that effectively manages resources within the allocated budget. Innovations like Genmas, Autopay, and Computer Audit have futher helped transform the face of Naval Logistics and Resource Management.

25

Integrated Logistics Management System [ILMS]

Logistics Management

The three major Material Organisations (MOs) are located at Mumbai, MO(MB), Visakhapatnam, MO(V) and Kochi, MO(K). In addition, there are Naval Store Depots (NSDs) at Port Blair and Karwar.

The Material Organisations cater to the requirements of their respective Naval Commands. Each MO is headed by a Material Superintendent(MS) and assisted by a Controller of Material Planning(CMP) who looks after the provisioning and planning activities, a Controller of Procurement(CPRO) who carries out procurement activities, a Controller of Warehousing(CWH) and a Controller of Technical Services (CTS).

Navy-wide procurement, beyond the financial powers of the Commands, as well as foreign procurement from the erstwhile Soviet Union countries are dealt with at NHQ by the Directorate of Logistic Support (DLS) and procurement functions are dealt with by the Directorate of Procurement (DPRO) carrying out centralised material planning. The Indian Navy's general purpose inventory includes stores (Naval Stores), specific equipment, sub-assemblies and spares for ships, submarines and shore establishments. The Navy maintains sufficient stock of these items at the MOs/NSDs. Stocks are periodically reviewed and procurement action is initiated with Indian and foreign vendors registered with these organisations.

ILMS is an on-line, all-station-linked project, interconnecting all the Navy's sections and store houses for speedy processing, easy accessibility to past purchase price, vendor data, linking up vendor to item, vendor analysis/rating/classification, reduction of clerical effort and greater transparency in procurement.

To remove procedural bottlenecks and to iron out the difficulties that were being experienced in the identification of electrical and engineering equipment spares by the Navy, a dedicated team of officers developed the Integrated Logistic Management System (ILMS) in-house. Its software integrated the Store/Weapon/Air Store depots of the Navy with Naval Headquarters, Naval Dockyards and other repair organisations. After the ILMS was fully developed, the objective sought to be achieved was qualitative improvements in inventory management and optimum utilisation of funds for spares.

In 1997, the Ship Logistics Management System (SLMS) was conceptualised as an inventory management tool for onboard accounting in ships and establishments. It covered the entire gamut of prevailing logistic procedures, including taking items on charge, preparing demands, issue to departments and local purchase. Over the years, the SLMS system underwent iterative improvement to remedy inadequacies that came to light. The remaining drawback awaiting resolution is to make it LAN compliant and interfaceable with ILMS. Efforts continue to enhance the utility of SLMS.

Development of ILMS

The ILMS, pioneered by the Navy, was the first on-line inventory management tool in the Defence Services. The changes required to migrate from manual mode to electronic mode were substantial and unprecedented, as it affected prevailing work-practices, ethos and conventional mindsets of the officers and staff who had over the years worked in a manual logistic management environment.

The Navy initiated the ILMS project on 17 May 1993 with a core team of 16 service and civilian officers. The project aimed to introduce transparency in Naval systems for materials management functions covering provisioning, procurement, warehousing, bill processing and audit to strengthen aggregate control while reducing, if not eliminating, the delays caused by transaction-specific controls in logistics procedures.

The development of the project involved:-

- Production of an integrated system design.
- Identification of hardware and software.
- Development of data processing systems to facilitate on-line transactions.

- Processing systems (OLTP), data links, network design, data capture, systems development and creation of databases.

The implementation of ILMS required massive data capture efforts at all the Controllerates at the Material Organisations. The bulk of data capture efforts were made towards capture of bin cards. The systems software was common for all Naval stations.

The complete system study, analysis, design, and software development were done in-house and ILMS was formally launched in December 1997.

Commander John Edison recalls the formative days of ILMS:-

> *"I remember the days we used to spend huddled as a team till 2 AM and reach the tennis court at 0630 AM to hit the ball hard. We also took up walks and run within MO (MB) campus to probably cool down. During the design and development phase, our normal working hours were 18 hours a day. We had to leave our families behind in different stations and the important aspect of this project was timely attainment of the desired objectives. When the country celebrated 50 years of its independence in 1997, Naval Logistics celebrated on-line demand processing in all centers, and ILMS was born".*[1]

ILMS Network. To carry out integrated functions, a LAN was laid in offices and storehouses at all stations by 1995 and connected over the ILMS WAN later. The ILMS Wide Area Network (WAN) connects Mumbai, Delhi, Vizag, Kochi and NSD(PB) using 2MBPS leased lines and a 64 KBPS VSAT standby connectivity. The system is managed by a dedicated team, controlled by the Chief System Administrator of ILMS based at Naval Headquarters. Users can connect to ILMS databases of other stations and access each other's data.

Inventory Management after ILMS

Transparency, availability of information and speed has been the hallmark of ILMS. The erstwhile Material Planning exercise of the magnitude of a Review Schedule used to take months in manual mode with innumerable inaccuracies and non-actionable indents. With ILMS, each MO is able to carry out its Review Schedule, in a matter of a few hours with the help of defined formulae, parameters and classification of the inventory on the system.

For example, an Assistant Controller of Material Planning at Kochi could see run-time parameters of all items at Mumbai, Vizag and Delhi and accordingly take/recommend planning/indenting decisions most suited to benefit the Navy through a seamless process. Similarly, an Assistant Controller of Procurement at NHQ could study on-line, prices, vendor-ratings at the MOs and any other vital parameter required to take a procurement decision.

Over the years ILMS has accrued the following benefits for the Navy:-

- Yielded substantial benefits for material and logistics management.
- Brought the majority of stakeholders of material logistics onto a common platform, be it Controllerates in depots or the connectivity between MOs and NHQ.
- Core functions of Planning and Warehousing have been fully computerised.
- Improved asset visibility in depots.
- Identification and disposal of SSS inventory.
- Improved speed of communication through e-mail and faxes from within the system.
- Accelerated the process of review-based forecasting/provisioning.

1 Cdr John Edison (Retd) was a core member of the ILMS Project in the initial days. Later on he became the System Administrator and he led the project as the Chief System Administrator (CSAILMS).

26

The Contribution of Research and Development to Self-Reliance

Self-reliance in 'core' naval defence requirements like warships, submarines, helicopters, missiles, radars and sonars entails not just long gestation projects but investment in Research & Development.

Historical Background

The report by Dr JE Keyston of the British Royal Naval Scientific Service in 1949 laid the foundation for scientific research for the Indian Navy. He recommended the setting of an Underwater Science Establishment and a Dockyard Laboratory and appointment of a Chief Scientific Officer at Naval Headquarters. The Government accepted these recommendations and the services of Dr GE Gale, a Principal Chief Scientific Officer of the Royal Naval Scientific Service were obtained on loan for a period of two years. He took over as Scientific Adviser (Navy) in March 1951. An Indian scientist was appointed to work alongside Dr Gale and take over from him when he left.

In March 1952, an Indian Naval Physical Laboratory (INPL) was established in INS Venduruthy, Cochin. In end 1952, a National Chemical and Metallurgical Laboratory (NCML) was created in Bombay Dockyard. These functioned as in-house laboratories for the Navy, solving day to day technical problems and undertaking studies and investigations as required by the Navy.

In 1958, the Defence Research and Development Organisation (DRDO) was formed by amalgamating all laboratories and scientific establishments working in the Defence Science Organisation. The two Naval Laboratories were brought under DRDO.

In 1968, it was realised that NPOL and NCML could not meet the Navy's entire requirements and that there was need to create a third major laboratory at Visakhapatnam called the Naval Science and Technology Laboratory (NSTL). It came into existence on 20 Aug 1969. These laboratories carried out various projects for the Navy.[1]

Scientific Progress 1975 to 1990

The progress on scientific research was immense that in the mid 1990s, the Scientific Adviser to the Defence Minister whilst addressing the Naval Staff commented that though the Indian Navy was the smallest of the three Services, a large number of projects being developed by DRDO were for the Navy and nearly 50% of the scientists of the DRDO were working on naval projects. The notable achievements during 1975 to 1990 were:

- An indigenous Transducer Assembly Facility for fabrication of all transducer elements/arrays of various types required for naval systems went into commercial production.
- Construction of underwater acoustic research facilities for underwater propagation and reverberation studies for designing sonar sets and calibration of transducers at very low frequencies.
- An instrumentation unit to provide independent strolling and range display for Naval Radar Unit was developed and accepted for bulk production after user trials.
- Two types of underwater training targets to facilitate training of naval personnel on board naval ships were developed.
- Studies were undertaken in the areas of marine corrosion and marine bio-deterioration in tropical waters and development of technologies for protection of Naval ships and underwater structures against corrosion and fouling.

1. For details refer to chapter titled "Naval Scientific Research And Development" in *Transition To Triumph.*

- A variety of paints and impressed current cathodic protection system for protection of ships hulls and other underwater structures were developed. Spin off from these technologies were utilised by ONGC and Shipping Corporation of India.
- Ceramic transducer materials similar in properties to those imported PZT-4 were developed for the first time in the country.
- A number of Aircraft components not readily available and those with a long leadtime, were locally fabricated at Naval Aviation Yard, Cochin, leading to considerable savings in foreign exchange and reduction in the period for which aircrafts were out of operation.

Scientific Progress 1991 to 2000[2]

1990–91. The Weapons and Electronics System Engineering Establishment (WESEE) integrated the combat system components procured from indigenous and external sources. WESEE linked the Naval Communication Centre at Delhi, Bombay, Vishakhapatnam, Cochin and Goa in the first phase as part of the naval signals communication automation and network programme. It proposed to extend the programme to smaller stations in the next phase. It also developed an in-house software based cypher system to ensure the security of the network.

The NSTL Project for converting torpedo 53–56 into a passive homer (NST 58) and the CET 53 into an active/passive torpedo (NST 59) made significant progress. A record number of 46 firings, which included the normal fleet work up, were carried out on the East Coast. The data collected from these firings enabled the clearance of the NST 58 Project. NSTL was also entrusted with the task of converting the CET 53 torpedo into a deep mobile torpedo. The first few test firings of the DMT were completed successfully.

1993

- A versatile acoustic target for use by the Navy was developed.
- A submarine battery monitoring system was developed and after extensive test was accepted.
- The Composite Sonar and Tactical Weapon Control System, 'PACHENDRIYA' and the construction and fitment work on the Marine Acoustic Research Ship (MARS) was progressed.
- A low frequency transducer array, developed by DRDO, was productionised by Bharat Electronics Ltd and installed on a naval ship.
- A DRDO second generation anti-fouling (SGAF) paint with self-polishing properties for naval ships was commercialised.
- Reusable polymeric dry blocks were developed based on blends of elastomers and plastic, as an alternative material for dry-dock block soft wood.

1994

- WESEE in consultation with lIT, New Delhi, developed an Advanced Data Link System for HF, VHF and UHF communication networking. The military version of this system for ship and airborne applications was to be produced at HAL. The system was to enable secure voice and data networking of the Navy's C31 nodes.
- DRDO and BEL were engaged in joint development of a modern hull-mounted sonar (HUMSA), whose ship installation was planned for early 1996.
- The indigenous Marine Acoustic Research Ship, (MARS) was christened INS Sagaradhwani on her commissioning in July 1994.
- The Navy approved use of DRDO's second generation Anti-Fouling (SGAF) paint, with self-polishing characteristics, on all ships.
- DRDO's indigenously developed hydraulic fluid was accepted for use in submarines.
- Limited series production of the Pilotless Target Aircraft, Lakshya, commenced to meet the requirements of two Services.

1996

- As a part of the Ocean Research Programme, Naval METOC (Meteorology and Oceanology) teams participated in five Oceanographic research voyages of the research vessel Sagarkanya of National Institute of Oceanography.

1997

- The preliminary design review of integrated electronic warfare programme 'Samyukta' was completed for trials in April/May 1997. The preliminary design review of the Naval EW programme 'Sangraha' was also completed.

2. MOD Annual Reports.

- A project for setting up under-water ranges for measurement of magnetic and noise signatures of Naval platforms was being executed off Goa, to enhance operational effectiveness of Naval ships and submarines.

1998

- Launcher and surveillance radar for Naval Trishul was installed at Cochin and its evaluation was completed.
- Composite Sonar System and Tactical Weapon Control System 'Panchendriya' comprising active and passive sonars was developed and installed on board a submarine for user's trials.
- Heavy duty coatings were developed for oily and rusty surfaces of bilge of Naval Ships. These paint compositions of polysulphide modified epoxy resin and non-leafing aluminium were found to have good dry and wet adhesion.
- A ready-to-eat, processed ration suiting Indian cuisine and providing 3300 calories was developed for Naval Commandos.

Two major projects undertaken during this period which were very significant for the Navy in the decade were Underwater Ranges and Anti-Missile Defence Systems.

1999

The technical trial of Mihir, the dunking sonar developed for fitment in the Advanced Light Helicopter (ALH) was completed and flight trials progressed.

2000

- The intelligent sea mine processor based ground mine and processor based moored mine were cleared for productionisation.
- An improved Immersed Current Cathodic Protection (ICCP) system for protection of hull of surface ships with an extended life of 10 years was tried out and cleared for production.
- Demonstration launch of surface-to-surface missile Dhanush (naval version of Prithvi) was conducted from a moving ship.

Naval Research Board (NRB). To provide thrust to basic research, DRDO constituted four Research Boards. These boards promote research in collaborative mode with academic institutions and other national R&D laboratories through funding of grants-in-aid projects. Under the Naval Research Board (NRB), 28 projects were pursued by the academic institutions in five technology areas in 2000.

Retrospect. Despite the much-heard complaint regarding the time and cost over-runs of the DRDO, the Navy has much to be grateful for DRDO's achievements particularly in the realms of sonar and of electronic warfare. There were, and there will always be, constraints on access to the latest technology in both these sensitive areas. It has taken decades to build up indigenous expertise and the infrastructure to research, develop and productionise the Navy's needs. To expect perfect synchronising of this process with the installation schedule in the latest ships under construction would be illusory. The Navy reconciled to this dilemma and fitted the best available imported systems until an indigenous system was ready.[3] By doing so, DRDO's expertise has been updated and long term self-reliance strengthened as illustrated in the developments post 2000, a few of which are:

- **Combat Management System (CMS)** is being manufactured by BEL with the active participation of the Navy and the Centre for Development of Telematics. CMS will form an important part of the entire C4I2SR (Command Control Communications Computers Intelligence Interoperability Surveillance and Reconnaissance) on board frontline combatants of the Navy.
- The DRDO's ERDE (erstwhile LRDE) is undertaking design and assembly of the prototype, Revathi 3-dimensional radar with a nominal range of over 150 km. Manufacture of the radar was to be undertaken through a collaborative effort with L&T.

3. Excerpt from the Kargil Review Committee Report, Page 262:

"The long standing controversy between the services and DRDO on drawing the line between "make" or "buy" resulted in the formulation of a new Procurement Policy in 1995. This liberalised the procedures for the import of equipment as against its indigenous development.

One problem the DRDO faces is that the Armed Forces borrow unique features from weapons and equipment on offer from advanced military suppliers around the world and marry these in their "General Staff Requirements" to make "impossible" demands. There is an element of truth in this assertion but none can be faulted for desiring the best.

The design and development of special materials as well as defence stores and equipment often entails working at the frontiers of technology. It is therefore possible and desirable to harness national talent wherever it lies — in the Universities and IITs, and in the private and public sectors — and not only within DRDO and designated defence undertakings. Casting the net wider would be advantageous and would ensure a greater degree of competition and technological spin-off into the civil sector."

- **The Ellora EW suite** designed by DLRL, Hyderabad for both active and passive EW applications was being manufactured by BEL.
- The Defence Metallurgical Research Laboratory (DMRL) in collaboration with SAIL developed and produced warship grade DMR249A steel plates and bulb structural sections for ship and submarine applications.
- The HUMSA sonar, Anti-ship missile Brahmos and indigenously manufactured (under license) Italian 76mm OTO Melara and Russian 30mm AK 630 guns are other notable examples.

Nevertheless, it would be useful to examine the relevance to India, of a reform initiated in 2002 of the Pentagon's weapon acquisition process. Under their old procedure, "a weapon did not enter production until 100 percent of the requirement was met". The reform aimed to field new systems in as little as five to seven years which was to be achieved through two interlinked concepts of Evolutionary Acquisition and Spiral Development.

Evolutionary Acquisition. The new idea is for the services to consciously accept into service a new weapon that is known to be short of the staff requirements by, say, 30% to 40%. The weapon would gradually evolve as it is updated. In short, it is an incremental approach to delivering new weapon technology.

Spiral Development. Traditionally, a staff requirement defines, as precisely as possible, the weapon/system that is required and the time frame. Spiral development, a method borrowed from the software industry, underlies the need for rapid adaptability to change. If during development, the technological risk of rigidly adhering to a staff requirement is likely to negate its timely fulfilment, the development organisation should have the flexibility to redesign what the staff requirement seeks to accomplish. In short, it is a method that accepts the possibility that the eventual weapon may be quite different from what the staff requirement envisaged, but will still accomplish the capability that was sought.

This reform requires a mindset different from the traditional one. However, there is evidence that Indian ingenuity can achieve remarkable things when there is synergy. One outstanding example is the Navy's APSOH Sonar,[4] which achieved as early as the 1980s, exactly what the Pentagon reform now seeks to achieve. The time taken to develop APSOH from concept to Sea Acceptance Trials was six and a half years.

The genesis of the project lay in the sinking of the frigate Khukri during the December 1971 Indo–Pakistan War and the inability of the subsequent Hunter-Killer operation to destroy the Pakistan Navy submarine. The urgency of finding a remedy led the Navy to whole-heartedly support, what is now termed Evolutionary Acquisition and Spiral Development.

4. Refer to Chapter 'The Indigenous Panoramic Sonar — APSOH' in *Transition to Eminence*.

27

Underwater Ranges

Preamble

The simplest and economical way to incapacitate ships and submarines is to damage their underwater hull by use of explosives so that the hull gets flooded with seawater and it sinks. Two types of weapons can damage the underwater hull of a ship — torpedoes and mines. Torpedoes can be fired from ships and submarines or dropped from aircraft. Mines can either be moored at varying depths or laid on the seabed. To ensure that the explosion occurs as close to the hull as possible, torpedoes and mines have mechanisms that avail of the natural characteristics of ships and submarines. For example, ship and submarine hulls are made of steel and steel has a magnetic field. In addition, ships' propellers make noise.

Mines are basically of two types. Their explosion can be initiated by a ship's magnetism or by a ship's acoustic noise or a combination of both. Countermeasures against such serious damage comprise electric cables in the ship that carry exactly the right amount of electric current to minimise its unique magnetic signature. Similarly, if the source of ship noise can be accurately pin-pointed, action can be taken to mitigate that source. When at sea during war, acoustic noisemakers can be used to trigger mines from a distance and avoid damage to the ship.

Underwater ranges therefore meet two basic requirements:-

De-Gaussing Ranges (DG Ranges). These are required for degaussing ships, i.e. demagnetising their hulls to reduce their magnetic signature and thereby minimise the chances of activating magnetic mines. Since magnetic field varies with distance, DG Ranges are of two types — for shallow draught ships and for deep draught ships.

Acoustic Ranges. They are required for noise ranging ships and submarines so as to record their unique noise signature and thereby:-

- Reduce their vulnerability to acoustic mines and acoustic homing torpedos.
- Minimise the range at which their machinery noise can be heard by the passive sonars of adversary submarines.

DG Ranging

The Navy's first DG Range was set up in Bombay harbour during the 1939–1945 World War. It ceased to function after the war ended. After independence, replacement equipment for this DG Range was acquired from Britain in 1951. However, a suitable site for this range could not be found in Bombay Harbour.

In 1964, Goa was chosen as the alternative site and NHQ directed the setting up Deep and Shallow DG Ranges off Goa.

The Deep DG Range

The setting up of the Deep DG Range was finally completed in 1965. The 'seabed sensors' were laid off Grandi Island with its associated 'instrumentation' set up on top of the island itself. However, this DG Range repeatedly became non-operational due to wave-damage during the monsoons and inability to maintain it.

The Shallow DG Range

The Shallow DG Range at Goa was successfully laid in 1977.

Noise Ranging

Before this range could be laid, preliminary discussions indicated that DRDO also had commenced a project on noise ranging and on noise mitigation. It became clear that greater consciousness needed to be inculcated amongst dockyard personnel to achieve noise mitigation during ships refits in the Naval Dockyards rather than depending solely on noise ranging.

Meanwhile, the technology of torpedo homing heads and magnetic and acoustic mine initiating mechanisms had improved vastly necessitating a very sophisticated

underwater range for ranging our ships and SSK submarines.

A project team was appointed to:-

- Analyse all aspects of noise reduction in ships and submarines.
- Inculcate in the Naval Dockyards the importance of special attention to noise generation aspects during refits of ships.
- Collect as much data as possible.
- Assess the overall requirement and sources of sophisticated equipment for the noise range and indent for those items that had the longest lead times.
- Initiate urgent action on all aspects of noise measurement and noise reduction.

Until 1975, only portable noise ranging equipment was available for carrying out noise ranging.

The Underwater Ranges Project

The Leander Frigate Project of the 1970s and the SSK Submarine Project of the 1980s sharpened the urgency to set up modern DG and Acoustic ranges on which indigenously constructed ships and submarines and minesweepers could be ranged.

In 1983, the Navy decided to set up the Underwater Ranges off Goa comprising an acoustic range and two degaussing ranges.

In May 1985, DRDO formed the Underwater Ranges Project to carry out a feasibility study. The feasibility study report submitted in 1988 recommended setting up the ranges at Bimbade Point in Goa.

Scope of the Project

Based on the feasibility report and numerous amendments after a series of studies, Govt sanction was accorded in 1995 for setting up:-

- A Mine Counter Measures Vessel DG (Magnetic) Range for minesweepers at a depth of 9 metres and at a distance of 1.5 km from the shore.
- A steel ship DG (Magnetic) Range for ships and submarines at a depth of 15 metres and at a distance of 4.5 km from the shore.
- An Acoustic Range for ships and submarines at a depth of 30 metres at a distance of 18 kms from the shore.

Infrastructure

For the execution of the project, a computerised Underwater Ranges Facility was set up in a shore office to function as the administrative and technical block and as the field unit of NSTL (Vizag) with a mixed complement of naval, DRDO and civilian personnel.

Execution

In 1997, the execution of the Project was contracted to a consortium of ER & DC, Thiruvananthapuram as the 'prime contractor' and M/s Thorn of UK as the 'Principal Partner and System Designer', to be completed by Apr 2000. The Technical and Administrative complex of the project was completed on June 30, 1998.

The offshore equipment of the DG ranges, including the range cables and sensors were laid at sea by Jan 2000. System installation and on-site acceptance trials progressed till Mar 2000.

During this activity, it was found that fishing/trawling activity had damaged the DG sensors and the underwater cables connecting the sensors to the technical block on shore.

Consequent to the loss of DG Range sensors and interconnecting cables, it became necessary for additional protective measures to be devised and validated before expending additional funds on the project. Trials of protective measures were completed in end Mar 2001.

It took another two year's monsoons to validate that the protective measures could withstand wave damage and fouling by anchors of trawler.

On satisfactory completion, the Range Technology Centre was inaugurated by Dr VK Atre (SA to RM) on 06 Jun 04 as Naval Underwater Ranges.

28

Anti Missile Defence (AMD) Systems

Preamble

In the 1971 Indo–Pakistan War, small 200 ton missile boats acquired from Russia attacked ships patrolling outside Karachi harbour. The radar homing heads of these liquid fuelled missiles successfully homed on, and, with two missiles, in two minutes devastated and sank a much larger and powerful 3000-ton Pakistan Navy destroyer from a range well outside the range of the destroyer's guns. From the point of view of naval tactics, the advent of such missiles heralded a revolution in the centuries-old-tactics of battle between naval ships by transforming gun battles within visual range to missile encounters much beyond visual range. This development also transformed the nature of the threat because, without any warning, missiles could, by day or by night, regardless of weather, approach their targets at near sonic speed and inflict fatal damage.

Between the 1970s and 1980s, the Pakistan Navy acquired Harpoon missiles from America and Exocet sea skimming missiles from France. Both missiles were technologically better than those used in the 1971 war because:-

- They could skim the sea flying just a few metres above the sea, which made their approach very difficult to detect and track.
- Being solid fuelled they could be fired from ships, submarines and aircraft.

During the 1982 war between Britain and Argentina in the Falkland Islands, the sinking of several British warships by French Exocet sea skimming missiles fired by Argentine aircraft reiterated the urgent need for Anti Missile Defence (AMD).

Need for AMD

In all navies, research intensified to cope with the threat posed by sea-skimming missiles. Gradually, concepts of anti missile defence began to crystallise as tiered options. These were:-

- To detect and destroy a ship, aircraft or submarine before it could fire its missiles.
- If not successful, then to detect the incoming missile and the radar transmission of its homing head and prevent a missile that had already been fired from hitting by electronically seducing its radar homing.

Throughout the 1970s and 1980s, a spiralling contest took place between new technologies of the homing heads of anti-ship missiles and the countermeasures to cope with every new advance in homing head technology while homing heads showed ever improving circuitry that would overwhelm/defeat the latest countermeasures.

Gradually, homing heads started combining multiple technologies from radar homing onto the largest echo with infra red homing, along with homing onto the target's radar/jammer transmissions. The desirability of denying a radar homing missile of a large radar echo led to the incorporation of "Stealth" technology[1] in the design of all future warships. The technological challenges were enormous.

Technological Challenges

To start with, it was essential to detect, at as long a range as possible, a slim missile approaching at the speed of sound just a few meters above the sea. Then, it was necessary to have a track and guidance system that could accurately guide the anti-missile missile also flying at least at the speed of sound to hit or arrive within proximity fuze exploding distance of the incoming missile. The combined crossing rate was twice the speed of sound. The slightest error or delay in computation meant that the incoming missile would escape interception and fatally damage its target ship.

To cater for this contingency, ships were fitted with small calibre (30 mm) guns having very high rate of fire (thousands of rounds per minute).

---

1. Refer to chapter titled "Project 17 Stealth Frigates".

Initially, ships acquired from the Soviet Union were fitted with AK 230 double barrelled 30mm mountings having autonomous detection and fire control systems.

In due course, the double barrelled gun mountings were superseded by AK 630 six-barrelled 30mm mountings to ensure that every ship had this type of terminal point defence. Agreements were negotiated with the Soviet Union for transfer of technology to indigenously produce these mountings under licence.

To increase kill probability against incoming missiles by gunfire, it was decided to use 76mm calibre proximity fuzed shells, fired from high rate of fire 76mm guns. Agreements were negotiated with the Italian firm Oto Melara for transfer of technology and indigenous production of these mountings under licence.

The Trishul Project

The Navy projected its critical requirement of an anti sea-skimmer missile to the Defence Research and Development Organisation (DRDO). The requirement for an anti-missile missile was included in the Integrated Guided Missile Development Plan (IGMDP) as Project Trishul, whose objective was the development of an inter-service, short range (9 km), quick reaction (6 sec) Tactical Surface to Air Missile (SAM). The Naval version was required to have anti-skimmer missile capability. The Army version was to be on tracked vehicles and the Air Force version was to be on wheeled vehicles.

The DRDO assured that Trishul was envisaged for fitment in the latest ships, i.e Project 16A Brahmaputra class frigates, then under indigenous construction.

Sequence of Events

As part of the IGMDP, the Trishul Project was accorded sanction in 1983, scheduled for completion in 1992 to dovetail with the completion of the Brahmaputra, the first ship of Project 16A. After a timely start, progress became sporadic for a variety of reasons. The sequence of events was:

1983 The Government approved the development of these missiles and the structure of the IGMDP.

1985 First flight of unguided Trishul from Sriharikota Range (SHAR).

1989 Full 9 km guided flight of Trishul. The original concept of gathering the missile into the field of view using TV proved unsuitable for injecting it into the initial narrow 0.6 degree wide gathering beam and later injection into an even sharper 0.43 degree guidance beam.

1992 The altimeter-controlled Mach 2 flight of a Trishul missile was successful against a pre-determined trajectory (programmed and stored in the missile) fired at a simulated sea-skimming target mounted 7 meters above the sea. However variation in altimeter control was found to be unacceptable.

1997 RAWS 03 (the search radar for detecting the incoming sea-skimmer) systems was installed in Dronacharya and became fully operational.

May 98 The missile tracking/guidance system was installed at Dronacharya, set to work, tested and tuned, integrated with the launcher and rendered ready for firing the first missile, which was also by then completed by BDL, Hyderabad.

Jun 98 The first missile was fired from Dronacharya against a simulated target. Thereafter, 14 telemetry version naval missiles were fired on a variety of simulated targets, Chukar Pilotless Target Aircraft (PTAs) for a higher flying missile and a static model on a pontoon for the sea skimmer version.

By end 1998, crucial sub-systems of the overall project completed development and became available from different locations for integration as a total system at the proving range in Cochin. These were the search radar for initially detecting the incoming missile, the guidance system for the outgoing missile, the missile launcher, and its barbette for reloading the launcher.

By the early 1990s, NHQ concluded that the Trishul project was not likely to be completed by the time that INS Brahmaputra would become ready for delivery. In view of the vital requirement of anti-missile defence, NHQ started looking for an alternative.

The Barak System

As the Navy scouted for options, it quickly became clear that only two effective options were available. One was the Russian Kashtan system that would be fitted in the three new Project 1135.6 frigates (later designated as the Talwar class frigates), the contract for which had been signed in 1997.

The other was the Israeli Barak system. In view of the operational urgency for installing an anti-missile missile system in INS Brahmaputra, both options were rigorously evaluated. The Barak emerged as the better system. The

details of the Barak SAM that were published in the national media are:

"The Israeli Barak SAM is an integrated system intended to destroy incoming anti-ship missiles. The system comprises of the 10 km-range interceptor missile, an eight-tube Israel Aircraft Industries (IAI)/Rafael-developed vertical-launch system, an EL/M-2221 STGR [Search, Track & Guidance Radar] and an Elbit fire-control system capable of automatic operation, with the ability to engage two targets simultaneously."

This missile system was short listed by the Indian Navy in 1994 and the first batch of seven systems, approved by the CCS in 1996, was followed by another approval in 2000 to install all seven systems onboard their respective platforms, initially announced as frigates of the Project 16 Godavari class/Project 16A Brahmaputra class and the aircraft carrier, INS Viraat. INS Brahmaputra was being built to accommodate the Trishul system, but even as the ship was being readied for launch, the latter had still not completed development. The ship was eventually commissioned without a SAM system, until finally equipped with the Barak system a while later. At least 10 new Barak systems were to be purchased in follow-on batches.[2]

The Government's approval to import Barak virtually endorsed the Navy's assessment that Trishul would not be able to meet the Navy's timeline for installation in the frigates despite years of challenging R&D effort.[3]

When the Kargil War erupted in 1999, the lack of Barak Systems for installing in all the ships likely to be deployed in harms way became a cause for serious concern. Breaking his silence on the Barak controversy, former Navy Chief Admiral Sushil Kumar spoke to *Force* about the need for anti-missile systems.[4]

"Navy's Requirement of Anti-Missile Defence. *Way back in the early 1980s, the Pakistan Navy secretly acquired a new generation anti-ship missile from the US and France. Against these lethal Harpoon-Exocet sea skimming missiles, our warships were absolutely defenceless. The requirement for a suitable Anti-Missile Defence (AMD) system for the Indian Navy thus became the most critical operational imperative. To fill this operational void, the DRDO commenced project.*

Israeli Barak as an Option. *By 1994, it became clear that DRDO's Trishul project had failed and the Navy had been left stranded after waiting for 12 years for an indigenous AMD system. Placed in a serious operational dilemma, the then Navy Chief Admiral Shekhawat urged the Government to provide an alternative AMD system. The hunt for a suitable import option took two years of extensive evaluation, analyses and field trials and involved the participation of the DRDO. The Government finally approved the induction of the Israeli Barak AMD system and formalised this policy through an MoU signed in early 1997 with the Israeli Government.*

Role of Kargil Conflict in the Induction of Barak. *In 1999, I had just taken over as the Navy Chief. By end June, the situation we faced was brutally stark. War with Pakistan had become imminent and we found ourselves in a serious operational dilemma: our warships were without AMD of any sort to counter the dangerous Pakistan Navy's Harpoon-Exocet threat. At a crucial meeting of the Cabinet Committee on Security (CCS), the three Service Chiefs had briefed the Prime Minister of the critical war-fighting deficiencies of the armed forces. Anti Missile Defence being the Navy's most critical need, the advice from the Naval Headquarters to the Ministry of Defence was specific: While we continue to await DRDO's Trishul project to shape up, the Navy urgently requires six Barak AMD systems as a war-fighting necessity.... The Navy strongly supports research and development and self reliance, but it cannot be at the cost of the nation's security.*

DRDO's Trishul. *For all practical purposes, Trishul did not exist. And for this very reason, the Government took a policy decision in the nineties for Barak to replace Trishul. Even today Barak-II remains the Government's policy option for the Navy's AMD requirement for the future. To me, it seems that the DRDO was being optimistic. ...*

Reaction to the CBI's Statement that the DRDO's 'Learned Advice' About Trishul had been Ignored. *It only shows that the charade played out for 25 years has fooled a lot of people, though mercifully not the Navy... Many things have remained unsaid, including the fact that Barak was approved by the Government for the Navy's AMD requirements. Firstly, Navy's recommendation was the sum*

2. As of July 2005, confirmed recipients of the Barak system include two Type 15 Delhi Class destroyers, one (probably more) Type 16 Godavari Class frigate, three Type 16A Brahmaputra Class frigates, at least one Rajput (Kashin II) Class destroyer and the solitary aircraft carrier, INS Viraat.

3. There is a view that the approval to induct Barak was resented by some DRDO scientists to such an extent that led to allegations that the approval was accorded under pressure from the import lobby opposed to self-reliance. The allegations led to the institution of an Inquiry by the Central Bureau of Investigation (CBI) which is still in progress and therefore sub-judice.

4. Extract of CNS Sushil Kumar's 2006 Interview in *Force* magazine.

total of the collective wisdom and professional experience of our operational commanders and based on the strategic requirement of the service that had been projected for several years by successive Navy chiefs, long before I came on the scene. In short, it was no off-the-cuff recommendation. Secondly, this recommendation was elaborately processed and scrutinised for several months by the highly structured hierarchy of all the key ministries of the Government of India including the Defence and Finance before it received the final seal of approval at the highest government level by the CCS chaired by the Prime Minister. There was nothing adhoc about it.

Is There a Mismatch Between the Armed Forces and the DRDO in terms of Expectations and Deliveries? *I would call it a mixed experience of highs and lows. DRDO's Sonar project was a stunning success in the 1980's that gave the Indian Navy a world class submarine detection capability. Trishul, on the other hand, was a disaster that left the Navy stranded without its most vital armament for almost 20 years. It took a man of Dr. Aatre's courage and conviction, as DRDO's chief, to roll back this project and reconfigure it as a joint venture with Israel to develop Barak II for future Indian Naval ships. All this hue and cry seems senseless, especially when Trishul was a self-accepted failure of the DRDO and the Government has now approved a DRDO partnership with the very same Israeli firm for Barak II.*

What Message Do Such Controversies Send to the Armed Forces? *To point a finger at the Navy for someone else's folly is inexcusable. Sure, this sort of a thing could demoralise the armed forces. All said and done, the first duty of any service chief is to ensure that his force remains combat-worthy. It is a duty performed through faith and trust. That indeed, is the bottom line."*

However, in March 2003, the Defence Minister stated in Parliament that "Trishul was being progressed by DRDO as a technology demonstrator, de-linking it from the user services."

Reference Notes

Background of Warship Building Yards

In the 17th, 18th and 19th Centuries, Indian-built wooden-hulled sailing ships, built of Malabar teak, were renowned for their sea-worthiness and survivability in the East India Company's (and later England's) contests for empire.[1]

The English East India Company set up its first trading post at Surat in 1613. In 1661, the Company moved its headquarters from Surat to Bombay.[2]

In 1735, at the invitation of the Company, a talented young shipbuilder, Lovji Nusserwanji Wadia, moved from Surat to Bombay to start building ships in a new shipyard.[3]

The dock at Mazagon was completed in 1774. It was built primarily to cater to ships of the East India Company, all of which could not be taken into the Naval Dockyard due to overcrowding. Ships started being built there in 1801. Mazagon's first dry dock was built in 1839 and the second in 1865.

Between 1735 and 1884, a succession of master shipbuilders of the Wadia family built, both in Mazagon and in the Bombay Dockyard, a total of 300 ships for the Company, for the British Navy and for private owners. One of these warships, still afloat, is the Trincomalee launched in Mazagon and fitted out in the Bombay Dockyard between 1814 and 1817[4].

In the second half of the 19th Century, several developments took place. Two major English shipping companies, Peninsular and Orient (P&O) and British India Steam Navigation Company (BISN) established a monopoly of all sea-borne passenger traffic and sea-mail delivery 'East of Suez'. In 1860, the P&O acquired Mazagon Docks to build, maintain and repair its ships operating in the Arabian Sea and westward and southward. BISN acquired the Garden Reach Workshops in Calcutta to repair and maintain its ships operating in the Bay of Bengal and eastward and southward.

The Suez Canal opened in 1869 and traffic increased manifold. Steel hulls gradually replaced wooden hulls. Steam-driven ships gradually replaced sail driven ships. In Mazagon Docks, ship repair skills overtook shipbuilding skills. In every British war east of Suez, ships of both these companies were converted in the dockyards at Bombay and Calcutta to ferry thousands of Indian troops to and from the battle zones.

On the eve of the First World War, P&O merged with the BISN and became the British Empire's largest shipping cartel — the `P&O Group'. It also became the main operator for India's coastal passenger traffic. Its services linked India with the Persian Gulf, the Far East and East and South Africa. The Mazagon Dock Company was formed in 1915.

---

1. The 5000 year-year-old Malabar teak beams found in the ruins of Ur in Babylon testify to the antiquity of Indian ships built of teak.
2. The Portuguese had handed over Bombay to the English in 1655. In 1658, the East India Company had assumed responsibility for Bombay.
3. This shipyard was the forerunner of today's Naval Dockyard at Bombay that celebrated its 250th Anniversary in 1985. In 1750, it had Asia's first contemporary dry dock. Its predecessor — the dock at Lothal, located at the northern tip of the Gulf of Cambay — was built circa 2500 BC.
4. 'Trincomalee' was constructed by Indian craftsmen using Indian materials under the direction of Jamsetjee Bomanjee Wadia. When she arrived in England in 1819, the Napoleonic Wars had ended. She spent the next 25 years in reserve and became obsolescent. In the 1840s, she was converted into a corvette — 24 large cannons replaced her 44 smaller cannons. For the next 12 years, she sailed the oceans of the world in anti-slavery patrols, fishery protection, disaster relief, coastal surveys and Arctic exploration. By the late 1850s, sailing warships had become obsolete. In 1857, she was converted into an afloat training ship for reserve sailors. (Her Bombay built sister, the 84-gun battleship Ganges, was converted into an afloat training ship for serving sailors.) In the mid 1890s, she was acquired by a philanthropic ship Preserver and renamed 'Foudroyant'. In the 1990s, she underwent an extensive restoration. In 2002, she was renamed Trincomalee and was opened to the public as the last classic frigate of the sailing era. (Source: *Trincomalee: The Last of Nelson's Frigates* by Andrew Lambert, Chatham Publishing House, 2002)

The group improved the facilities in Mazagon Docks and Garden Reach Workshops to sustain their ships. The Group also held a controlling interest in the Mogul Line in Bombay. Until the first half of the 20th Century, the group successfully edged out every Indian-owned company that tried to penetrate their monopoly, except for the Scindia Steam Navigation Company.

Acquisition of Hindustan Shipyard Limited (HSL). During the Second World War, an urgent need arose to build merchant ships in India to replace Britain's wartime losses. In 1941, the Scindia Steam Navigation Company was given a site at Visakhapatnam on the East coast of India. It launched its first merchant ship in 1948. In due course, this shipyard was taken over by the Government and renamed Hindustan Shipyard Limited (HSL).

Acquisition of MDL and GRW[5]

By the mid 1950s, there was a slump in world shipping. In 1956, the P&O Group offered to sell MDL to the Government of India. The reaction to this offer was that "the demand for ships of 4000 GRT and below, especially for new ships, and the demand for odd harbour craft are so small that it would not be advantageous for Government to consider taking over Mazagon Docks merely for the construction of smaller vessels."[6]

In 1957, Mr VK Krishna Menon became India's Defence Minister. He was an ardent pioneer of self-reliance in defence particularly for core requirements of warships, tanks, and aircraft. HSL was fully occupied building merchant ships. The choice for building warships was between MDL and GRW. He appointed a committee to look into MDL's capabilities for building frigate-size warships. After protracted negotiations, the Government purchased MDL and GRW in a package deal for 12.1 million pounds (approx Rs 3.85 crores) on 19 April 1960. The deal provided for part of the payment to be adjusted towards repairs of P&O Group ships after takeover.

Acquisition of Goa Shipyard Limited (GSL)

In the 1950s, Japan started rebuilding its industries after the devastation it had suffered during the Second World War. It evinced interest in importing iron and manganese ore from Goa, which at that time was still a Portuguese enclave. Development commenced of the mines in the hills upstream of the rivers Zuari and Mandovi. The ore was to be transported in barges down these rivers to bulk-ore — carrying merchant ships at anchor off Marmogoa.

In 1957, the Portuguese established, at the mouth of the River Zuari, a small shipyard named 'Estaleiro Navais de Goa' to construct and repair ore carrying barges, provide assistance to maintain and refit merchant ships and assist visiting Portuguese warships. By 1961, the yard had set up rudimentary facilities to repair and construct barges.

Operation Vijay (17 to 20 December 1961) liberated Goa from 450 years of Portuguese rule and marked the formation of Goa as a Union Territory. The Naval Officer-in-Charge, Goa was appointed as the custodian of the shipyard. A few months later, the yard was entrusted to MDL Bombay on lease and renamed as Mazagon Dock, Goa Branch.

From 1964 onwards, the yard started constructing barges. In 1967, on completion of the lease agreement with MDL, the yard became an autonomous subsidiary of MDL and renamed itself as Goa Shipyard Ltd (GSL). Under this subsidiary arrangement, MDL provided GSL with technical know-how for shipbuilding and ship repair, assistance in securing orders and purchase of materials, and transferring, at book value, machinery from MDL's yard at Bombay.

In 1970, GSL started taking naval orders. Between 1975 and 1977, the building berths were extended, new slipways and a fitting out jetty were built and overhead cranes were installed. This enabled GSL to construct, between 1980 and 1987, minor war vessels like Landing Craft Utility, Torpedo Recovery Vessels, Survey Craft and Seaward Defence Boats.

From 1990 onwards, GSL started constructing larger ships like offshore patrol vessels and survey ships and participated in the licensed production of Russian 400-ton missile boats.

5. Garden Reach Workshops (GRW) was later renamed as Garden Reach Shipbuilding and Engineering (GRSE).

6. *History of Mazagon Docks Ltd* by Rear Admiral K Sridharan.

Reference Notes

Commissionings and Decommissionings

Ships Commissioned 1991 to 2000

(Note: Destroyer: 5000 tons and larger; Frigate 2000 — 5000 tons; Corvette, Below 2000 tons)

NAME	DATE	SHIP TYPE
1991		
Kirpan (ex MDL)	12 Jan 1991	Missile Corvette (Project 25)
Agray	31 Jan 1991	Anti-submarine Patrol Vessel
Vibhuti	03 Jun 1991	Fast Missile Attack Craft
Jamuna (ex GRSE)	31 Aug 1991	Survey Ship
Saryu (ex HSL)	08 Oct 1991	Offshore Patrol Vessel
Khanjar (ex MDL)	22 Oct 1991	Missile Corvette (Project 25)
1992		
Vipul	16 Mar 1992	Fast Missile Attack Craft
Sharda (ex HSL)	20 Dec 1992	Offshore Patrol Vessel
1993		
Sutlej (ex GRSE)	19 Feb 1993	Survey Ship
Sujata (ex HSL)	03 Nov 1993	Offshore Patrol Vessel
Vinash	20 Nov 1993	Fast Missile Attack Craft
1994		
Sagardhwani	30 Jul 1994	Oceanographic Research Ship
Nashak	15 Dec 1994	Fast Missile Attack Craft
1995		
Vidyut	16 Jan 1995	Fast Missile Attack Craft
Krishna (ex UK)	22 Aug 1995	Cadet Training Ship (2nd hand Leander)
Nireekshak (ex MDL)	15 Sep 1995	Diving Support Vessel
1996		
Jyoti (ex Russia)	20 Jul 1996	Fleet Tanker (Converted)
1997		
Gharial	14 Feb 1997	Landing Ship Tank (Large)
Prahar	01 Mar 1997	Fast Missile Attack Craft
Tarangini	11 Nov 1997	Sail Training Ship
Delhi (ex MDL)	15 Nov 1997	Guided Missile Destroyer (Project 15)
1998		
T 80	24 Jun 1998	Extra Fast Attack Craft
Kora (ex GRSE)	10 Aug 1998	Missile Corvette (Project 25 A)

1999		
Mysore (ex MDL)	02 Jun 1999	Guided Missile Destroyer (Project 15)
T 81	05 Jun 1999	Extra Fast Attack Craft
2000		
Aditya (ex GRSE)	03 Apr 2000	Fleet Tanker
Brahmaputra (ex GRSE)	14 Apr 2000	Guided missile frigate (Project 16 A)
Trinkat (ex GRSE)	28 Sep 2000	Fast Attack Craft

Ships Commissioned After 2000

NAME	DATE	SHIP TYPE
2001		
Mumbai (ex MDL)	22 Jan 2001	Guided Missile Destroyer (Project 15)
Kirch (ex GRSE)	22 Jan 2001	Missile Corvette (Project 25A)
Tillanchang (ex GRSE)	17 Mar 2001	Fast Attack Craft
Darshak (ex GRSE)	28 Apr 2001	Survey Ship
Kulish (ex GRSE)	20 Aug 2001	Missile Corvette (Project 25A)
Tarasa (ex GRSE)	24 Aug 2001	Fast Attack Craft
2002		
Sarvekshak	14 Jan 2002	Survey Ship
Tarmugli (ex GRSE)	09 Mar 2002	Fast Attack Craft
Prabal	11 Apr 2002	Fast Missile Attack Craft
Gaj	10 Oct 2002	Ocean Going Tug
Pralaya	18 Dec 2002	Fast Missile Attack Craft
2003		
Talwar (ex Russia)	18 Jun 2003	Guided Missile Frigate (Project 1135.6)
Trishul (ex Russia)	25 Jun 2003	Guided Missile Frigate (Project 1135.6)
T 82	09 Oct 2003	Extra Fast Attack Craft
2004		
T 83	14 Jan 2004	Extra Fast Attack Craft
Karmuk (ex GRSE)	04 Feb 2004	Missile Corvette (Project 25A)
Tabar (ex Russia)	19 Apr 2004	Guided Missile Frigate (Project 1135.6)
T 84	19 Apr 2004	Extra Fast Attack Craft
Betwa (ex GRSE)	07 Jul 2004	Guided Missile Frigate (Project 16 A)
2005		
Beas (ex GRSE)	11 Jul 2005	Guided Missile Frigate (Project 16 A)
2006		
Bangaram (ex GRSE)	10 Feb 2006	Fast Attack Craft
Bitra (ex GRSE)	28 Mar 2006	Fast Attack Craft
Batti Malv (ex GRSE)	31 Jul 2006	Fast Attack Craft
Baratang (ex GRSE)	12 Sep 2006	Fast Attack Craft
2007		
Shardul (ex GRSE)	04 Jan 2007	Landing Ship Tank (Large)
Jalashwa (ex US Navy)	22 Jun 2007	Landing Platform Dock (2nd hand)
2008		
Kesari	05 Apr 2008	Landing Ship Tank (Large)

Ships Awaiting Commissioning at the Time of Writing

MDL	Three Project 15 A improved Delhi class Destroyers
MDL	Three Project 17 Shivalik class Stealth Frigates
GRSE	Four ASW Corvettes
GRSE	Two LSTLs
GSL	Advanced OPVs
Russia	Three Project 1136.6 improved Talwar class
Russia	Vikramaditya (ex Russian Gorshkov)
CSL	Air Defence Ship (Indigenous)

Submarines Commissioned 1991 to 2000

NAME	DATE	TYPE
Shalki (ex MDL)	07 Feb 1992	SSK
Shankul (ex MDL)	28 May 1994	SSK
Sindhurakshak (ex Russia)	24 Dec 1997	EKM
Sindhushastra (ex Russia)	19 Jul 2000	EKM

Naval Air Squadrons Commissioned 1991 to 2000

INAS 552	07 Jul 2005	Sea Harrier Operational Training Flying Unit
INAS 339	23 Nov 1990	Kamov 28 and 31

Naval Air Squadrons Commissioned After 2000

INAS 342	06 Jan 2006	UAV Squadron

Aircraft Inducted After 2000

TYPE	SOURCE
Sea Harriers (in 300 Squadron)	Britain
Dorniers (in 310 Squadron)	Germany and Hindustan Aeronautics
Advanced Light Helicopters (ALH) in the process of induction in Utility/Commando/ASW versions	Hindustan Aeronautics
UAVs (Unmanned Aerial Vehicles)	Israel

Shore Establishments Commissioned 1991 to 2000

ESTABLISHMENT	DATE	LOCATION	ROLE
INS Dega	21 Oct 1991	Visakhapatnam	Naval Air Station
INS Rajali	11 May 1992	Arakkonam	Naval Air Station
INS Vajrabahu	01 Feb 1996	Mumbai	Submarine Headquarters
Naval Air Station (not formally commissioned)	1999	Mumbai (Kunjali)	Helicopter Operating Base
INS Eksila	28 Aug 2000	Visakhapatnam	Gas Turbine Overhaul

Shore Establishments Commissioned after 2000

INS Zamorin	06 Apr 2005	Ezhimala	Base Depot of Naval Academy
INS Kadamba	31 May 2005	Karwar	Base Depot at Karwar
INHS Patanjali	28 Dec 2006	Karwar	Base Hospital at Karwar

Ships Decommissioned 1991 to 2000

SHIP	DATE	SHIP TYPE	YEARS OF SERVICE IN INDIAN NAVY
1991			
Vidyut	31 Mar 1991	Missile Boat	20
Kamorta	31 Oct 1991	Anti-submarine Vessel	23
T 51	30 Nov 1991	Seaward Defence Boat Mk II	13
Betwa	31 Dec 1991	Anti-aircraft Frigate	31
1992			
Vijeta	30 Jun 1992	Missile Boat	21
Trishul	31 Aug 1992	Anti-submarine Frigate	32
Kadmatt	30 Nov 1992	Anti-submarine Vessel	24
Beas	22 Dec 1992	Anti-aircraft Frigate	32
1993			
T 61	31 Mar 1993	Seaward Defence Boat Mk III	15
T 53	31 Aug 1993	Seaward Defence Boat Mk II	15
1994			
T 52	31 May 1994	Seaward Defence Boat Mk II	17
1996			
Deepak	30 Apr 1996	Fleet Tanker	29
Pratap	17 May 1996	Missile Boat	20
Charag	17 May 1996	Missile Boat	21
Nilgiri	31 May 1996	Leander Class Frigate	24
Gaj	14 Aug 1996	Ocean Going Tug	23
1997			
Vikrant	31 Jan 1997	Aircraft Carrier	36
Shardul	30 Jun 1997	Landing Ship Tank	22
1999			
L 31	01 Feb 1999	Landing Craft Utility	20
Mesh	01 Feb 1999	Survey Craft	14
Arnala	09 Apr 1999	Anti-submarine Vessel	27
Androth	09 Apr 1999	Anti-submarine Vessel	27
Kesari	10 May 1999	Landing Ship Tank	24
Hosdurg	05 Jun 1999	Ocean-going Rocket Boat	21
Prabal	29 Dec 1999	Missile Boat	23
Prachand	29 Dec 1999	Missile Boat	23

Ships Decommissioned After 2000

SHIP	DATE	SHIP TYPE	YEARS OF SERVICE IN THE INDIAN NAVY
2001			
Pralaya	08 Jun 2001	Missile Boat	25
Magdala	31 0ct 2001	Inshore Minesweeper	17
2002			
Amini	16 Sep 2002	Anti-submarine Vessel	28
Vijaydurg	30 Sep 2002	Ocean-going Rocket Boat	26

Malvan	03 Jan 2003	Inshore Minesweeper	19
Chatak	05 May 2003	Missile Boat	26
Mulki	16 May 2003	Inshore Minesweeper	19
Anjadip	13 Dec 2003	Anti-submarine Vessel	31
Mangrol	07 Apr 2004	Inshore Minesweeper	20
Sindhudurg	24 Sep 2004	Ocean-going Rocket Boat	28
TRV 71	25 Mar 2005	Torpedo Recovery Vessel	22
Makar	04 Apr 2005	Inshore Minesweeper	20
Meen	25 Apr 2005	Survey Craft	14
Chapal	05 May 2005	Missile Boat	28
Chamak	05 May 2005	Missile Boat	28
Himgiri	06 May 2005	Leander Class Frigate	31
Amba	15 Jul 2006	Submarine Depot Ship	38
SDB T 57	24 Aug 2006	Seaward Defence Boat	21
Mithun	30 Mar 2007	Inshore Minesweeper	22
Porbandar	25 May 2007	Coastal Minesweeper	30
Shakti	21 July 2007	Fleet Tanker	31
SDBT 56	31 Jan 2008	Seaward Defence Boat	22

Submarines Decommissioned 1991 to 2000

Kalvari	31 May 1996	Foxtrot Class	28
Vaghsheer	30 Apr 1997	Foxtrot Class	23

Submarines Decommissioned After 2000

Vagir	07 Jun 2001	Foxtrot Class	28
Kursura	27 Sep 2001	Foxtrot Class	32
Karanj	01 Aug 2003	Foxtrot Class	34

Reference Notes

Commissioning Commanding Officers of Major Inductions

Major Warships

Delhi Class Missile Destroyers	
Delhi	Captain (later Vice Admiral) Anup Singh, NM (01424 K)
Mysore	Captain R Dhamdhere (01397 Z)
Mumbai	Captain (later Vice Admiral) Sanjeev Bhasin (01248 K)
Brahmaputra Class Missile Frigates	
Brahmaputra	Captain (later Rear Admiral) Pradeep Chauhan (01610 H)
Betwa	Captain (later Rear Admiral) Rakesh Pandit, NM (01700 N)
Khukri Class Guided Missile Corvettes	
Kirpan	Commander (later Captain) HS Bawa (01385 Y)
Khanjar	Commander (later Captain) NS Rawat
Kora	Commander (later Captain) HCS Bisht (02035 Z)
Kirch	Commander (later Captain) AK Mahadevan (02334 B)
Kulish	Commander (later Captain) P Ajit Kumar (02275 W)
Karmukh	Commander (later Captain) B Dasgupta (02782 Y)
Submarines	
Shishumar (German HDW 1500) Class	
Shalki	Commander (later Vice Admiral) KN Sushil (01369 K)
Shankul	Commander (later Rear Admiral) PK Chatterjee, NM(01701R)
Sindhughosh (Russian 877 EKM/Kilo) Class	
Sindhurakshak	Commander (later Captain) TS Ramanajum
Sindhushastra	Commander (later Captain) Rajesh Sarin (02298 Y)

Commissioning Commanding Officers	
Jyoti (Fleet Tanker)	Captain GN Sashidharan (01104 H)
Aditya (Fleet Tanker)	Captain Vimal Narayan (01536 R)
Gharial (Landing Ship)	Commander P Murugesan (01958 Z)
Krishna (Cadet Training Ship)	Commander Rajiv Kapoor (01794 A)
Darshak	Captain SS Karnik, NM (01865 N)
Talwar	Captain (later Rear Admiral) S Soni, NM (01683 Z)
Trishul	Captain (later Rear Admiral) SPS Cheema, NM (01704 Y)
Tabar	Captain (later Rear Admiral) AG Thapliyal (01773 B)
Survey Ships	
Investigator	Commander Ajay Chadha (01283 R)
Jamuna	Commander (Later Rear Admiral) BR Rao (01248 N)
Sutlej	Commander RV Jayaraman (02372 R)
Sarveshak	Captain MK Nair (02068 Z)
Offshore Patrol Vessels	
Saryu	Commander (later Commodore) SPR Reddy (01358 K)
Sharda	Commander B Bandhopadhyay (01452 Z)
Sujata	Commander VK Bakshi (01581 T)
Air Squadrons	
INAS 339	Commander SV Purohit

SECTION IV

Introspection, Perspective & Personnel Planning

Structural Dilemmas and Challenges

Preamble

"A functioning anarchy is outwardly chaotic and appears ungovernable. But it knows how to contain its furies; it does not export its miseries and has an inner calm that permits it to grow". — **John Kenneth Galbraith**

For the Navy, the period 1991 to 2000 was one of profound change. It was a period of considerable innovation and consolidation in force levels. The Navy's achievements spread over many fields. Curiously, it was also a period of careful introspection.

The decade was noteworthy for the discussions that took place on structural dilemmas and challenges, in the realm of perspective planning, budget and resource allocations, changes in command and control structures, and personnel related issues against the backdrop of unusual domestic, regional and global geopolitical events. Several Committees were constituted which delved deep into issues related to India's Defence Policy, Security and Higher Management, etc. Significant amongst these were:

- The Committee on Defence Expenditure (CDE), set up in June 1990, chaired by Mr Arun Singh, Deputy Defence Minister, between 1984 and 1987. Its report laid the foundation of delegation of financial powers and the New Management Strategy of the Armed Forces.
- The 1990–91 Ministry of Defence Estimates Committee which was chaired by Mr Jaswant Singh[1] which focussed on Defence Force Levels, Manpower Management and Policy. The report dealt with the inadequacies that existed in these areas and the causes thereof.
- The Kargil Committee Report that reviewed the events leading up to the Pakistani aggression in Kargil in 1999 and recommendation of measures necessary to safeguard national security against such armed intrusions. The Report of the Committee recommended the constitution of a Task Force to review the Management of Defence. This Task Force submitted its Report in September 2000.

The decade was also significant for the effort put into the formulation of Perspective Naval Plans. The VII, VIII and IX plans drafted in this period displayed a greater vision for the development of the Navy. These were undertaken in consultation with the Defence Planning Staff (DPS).

The introduction of the New Management Strategy (NMS) was also a significant first. A major issue that confronted the Armed Forces during the decade was the issue of finance and the release of funds for Plan projects. The NMS was a bona-fide effort at evolving a framework of financial control.

The Navy drew from its experiences of 1988, when, three years into the 1985–1990 Defence Five Year Plan, funds had not been released for plan projects due to failure of monsoons. This was followed by a prolonged drought, which compelled funds to be restricted for defence. It resulted in the 'capital' segment of the defence budget being curtailed in favour of allocations for social development (education, health, drinking water, roads and other infrastructure).

The national calamity turned out to be a fitting lesson in resource management for the Navy. It realised that reforms were needed to facilitate the sustenance of the acquisition/modernisation segment of the defence budget by savings in revenue expenditure, without compromising operational readiness. On ground, this needed taking some drastic measures:-

- Reducing personnel costs by outsourcing or by not replacing civilian retirees.
- Reducing maintenance and logistic costs by cocooning whatever assets are cocoon-able (tanks, artillery, aircraft, submarines) to extend life in our hot and humid tropical climate.

1. Mr Jaswant Singh, ten years later, became India's Defence Minister and subsequently Foreign Minister.

- Changing the way the service trained for war.
- Becoming more cost-efficient (readjusting traditional arms/services/branch roles, outsourcing refits, closing bases, retiring old assets to cut rising maintenance costs rather than prolonging their in-service life to make up numbers and so on).

In effect, substantive reforms were needed to be implemented and accepted with the specifically focused objective of becoming a leaner, more efficient organisation and re-investing the savings in modernisation/upgrades. The NMS was an effort in this very direction.

The Navy's efforts in Harnessing Information Technology were also quite remarkable. In tapping the potential of blossoming Information Technology, the Navy showed great ingenuity. It also realised that whilst there had been a rapid growth of computer systems, there was no centralised plan to guide further system acquisition for meeting overall naval objectives. It thus, formulated a policy for computerisation in a systematic and time bound manner for the period 1995 –2000. An IT vision of the Navy was also promulgated.

The decade also saw significant steps being taken to address the Navy's personnel problems as new measures were drafted to attract and retain talent. The renewed emphasis on training meant that the right moves were being made to introduce systemic corrections and organisational changes in ensuring an improved operational readiness.

Despite its best efforts at upholding morale and maintaining discipline in service life, the Navy struggled with issues that were to eventually affect the course of its policy. Prime among them was the inability to attract high quality source material for its officer cadre and the alarming reports from the Services Selection Boards that they had 'no option but to lower their minimum acceptable standards', if the numbers required by the Navy were to be met. The answer perhaps, lay in making a career in the Navy an attractive proposition. This led to a series of measures to enhance the Service's brand value. There were improvements in pay scales and allowances; introduction of free rations; longer tenures in service; improved schooling facilities for children; a rise in accommodation in family stations, etc. The efforts eventually met with mixed success but in hindsight, the exertions undertaken by the Service were well worth it.

29

Committees on Higher Defence Management — Excerpts on Aspects Affecting the Navy

Preamble

The decade 1990–2000 was noteworthy for the Committees that were formed to look into National Security affairs against a backdrop of compelling domestic, regional and global geopolitical events.

- The balance of payments and acute shortage of foreign exchange crisis of the end 1980s led to the constitution of the 'Committee on Defence Expenditure' in June 1990.
- The 1991–92 and 1992–93 Reports of the Ministry of Defence Estimates Committee on Defence Force Levels, Manpower Management and Policy discussed the inadequacies that existed in these areas and the causes thereof.
- The Kargil War from May to July 1999 led to the institution of the 'Kargil Review Committee'. It recommended the constitution of a Task Force to review the Management of Defence.

Each of these Committees went in depth into India's Defence Policy, Security and Higher Defence Management:-

The Committee on Defence Expenditure (CDE) — 1990. Mr Arun Singh, who, between 1984 and 1987, had been the Deputy Defence Minister under Prime Minister/Defence Minister Mr Rajiv Gandhi, chaired the Committee. Though its Report remains classified, parts of it were quoted in the Reports of the other Committees and have also found mention in the public domain.

The Ministry of Defence Estimates Committee 1990–91. Mr Jaswant Singh, India's Defence Minister in 2000 and subsequently Foreign Minister, chaired the Committee. Its Report ranked among the more sharply focussed national security documents to emerge in the public domain. The terseness of the questions put to the Ministry of Defence and the candour of the Ministry's replies were a tribute to the transparency of India's Parliamentary system, more so as the issues discussed were, and remain, extremely complex. The Report of the 1990–1991 Committee was presented to the Lok Sabha by the Estimates Committee 1992–93. Some of the Committee's recommendations were implemented. Some await full implementation.

The Kargil Review Committee. In 1999, Pakistani military intrusions from Pakistan-Occupied Kashmir led to the Kargil War. This war was fought against the backdrop of threats by Pakistan to use its nuclear weapons. Pakistan's troops were evicted. America gave Pakistan a face saving exit that compelled it to withdraw behind the Line of Control. Several shortcomings came to light during this operation. In the aftermath of the war, the Government constituted the Kargil Review Committee[1] to:-

- Review the events leading up to the Pakistani aggression in the Kargil District of Ladakh in Jammu and Kashmir.
- Recommend such measures as were considered necessary to safeguard national security against such armed intrusions.

A Group of Ministers (GoM) was constituted to follow up the recommendations of the Kargil Review Committee. The GoM constituted four Task Forces. Their reports, not yet fully in the public domain, dealt with many of the problems highlighted in the 1992 Report of the Estimates Committee.

Task Force for Management of Defence. In 2000, a Task Force was constituted under Mr Arun Singh to review

1. *From Surprise to Reckoning — The Kargil Review Committee Report*, Sage Publications, New Delhi, 2000.

the "Management of Defence". It rendered its Report in September 2000. Many of its recommendations were implemented. Some are still under consideration.

Almost all of the problems reflected in these reports were endemic and indeed, many persist to this day. Excerpts from these reports providing an overview of the deliberations of these Committees and ones that affect, or pertain to, the Navy, directly or indirectly, comprise this chapter.

The Estimates Committee Report

The Committee on Defence Expenditure had a mandate to look into the fiscal requirements of the defence services and suggest a figure of expenditure that was reasonable and justified. Convened against the backdrop of professed uncertainties about the availability of funds/foreign exchange, which had led to a review of certain pipe-line proposals made by the Services and the Ministry of Defence, the Committee undertook a very careful assessment of VIII Defence Plan requirements and looked into the need for a higher outlay for the VIII Defence Plan.

Before it had actually been set up, there was a general consensus among political class that an outlay of 80,000 crores would be enough to meet the requirements of defence. The Committee analysed the issue and found that contrary to the popular perception, restricting the outlay to only Rs 80,000 crores was not only inadequate for regular planned expenditure but grossly insufficient to even meet the contractual and committed maintenance liabilities. Consequently, it inferred that with such a limited budget, it would be well nigh impossible to take up any modernisation projects and adversely affect the country's defence preparedness.

The Committee also considered concrete proposals on manpower planning and recommended a reduction without adversely affecting operational capability. It noted that the Ministry of Defence was in the process of evolving an alternative model of manpower policy under which various new initiatives were contemplated. These included voluntary national service, reduced terms of engagement in the Army and lateral transfer of servicemen to various civil sectors, which, if implemented, could reduce the Defence Pension Bill by 64%. Apart from this, it also highlighted the need for more comprehensive training of civilian manpower to enable them to deal with higher levels of technology besides effecting better career management and promotion prospects for them.

The need for reviewing the terms of engagement in the three Services and the desirability of a reduced colour service was also highlighted.

The Committee made some marginal recommendations on the issue of redressal of grievances wherein, it acknowledged that notwithstanding established procedures, certain individuals were bound to seek remedies through the Courts of Law. It noted a parallel in respect of civil services where the recourse to Central Administrative Tribunal (CAT) and higher Courts was also on the rise. However, in the case of the defence services the matter got more publicity, at a great cost to their reputation and tended to reflect badly on the Ministry, as well. The Committee commented on a wide range of issue.

Combat Levels — Institutional Aspects

Force Levels. The term 'force level' is quite distinct from the total manpower of a defence force and has a different connotation for the Army, as opposed to what it implies for the Navy and the Airforce. In the Army, since the Corps/Division/Brigade/Battalion/Company, etc. generally refers to specific laid down numbers in terms of manpower, the term 'force level' is often used synonymously with the manpower of the Army. However, in the Navy and the Air Force, the term specifically relates to the number of ships, submarines, aircraft, etc. The manpower required to maintain ships/aircraft is primarily dependent on the number and the types of ships/aircraft being operated. So, while an increase in the force level of the Army is to invariably mean an increase in the number of its personnel, this is not necessarily so for the Navy and the Air Force. This distinction was borne in mind by the Committee while examining the policies with regard to the force level and manpower management.

The Committee was quite shocked to find that there was a lack of clarity on the question of force levels. It had been apprised that 'force levels' under the MoD were determined by 'the dynamic perspectives of the security scenario coupled with the overall availability of resources within a plan period, competing demands from other prioritised sectors, the technological developments and other systemic inputs'. The Committee thought that there was great ambiguity in the premise. For a concept inherently linked with perspectives on national security, it was dealt with in remarkably lacklustre fashion with major decisions being taken on vague and unpredictable considerations.

On the question of Force Levels being defined in relation to the Gross National Product (GNP), the Committee found the idea to be lacking clarity and coherence. The Ministry of Defence had maintained that it was not practical to build force levels on any fixed percentage of the GNP formula, as

the overall military potency is to be related with the threat to be encountered, as perceived from time to time. The Committee felt that while there were arguments in favour of fixing defence investment as a percentage of the GNP in the interest of long term planning, the actual determination of force levels were not necessarily to relate to the overall allocation for defence.

Naval Plans. There was, however, an acknowledgement of the fact that with the rise in population and depletion of land resources, the country's maritime interests was likely to grow very significantly. Besides this, the growing strength of the Naval Forces of India's potential adversaries was also a factor to be taken into account.

While appreciating that current force levels of the Navy were commensurate with India's current maritime interests, the Committee expressed its concern that owing to the resource crunch, the Naval Plan 1985–2000 catered for only a modest modernisation programme, which includes replacement of obsolete units by suitable new inductions. For similar reasons, several of the planned inductions had to be either deferred or slowed down.

Strategic Forces Command. When informed that the Air Headquarters was examining the need and possibility of establishing a Strategic Air Command with control over all strategic forces including strategic reconnaissance, air lift, long range strike and surface-to-surface engagement, the Committee members averred that they were only too conscious of the fact that in future our country was likely to face a far greater threat from the sea and the air. The members were convinced that the time had come to pay far greater attention to strengthening the country's Naval and Air Power.

Indian Defence Policy. The Committee opined that the articulation of Indian Defence Policy as an instrument merely in defence of territory was a needless over-simplification. It expressed its dismay over defence planning being thrown into disarray by sudden and unexpected events such as the Gulf War.

It was noted with concern that though the country has fought four wars (1947, 1962, 1965 and 1971) and even launched armed operations in support of neighbouring countries (Sri Lanka 1987–1990 and Maldives 1988), most operations had been undertaken without a clear articulated and integrated defence policy. It stressed that a formal National Security Doctrine was an imperative underlying the question of 'Force Levels' and could no longer be put off.

Operational Directive. The Committee was briefed on the need for an op directive — a set of tasks given to the three Services, to be performed in a particular situation. Members could however, not see how such a document could be equated with a policy on National Security. In fact, they felt directions and tasks must necessarily flow from a well-defined policy or else tasks to be performed by the Armed Forces can tend to be guided by adhocism.

Higher Direction of Defence Services. The Committee noted that even though the apparatus for higher direction in the Ministry of Defence, viz. periodic ministerial meetings with the Chiefs of the three Services and senior civil servants, consultations held at the level of Chiefs of the Staff, etc, was in place, in the absence of a clear political direction, such meetings tended to be more routine in nature serving neither as a viable national security apparatus nor providing inputs necessary for appropriate direction of defence management.

The Committee conceded that any degree of political instability in the Government robbed the existing system of all effectiveness. In this context, members noted that though it was heartening that the National Security Council was set up in 1990, it was hardly surprising that it had not really taken off. There was therefore, a need for the Government to evolve a formal manner of higher direction of national security, taking a holistic view of national security in both its internal and external dimensions.

Defence Policy. There was an appreciation that excessive secrecy in matters concerning Defence and uncertainties of annual budgetary support had rendered the task of formulating Defence Policy difficult. The Committee, while appreciating these difficulties, was surprised that not much had been done to overcome these by way of rationalisation of the regulations governing secrecy of information and the budgetary procedure in relation to the Ministry of Defence. It noted that the culture of excessive secrecy had inhibited free and wider debate in the country, about the issues concerning national security.

Decision Making Process. The Committee was apprised that decisions relating to Defence of the country against external aggression and related matters were taken at various levels in the Government and the Ministry of Defence, the highest such level being the Cabinet Committee of Political Affairs. While arriving at these decisions, the Defence Ministry assessed the threat scenario, the capabilities of the adversaries and determined steps to be taken to face the threat. In doing so, the Ministry also interacted with Ministries of External Affairs, Home Affairs and various intelligence agencies, etc. Ultimately a crystal clear directive was issued from the highest level and final decision communicated to the Service Chiefs, who then were to translate these directives

into concrete action. The three Chiefs were to determine the financial and manpower implications of the directive given to them. The resultant proposals for additional manpower, equipment and weapons were projected back to the Ministry of Defence.

The Committee found the entire process of decision making too 'cumbersome' — almost assuming the form of a hurdle race. Since the proposals were reviewed at various desks in the Ministry of Defence, Ministry of Finance and the Prime Minister's Secretariat before being presented to the CCPA, the process obviously got too prolonged. It noted that underlying the malady were the economic constraints facing the country and the competing demands from other segments of the Government.

Under these circumstances, the Committee was of the opinion that the directives issued by the political authority carried no concomitant assurance about the availability of resources necessary to transform them into reality. The resultant situation that the Services ended up in, was one of great anxiety and irony, and not justifiable by any means.

The Committee also found that in their projections the MoD had articulated a somewhat contradictory viewpoint on the effectiveness of the decision making process in the Ministry. While on the one hand, the periodic observations made by Comptroller and Auditor General of India and Public Accounts Committee (pointing out delayed decisions, cost overruns and missed opportunities) were dismissed by the Ministry as procedural irregularities, on the other, it was stated that the Ministry was continuing to make improvements to optimally utilise the various resource, viz. manpower, money and time at all operational levels.

By its own admission, matters at the MoD did tend to drag on without a decision for some time, because of the enormous financial implications involved. At the same time, it was argued that mere delegation of more powers would not lead to expeditious decision-making because resource constraints would compel the Service Headquarters also to procrastinate over proposals submitted to them in the lower formations.

The Committee was however, convinced that by empowering the Service Headquarters to take more decisions at their own levels, a great deal of time and cost could be saved by merely eliminating, to a great extent, the consequences of the gap in perception, specialisation and familiarity that exists now between the Services and the civilian apparatus in the Ministry of Defence Secretariat. It therefore, recommended delegation of greater financial powers accompanied by integration of financial advice at different levels of command.

Defence Planning. The Committee concurred with the Defence Ministry's viewpoint that decision making could become more effective if realistic Defence plans were formulated on the basis of clear national security objectives and military aims. In the absence of these two pre-requisites, most of the proposals coming before the Ministry were examined on a general basis. The Ministry was also forced to review the priorities set in the Defence Plan.

The Committee felt that beyond a point, this tendency weakens the very rationale of planning. In this context, it was observed that the weaknesses inherent in the existing practice of tasking the Defence Services could be traced back to the weaknesses in the Defence planning process. The Defence Planning Staff (DPS) under Ministry of Defence initiated the planning process by carrying out an assessment of strategic and technological environment of the country. However, in financial terms, only Annual Plans provided a firm basis for decision-making. It therefore, agreed with the viewpoint that both the 15-year Perspective Defence Plan and the 5-year Defence Plan served only a limited purpose. It was however noted that the Defence Ministry had more or less reconciled to this situation.

Members were apprised that in order to make Defence planning effort worthwhile, the suggestion to let Defence plans carry concomitant assurance about budgetary allocations at least over a period of 5 years, has not been found favourable for various legal and technical reasons. They, however, observed that the fluctuations in the annual revenue of Government of India were relatively marginal and rarely had the defence expenditure ever been cut back.

The Committee concluded that notwithstanding the legal and technical difficulties, on practical considerations, a 5-year budget allocation was feasible. Moreover, to deal with competing demands in an economy, an unlimited availability of funds could perhaps, never be expected even under the most favourable economic conditions.

It was clear to the members that the Government had to firmly commit funds, at least for those projects and procurements, which were high on the priority list over a period of five years. This, they felt, would not only speed up decisions, but also obviate prohibitive cost over-runs.

Operational Availability of Equipment. The Committee was concerned at the gaps being experienced between the

identification of the need for equipment and its operational availability due to delay in setting up support/maintenance facilities. They felt that in this manner the country couldn't take full benefit of the investment being made in the Defence Sector and any complacency in the matter could tell upon the defence preparedness of the country.

Aid to Civil Authority. Deployment in aid of civil authority is one of the legitimate functions of the armed forces. Usually, use of armed forces was done sparingly and only when circumstances rendered all other options unviable. The Committee felt such instances were too many and expressed its disquiet over the increased involvement of the Army in the maintenance of internal security. This has a deleterious affect on the combat effectiveness of the Armed Forces besides telling upon their image and morale. Since most of the internal security problems arise from political issues and administrative mismanagement, the Committee considered inappropriate the attitude of transferring to the Army more and more responsibility in handling the consequent problems.

Recommendations. The Committee made the following recommendations:

- The Government was advised to articulate a clear and comprehensive defence policy based on a viable national security doctrine.
- For a more effective higher direction of national security, the dormant National Security Council was to be revived.
- The Official Secrets Act was to be reviewed and rationalised to facilitate a more meaningful debate on national security affairs.
- With a view to stabilising defence plan expenditure, the feasibility of making the defence sector allocations for the entire plan period as unalterable was to be examined.
- The Defence Policy had to take a greater note of emerging threat to the country from air and sea and must be reshaped to safeguard growing economic and maritime interests of the country. For this purpose, future defence plans towards modernisation of Air Force and Navy needed greater focus.
- The process of Defence Planning and allocation of resources was also to be correlated such that tasks given to the Defence Services were backed by sufficient assurance about the availability of resources.
- The decision making process in the Ministry of Defence needed to be reformed to avoid time and cost over-runs. For this purpose, far greater powers needed to be delegated to the three Chiefs of Staff.
- It was recommended that financial Advisers could be appointed in respective Service Headquarters, and at various Command/Formation levels, to ensure proper decentralisation coupled with rapid decision making and corresponding accountability.
- Immediate attention to be paid to imparting greater specialisation to the civilian officers of the Ministry of Defence Secretariat.
- The question of maintaining the combat effectiveness of the Armed Forces was to be examined afresh in the light of the current budgetary constraints. Fleet modernisation, force multipliers for the Air Force and specialised troops for the Army had to be seen in that light.
- Serious efforts were to be made to plan infrastructure for maintenance and support services for weapon systems and equipments to minimize the gap being experienced presently between the identification of the need and actual induction into service of weapons system/equipments etc.
- Government was to take both long term and short-term measures in order to minimise the involvement of Armed Forces, particularly the Army, in the maintenance of internal security.

Personnel

Manpower and Management Policy. The Committee was informed by the MoD, that the policy relating to management of manpower in the Defence Services sub-served the objectives underlying the resource allocation to the Defence sector and therefore sought to ensure optimum use of force levels. Appropriate recruitment and personnel policies, besides an effective training programme and creation of an internal structure that was well tuned with the environmental and strategic factors, were the essential components of this policy.

The Committee was further apprised that with the growth in the absolute numbers of personnel and the fact that personnel costs constituted a large part of the Services budget, the share of resources available for modernisation schemes got affected. As budgetary support was circumscribed by availability of resources and the competing demands from other sectors, the size of manpower in the Defence Services was causing anxiety at the policy-making levels as well as in the Services. The

natural fallout of this situation was a difficulty experienced by the Services in keeping the manpower well provided in terms of infrastructure, equipments, stores or welfare and in its inability to attract human resource of desired quality at existing package of incentives.

The Committee noted that, despite the stated circumstances and the assertion of the Ministry that there was a manpower management policy, the Ministry had not been able to place before them any articulated statement outlining the basic parameters of such a Policy. Various statements proffered by the Ministry on composition of manpower in the three Services, its functional classification, its structural features in different Services reflected a diffused thinking on policy issues and could not be purported to be a statement of policy. On the contrary, the multifarious problems being faced currently in the management of manpower itself underline the very absence of a well-thought and long term policy in the matter.

Manpower Requirements. The Committee was informed by the MoD that within the Army, economy in expenditure remained the uppermost consideration, whereas in the Air Force emphasis was on providing the minimum necessary manpower for operational requirement and the necessary support element. Moreover, there was a Standing Establishment Committee in respect of the three Services which reviewed periodically the manpower in each Service, taking into account the relevant manpower norms, the latest weapon profiles of the Service and the questions relating to absorption of new technology.

Members were also apprised that there was an overall ceiling on manpower in the Army and Air Force. There was no such ceiling for the Navy, which was still considered to be a growing service. These ceilings, however, did not imply a ceiling on force levels. In fact, as and when new weapon systems or equipment were inducted into the services or their configuration underwent a change, additional manpower requirements which arose were sanctioned notwithstanding the ceilings.

The ceilings on manpower were reviewed from time to time. However, deviations notwithstanding, such a ceiling served a useful purpose in futuristic planning and was determined taking into account defence objectives, security environment, geo-political scenario besides the growth and modernisation of the Armed Forces of our adversaries.

Teeth to Tail Ratio. The Committee were informed that indicators like teeth to tail ratio in the Army and man–ship ratio in the case of Navy had, over the years, declined and reflected an improvement in the level of efficiency/productivity in the utilisation of manpower in these Services. However, these ratios did not reflect the true picture since the size of the ship or the extent of high-tech equipment deployed on it had not been taken into account. On the other hand, in the Air Force the ratio of combat to support element had been established only after 1980. Hence, no conclusive trend was available.

The Committee noted that the ratios were misleading and had been rendered meaningless. They were dismayed to find that the Ministry had not developed meaningful indicators for measuring manpower efficiency in the three Services. It also took exception to the statement of the Ministry that the Service Headquarters had been continually asked to closely monitor the teeth to tail ratios.

The Committee was deeply perturbed to note that there were significant shortages of manpower in the three Services. These include a shortage of 9,000 officers in the rank of Captains in the Army, 900 officers in the rank structure of Squadron Leader and below and 6000 airmen in the IAF and 700 to 800 officers and about 1000 sailors in the Navy. The Ministry had contended that the three Services were able to live with these deficiencies and maintain their operational readiness. However, since the shortage related to those ranks, which constituted the cutting edge of the Armed Forces, it was indeed, an alarming situation.

Cadre Reviews. The Committee was informed by the MoD that one of the factors, which had contributed to shortages in the ranks of Squadron Leaders/Captains, etc., was the Cadre Review, carried out first in 1980 and later in 1984. Since a large number of posts were created in the higher ranks, vacancies in the lower ranks could not be matched by the normal intake of officers, particularly through the Short Service Commission.

The Committee observed that the Cadre Review enhanced the rank held by an officer without corresponding enhancement of authority, thus causing an imbalance in his position besides giving rise to an unfavourable age profile in the Services. This resulted in units being commanded by older men thus affecting the operational effectiveness of troops as noticed during IPKF involvement in Sri Lanka. Members were not impressed by the Ministry's view that Cadre Review had helped in retention of officers of maturity, experience and expertise. They noted that the baneful consequences of Cadre Review could prove to be irreversible unless the situation was eased by introducing an attractive voluntary

retirement scheme or a scheme for lateral transfer of middle rank service officers to appropriate civilian jobs in the Government. That levels of stagnation were allowed to reach a pressure point where Cadre Review became unavoidable itself spoke volumes about the myopic management of manpower in the Defence Services.

Quality of Personnel. Presenting its case, the MoD stated that the Armed Forces no longer attracted the required quality of personnel in adequate number as a result of which training establishments like National Defence Academy (NDA), Indian Military Academy (IMA) and Officers Training Academy (OTA) had lately remained underutilised. Besides, there were considerable wastages in the selection process itself due to sub-standard quality of human resource that drifted towards the Defence Services. This trend had further accentuated the deficiency of officers in the Services. Although concerted efforts had been made by the Services to attract better quality of human resource and in adequate numbers, the results had not been uniformly encouraging.

In this context, the Committee found that there was near unanimity amongst the services in holding the view that Government must do something positive in helping the Services to overcome this problem. Members felt that an improvement in the existing terms of Short Service Commission by incorporating in it some of the attractive features of the Emergency Commission Scheme (ECS) introduced in wake of 1962 hostilities with China could go a long way in obviating the middle level shortage of officers in the three Services. They also averred that for attracting officers of high quality, recruitment efforts of the three Services had to focus on a wider social base, particularly, the rural population.

Colour Service. The Committee was informed that the existing terms of engagement in the three Services ensured a service profile, which stretched from 18 years to 35 years. Consequently, the periods of colour service had become longer. This put the available infrastructure such as housing, medical and educational facilities, etc. to great strain besides burgeoning the pension bill of the Defence Services. Moreover, prospect of comparatively earlier retirement with no assurance of re-employment also dissuaded potential candidates from joining the Services. The Ministry was reviewing the existing terms of engagement to reduce the period of colour service for servicemen.

Welcoming the step, the Committee felt that a final decision in the matter needed to be accompanied by a better resettlement strategy so as to ensure that the working life of servicemen was not cut short.

The Committee also, in principle, welcomed the induction of women in the Armed Forces, which had traditionally been the preserve of men. However, they expected the Government to make gradual progress in this direction without, upsetting the discipline and fighting capabilities of the Services. They considered it highly important that the initiatives taken recently were thoroughly reviewed in the light of experience on the ground.

The Committee noted that the Ministry of Defence were in the process of evolving an alternative model of manpower policy under which, various new initiatives were being contemplated. These included voluntary national service, reduced terms of engagement in the Army and lateral transfer of servicemen to various civil sectors. If implemented, these measures could reduce the Defence pension bill by 64%. Apart from this, members also deliberated over the need for comprehensive training of civilian manpower to enable them to deal with higher levels of technology besides effecting better career management and promotion prospects for them.

Recommendations. The Committee made the following recommendations:-

- Adoption of a long term and cogent manpower management policy.
- A comprehensive review of the overall number of personnel in uniform as well as civilian staff to judge the extent to which it could to be pruned.
- The manpower ceilings fixed in the Services be determined on a futuristic basis and enforced meaningfully to ensure that these are not exceeded under any circumstances.
- The data relevant for determining the ceiling on manpower at different levels be maintained in a systematic manner and updated at appropriate fixed intervals.
- For ascertaining that manpower is being optimally and productively utilised, a set of reliable indices be developed, applied and monitored at the higher echelons of the three Services.
- In order to overcome the shortage of Commissioned Officers in the three Services, particularly the Army, the existing package being offered to officers recruited under the Short Service Commission Scheme be improved upon to bring it at par with what was being offered to officers recruited under Emergency Commission Scheme in 1962.

- More Sainik Schools be opened in the rural areas to target recruitment efforts at a wider social base and to catch appropriate human resource at a young and impressionable age.
- Serious efforts be made to bring down the age profile of the unit commanders. For this purpose, an attractive voluntary retirement scheme for the officers at appropriate level should be introduced.
- Steps be taken to reduce the top heaviness of the Services in order to streamline the command structure.
- In the normal course, a Cadre Review be used merely for fine tuning promotional policies and the rank structure and should not result in upgradation of most ranks over a wide canvas. Appropriate manpower policy models should therefore be developed to meet enhanced requirement of officers and men.
- The terms of engagement in the three Services be reviewed and desirability of a reduced colour service considered.
- Appropriate schemes for lateral absorption of retiring Defence personnel in civilian departments be drawn up by offering appropriate relaxations of recruitment rules and procedures. The Government should urgently prepare an appropriate scheme for gainful re-employment of ex-servicemen.
- The question of induction of women in the operational arms of the Defence Services be examined.
- Greater attention be paid to appropriately training civilian manpower in the Defence Services.
- Promotion prospects of the civilian manpower in the Defence Services be reviewed and improved upon.
- The question of Voluntary National Service be subject to a comprehensive national debate and all necessary steps taken for the purpose.

Discipline and Welfare

Redressal of Grievances. The Committee was apprised that there was a well laid down procedure under which, aggrieved Defence personnel could make non-statutory or statutory representations to the Service Chief/Government for redressal of their grievances in regard to punishments, promotions, postings, retirement, etc. The number of statutory complaints as well as references to court cases had, however, gone up considerably during the recent years. This was attributed to an increase in the number of Defence personnel, their improved educational standards and rising expectations. Even so, statutory complaints in each Service and the total number of court cases, as a percentage of the cadre strength of officers' class, were not very significant.

The Committee was constrained to observe that it would have been more appropriate to indicate percentage of aggrieved officers ultimately approaching civil courts for redressal of their grievances and the number of cases in which, the courts had upheld their pleas. Members were of the view that percentage of such officers will not be insignificant. This was therefore, not a cause for optimism on this account.

However, low percentage of such cases notwithstanding, often such matters got highly publicised and reflected disproportionately on the reputation of the Armed Forces, which was more injurious to the morale of the Forces and their faith in the leadership. It also sullied the public perception about our armed forces. The Committee could not but express their concern over such a trend, which was likely to accentuate further as society changed and individual citizens became more assertive about their rights. The Committee was convinced that there was something inherently wrong in the system of grievance redressal in the Services, which needed fine-tuning.

In this context, the Committee noted that the Ministry was willing to review, in consultation with the Service Headquarters, an alternative structure for providing satisfaction to aggrieved officers so that they do not resort to the Courts of Law for redressal of their grievances. They were further apprised that for this purpose the Ministry of Defence was contemplating revival of an earlier idea of setting a statutory board consisting of a sitting or retired judge of High Court, besides representatives from the Services, preferably retired, and a civilian of equivalent status.

Residential Accommodation. The Committee acknowledged that housing was a basic necessity, which contributed to a large extent in maintaining the morale of the personnel. They were also conscious of the fact that full satisfaction on this account was not possible and could not be planned for, under the present circumstances, unless the number of beneficiaries was kept reasonable and constant. For a large organisation like the Ministry of Defence, it was impossible to provide 100% satisfaction without committing disproportionately large resources, which could be direly

needed in other areas. The Committee was satisfied to note that the Ministry of Defence were seized of this problem. They were of the view that deep thought needs to given to evolve long term and short term strategies to optimise satisfaction on account of housing in the defence services. The Committee took note of the proposals to review the scale of accommodation and to optimise the utilisation of the existing assets.

Medical Facilities. While the Committee was satisfied with the medical facilities provided to service personnel and their families, they were nevertheless concerned about the existing gap between the sanctioned and availability of beds in Military Hospitals which has been attributed to lack of accommodation and supporting services. The Committee hope that the Government will soon take steps to set-right the imbalance.

Recommendations. The Committee recommended that in order to identify the existing and potential causes of dissatisfaction with the existing system of grievance redressal, it needed a thorough review.

- **Imparting Objectivity to Existing Institutions.** There was a need for steps to be taken to impart utmost objectivity to the existing institutions for redressal of grievances internally. For this purpose, the Committee desired that no further time be lost in setting up statutory boards or tribunals exclusively for Service personnel; such bodies should be represented by retired Service officers, eminent civilian persons from the fields of judiciary and higher civil services. As a corollary to this, it was recommended that service personnel be barred from approaching civil courts except for the purpose of review by the Supreme Court of the decision given by the proposed statutory board.
- **Review Existing scales of Accommodation.** The existing scales of residential accommodation need to be reviewed with a view to optimise satisfaction from the existing housing facilities and ensure greater availability of hired accommodation within the authorized scales of rent. To begin with, such exercise could be undertaken urgently in respect of metropolitan cities and other areas where residential accommodation was scarce.
- **Manpower Structure and Age Profile.** An in-depth study of the manpower structure and age profiles need to be carried out in order to meet the burgeoning requirement for housing and other facilities.

The Report of the 2000 Kargil Review Committee

In the aftermath of the Kargil conflict in 1999, the Government of India instituted an investigation Committee to go into the reasons for the conflict. The Kargil Review Committee was mandated to review the events that lead to Pakistani aggression in Kargil and recommend measures necessary to safeguard national security against armed intrusion.

Setup in Jul 1999, the Kargil Review Committee Report was tabled in Parliament on February 23, 2000. The report carried out an exhaustive analysis of the conflict, stating reasons, rationale and circumstances that led to the conflict. It evaluated the raison-de-etré of the Pakistani establishment for going ahead with an audacious plan and deconstructed the Pak Army's daring strategy, as it recreated events leading up to the war.

A threadbare analysis of the conflict brought out many grave deficiencies in India's security management system.

Failure of Intelligence. In its very essence, the Kargil incursion was a failure of Intelligence. The Review Committee had before it overwhelming evidence that the Pakistani armed intrusion in the Kargil sector came as a complete and total surprise to the Indian Government, Army and intelligence agencies as well as to the J&K State Government and its agencies. The Committee did not come across any agency or individual who was able to clearly assess before the event the possibility of a large scale Pakistani military intrusion across the Kargil heights. What was conceived of was the limited possibility of infiltrations and enhanced artillery exchanges in this Sector. The Committee concluded that there was crying need for the intelligence setup in the country to be reorganized so there was better collection, assimilation and sharing of information.

Overhaul of the National Security Management System. The Committee found that the system of security management in the country was outdated. The framework, formulated by Lord Ismay and recommended by Lord Mountbatten, had been accepted by a national leadership that was unfamiliar with the intricacies of national security management. There has been very little change over the past 52 years despite the 1962 debacle, the 1965 stalemate and the 1971 victory, the growing nuclear threat, end of the Cold War, continuance of proxy war in Kashmir for over a decade and the revolution in military affairs. Moreover, the political, bureaucratic, military and intelligence establishments appeared to have developed a vested interest in the status quo. National security management

receded into the background in time of peace and was considered too delicate to be tampered with in time of war and proxy war. The Committee strongly feels that the Kargil experience, the continuing proxy war and the prevailing nuclearised security environment justified a thorough review of the national security system in its entirety. It recommended that the system, be revamped at the earliest, preferably by an independent body of credible experts.

Structural Reform of the Services. The Committee also had some insightful comments to offer on the role of Chiefs of Staff and structural reforms in service. It noted that India was perhaps the only major democracy where the Armed Forces Headquarters were outside the apex governmental structure. The Chiefs of Staff had assumed the role of operational commanders of their respective forces rather than that of Chiefs of Staff to the Prime Minister and Defence Minister. They simultaneously discharged the roles of operational commanders and national security planners/managers, especially in relation to future equipment and force postures.

Most of their time was however, devoted to the operational role. This had led to a number of negative results, not the least of which was the inadequacy of future-oriented long term planning. Army Headquarters had developed a command rather than a staff culture. Higher decisions on equipment, force levels and strategy were not collegiate but command-oriented. The Prime Minister and Defence Minister did not have the benefit of the views and expertise of the Army Commanders and their equivalents in the Navy and Air Force so that higher level defence management decisions were more consensual and broad based.

The Committee added that the present obsolete system had perpetuated the continuation of the culture of the British Imperial theatre system of an India Command, whereas what is required is a National Defence Headquarters. Most opposition to change came from inadequate knowledge of the national security decision-making process elsewhere in the world and a reluctance to change the status quo and move away from considerations of parochial interest. The status quo was often mistakenly defended as embodying civilian ascendancy over the armed forces, which was not a real issue. In fact, it went ahead to recommend, locating the Services' Headquarters in the Government would further enhance civilian supremacy.

On the issue of 'structural reforms', the Committee said that there was a need to bring about a much closer and more constructive interaction between the Civil Government and the Services. The present obsolete system, bequeathed to India by Lord Ismay, merited re-examination. An effective and appropriate national security planning and decision-making structure for India in the nuclear age is overdue, taking account of the revolution in military affairs and threats of proxy war and terrorism and the imperative of modernising the Armed Forces.

The Committee surmised that the country was lucky to have scraped through various national security threats without too much damage, except in 1962. But it could no longer afford such ad hoc functioning. It, therefore, recommended a comprehensive reorganisation of the entire gamut of national security management and apex decision-making and the structure and interface between the Ministry of Defence and the Armed Forces Headquarters.

A Comprehensive Manpower Policy. The Committee found that a comprehensive manpower policy was the need of the hour. In the existing international security environment, proxy war and terrorism had become preferred means of hurting a neighbour's social, political and economic well-being. Given Pakistan's unrelenting hostility towards this country, it was necessary to evolve a long-term strategy to reduce the involvement of the Army in counter insurgency and devise more cost-effective means of dealing with the problem. The heavy involvement of the Army in counter insurgency operations was clearly affecting its preparedness for its primary role, of defending the country against external aggression.

Need for Critical Equipment. The Committee focused on the need for making critical equipment available in time for combat, which is the supreme consideration that must govern acquisition policy. However, as things stood, it did not appear to be the case and there was no mechanism to monitor that the process of equipment acquisition serves the best interests of the country.

The Defence Research and Development Organisation and the chain of defence laboratories under its jurisdiction were responsible for indigenising and constantly upgrading the country's weapons and equipment inventory and related supplies. The dilemma had always been to determine the correct balance between 'make or buy.' There were obvious constraints such as of foreign exchange and the non-availability of state-of-the-art technology from advanced nations, which were at best only prepared to share these with their military allies. As a non-aligned power, India also did not have access to some of the Western technologies that have flowed to Pakistan. Dual-use technology-denial regimes have also operated against India.

These considerations demanded that the country develop a degree of self-reliance in defence-related technology and military hardware.

Need for a National Security Advisor. The Committee felt that having a National Security Adviser, who also happens to be Principal Secretary to the Prime Minister, could at best only be an interim arrangement. There was a pressing need for a full time National Security Adviser. It also recommended the induction of a second line of personnel into the system as early as possible and groomed for higher responsibility.

Increased Role for the National Security Council. The National Security Council, formally constituted in April 1999, was still evolving and its procedures were taking time to mature. There was a need for the council to play a greater and proactive role in security affairs. Members of the National Security Council, the senior bureaucracy servicing it and the Service Chiefs needed to be continually sensitised to assessed intelligence pertaining to national regional and international issues. This could be done through periodic intelligence briefings of the Cabinet Committee on Security with all supporting staff in attendance.

Border Management Policy. The Committee highlighted a pressing need to fashion an effective border management policy, which covered not just terrorist infiltration, but illegal migration, smuggling and the flow of narcotics. These were matters of national concern being looked at compartmentally. The inevitable result had been sub-optimal border management at a time when the narcotics trade had been playing a crucial role in Pakistan's promotion of cross-border terrorism.

Media Relations and Information. Kargil was India's first television war. Even though, coverage by the print and electronic media was by and large satisfactory, the Committee found that is some cases media personnel lacked training in military affairs and war reporting and that the Armed Services lacked training and preparedness to facilitate the task of the media and counter disinformation.

Review of the Management of Defence by the Arun Singh Task Force

Chaired by Mr Arun Singh, Deputy Defence Minister in the Rajiv Gandhi Government, the Committee rendered a report that remains classified. However, some parts of it have been quoted in the Reports of the other Committees and have also found mention in the public domain. The report, details of which are placed at reference notes, traced the origins of the Defence Services and chronicled their growth through the years. It is noteworthy for its perceptive observation that most ills plaguing the services, invariable are rooted in history.

Conclusion. For long, the issue of Higher Defence Management has been contentious and vexed. During British Rule, for the first time an attempt was made to evolve a Higher Defence Organisation. After Independence, Ismay, a recognised world expert on Defence management, worked on a Committee system that made recommendations for the setting up of such an organisation. After much consultation and effort a system was finally evolved that consisted of unique features of a combined defence organisation and a combined professional head. Even so, almost four decades after independence, the Ministry of Defence continued to lack professional co-ordination in areas demanding high professional competence. It was, principally, a problem of control and an unequal distribution of authority vis-à-vis the service HQs. Committees set up in the 90s decade tried to address the problem and restore the balance with the overall aim of fine-tuning the organisation and mechanism for Defence Management.

30

Perspective Naval Planning

Background

The idea of a perspective plan apparently germinated in the early 80s. In October 1981, whilst addressing Senior Naval Officers, the then Prime Minister Indira Gandhi, perhaps for the first time, stressed on the need for the Navy's development to be cast in the framework of a perspective plan that would cover both short term and long term requirements. The Navy forwarded its plan in February 1982.

A year later, a related development only underlined the need for long term naval perspective planning. On 30 April 1982, the United Nations Convention on the Law of the Sea was adopted after nine years of deliberation. The 200-mile Exclusive Economic Zone and the extension of the continental shelf made it necessary to forestall jurisdiction claims by littoral neighbours. Already, there was the New Moore Island problem with Bangladesh and the Narkondam Island problem with Myanmar. India's southernmost island, Great Nicobar, was 1000 miles from India, but only 90 miles from Bandar Aceh, at the northern tip of Indonesian Sumatra. Indonesia, for some years, had an eye on the Nicobars. Neither the Andaman, Nicobars nor the Laccadive Islands of India had been accepted as archipelagos whose waters could be subject to India's regulatory control.

In the far east, China's growing Navy was in preparation for flexing its muscle in the Bay of Bengal, possibly seeking base facilities in both Myanmar and Bangladesh. The Pakistan Navy had re-armed after its debacle in the 1971 War. A combination of all of these factors necessitated that there should be sufficient naval force levels to safeguard the nation's interests. And in Parliament, all sections of the political spectrum had urged the Government to strengthen the Navy.

The Navy reasoned that the best way to approach the problem would be to obtain a consensus on the reason for a force to exist, after which it would be easier to assess the scope, the requirements and the physical shape in which this force should materialize. It formulated the framework of a National Maritime Strategy and a Naval Security Doctrine and derived a 30 Year Perspective Plan for the Navy's development.

The plan took over two years to take shape and was one of the most detailed and holistic studies undertaken after independence in 1947. The then CNS, Admiral Dawson, forwarded this plan to the Government in October 1984 before he demitted office.

The Plan was based on the Government's pronouncements of our National Aims namely:-

- To ensure rapid economic growth with guaranteed social justice within the present constitutional structure.
- To ensure the territorial integrity and sovereignty of India.
- To pursue a foreign policy seeking peace, stability and cooperation appropriate to the changing regional and international environment.

The plan summarised India's Maritime Strategy as follows:

By virtue of her economic development, India must prepare to assume the role of the predominant regional power in the Indian Ocean. Politically, India has unequivocally declared that it has no intention to dominate any littoral neighbours. Equally, India must resist coercive diplomacy of non-littoral states in Indian Ocean affairs.

In the above stated background, the Navy's 15 Year Perspective Plan was prepared. Based on this Plan, Five Year Plans were drawn up which were made co-terminus with the National Five Year Plans.

Defence Planning Staff Function & Objectives

In 1986, the Government created the Defence Planning Staff. The functions assigned to the Defence Planning Staff (DPS) are:-

- To carry out threat analysis and formulate threat assessment for various time frames.
- Evolve military aims.
- Formulate concepts of combined operations.
- Conceive and recommend balanced force levels to achieve military aims.
- Carry out joint training and joint logistic management.
- Coordinate perspective planning for about 15 to 20 years.
- Interact closely with R&D, Defence Production, Industry and Finance.

The process of Defence Planning[1] was to be initiated by the DPS by carrying out an assessment of Strategic and Technological Environment of the country. Guidelines were communicated by the MoD to the services HQs for formulation of the draft plan. Based on the Service projections, DPS prepared a draft integrated Plan. This was considered by Government/CCPA for approval, in consultation with all the concerned agencies.

In each of the three Services, the Annual Plan was based on the 5 year Defence Plan which, in turn, took into account the 15 year Defence Perspective Plan.

Defence Planning Priorities & Requirements for Operational Preparedness[2]

In the area of defence, the priorities were seen as quantifiable in terms of the minimum requirements of operational preparedness, both to deter war as well as to achieve satisfactory conclusion in a war that might be thrust on the country. These requirements were worked out jointly by the Defence Planning Staff and the Planning Staffs of the three Services in consultation with other involved agencies like Department of Defence Production and the Defence Research and Development Organisation. The requirements were also to be further reviewed by the Committee on Defence Planning before being finally approved by CCPA. The newly formed National Security Council was expected to play a role in this process in the future.

Naval Plans and Projects

Naval Projects have long gestation periods and are capital intensive. A new ship design takes 5 years and shipbuilding another 5–7 years. Replacement and funding decisions therefore have to be taken at least 15 years ahead if force levels are to be maintained. Regrettably, in the early 80s, there was no system that enabled such funding. In its absence, it was appreciated that the force level of 135 ships of assorted types would decline to 95 by year 2000, which would be grossly insufficient for the task of ensuring maritime security of our vast coastline at a time when the Indian merchant fleet and overseas role would be enlarging greatly as a consequence of new economic opportunities. To maintain a force level of at least 120 ships with average life of 20 years, the Navy had to induct at least 6 ships per year.

---

1. Systematic Planning for Defence was introduced in India during the 1960s and the first Defence Plan was prepared for the period 1964–69. This was followed by the Plan for the period 1969–74. The concept of a "Roll on" plan was introduced during 1970 and the first "Roll on" Plan was drawn up for the period 1970–75. The 1971 war had upset the plan for the year 1975–79. This was followed by Defence Plan 1979–84 which was revised in 1981–82 in view of the changed security environment in the region.

   Five Year Plans. The salient aspect of the Defence Planning System was an output oriented Five Year Defence Programme; a review of major issues prior to the preparation of the Annual Budget, close participation by the three services, the Departments of the Ministry of Defence and Defence Finance in the Plan review and a periodical programme adjustment procedure to keep the five year programme reasonably current.

   The Five Year Plan is updated through annual reviews. These annual reviews reflect the changes in priority, the shifts in emphasis, newer concepts and enable to reorient the plan within the availability of resources. This ensures that the Plan does not become rigid five year commitment but remains flexible and adaptable to change in the pattern of international relationship, strategic and tactical concepts, technology and availability of resources.

   Implementation of Defence Plan. A 'Defence Plan Coordination and Implementation Committee' headed by the Defence Secretary acts as a forum for coordinated action among the Services and the Departments in the Ministry of Defence. At the middle level, the Joint Secretaries head the plan monitoring groups for the three Services.

   Defence Planning Staff (DPS). DPS was formed in May 1986 to contribute towards the integration of the Defence Planning Process. Along with the formulation of the VII Defence Plan (1985–90), a Defence Perspective Plan for the three services and DRDO covering the period 1985 to 2000 was drawn up. This Perspective Plan contained the force development objectives of the three services the 7th, 8th and 9th plans together with an agreed scheme of financial guidance for distribution of future plan funds amongst the services.

2. While reflecting on the Defence Plan 1980–85, the need for developing the Navy was described by the CCPA in the following words:- "*The development of maritime or Naval strength has a fundamental difference in its basic aim from that of other two Services. Overall naval development is directly related to the support of national interests. This includes trade in exports or imports, carried almost entirely by sea and the safeguarding of our Exclusive Economic Zone (EEZ).*"

The 30 Year Perspective Plan — Oct 1984

The dramatic changes and force level imbalances in the neighbouring countries in the early 80s stressed the need for the Navy's development to be cast in the framework of a perspective plan that would cover both short term and long term requirements. The Navy formulated a '30 year Perspective Plan' in February 1982. It took the following aspects into consideration:-

- The indigenous shipbuilding capability and capacity that had been built up in the frigate and submarine projects.
- The confidence that had built up in integrating Russian and indigenous equipment.
- The recommendations of the Naval Expert Committee on Maintenance and Logistics.
- The revitalisation of naval training.
- The build up of naval bases and forward operating bases.
- The plans for increasing the depths of India's ports and harbours, of the future home-port of ships.

It was submitted to the Government in October 1984.

Naval Perspective Plan 1985–2000

The external security environment of the country and its growing economic interests at sea dictated the need for an effective and credible maritime strategy to safeguard its interests. For this, the Navy had to develop capacities to:-

- Inflict decisive punishment on any regional Navy in war and to raise the threshold against intervention by foreign powers.
- Ensure the safe movement of trade to and from Indian ports and the unhindered exploration and exploitation of offshore resources.
- Help small friendly littorals by creating amphibious sealift capability.

This capability was aimed to be achieved by creating force levels of sea going ships, submarines and aircraft commensurate with our maritime interests and by developing shore support infrastructure to sustain these forces. The Force Levels to be created by 2000 were:-

- One task force for each coast consisting of one Sea Control Ship (SCS) and eight General Purpose (GP) Destroyer/Frigates supported by long range reconnaissance (MR/ASW) aircraft and airborne early warning (AEW) aircraft.
- A Coastal force (two groups) to be deployed in the coastal waters as the second line of defence. Each such group to consist of one GP Frigate and 5 Missile/ASW Corvettes supported by MR/ASW aircraft.
- Capability to lift a brigade group including helo lifting of a battalion with associated vehicles and equipments.
- To deploy in offensive missions in enemy's coastal waters, important trade route to enemy ports, and in defensive patrols in own coastal areas and off harbours.
- As an integral part of sea control operations, aircrafts were to be used in various roles:-
  - **MR/ASW/AEW.** Requirement of 24 operational MR/ASW/AEW aircraft for supporting the ocean going/coastal forces.
  - **VTOL Aircraft.** A squadron of VTOL aircraft for air strike/air defence for each Sea Control Ship.
  - **Multi-role Helicopters.** Each SCS (ASW/ASV/AEW) to be provided with 8 helos, each GP Frigate (ASW/ASW) with 2 helos, each LPH (Commando) with 12 helos, each LST (Commando) with 2 helos.
- MCM ships and Missile Boats supported by a number of small aircraft for reconnaissance in the approaches to our harbours.
- Tankers, Training Ships, Diving Tenders, Afloat Support Ships, Survey Vessels, Submarine Rescue Vessels, Ocean Going Tugs etc.
- A strategic option at sea with two nuclear submarines to provide this capability.

Indigenous Capability. The plan placed great emphasis on indigenous ship construction and envisaged almost complete self-reliance in design and construction of surface warships to be achieved by 2000. To this end, a full fledged Warship Design Bureau including the associated weapons/sensors integration group was to be developed and the ability to manufacture weapon systems to be augmented.

During the 1980–85 Plan, defence shipyards delivered 21 ships, with the Navy's outlay on indigenous ship construction totalling Rs 318 crores. In 1985–90, the plan outlay was Rs 950 crores and 38 ships were to be ordered. In the 15 year period 1985–2000, 94 ships were expected to be delivered by Defence Shipyards.

The period 1985–2000 was characterised by large funding shortfalls, along with a virtual freeze on the Navy's new capital schemes for replacement and modernisation. The last CCPA sanction for a major frontline warship was given in 1986. Furthermore, the collapse of the former Soviet Union affected the availability of both spare parts and new equipment which had resultant effects on the subsequent Five Year Plans.

According to the Perspective Plan 1985–2000, the share of the Navy was to progressively increase from 13% during the 7th Plan to 16.5% during the 8th Plan and peaking at 20% during the 9th Plan. The Committee for Defence Expenditure agreed that the increase from 13% to 16.5% was inescapable. However, none of these increments actually took place.

Perspective Plans for the Period 1992–2007

The terms of reference with which the 1985–2000 Perspective Plan of the Indian Navy was formulated, altered significantly in the early 90s, due to changed strategic and fiscal environment. The Indian Navy therefore formulated the Perspective Plan for the period 1992–2007, spanning the period of VIIIth, IXth and Xth Plan periods. While the previous Perspective Plan (1985-2000) had projected development of the Naval Force Level to 178 ships and submarines by 2000, the Perspective Plan 1992–2007, taking in to account the long term impact of the serious financial shortfall in allocation of funds from the VIIth Plan onwards, further compounded by the two year plan holiday during 1992–94, envisaged a force level of 145 ships and submarine by 2007.

VII Naval Plan (1985–90)

The aim of the 7th Naval Plan was to obtain a decisive superiority over traditional adversaries and force level inductions were planned accordingly. It was planned to improve Blue water capability that saw plans being drafted for accretion of force levels and an increase in the recruitment of manpower.

The progress of the 7th Plan was fast in the first three years, however, the momentum slowed down in the last two years for want of funds. It resulted in time and cost overruns and placed a heavy strain on the Naval Budget. The Plan had envisaged an outgo of Rs 7,400 crores (at 1985 prices and based on the prevailing exchange rate). However, this plan period witnessed a large adverse variation in both FFE and NCR exchange rates. The effect of these exchange rate variations was exacerbated owing to the large number of FFE oriented projects. Further, the award of the IV Pay Commission resulted in a substantial outgo on Pay and Allowances.

These factors resulted in a total shortfall of Rs. 600 crores. A number of schemes, which should have been initiated during the VIIth plan, could not be taken up owing to the non-availability of funds leading to a decline in Force Levels.

VIIIth Naval Plan(1990–1997)

The perspective of the VIIIth plan was based on the changes in the Indian Ocean region:-

- Though the IPKF had returned home, the threats from Palk Bay continued to be alive and fraught with continuous developments. The Navy was charged with the dual responsibility of preventing clandestine operations as well as protecting fishermen. Naval ships, aircraft and submarines were deployed throughout the year to maintain peace in the region.
- Further East, apart from warding off poachers in the Andaman and Nicobar Islands, the Navy had a major task of preventing intrusions on uninhabited islands and other marine fauna in the area.
- Political developments in Pakistan and the Middle East brought fresh threats to the western seaboard.

The VIIIth Naval Plan took shape in 1988 based on the objectives contained in the Perspective Plan with an initial outlay of Rs 23,632 crores. The aim of the plan was to speed up the process of indigenisation. Maximum thrust was placed on increasing the indigenous content of all types of warships and development of various indigenous systems and sensors like radars, sonars, Computerised Action Information System(CAIS), etc, for fitment on ships. The propulsion and auxiliary machinery for various types of ships were to be indigenous or produced under license.

A Committee on Defence Expenditure (CDE) was appointed by the Government in June 1990 to examine various issues related to Defence expenditure with particular emphasis on the VIIIth Plan. CDE in discussions with the Ministries of Finance and Defence and the Service Chiefs recommended a plan outlay of Rs 1,03,000 crores for Defence with the naval share at 16% amounting to Rs 16,500 crores. After revising, the final figures for the Defence Plan were Rs 94,644 crores, with the Navy's share being Rs 11,616 crores with a shortfall of Rs 4884 crores in the Naval Budget.

The start of the VIIIth Plan was characterised by a plan holiday for a period of two years, 1991–92, marking it as the worst years for defence allocations. An amount of Rs 700

crores was lost due to devaluation and an equal amount due to double digit inflation, hike in POL prices and railway freight rates. In 1992–93, the situation was aggravated due to pressure from World Bank, IMF and aid consortium countries to reduce defence expenditure.

The salient proposals of the Plan were:-

Construction/Import of Ships

- Acquisition of a second hand tanker from trade to reduce the lead time for induction of third fleet tanker under construction at GRSE prior decommissioning of INS Deepak.
- Import of six LST(M)s or commence construction of a suitable design in an Indian yard prior decommissioning of the first of the 8 LST (M)s in 1994.
- Construction of a small vessel fitted with the state-of-the-art communication and electronic warfare systems.
- Requirement of Hovercraft Patrol Vessels to operate in shallow waters.
- Acquisition of two new cadet training ships to support INS Tir.

Refurbishment of Ships

- The first three ships of the Rajput Class due for long refits were to be updated with systems to contemporary standards.
- Refurbishment of Godavari class ships was to commence during the 8th Plan and continue through the 9th plan.
- Add modest weapon capabilities to OPVs acquired recently from ex-Korea/HSL which did not possess any weapon capability.
- Refurbishment of Viraat with inescapable updates in sensors and addition of CIWS.
- Older ships were to induct contemporary EW systems.

Submarines

- Acquire missile capability for SSKs as a retrofit.
- Retrofit ULF antennas to enable submarines to receive VLF communications while submerged.

Aircraft

- Create 3rd, 4th line maintenance of Sea Harriers.
- One ship each of the Project 15 and 16A (to be delivered in 1994–95) were to be equipped with suitable multipurpose ASW/ASV single package helicopters.
- Procure 24 Dorniers in addition to the first 10 Dorniers.
- Refurbish Seaking 42 Helicopters.

Infrastructure

- Commence Phase II of NAS Arkonam on completion of Phase I.
- Modernisation of Naval Armament Depots.
- Augmentation of existing dockyard facilities at Bombay, Vizag, Cochin and Port Blair.
- Construction of base facilities at Porbandar to cater for replenishment of ships and craft operating off the Saurashtra coast and also to give support to aircraft.
- Creation of a full-fledged Central Design Organisation.

The IXth Plan (1997–2002)

The IXth Plan viewed the Navy's rapidly declining combat capability in the context of its deterrence and war fighting goals and aimed:-

- To maintain a minimum deterrent capability vis-à-vis any other Naval force operating/likely to operate in the Indian Ocean.
- The Navy should have the ability to raise the threshold of confrontation or the factor of uncertainty that would deter even a major extra regional power.
- Evolve as a national instrument of sea based deterrence.

It also aimed to acquire the force levels necessary to raise the threshold against intervention by extra-regional powers in the Indian Ocean. However, the Perspective Plan (1985–2000) long since been derailed had eroded the margin of combat superiority due to inadequate funding support in the VIIth & VIIIth Plans.[3]

3. **Standing Committee on Defence — 6th Report.** The Committee was constrained to observe the adhocism in Defence Planning. This was amply evident to them from the fact that in a period of about 20 years, six Defence Five Year Plans were prepared but none could be completed for one reason or the other and had to be either deferred or refrained midway. The Committee was also deeply concerned to find that the 7th Five Year Plan for the period 1985–90 could be finalised only in the last year of the plan and the 8th Five Year Plan for the period 1990–95, later revised to 1992–97 had still not been finalised even after four years of the Plan period being over. The Committee also expects the Ministry to take adequate remedial measures to overcome the drawbacks noticed in the earlier plans and to ensure the finalisation of IXth Defence Plan would be completed well ahead of its commencement.

The reduction of Navy's Plan projection by 33% was not an acceptable situation. In this context the eighth report of the Parliamentary Standing Committee for Defence stated:-

"The Committee felt that the Navy has been ignored for many years. This has resulted in considerable slackness in the development of the Indian Navy, both the terms of fleet strength and technological advancement. To improve the situation the Committee recommended that adequate funds should be allocated in the coming years to the Navy to improve the fleet strength."

The force mix during the Plan period was characterised by three major drawbacks:-

- The IN did not have adequate submarine force level (declined from 19 to less than 12), and was dependent on foreign sources for supply of submarine systems.
- With the Vikrant phased out and Viraat left with only 8–10 years of life, the Navy would be devoid of an Aircraft Carrier unless urgent replacement action is taken.
- The ratio of large ships to small ships in the fleet was heavily slanted towards the latter, thereby detracting from the Navy's 'Blue-water' capability. As against a force level of 30 destroyers and frigates sanctioned by the ECC in 1964, there were only 13, most of which were ageing and in need of modernisation.

The IXth plan aimed to arrest the force level decline, attain the correct 'force mix' and architecture, provide impetus to the indigenous production of weapon system sensors, National and Defence R&D, support national level objectives/missions in developing strategic systems and structure and 'invest in the force structure of the future'.

Financial Outlay. The Capital outlay for the IXth Plan had a sharp increase on account of the delay and deferment of numerous capital scheme of the VII and VIII plans. Not only had schemes got bunched together, but their cost had increased substantially in relation to the initially projected outgo on the same. Added to this was the lack of sanctions of capital ships during the last 10 years.

In view of the reasonably healthy Revenue to Capital ratio and the fact that all schemes depended on own shipyards and aircraft manufacturing segments, an attempt was made to fund the ongoing ship construction programmes through a "Roll on Credit Plan". This envisaged shipyards borrowing on commercial terms to make good the inadequacies in the funding support in the 8th Plan. By judicious use of remaining resources, it was established that the entire loan with interest incurred during the 8th Plan could be repaid by the Navy in the 9th Plan period. It also established that the funds released from indigenous ongoing ship construction programmes could be diverted to start new schemes of ships, submarines, aircraft and infrastructure.

The significant proposals of the 9th Naval plan were:-

- **Ships.** The Navy had eight frigates (Leander and Godavari) and five Destroyers (Rajput class) acquired from the former Soviet Union. With the scheduled decommissioning of ships, the force level would decline to 17. It was planned to maintain a flow of warship deliveries through series production during the IXth, Xth and the XIth Plans. Three P-16A frigates and three P-15 frigates were under construction at M/s GRSE, Calcutta and M/s MDL, Bombay respectively. Induction of three frigates of Project 1135.6 with KA -31 Helicopters for AEW from Russia was planned.
- **Submarines.** Of the 18 submarines in the inventory, all the 6 Foxtrot Class submarines were scheduled for decommission by year 2000. Out of remaining 12 submarines, 6 submarines were overdue for extended three year major refits. It was planned to recommence indigenous series construction of submarines under Project 75, in batches during the IXth and Xth Plan, commencing with two in 1997-98. The submarine force levels were also to be augmented with import of two EKM submarines from Russia.
- **Air Defence Ship.** Vikrant was scheduled to be decommissioned in Jan '97. The Navy planned to explore the induction of an Aircraft Carrier from abroad to bridge the time gap between the Vikrant's decommissioning and induction of an indigenously built ADS.
- **Aircrafts.** Acquisition of four KA-31 AEW Helicopters from Russia to reduce the reaction time available to ships at sea to counter airborne missile threat.
- Induction of two Sea Harrier trainers to meet the training requirements.
- Induction of an advanced MR ASW aircraft capable of firing air to surface missiles as replacement for IL 38 aircraft.

The Indigenisation Plan

Indigenisation across the entire range of naval platforms and weapon systems had become the cornerstone of Naval planning. It resulted in the wherewithal to design and build warships, ranging from aircraft carriers to small gunboats. By the mid-90s, 43% of ships in service had been constructed in Indian shipyards and imports were undertaken only to address the imminent sharp decline in force levels. Considerable progress was being made by DRDO in developing weapon systems and equipment, which was receiving the Navy's enhanced support in terms of 'seed money' to give further impetus to various projects under development. However, funding continued to be a problem.

Effects of Inadequate Funding

The Committee on Defence Expenditure, 1993 had envisaged 18% share of the Defence Budget for the Navy. However, the funding was not commensurate with the percentages recommended by CDE. The average remained at 13.2% in the period 1991–2000. The Navy's satisfaction level of funding was around 66% percent compared to 82% for the Army and 91% for the Air Force in terms of projected requirements.

Shortage of funds had some long term effects for the Navy:-

Decline in Force Levels. As against a force level of 178 ships and submarines envisaged by the year 2000, the Navy, it was envisaged, would have only 109 ships and submarines in commission by the turn of the century.

Ageing Fleet. On account of lack of induction, the Navy had been forced to keep ships/submarines in service beyond their normal service life, thereby raising the average age of its front line combatants and making them maintenance intensive. On the other hand a severe cut had to be applied in the procurement of stores and in refitting of units. These factors, combined with delay in setting up of infrastructure facilities, had direct repercussions on the operational availability of the units.

Construction Delays. The breakup of the former Soviet Union resulted in a hold-up in equipment required for our ongoing construction programme, which consequently suffered inordinate delay. The subsequent cost overruns imposed an additional liability on the Naval Budget.

Force Level Structure

In the late-90s, the ECC report of 1964 was the only formal Force Level approval accorded to the Indian Navy. Although the international and maritime security environment underwent many changes, no specific Force Level plans were approved by the Government since then. Therefore, in March 1998, the Indian Navy prepared a Force Level Structure (FLS) for the next 30 years. This plan envisaged a force level of 127 blue water units.

Strategic Defence Review

Subsequent to the Force Level Structure being formulated, the Indian Navy prepared a Strategic Defence Review in 1998, to highlight the factors unique to the maritime world and articulate the opportunities, threats, weaknesses and strength of our maritime capabilities and environment, so as to align them to our strategic thoughts.

30 Years Submarine Construction Plan

In 1999, the Government approved the 30 Year Submarine Construction Plan. The plan envisaged series constructions of submarine and acquisition of national competence in submarine building.

Retrospect

The most rapid growth seen by the Navy was during the 1950s when its share of the defence budget went up from 3.9% to 12.4% in ten years. In early 60s, the Navy embarked upon a growth plan for a balanced ocean going fleet. The Indo–China War in 1962 however put this Naval growth in suspension and very little development took place in the seventies. During the eighties the planned growth of the Navy made some headway and in 1985, the perspective plan paper had projected a force level of 136 ships by 1990, 170 ships by 1995 and 178 ships by 2000. The naval budget gradually rose to about 9% in the 80s, and thereafter crept with painful slowness to 13% in 1991 and 12.5% in 1992. However, in absolute terms, there was a continuous and substantial erosion in allocations due to the combined effects of inflation and devaluation.

The 90s decade, saw synergy in defence planning restored by the creation of the Defence Planning Staff as an umbrella organisation for the Services. The Services, in turn, prepared Perspective Plans based on the national security perspective. However, the changes in the geopolitical scenario and in the Indian Ocean region and littorals during this decade were swift and dynamic that could not be contained by the various plans resulting in a sharp decline in force levels. This forced the Navy to look in for indigenous capabilities in design and construction. To cater for the shortages, minimal imports were also planned.

An increased allocation of funds for force level development was required to be made available from the

7th Plan onwards. This however did not materialize as the planned outgo of Rs 7592 crores fell short by Rs 1100 crores. This had an adverse effect resulting in a force level of 102 ships by year 2000. There was a decline in Naval force levels during a critical period when extra regional threats were on the increase.

The only way to tilt the balance was to review the force mix which had reached 30% ocean going ships and 70% small and medium ships to a 60% – 40% ratio in favour of major war vessels and submarines. This was to be achieved by inducting ocean going ships and nuclear submarines, to provide fire power and deterrence. To fill the immediate gap in force levels, imports from the Soviets were considered. The Navy endeavoured to stretch every rupee to the maximum thereby achieving "Much More with Much Less".

31

The New Management Strategy (NMS) Budgetary Reforms in the Navy

Preamble

The system of Budgetary Management is closely related to the system of essential governance[1] — for the 'controlling authority' decides the scope and scale of the budget and the methodology of its utilisation. Consequently, the system of governance assumes a pivotal position in the eventual management of the allotted budget.

One of the facets in the evolution of systems of governance, whether imperial, colonial, totalitarian or parliamentary, has been the method and degree of control to be exercised over the 'Armed Forces' by the 'civil side' — 'civil' being interpreted sometimes as 'the political component of Government' and sometimes as 'the civil service–bureaucrat component of Government'.

The Armed Forces have always been the 'ultimate power' of the state. During war, the state expects the Armed Forces to win. During peace, the state expects the 'power' of the Armed Forces to be credible enough to deter war. Understandably, there has always been apprehension in the 'civilian' mind that if the Armed Forces are permitted too much power, they might be tempted to depose the elected civilian government in a coup, as indeed has happened in the countries neighbouring India.

All systems of governance, therefore, have devised checks and balances to manage this inherent tension between the military and civilian arms of the state. The antiquity of this tension is reflected in innumerable clichés and aphorisms:-

— "War is too serious a matter to be left to the generals and the admirals".

— The resources of the state must be judiciously apportioned between 'development' and 'defence'.

— "The Armed Forces should be told how much money they will get and they in turn will tell the Government how much 'defence' that money will buy".

— "The security of the state does not depend on military "hard power" alone. It must be inter-laced into a larger perspective of "diplomatic, commercial and economic "soft power" inter-relationships".

The list is endless. Each cliché reflects a facet of the truth. Many reflect serious dilemmas.

This chapter discusses the early role of financial control in the system of checks and balances that Britain had established in controlling the Armed Forces of colonial India (which India inherited at the time of independence) and traces its way to present day with the implementation of the new, progressive and path-breaking 'Naval Management System'.

The British Legacy of Financial Control

It is not widely known that this constricting role of Finance was not meant to be malevolent. Its genesis goes back to the British system of controls on the spending of public money.

The British Commander-in-Chief India was, after the Viceroy, the second senior most official in India, and even though his mandate came from the War Office in London, defence expenditure in India came under the C-in-C's Military member. In 1906, the Military Accounts Department, which used to function under the Military Member of the Governor General's Council, was replaced by a Military Finance Department. The Government resolution announcing this change stated, *"With the object of making financial control over military expenditure more constant and efficacious, the Military Finance Secretary and his establishment will be located in the same office building as the Army Department and the said Secretary will be in constant personal communication with His Excellency the C-in-C, who will thus be able, whenever*

1. Refer to Chapter titled 'Committees on Higher Defence Management'.

that is thought desirable, to take his advice on the financial aspect of any military question, before making a formal reference to the Department through the Military Finance Branch. He will also be a member of any Consultative Committee, which may be formed to consider matters relating to Army administration. At the same time, he will in no way be subordinate to the Military authorities but will be responsible only to the Honourable Finance Member and to His Excellency, the Governor General".

Thereafter defence expenditure came firmly under the control of the Ministry of Finance. In the British view, this provided a check on the authority of the C-in-C who had become all powerful in military administration after the 1906 reorganisation. This check was exercised by the Ministry of Finance's (Defence Division), which came into being in 1906, became part of the Finance Ministry and was known as the (Defence) Division of the Ministry of Finance.

The British Canons of Financial Propriety. The British, in essence, sought to lay great stress on propriety in dealing with finances. There were rules, both written and unwritten, that gave high importance to the due process of rigour and diligence in clearing financial proposals. But more importantly, there was an equal emphasis given to the appropriateness of taking certain monetary measures that could appear to be seen as dubious. Canons of propriety were manifest in the manner they approached fiscal jurisprudence.

- Every public officer should exercise the same vigilance in respect of expenditure incurred from Government revenue, as a person of ordinary prudence would exercise in respect of the expenditure of his own money.
- No authority should exercise its power of sanctioning expenditure to pass an order, which will be, indirectly or directly, to its own advantage.
- The amount of allowances, such as travelling allowances, granted to meet expenditure of a particular type, should be so regulated that an allowance is not, on the whole, a source of profit to the recipient.
- Government revenues could not be utilised for the benefit of a particular person or section of the community unless:-
  - — The amount of expenditure involved was insignificant.
  - — A claim for the amount could be enforced in a court of law.
  - — The expenditure was in pursuance of a recognised policy or custom.

These canons continued to guide the Government of Indian after independence with the significant addition of a few others.

- An over-arching canon laid down in the Financial Regulations Defence Services 1983 (which derive from the Government of India's General Financial Regulations — GFR) stated that the "The expenditure should not be more than the occasion demands".
- In 1989, a sixth canon was added which brought in the concept of accountability by the person who spends the approved grant.

The Naval Budget

Procedurally, the Naval Budget comprises two sub divisions, Revenue Budget and Capital Budget. The Revenue Budget encompasses expenditure on the day-to-day running of the Navy and included Pay & Allowances of personnel, cost of feeding, clothing, transportation and the cost of keeping them trained for war. It also accounted for the cost of fuel for operating military platforms like armoured vehicles, aircraft, ships, submarines and the cost of maintaining them in readiness for war. The Capital Budget on the other hand, included the planned expenditure on capital projects, such as indigenous construction and acquisition from abroad of armoured vehicles, aircraft, ships and submarines; expenditure on land and buildings; and expenditure on major long-gestation projects like construction of new bases, repair depots, etc.

The Old System. Even though the allocation of budgets was a fairly streamlined and straightforward project, getting the allotted funds in hand was not quite such a simple affair. In fact, prior to 1990, getting a proposal approved was considered to be a 'challenge' of formidable propositions. There were minefields and pitfalls, in the form of intermediate vetting authorities that the proposer had to contend with and it was rare for a proposal to come through without false starts or it being 'shot in mid-flight', at least once.

A presentation given by a Joint Controller General of Defence Accounts is a revelation of how ponderous and long winding the old system was before the introduction of NMS and highlights the anomaly that the new system sought to reform. Intending to make a point about the egregious delay involved in getting proposals through, he mentioned the various stages of evaluating a 'material demand' before it could be considered for sanctions:-

- 'Felt Need' at unit level.
- Evaluation at Admin/Operational authority level.
- Appraisal at Command Headquarters level.
- Assessment at Naval Headquarters level.
- Valuation at MoD.
- Cost Estimation Valuation and Assessment at MoD/ Def (Finance).
- Final analysis at DOD for approval of CFA.
- Issue of sanction authority.

Most proposals would peter out by the third or fourth stage even before the authorities had been convinced about the need. But the real minefield lay further afield in the real procurement, which was, put plainly, a 'mind-numbing exercise'. The procedure in place made sure there were a sufficient number of 'snipers' en-route that could 'take out' the proposal before it could ever hope to come through. It took weeks, months — sometimes even years, for a case to be properly approved and payment executed.

In effect, from the time the procurement procedure was initiated, it practically, took years before the item physically arrived for exploitation. The process was slow, long-winding, time consuming and mind-numbingly tedious.

Not surprisingly, by 1990 the ground reality was that 90% of the Revenue Budget and the complete Capital Budget was centrally controlled by Naval Headquarters (NHQ) and the Ministry of Defence (MoD). Very limited financial powers had been delegated to lower formations like the Commands and Commanding Officers of units.

It was widely lamented that the interminable queries of Finance (Defence) on Naval Headquarters' proposals resulted in a 'slow death' of most proposals. In most cases, delays translated into cost over-runs, which were particularly deleterious — because naval budgets were slender and naval development is inherently of long gestation.

The Navy therefore, gradually arrived at the conclusion that it had no other option but to go ahead with a New Management Strategy (NMS) that would rationalise and simplify the procurement process.

The New Management Strategy (NMS)

The decades prior to 1990 had witnessed substantial naval expansion. At the macro level, the new Leander project and the new Russian acquisitions requiring new production, maintenance, repair, refit and logistic infrastructure involving huge expenditure over several years were overseen by financially empowered Steering Committees chaired at Secretary level and assisted by the Additional Finance Adviser.

The report of the Estimates Committee of Parliament — 1992, had first recommended the need for a change[2] is the system of financial control, following which a more

2. The Estimates Committee of Parliament Report — 1992 traces back the roots of the present decentralised system of financial control to 1906 when the abolition of the appointment of Military Member led to a change in the pattern of Finance Management. On being asked whether the Ministry of Defence would recommend any amendment to the Transaction of Business Rules, the Secretary, Ministry of Defence stated during evidence as under:-

   "They are, by and large, already good. Recently, we have been suggesting certain delegations to the Department of Finance and Expenditure. They had given us, in the interim, some concessions, for instance, deployment of foreign exchange, they have entirely transferred to us; earlier we used to get case by case noted by them and approved by them. They have raised the limit of the level of financial sanctions at all levels of functioning, from Under Secretary level upward. But the problem really is not of this kind; the problem perhaps lies somewhere else.

   Now, presently, there is a move that we are going to give, across the board, larger delegations to the Service Headquarters the authority that we have in the Ministry; this proposal has made a considerable headway. Our Financial Adviser has discussed this move with the Ministry of Finance. There is an agreement. We are working out a detailed procedure of how it will work out from the lowest formation level up to the Army Commanders and then Service Headquarters."

   In this context, the Committee also wanted to know whether it would not be prudent to have the Financial Advisor become integral to the Ministry of Defence, so that financial concurrence along with financial delays can be minimised. The Secretary, Ministry of Defence reacted:-

   "The idea, which is being processed by our FA is to place trained financial officers of CGDA organisation right from the bottom level upwards commensurate to the tasks to be performed. We will have very senior officers at the level of Army Commander and naturally more experienced in work in each of the Service Headquarters, the senior-most will be in Army because of the scale of expenditure. That is built in financial delegation. That is what we are seeking to establish now."

   Asked whether the Ministry of Defence would simultaneously be considering the revision of the financial authorisation of expenditure, the Defence Secretary stated:-

   "Some of our financial powers have been increased. What was Rs 50 lakhs is now Rs 1.5 crores, what was Rs I crore is now Rs 2.5 crores. We have again recently reviewed the cost of the value of money and the kind of spending we do. Our FA has been examining expenditures relating to Defence. These delegations are not for Government as such, but relating to us and we will try to get further dispensations..."

decentralised system was put in place. It did not, however, do much to solve issues at the micro level, where problems continued to persist. Sanctions sought for personnel to man critically important small new units like Testing and Tuning Teams, Acceptance Trials Teams, Work Up Teams, Weapon Analysis Teams, Base Maintenance Units, Ship Maintenance Authority, etc invariably got so entangled in protracted discussions with Finance (Defence) that the adverse effects of the delays in sanctions began to snowball.

The Government's consistent view was that the Navy should have a 'manpower ceiling' and until this was arrived at, proposals for additional manpower should either 'be met from within sanctioned manpower' or 'by matching savings elsewhere'. The Navy's consistent view was that an expanding service could neither have a manpower ceiling nor find 'matching savings elsewhere.' This contretemps was compounded by the financial crisis caused by the sharp rise in oil prices in 90s.

It became the Government policy to have power over spiralling manpower costs by stringent control on every single proposal for additional manpower. The impact of absorbing the costs of the Pay Commission recommendations and the costs of recurring instalments of "additional dearness allowance" from "within existing budget", together with the Government's strict control and the mushrooming requirements generated by the new acquisitions placed Naval Headquarters in a cleft stick.

Evolution of NMS. Until a few years back, the Financial Adviser Defence Services (FADS) was one of the most important functionaries of the Finance Ministry. This arrangement had its genesis at independence and had continued to exist in the same form since them. Even though some reforms were introduced towards Integrated Finance, not much headway could be made.

The Committee on Defence Expenditure. The Committee on Defence Expenditure was set-up against the backdrop of a bleak fiscal scenario. By the early 90s, several international and domestic developments coincided to result in a perilous situation for the economy. The prolonged resource crunch after the widespread drought of the mid 1980s, a serious balance of payments crisis and the economic restructuring of the Soviet Union culminated in stringent financial control. This situation led to the constitution of the Committee on Defence Expenditure (CDE) to suggest ways and means of making every defence rupee travel the farthest.

One of the CDE's seminal recommendations[3] concerned delegation and decentralisation of financial powers so that approval for buying day-to-day requirement of spares did not have to run through a succession of hurdles. The Committee opined that it was not logical that the accountability for procurement of equipment for execution of tasks should rest with one person whilst financial control rested with somebody else. It recommended that the Chiefs of the three services should be empowered to procure the equipment required for the execution of their tasks, whilst remaining within their overall budgetary allocations. The Committee recommended substantial delegation of financial powers to the three Services in a number of areas of functioning and led to the appointment of a Task Force,[4] based on whose report the Government approved the first phase of the "New Management Strategy" NMS[5] for

---

"I think answerability, accountability along with responsibility would, over a period of time, considerably improve the situation. And I have a feeling that the delay which now takes place in the Ministry vis-à-vis the main Defence, when the responsibility gets transferred to the Chief of the Staff and those below, similar delays will remain there because they will be equally tough with their own supporting organisations in not agreeing to certain cases when the direct responsibility for expenditure travels from the Ministry to the Service Headquarters because when there is constraint of resources, decisions do get dragged. It is as simple as that."

Therefore, the Committee are of the firm opinion that delegation of greater financial powers accompanied by integration of financial advice at different levels of command will be a step in the right direction.

3. The recommendations of the CDE were not implemented. However, the Ministry of Defence along with Defence (Finance) taking note of the Estimates Committee and the CDE recommendations undertook a number of steps towards better resource management. The thrust was not on mere delegation of financial powers but on optimum utilisation of resources and including financial consciousness not only at the Service HQ, but also down the line. Towards this end, the following steps were taken:-

   - Posting of IFAs in the Service HQs.
   - Greater delegation of powers to Service HQs and to the field with need based formulation and with appropriate phasing.
   - Evolving methods to link procurement with provisioning and evolving a plan based on this, leading to better inventory management and

4. The Task Force was headed by Shri AK Ghosh as Officer on Special Duty. He later became Financial Adviser Defence Services and participated in the structuring of the New Management Strategy (NMS).

5. In keeping with the 'Management Revolution' of the 1980s, the British Navy itself had reformed the procedures that our Navy had inherited and had formulated its "New Management Strategy." faster procurement.

   - Establishing a concept of Budget Centres at the Service HQs and down the line.
   - Controllers of Defence Accounts and their officers providing financial advice and support in the field.
   - Expansion in the financial information system and better financial control with factorised budget allocation, etc.

the Naval Dockyards to be implemented with effect from 1st December 1993. It was intended that NMS for the Material Superintendent Organisation and the entire Navy would be implemented in subsequent phases after a settling down period of two years. The Navy introduced NMS in the field of 'maintenance' on 04 October 1993 and in the field of Logistics on 23 November 1994. Its aim was to:-

- To enhance 'value for money' in revenue expenditure by establishing a clear linkage between resources utilised and outputs achieved.
- To establish the concept of Authority and Responsibility Centres with clear cut budgetary allocations to Budget Centres for achieving laid-down targets.

It took some years of deliberations to restructure how financial powers should be delegated without violating the sanctity of the earlier canons of propriety. In 1990, the Estimates Committee of Parliament chaired by Mr Jaswant Singh, (later Defence Minister and Foreign Minister of India) interacted closely with the MoD and the Defence Secretary, during an extensive review of the working of the Ministry of Defence and also recommended implementation of the Management Strategy.

Implementation of the NMS. The fundamental objective of the NMS was the achievement of value for money through economy. In practice, it meant doing things at the lowest cost, doing them with efficiency and in the right way. In implementation, it entailed a few measures:-

- Change in financial management and budgetary control procedures.
- Delegation of substantial financial powers[6] to NHQ.
- Decentralisation of Management and monitoring of Revenue Budget by introduction of concept of Budget Centres.
- Introduction of new reports and returns.
- Positioning of Integrated Financial Advisers (IFAs).

The Controlling Officer. As per the NMS, the controlling officer is made the essential custodian of propriety. The Officer is not only charged with ensuring that total expenditure was kept within the limits of the authorised grants of appropriation, but also that the funds allotted to spending units are expended in the public interest and upon objects for which, the money was provided.

The Finance Division of MOD. The Finance Division of the MOD is made responsible for:-

- Careful and intelligent scrutiny of all proposals involving expenditure from public funds, the objective being safeguarding of economy, efficiency and propriety in public finance.
- Seek justification for the proposal, which may entail even challenging the necessity for spending so much money or on such a scale to secure a given object.
- To make sure that the expenditure involved is justified in the circumstances and preclude the possibility of the same result being obtained by other means with greater economy.
- To make sure individual items are in furtherance of general Govt policy in line with financial canons.

In a nutshell, the Department of Finance is charged with asking all questions that might be expected from an intelligent taxpayer bent on getting the best value for his money.

The Financial Adviser. NMS was meant to decentralise authority but without diluting any of the financial canons or procedures. All that has really happened under NMS was that the role of CFA had shifted from MoD to Service HQs and Def/Fin is represented by the IFA, whose role is envisaged as the following:-

- Render advice on all financial matters, which fall within the competence of various authorities at NHQ within delegated powers.
- Participate in various TPCs/PNCs held at NHQ.

---

6. **Delegation of Financial Powers.** The Vice Chief of the Naval Staff is to be the Top Level Budget Holder (TLBH) of the Navy under NMS. The revenue budget of the Navy will be allocated by VCNS (TLBH) among Authority-cum-Accountability centres (High Level Budget Holders HLBHs), at NHQ who are VCNS, DCNS COP, COM, COL and CWP&A. Allocations to HLBHs will be used as means of allocating resources as well as management of the budget during the year.

   *Budget Centres.*To fit in with the output oriented budgetary system of NMS, the management responsibility has been decentralised. As systems for accounting and monitoring expenditure get developed, it is assumed that budget centres would acquire the management responsibility for the whole range of expenditure and receipts that fall within their areas. Within the limits of their delegated authority, budget centres have been given the freedom to manage their budgets so that objectives and targets are achieved in the most economic, efficient and effective manner.

- Assist NHQ in formulation of budget at different stages.
- Implementation of Authority-cum-Responsibility Centre concept.
- Monitor implementation of measures to achieve economy.
- Assist NHQ in rationalisation of maintenance expenditure and inventory management procedures.
- Ensure effective financial management in Navy keeping liaison with all agencies.

Progress Between 1993 and 2000

Extension to Command Level. In the first few years of its implementation, there was an initiative towards simplifying and systematising procedures involved in procurement and logistics management. Extended to the Command level, the entire Revenue Budget was sub-allotted for control by respective controlling authorities. Revenue expenditure was incurred under delegated powers to the Navy with the concurrence of Financial Advisers. Financial Advisers were posted to dockyards and material organizations and they formed an integral part of the Navy.

Delegation of Responsibility to Naval Dockyards. It saw the extensive delegation of administrative and financial powers to the naval dockyards along with the full responsibility to complete tasks on schedule at sanctioned costs. The production, maintenance and training establishments at the same time updated their computer hardware and software in order to provide a firm basis for quicker decision-making.

Efficiency in Spares Procurement. By 1995, greater efficiency in procurement of spares was plainly visible in the dockyards and procurement organizations. It resulted in timely completion of refits of ships/submarines.

Setting up of WAN/ILMS. In its quest to build upon the advantages, which had accrued through NMS, the Navy automated its entire procurement process through creation of a Wide Area Network (WAN) Integrated Logistics Management Systems (ILMS). It also achieved computerisation of the financial management requirement, which was proposed to be linked with the Management Information System.

The working level difficulties that came to notice during the implementation of NMS were resolved. NHQ proposed to extend NMS for: -

- Enhanced delegated powers under revenue.
- Extension of NMS for expenditure under the capital budget.
- Allowing of recycling of receipts and recoveries.
- Total delegation of foreign travel scheduling.
- Manpower relocation and additional funding against manpower shortages.
- Fast track procurement procedures for streamlining decision making.

The IFA (Navy) has been made accountable to MoD (Fin) for the integrity of the financial system. This accountability should not be confused with the IFA's advice given on expenditure proposals or budget management that is needed to achieve the performance required by an HLBH to meet his objectives.

Retrospect. The greatest positive outcome of the implementation of the Naval Management Strategy has been that the Navy today is more finance conscious and budget aware and expenditure is being prioritised to achieve the 'best value for money'. It has been to the greatest good of the service. Budgets are now allocated with clearly defined objectives/targets, with resources provided in a time-bound manner to budget centres, whose performance in terms of objectives/targets achieved is regularly reviewed. Appropriate financial accounting systems and procedures have been established and function in accordance with the accounting procedures laid down by the Government. There is an increased level of clarity on budgetary issues. Budgetary exercises are carried out diligently and scrupulously. In fact, lower level Budget Holders even receive guidance in the preparation of budgetary estimates. The implementation of the NMS has indeed, been a seminal development for the Navy.

32

Harnessing Information Technology

Overview

One of the significant achievements in this decade was the manner in which the Navy channelised the hidden potentials of the ever-growing information technology. Computerisation in the Navy had started with the installation of an ICL 1901A computer in Naval Dockyard, Bombay in Apr' 72.

The Government's drive in the late 70s to 'modernise administration' led the Navy to formulate a Ten Year Computerisation Plan which was approved by the Chief of the Naval Staff, Admiral Pereira, in Jul' 81. Momentum developed in the 80s with priority accorded by Prime Minister Rajiv Gandhi to modernise governance through nationwide computerisation.

The setting up of the National Informatics Centre (NIC) helped to identify the basic priorities of the computerisation drive like creating computer literacy, establishing Computer Training Centres and the need for a cadre to specialise in Electronic Data Processing (EDP), evolving training syllabi in software development and hardware maintenance.

Advances in Information Technology soon led to the advent of Personal Computers (PCs). With the increased availability of PCs by the mid 80s, Naval Headquarters laid the foundation for a Navy-wide computer literacy programme with a liberal sanction of about 4000 PCs by the CNS, Admiral Nadkarni.

In the late 80s, the aircraft carrier Viraat arrived from Britain with a ship based Local Area Network (LAN). This led to the NHQ sanctioning LANs for major war vessels.

An associated objective of the IT initiative had been to computerise routine office functions at Naval and Command Headquarters and lower formations and in due course extend it to the Logistic and Material Organisations. Despite financial constraints and lack of familiarity with computer hardware, the Navy achieved computer literacy, and proceeded to complete several man-hour saving projects by the early 1990s. Some of these were:-

- **Bureau of Sailors.** All sections of the Bureau of Sailors (CABS) were computerised. Ships and establishments started using floppies to forward data pertaining to leave and transfer of sailors to the Bureau. Floppies were also used to generate and store GENFORM data for transmission to CABS using an in-house developed package called 'GENFORM Management System' (GENMAS).

- **Naval Pay Office.** Pay accounts, Provident Funds of officers and sailors and Leave Records of officers were computerised. Monthly, quarterly and annual statements of salary started being generated on computers.

- **Material Organisation**. Inventory management of naval stores and machinery spares were computerized. Ships and establishments having computers started forwarding demands on floppies using software developed in-house.

IT Policy for the Navy

By the mid nineties, it was realized that whilst there had been satisfying growth of computer systems, there was no centralized plan to guide further system acquisition for meeting overall Naval objectives. Information management was not being addressed at an organisational level nor was timely information available Navy-wide to support managers. Major IT projects were in the hands of a few enthusiastic naval personnel. Applications and systems were generally stand-alone or on a small limited capacity network.

IT policy decisions were therefore promulgated to organise IT activities. These were:-

- To derive maximum benefit from automation, the sponsoring agency had to clearly define user requirements. For major projects, services of a reputed consultant were to be availed of to generate user requirements. The technical approval of NHQ's Directorate of Information Technology (DIT) was to be sought for projects whose financial implication was more than Rs 5 lakhs.

- To avoid duplication of effort in creating software and databases for similar functionalities at diverse locations, a centralized record of all IT assets was to be maintained at NHQ by DIT.
- The growth of databases, the increased requirements of functionalities and the obsolescence of IT products entailed periodic upgradation and costs of re-training personnel. The Annual Maintenance Charges (AMC) and indirect costs encompassing training of personnel, loss of productivity due to system downtime, cost of consumables, etc were catered for in the Navy's IT budget.

Five Year Computerisation Plan of Navy 1995–2000

The Navy formulated a policy for computerisation in the Navy in a systematic and time bound manner for the period 1995–2000. The computerisation plan was arrived at by studying two important factors, namely, total requirement of computers and the types of jobs that required to be automated.

The requirement of PCs for the Navy during the period was arrived at by finalising the number of computers needed for types of ships/establishments based on their functions. The specific functions that need to be automated in a ship-borne environment were clustered into general administration, logistics and technical functions. The total financial implication for hardware maintenance and software for the five years was arrived at Rs 15 crores.

IT Policy of 1998

The Navy formulated its Information Technology policy in 1998 to provide direction and guidance for the development of Information Systems within the Navy over the next 5 years. The IT policy was based on:-

- Recognition of information as a strategic resource.
- Lay down standards for hardware, software and network components.
- Provide a framework within which the IT could be applied for improving the efficiency and effectiveness of information management system.
- Phased and prioritised implementation without undue strain on available resources and skills.
- Build an information system interoperable within the Navy and with the Army, Air Force, Coast Guard and other civilian agencies.

The IT vision of the Navy was also promulgated:-

"The Navy shall endeavor to computerise and network all its units at sea, establishments and offices ashore and headquarters for operational and support role within the service and for interoperability with Army, Air force and other civil agencies progressively by 2003. Every officer and sailor of the Indian Navy would become computer proficient by 2002."

It was aimed to computerise and network approximately 350 units and establishments spread across seashores, dockyards, stores and armament depots, training establishments, Fleet offices, Command Headquarters, Naval Headquarters and other miscellaneous agencies. The networking visualised Local Area Networks (LANs) within the establishments, Metropolitan Area Networks (MANs) within metropolises and Wide Area Networks (WANs) providing connectivity over the continental land mass including the island territories. The resulting network would provide Navy-wide, end-to-end connectivity leading to availability of information across the board at all levels resulting in performance improvement and quality management.

The IT vision was to be realised in a phased manner within 5 years based on availability of funds and trained manpower. The Directorate of Information Technology (DIT) was tasked for formulation of time bound plans for IT Projects and subsequent updating of IT infrastructure.

IT Training

The effort to develop an elaborate naval information infrastructure and use of Information Technology as an asset represented a paradigm shift for which the staffing and training needs were reviewed. The training focused on providing personnel in adequate numbers and job specific expertise. New syllabi on IT were added to be taught in training establishments like Chilka, Mandovi, Shivaji and Valsura. To cater for adequate numbers, new computer labs with sufficient computers were sanctioned in these establishments and every sailor and officer entrant was exposed to IT.

Major IT Projects

Few of the major IT projects undertaken during this decade were:-

- Most of the pay accounting functions at the Naval Pay Office, which was maintaining pay accounts of about 8000 officers and 50,000 sailors on Individual Running Ledger Accounts were computerised.
- Project ODOC (Offshore Defence Operations Centre) envisaged linking of Maritime Operations Rooms (MORs) with War Room using dedicated data

circuit lines hired from DOT. The primary function of this project was to collect, collate, process and disseminate data relevant to naval environment and was expected to provide necessary information to the Commanders ashore to conduct naval operations.

- A team of officers were involved in development of software for Integrated Logistics Management System (ILMS). This involved automation of spare management at Material Organisations on a LAN and interconnectivity of MOs and DLS/DPRO at NHQ.
- A pilot project on naval hospitals management was taken up that aimed to computerise all the functions of naval hospitals. INHS Asvini was taken up as a model project.
- An 'Enterprise — Wide Resource Planning' system was undertaken for the naval dockyards.
- An automated Maintenance Management System was progressed, for the linking up of ships maintenance records with a database at the INSMA aiming at reliability controlled maintenance concept.

To accentuate the thrust on IT, few major policy initiatives were undertaken at Naval Headquarters:-

- The Charter of Duties of Assistant Chief of Material (Systems) was expanded to include IT. ACOM (Sys) was redesignated as ACOM (IT & Sys).
- The Charter of Duties of Assistant Chief of Naval Staff (Operation) was expanded to include Information Warfare. ACNS (Ops) was redesignated as ACNS (IW & OPS).
- The Director of Management Services (DMS) was reconstituted as Director of Information Technology (DIT).
- An Information Technology Group was formed under the chairmanship of the ACOM (System) in order to formulate and recommend an IT policy for the Navy.
- An Information Technology Bulletin named "Infotech Update" was published to emphasize the role of IT, and to provoke reflection and debate.
- A strategic partnership was initiated with the Confederation of Indian Industry and a Navy-CII Interaction Seminar was held in August' 97. A joint Navy-CII resolution was formally adopted, and a joint-council was formed to draw up an agenda for greater Navy-industry interaction, with CII acting as a facilitator. The first meeting of the committee with industry and infrastructure providers of Government was held on 12 December 1997 with a focus on connectivity and technology induction by DOT and industry participation in IT training in the Navy.

The nineties marked harnessing of Information Technology to the advantage of the Navy. Procurement of computers, promulgation of the IT vision and training of personnel to an acceptable standard helped the Navy to enter into networking of its systems in a holistic manner post 2000.

Based on the IT Act 2000 enacted by the Parliament in June 2000, a High Powered Committee laid down a '12 point Minimum Agenda on E-governance' to be implemented by Ministries/Departments and Government agencies. The Navy had by then implemented most of them based on its IT Policy of 1998.

33

Changes in Command and Control Structure

Background

The Reorganisation of 1986

In 1985, NHQ sought approval to streamline the Navy's Command and Control structure. The main features were:–

- To reduce the Operational Control Authorities from three to two and make them accountable for all operational activity in their areas:–
  - — FOC-in-C West for the Western seaboard and the Arabian Sea.
  - — FOC-in-C East for the Eastern seaboard and the Bay of Bengal.
- To place the control of all Training Establishments hitherto under FOCs-in-C West and East under FOC-in-C South and place accountability for all training policy formulation and implementation under one authority, leaving the Director of Training in NHQ to interact with the Ministry of Defence and the other services.
- To rationalise Command and Control of the Air Arm by designating FOGA also as Flag Officer Naval Aviation (FONA) and make FONA responsible directly to NHQ for all aviation training and maintenance activity and act as the class authority for all aviation matters. Operational deployment of all aviation units to continue to be controlled by FOCs-in-C West and East.
- To rationalise Command and Control of the Submarine Arm by creating Flag Officer Submarines (FOSM) as the single point class authority and responsible for all training and maintenance of submarines, analogous to FONA for naval aviation.
- In NHQ, to restore the Logistics function to the Material Branch, redesignate the Chief of Logistics (COL) as Controller of Logistic Support (CLS) and make the Chief of Material (COM) the single point of accountability for maintenance and logistics.
- To constitute Flag Officer Maharashtra Area (FOMA) to be responsible to FOC-in-C West for the:–
  - — Operational control of forces assigned for the Local Naval Defence of all ports in the Maharashtra area.
  - — Administration of the establishments/units located at Bombay.
  - — Interaction with the State Government and other agencies.

NHQ's proposals were approved and the revised Command Structure was implemented from 1 July 1986.

The Navy's Command and Control Structure in 1990

CNS (Chief of the Naval Staff)

FOC-IN-C WEST (Flag Officer Commanding-in-Chief, Western Naval Command)

- FOCWF (Flag Officer Commanding Western Fleet)
  - Western Fleet
  - Warship Workup Organisation
- FOMA (Flag Officer Maharashtra Area)
  - NOIC (B)
    - Local Flotilla
    - Harbour Defence
- ASD (B) (Admiral Superintendent Naval Dockyard)
  - Naval Dockyard, Bombay
- FODAG (Flag Officer Offshore Defence Advisory Group)
- NOIC Saurashtra
- Ships, Submarines under direct Control
- Naval Air facilities
- MS (B) (Material Superintendent, Bombay)
  - Material Organisation/Store Depot
- Weapon Production & Armament Depot
- Shore Establishments/Authorities/Units

FOC-IN-C EAST (Flag Officer Commanding-in-Chief, Eastern Naval Command)

- FOCEF (Flag Officer Commanding Eastern Fleet)
  - Eastern Fleet
- FOSM (Flag Officer Submarines)
  - Submarine Base
  - Submarine Training School
- FORTAN (Fortress Commander A&N Island)
  - Ships
  - Naval Air Facilities
  - Base Repair Organisation, Port Blair
  - Shore Establishments/Authorities/ Units
- ASD (V) (Admiral Superintendent Naval Dockyard)
  - Naval Dockyard, Visakhapatnam
- NOICs Calcutta, Visakhapatnam, Madras, Paradip, Tuticorin
- Ships under direct control
- Naval Air facilities
- MS (V) (Material Superintendent, Visakhapatnam)
  - Material Organisation/Store Depot

FOC-IN-C SOUTH (Flag Officer Commanding-in-Chief, Southern Naval Command)

- FOGA (Flag Officer Commanding Goa Area)
- NOIC Goa
- Ships, Aircraft for Local defence
- Shore Establishments/Authorities/Units
- Training squadron and Local Naval Defence forces
- Training Establishments and Schools
- Base Repair Organisation, Cochin
- Naval Store Depot, Cochin
- Weapon Production & Armament Depot
- NOICs Cochin, Lakshadweep, New Mangalore
- Administrative Support of Naval Air Establishment/ Units

In 1990, the two Commands forwarded a proposal to NHQ to revert to the earlier Command and Control structure namely having three Operational Control Authorities — West, East and South, disestablish the Training Command and relocate FONA and FOSM. This proposal was the result of:-

- Operation Pawan in Sri Lanka and Operation Cactus in the Maldives, both of which highlighted the need for Southern Naval Command to be charged with operational responsibilities for effective command, control and logistics.
- The administrative incongruities of Southern Naval Command controlling major naval training establishments in other coastal states with whom the other Command Headquarters were interacting.
- The class authorities, FONA and FOSM, being too removed from the major decision making that took place in NHQ pertaining to acquisitions, maintenance, plans, etc.
- Western Naval Command wanting FOGA to be placed under it for more effective utilisation of air assets.

The changes proposed were:-

- Creation of FOC-in-C South as an operational authority with a maritime area of responsibility.
- Reversion of the control of training to NHQ.
- Shifting of the two Class Authorities, FONA and FOSM, to NHQ as ACNS (Air) and ACNS (Submarines) for better interaction with other branches in major policy decisions.
- Placing of FOGA under FOC-IN-C West.

The VAdm KASZ Raju Committee Report of 1991

In 1990, Vice Adm KASZ Raju, FOC-in-C South was tasked for an "in depth study to review the Command Structure of the Navy, with special emphasis on the higher command organisation in the Navy upto the level of FORTAN, FONA, FOMA and FOSM". The summary of recommendations of Vice Adm KASZ Raju Committee Report of 1991 on the Higher Level Reorganisation of the Indian Navy were:–

- The concept of Training Command be done away with and Southern Naval Command (SNC) be made an operational command.
- Goa be transferred to Western Naval Command from SNC and Tamil Nadu to SNC from ENC.
- The number of authorities reporting directly to a C-in-C be reduced to Fleet Commander, Offshore/ Local Naval Defence (LND) Commander, Submarine Force Commander, Area/Station Commander, Admiral Superintendent Dockyard (ASD) and Material Superintendent (MS).
- Flag Officer Maharashtra Area (FOMA) be re-designated as Flag Officer Offshore Defence (FOCOD) with all afloat offshore and LND responsibilities and also function concurrently as FODAG.

- All shore establishments at Bombay be under the Area Commander designated as Flag Officer Bombay Naval Area (FOBNA).
- The concept of FONA be done away with and all field functions of FONA be transferred to the respective Cs-in-C and all Navy-wide aviation functions to ACNS (Air). FOGA be made Area Commander as Flag Officer Goa Naval Area (FOGNA).
- FOSM be shifted to Naval Headquarters as ACNS (UW).
- In Naval Headquarters, VCNS be made responsible for operations with ACNS (Ops), ACNS (Air) and ACNS (UW) under him and DCNS for plans. Chief of Material be redesignated at Chief of Maintenance. CWP&A be redesignated as Chief of Acquisitions (COA) and be made a PSO along with Chief of Logistics (COL).

However, none of these recommendations were implemented.

1994 Committee for Reorganisation of HQs

In November '94 a Committee headed by VAdm Madhvendra Singh was formed to look into 'Reorganisation of Naval HQ and Command Headquarters'. The Committee was guided by the VAdm Raju Committee Report of 1991 and tasked to examine organisation of Directorates in Naval Headquarters and recommend deletion/introduction and changes in nomenclature and also to examine the organisation of FOSM and FONA. The recommendations of the Committee were as follows:–

- **Re-Organisation of the Submarine Arm.** It was proposed to restructure the submarine branch to be headed by ACNS (SM) functioning under DCNS as a class authority coordinating all aspects of submarine operations, logistics and maintenance. It was recommended to shift FOSM from Vizag to NHQ.

  ACNS (SM) was appointed wef 14 Oct' 96.

- **Flag Officer Maharashtra Area.** FOMA was constituted to assist the C-in-C (West) by taking over administrative tasks, such as quartering, Naval Public School (NPS), Naval Kindergarten (NKG), transport, administration of Naval Officers Residential Area (NORA) etc., and function as a Station Commander (Colaba) akin to Station Commander (Karanja).

  Subsequently, the appointments of FOMA and FORTAN were operationalised in 1993 which led to FOMA proceeding to sea on a variety of minor ships of the Flotilla. FOMA and his staff were appointed additional to a ship.

  It was decided that FOMA and FORTAN would continue to be an operational authority, but would be a shore authority.

  It was proposed that missile vessels could function under K-22 as was the case from 1971, the Minesweepers and 1241PEs under NOIC (Maharashtra) and the OPVs either under HQWNC or FOCWF.

- **FONA/FOGA.** The Flag Officer Commanding Goa Area and NOIC (Goa) were placed under the administrative control of C-in-C (South). The proposal to shift FOGA and FONA under C-in-C (W) was considered. It was decided that FOGA with his responsibilities of Goa Area is to function under FOC-in-C (West), whilst FONA would be responsible to NHQ on all matters related to the maintenance and class authority functions of naval aviation.

  The operational changeover was effected from Nov 96 and the administrative changeover from Apr '97.

Work Up Organisation and Creation of FOST[1]

The Warship Workup organisations of Bombay, Visakhapatnam and Local Workup Team, Bombay were brought under Flag Officer Sea Training (FOST) in November 1992.

Naval Officers-in-Charge (NOIC)

Creation of NOIC (Port Blair)

INS Jarawa was commissioned on 15 February '64 and the Commanding Officer, INS Jarawa carried out the duties of Resident Naval Officer (RNO) till 1968. Between 1968 and 1976, the Commanding Officer, INS Jarawa also functioned as the NOIC (A&N). In 1976, the two appointments were merged and a Commodore was appointed as Commodore A&N (COMAN). The appointment was upgraded to Fortress Commander A&N (FORTAN) in the rank of Commodore initially in 1977 and then in the rank of Vice Admiral in 1987. Port Blair thus became a fairly comprehensive naval base and the Fortress Headquarters has grown into a structure with

1. Refer to Chapter titled "Flag Officer Sea Training".

a wide spectrum of activities including that of Unified Command.

The billet of Commanding Officer, INS Jarawa was held by an officer of the rank of Commander. With the steady growth in the size and number of units in Port Blair, the responsibilities of INS Jarawa as the Flag Ship and Station Commander increased. Naval Headquarters therefore upgraded the rank of the Commanding Officer, INS Jarawa to that of Captain, who carried out duties of NOIC (A&N) also. NOIC (Port Blair) was constituted on 19 February '93 as an additional duty of CO, Jarawa.

Creation of NOIC (Kerala & Lakshadweep)

In 1995, there were three NOICs stationed at Kochi namely NOIC (Cochin), NOIC (Lakshadweep) and NOIC (New Mangalore).

The Commanding Officer, INS Venduruthy was carrying out the duties of NOIC (Cochin). The Officer-in-Charge, ND School carrying out the duties of NOIC (New Mangalore) operated from ND School, except during dedicated exercises when arrangements are made to operate from New Mangalore. NOIC (L) was operating from Kochi but had a detachment each at Kavaratti and Minicoy Islands.

In August'99, NOIC (Cochin) and NOIC (Lakshadweep) were merged and redesignated as NOIC (Kerala & Lakshadweep).

Creation of NOIC (Tuticorin)

NOIC Madras used to be responsible for the Local Naval Defence of Tamil Nadu ports along both the Bay of Bengal and Gulf of Mannar. It was envisaged to create an appointment of NOIC Tuticorin responsible for the Gulf of Mannar.

In December '94, NOIC (Tuticorin) was constituted with CO, Kattabomman as NOIC(T) with responsibility for the local naval defence of all the major and minor ports of Tamil Nadu along the Coast of the Gulf of Mannar and part of Kerala. The Local Naval Defence of ports of Tamil Nadu along the Bay of Bengal remained under NOIC (Madras).

Change in Nomenclature of NOICs

Naval Officers-in-Charge were designated by the port at which they were located, for example, NOIC (Calcutta), and were responsible to the naval matters of the port. They functioned under the FOC-in-Cs either directly or through the Area Commander. Since their charter of duties, field responsibilities and jurisdiction actually extended over the geographical span of the State in which the port was located, they were designated as per their State in 1997, for example NOIC(Tamil Nadu). The NOICs and their jurisdictions on 1997 were:–

Old Designation	New Designation	Jurisdiction
NOIC Saurashtra	NOIC Gujarat	Gujarat, Daman, Diu
NOIC Mumbai	NOIC Maharashtra	Maharashtra
NOIC Calcutta	NOIC West Bengal	West Bengal
NOIC Visakhapatnam	NOIC Andhra Pradesh	Andhra Pradesh
NOIC Madras	NOIC Tamil Nadu	Ports along Tamil Nadu Coast (including Pondicherry) up to the Pamban Pass
NOIC Tuticorin	No change	Ports along TN coast in Gulf of Mannar
NOIC Paradip	NOIC Orissa	Orissa
NOIC Port Blair	NOIC Andaman Islands	Andaman Group of Islands
NOIC Nancowry	NOIC Nicobar Islands	Nicobar Group of Islands
NOIC Kochi	NOIC Kerala	Kerala
NOIC Goa	No change	Goa
NOIC New Mangalore	NOIC Karnataka	Karnataka
NOIC Lakshadweep	No change	Lakshadweep

Major Changes Post 2000

In May 2001, FODAG was re-designated as 'Advisor Offshore Security and Defence' to the Govt of India.

In the new incarnation, ODAG was to operate in close consultation with MoD, Ministry of Surface Transport (MOST) and other Ministries of the Government of India and also to interact with a host of local and foreign agencies.

The revised charter envisaged a much larger role in addition to the security of offshore assets off Mumbai

and resulted in ODAG being placed under VCNS. ODAG continued under FOC-in-C West for administrative purpose and remained based at Mumbai.

In Jan 2002, the posts of DGNAI and DSMO were upgraded from the rank of Cmde to Rear Admiral and DSMO was re-designated as ACNS (SM).

The Navy's Command and Control Structure in 2003

CNS (Chief of the Naval Staff)

FOC-IN-C WEST (Flag Officer Commanding-in-Chief, Western Naval Command)

- FOCWF (Flag Officer Commanding Western Fleet)
  - Western Fleet
  - FMU (Mumbai)
- FOMA (Flag Officer Maharashtra Area)
  - NOIC (Maharashtra)
    - — Local Flotilla
    - — Harbour Defence
  - Kunjali, Regulating School & DNPM
- COMCOS (W) (Commodore Commanding Submarines)
  - 9th, 10th & 12th Submarine Squadrons
- FOGA (Flag Officer Commanding Goa Area)
  - NOIC Goa
  - Ships, Aircraft for Local defence
  - Shore Establishments/Authorities/Units
- ASD(M) (Admiral Superintendent Naval Dockyard)
  - Naval Dockyard, Mumbai
- FODAG (Flag Officer Offshore Defence Advisory Group)
- NOIC Gujarat
- Ships, Submarines under direct control
- Naval Air facilities
- MS(M) (Material Superintendent, Mumbai)
  - Material Organisation/Store Depot
- Weapon Production & Armament Depot
- Shore Establishments/Authorities/Units

FOC-IN-C EAST (Flag Officer Commanding-in-Chief, Eastern Naval Command)

- FOCEF (Flag Officer Commanding Eastern Fleet)
  - Eastern Fleet
  - FMU (Visakhapatnam)
- COMCOS (E) (Commodore Commanding Submarines)
  - 8th & 11th Submarine Squadrons
- FOSM (Flag Officer Submarines)
  - Submarine Base
  - Submarine Training School
- FORTAN (Fortress Commander A&N Islands)
  - Ships
  - Naval air facilities
  - Naval Ship Repair Yard (NSRY), Port Blair
  - Shore Establishments/Authorities/Units
- ASD(V) (Admiral Superintendent Naval Dockyard)
  - Naval Dockyard, Visakhapatnam
- NOICs Andhra Pradesh, Tamil Nadu, West Bengal, Orissa & Tuticorin
- Ships under direct control
- Naval Air facilities
- MS(V) (Material Superintendent, Visakhapatnam)
  - Material Organisation/Store Depot

FOC-IN-C SOUTH (Flag Officer Commanding-in-Chief, Southern Naval Command)

- FOST (Flag Officer Sea Training)
  - Indian Naval Work up Team
    - — Local Work up Team (LWT) West
    - — Local Work up Team (LWT) East
- NOICs Kerala, Karnataka & Lakshadweep
- Training squadron, Local Naval Defence forces and Survey Ships
- Training Establishments and Schools
- Naval Ship Repair Yard (NSRY), Kochi
- Naval Store Depot, Cochin
- Weapon Production & Armament Depot
- Administrative Support of naval air establishment/ units
- Shore Establishments/Authorities/Units

34

Changes in Naval Headquarters Organisation

Preamble

The organisation of the Naval Headquarters has changed along with the growth of the Navy. Procurement of new hardware and acquisitions and venture into untrodden areas had necessitated changes in manning and planning which needed coordinating agencies at NHQ. Various small offices that are set up for overseeing specific projects have grown into directorates and integration of weapon platform and technology from many nations has led to growth and in turn re-organisation of NHQ to cater to these changes.

Organisation of Naval Headquarters in 1992

PSO	CONTROLLER	APSO	DIRECTORATE
VCNS (Vice Adm)	**CWPA** (Controller of Warship Production & Acquisition) **Dtes :** Contracts, Equipment and Ship Production	**ACWPA** (R Adm)	Ship Acquisition Submarine Acquisition Ship System Development
		DGND (R Adm)	Naval Design(Construction) Naval Design(Engineering) Naval Design(Electrical) Submarine Design Group
		ACNS(P&P) (R Adm)	Naval Plans Staff Requirements Works Naval Academy
	Director General (SEABIRD)	—	—
	Chief Hydro	—	Hydrography
	Scientific Advisor to CNS **Dtes:** Administration,Naval Armament		
DCNS (Vice Adm)	**Dtes :** System Application Naval Intelligence	**ACNS** (Ops) (R Adm)	Naval Operations Submarine Operations Diving Oceanology and Meteorology Signals Tactics
		ACNS (AIR) (R Adm)	Air Staff Air Material Air Acquisition

PSO	CONTROLLER	APSO	DIRECTORATE
COP (Vice Adm)	**DGMS(N)** (Vice Adm) **Dtes :** Judge Advocate General Naval Standing Estb Committee	— **ACOP (CP)** (R Adm) **ACOP (PC)** (R Adm) **ACOP (CIV)** (R Adm)	Medical Services Personnel Manpower & Recruitment Training Education Personnel Services Non-Public Funds Pay & Allowances Civilian Personnel
COM (Vice Adm)	— **COL** (Chief Of Logistics) (V Adm)	**ACOM (SYS)** (R Adm) **ACOM (D&R)** (R Adm) **ACOL** (R Adm) **DGAS** (R Adm Equiv)	System (Engineering) System (Weapons) System (Electrical) Value Engineering Management Services Naval Architecture Fleet Maintenance Dockyard Logistics Support Clothing & Victualling Purchase Cell Transport —

VAdm KASZ Raju Committee Report, 1991[1]

In 1990, Vice Adm KASZ Raju, FOCINC South was tasked to review the Command Structure of the Navy. Though the committee had made far reaching recommendations, none of them were implemented.

1994 Committee for Reorganisation

On Nov '94, a Committee was formed to look into the Reorganisation of Naval HQ and Command Headquarters headed by V Adm Madhvendra Singh. The recommendations of the committee were:

Swap of Duties — VCNS & DCNS. Raju Committee had recommended a swap between duties of VCNS and DCNS to introduce similarity with other two Services. However, status quo was recommended since VCNS being second-in-command and coordinating PSO, interacts with various agencies of the Government beyond the day-to-day running of the Navy. It was also in keeping with the naval practice of keeping the younger man involved with operations.

Additional PSO. The span of control of the VCNS with 13 Directorates, 5 APSOs, IFA(N), SA/CNS and one Controller and the COM with 12 Directorates, 3 APSOs and one Controller was considered too large. COL was a PSO prior abolition of the Supply Branch. It was recommended to upgrade COL and CWP&A as PSOs.

Upgrading of COL to a PSO was to achieve single point responsibility/accountability in aspects of logistics with following Directorates working under him:

- DLS, DPRO, DCV and DTP reporting through the ACOL.
- DPA and DOMS reporting directly to COL.

Few Directorates were identified as superfluous:

- Directorate of Tactics to be wound up and its field functions carried out by INTEG and at NHQ by DD (Tactics) under DSR.
- Directorate of Transport to be wound up and a DD (Transport) to function under DLS.
- Directorate of Naval Equipment under CWP&A to be wound up.
- Directorate of Value Engineering to be wound up.

Other organisational changes recommended were:

- DGAS be reverted to Staff Branch I.
- DNAI be placed under ACNS (P&P).
- DSR to be nodal agency to interact with DRDO for projects aimed towards self-reliance and indigenisation of weapons and sensors.
- DCP to be augmented since 50% of the Navy consists of civilians.
- Ocean Development be given importance view defence of maritime assets.

Developments Between 1990 to 2000

In Apr '91, Controller of Logistic Support (CLS) and ACLS were redesignated as Controller of Logistics (COL) and Asst Controller of Logistics (ACOL).

In Oct '92, the Directorate of Aircraft Acquisitions (DAA) was run down because all Sea Harriers and Seakings Mk 42 B had been inducted. However, in Nov '93 DAA was revitalised to cope with new inductions like ALH, Dornier, AEW halos, LCA (Naval version) and the IL 38 replacements.

ACOP (P&C) was additionally tasked to oversee the Directorate of Non Public Funds (DNPF) and the Directorate of Personnel Services (DPS) in Jan '93.

A new Directorate of Procurement, DPRO was created under ACOL for 'post-indenting procurement' and disposal of stores and spares which was a DLS function before, in 1994.

In Jan '94, DME was redesignated as DOS(E), DEC was re-designated as DOS(L) and DWE was re-designated as DOS(W). However, they were reverted back to original designation is Aug '99 and DME was placed under ACOM(D&R).

In May '94, Directorate of Contracts (DOC) was redesignated as Directorate of Contracts and Cost Management (DCCM).

A new Directorate of Pension and Training (Civilian Personnel) was constituted to function under ACOP (P&C) and tasked with matters pertaining to pension & training of civilian personnel in the Navy and maintenance of their service records in Mar '94.

In Apr '96, Directorate of Value Engineering (DVE) was wound up and reorganised as part of DOMS.

In Jul '96, Directorate of Work (DW) was bifurcated into Directorate of Works (Planning & Infrastructure) under ACNS (P&P) in SB I and Directorate of Works (Quartering & Maintenance) under ACOL in the Controller of Logistics under Material Branch. However, they were remerged into Directorate of Works with DW (P&I) as Director Works and DW (Q&M) as Joint Director Works in Feb '98.

In Oct '96, FOGA/FONA were placed under administrative and operational control of FOC-in-C West. FONA continued to function under the direct control of NHQ.

In Oct '96, appointment of Assistant Chief of Naval Staff (Submarines) was created at Naval Headquarters to function as senior submarine advisor at NHQ on all submarine matters. He was to function under CWP&A and tasked with career planning of submarine officers and to oversee the functioning of the Directorates of Submarines Acquisition (DSMAQ) and Ship Systems Design (DSSD). The Director Submarine Operations (DSMO) was to consult ACNS (Submarine) on important operational and policy matters concerning submarines but would function under ACNS (Ops) as hitherto.

In Dec '96, Commodore Submarines COMSUB (West/East) were redesignated as Commodore Commanding Submarines COMCOS (West/East).

ACNS (Ops) was also entrusted to tasks related to "Information Warfare"(IW) and was redesignated as ACNS (IWOPS) in 1997.

ACOM(Sys) was redesignated ACOM(IT&Sys) and entrusted with tasks related to System, Software, Simulations & Information Technology in Mar '97.

ACOP(CP) was redesignated as ACOP(HRD) in Sep '97.

In Apr '98, the Hydrography Department was shifted to function under DCNS/SBII. The seniormost CO of survey ship in every Command was designated as Command

Hydro Officer and the second seniormost CO as 'ex officio' Deputy Cd Hydro Officer.

With the signing of the Stage II, Consultancy Agreement between the architects and Chief Engineer (Navy), Kochi in Jan '98, NAVAC Project entered its execution stage. To ensure close interaction between Project Director, NAVAC and DNT/NHQ, PD NAVAC was placed under control of the Personnel Branch at Naval Headquarters with effect from Apr 98.

In May 2000, Aircraft Carrier Project (ACCP) was created to coordinate activities relating to the acquisition of the Russian aircraft carrier Gorshkov and activities relating to construction of the Indigenous Air Defence Ship at Cochin Shipyard.

In Mar 2000, to devolve some of COP's responsibilities, the Controller of Personnel Services (CPS) was created in the rank of Vice Admiral. He was tasked with issues pertaining to service conditions, welfare, pay, pension, allowances and non-public funds and also matters pertaining to recruitment, training, discipline, and welfare of naval civilian personnel of lower formations. ACOP (P&C) and ACOP (Civ) were to function under him. In addition, he is to function as the Administrative Authority of INS India.

Organisation of Naval Headquarters in 2004

PSO	CONTROLLER	APSO	DIRECTORATE
VCNS (Vice Adm)	**CWPA** (Controller of Warship Production & Acquisition)	**ACNS(S/M)/FOSM**	Submarine Acquisition
	DGONA (Director Gen of Naval Armament)	—	Naval Armament
	Scientific Advisor to CNS	ACWP & A (R Adm)	Ship System Development Surface Acquisition Ship Production Contracts & Cost Management
	Integrated Financial Advisor(N)		
	Dtes: Administration, Naval Projects (Delhi)	**DGND** (R Adm)	Surface Ships Group Submarine Design Group
		ACCP (R Adm)	Aircraft Carrier Project
		ACNS (P&P) (R Adm)	Naval Plans Staff Requirements Works
		DG (SEABIRD) (R Adm)	Project Seabird
		DGNAI (R Adm)	Naval Armament Inspectorate
DCNS (Vice Adm)	**Dtes:** Naval Intelligence	**ACNS (IWOPS)** (R Adm)	Naval Operations Special Ops & Diving Oceanology and Meteorology Submarine Operations Signals
		ACNS (AIR) (R Adm)	Air Staff Air Material Air Acquisition
		CHIEF HYDRO (R Adm)	Hydrography

PSO	CONTROLLER	APSO	DIRECTORATE
COP (Vice Adm)	**DGMS(N)** (Vice Adm) **CPS** (Vice Adm) **Dtes :** Judge Advocate General	— — **ACOP (P&C)** (R Adm) **ACOP (CIV)** (R Adm) **ACOP (HRD)** (R Adm) **DG NAVAC** (R Adm)	Medical Services — Personnel Services Education Ex-Servicemen Affairs Non Public Funds Pay & Allowances Civilian Personnel Civilian Personnel Services Naval Standing Estb Committee Manpower & Recruitment Personnel Adventure, Physical Fitness & Sports Training —
COM (Vice Adm)	— **COL**(Chief Of Logistics) (V Adm)	**ACOM (IT&S)** (R Adm) **ACOM(D&R)** (R Adm) **ACOL** (R Adm)	Electrical Engineering Weapons and Equipment Information Technology PMG EMCAA Naval Architecture Fleet Maintenance Dockyard Marine Engineering Logistics Support Clothing & Victualling Procurement Transport

35

Personnel and Talent Management

Introduction

In the early 90s, liberalisation of the economy resulted in an exodus of talent towards the corporate sector. Young men, across class strata, rejected all other careers, in favour of a specialisation in Business Management or Information Technology that helped them snag a plum job in the corporate sector. For the Armed Forces, it was a demoralising development. Already reeling under a severe manpower shortage, the enticing opportunities in the corporate sector, made their problems of personnel deficit even more acute. It kept potential quality candidates outside their fold as the young queued up for jobs in corporate offices. Quality of intake suffered greatly.

Gradually, a realisation dawned that in order to attract and retain the best talent, a need existed to package a career in Navy as an attractive proposition. More importantly, it needed follow-up action with the adoption of best personnel practices. Thus, began the process of re-organisation, focused on making policies transparent, fair and effective. The Personnel Branch set itself upon the task of redefining personnel induction plans — initiating new measures to identify people with the right attitude and outlook, putting plans in place to nurture qualities and train instincts and instituting measures to retain services. In short, the personnel policy was geared towards spotting, nurturing and retaining talent.

But it wasn't going to be easy, especially in the absence of a substantive inducement. The Navy wanted talented and motivated young people. The personnel branch was preparing for it with the right policies and plans. However, there were no real incentives to offer. Moreover, retention of officers with specialised skills in the service was becoming difficult due to the yawning gap in pay and perks with their civilian counterparts. Thus, despite its best efforts, the Navy found itself staring at serious shortages.

Officers

Dealing with Shortages. Through the 70s and 80s decades, the Navy had made up its officer shortfall through schemes like the 'Revised Special Entry Scheme', the 'Direct Entry Scheme' and the 'Graduate Special Entry Scheme (GSES)' for Executive officers. However, despite the existing schemes, it was still short by nearly 12% . In the late 80s, a decision was taken to increase intake of officers by augmenting levels through its main cadet Entry Schemes. This was done via the introduction of the 10+2 (Executive) Cadet Entry Scheme and the 10+2 (Technical) Cadet Entry Scheme.[1] More importantly perhaps, a decision was taken to start inducting officers via the Short Service Commission (SSC) under the Direct Entry and University Entry Schemes.

The Short Service Commission (SSC)

The successive increase in officer intake in the preceding years, lead to over-recruitment of officers from 1987. This resulted in accommodation shortages in certain stations and a drop in job satisfaction levels at the young Lieutenant's stage itself, affecting their individual development. The Navy decided to remedy the situation by reducing intake. However, by the late 90s, with the service growing and induction of new platforms, there was again shortage of officers. In 1999, the figure of deficit was pegged at approximately 14%. There were even larger officer shortages in the technical branches with the Electrical Branch showing a 27% shortfall and the Engineering branch 17%. The shortages in Special Duty Officers cadre were also significant.

The problem lay on account of the limitation at Service Selection Boards (SSBs) and limited capacity of training establishments. The Naval SSBs at Bhopal and Bangalore were able to accept only 120 to 160 candidates at any time and the selection rate was approximately about 4 out of 100. Similarly, the capacity of the premier training

1. Refer to chapter titled 'Naval Training'.

establishment Mandovi was only 250 male and 20 lady under trainees and the NDA entry was fixed at 43. Efforts were made to increase the capacity at Mandovi to 300 plus 20 women cadets and set up an additional SSB at Diamond Harbour or at Agrani.

The Navy extensively debated and deliberated over the induction of Short Service Commissioned Officers. It was highlighted that the proposed scheme would yield the following distinct advantages:-

- It would keep the intake of high cost cadet entry officers minimal.
- Brighten up the promotion prospects of permanent commissioned officers.
- Cut down on cost of training and pension bill.
- Short Service Commissioned officers could provide the padding at the base of the officers' pyramidical structure at minimum cost.

The merits were weighed against the scheme's obvious demerits that included the assumed shortsightedness and apparent imprudence of spending huge amounts in training officers for a short career span of 7–10 years. There were lingering doubts in some quarters of whether officers inducted on a fast-track scheme would be able to distinguish themselves professionally. It was also not clear whether such officers would be able to immerse themselves completely in the military ethos and properly imbibe service values and traditions.

But, in the light of the constraints that it faced, the advantages that the scheme promised to accrue seemed to far outweigh the demerits. The SSC induction in the Navy therefore, became inevitable. Induction of officers by granting Short Service Commission (SSC) for a period of 07 years was considered an ideal way of avoiding the high cost involved in preparing long gestation main stream officer whilst fulfilling the manpower requirements at the base of the officers' pyramidal promotion structure. The additional benefit was the reduced service liabilities that such a cadre was likely to demand. SSC intake was planned to be increased sharply to attain the 60 to 40 ratio of the PC: SSC. With enhanced intakes of SSC officers, availability of officers at junior ranks increased.

Induction in Support Functions. Officers were inducted into the Education, Logistics, Hydrography, Air Traffic Controller and Law cadres, through the SSC scheme, in 1991. The Direct Entry SSC scheme for officers of Engineering and Electrical branches of the submarine cadre was introduced in Apr 2000.

Then in 2001, the IN commenced inducting officers through the University Entry SSC scheme into its Engineering and Electrical branches. To overcome the shortages of Air Technical Officers, it was decided to nominate officers for Air Tech Cadres, from amongst the technical graduates inducted under the Direct SSC scheme. The selected officers underwent the Air Specialisation Course at NIAT(K) on completion of the Naval Orientation Course.

Induction of SSC (X). The Navy was initially averse to the idea of introducing SSC for Executive officers, as it was believed that extensive exposure and thorough grounding was a prerequisite for holding a deck watch. However, owing to the planned decommissioning of ships during the 8th & 9th plans and the resultant reduction in the sanctioned strength, the Navy reviewed its stand and in 2001, opened SSC entry for the 'X' Branch too.

Meanwhile, junior rank billets, which could be earmarked for SSC officers in keeping with their ab-initio training commensurate with their short tenures, were identified. They were found suitable for initial employment in non-specialist billets in minor war vessels such as SDBs, LCU, IMS, SNMS etc to gain vital experience in independent operations at sea. The first and second batches of SSC X/GS officers were inducted in 2000.

Tenures for SSC Officers. At the time of inception, it was decided to maintain a stable population of 200 SSC officers who would achieve maturity after 07 years of service. After achieving this figure of 200 within a time frame of 10 years, it was decided to retire 20 officers every year with a corresponding intake at the bottom of the pyramid and a reduction in the intake in the NDA and Naval Academy. The training pattern and career options for this cadre were suitably modified due to their limited utility and the requirement to achieve a low cost cadre.

But the motivated SSC officers were unwilling to leave the service at the end of 7–10 years and requests for grant of PC to SSC officers came up too often. After deliberations it was decided to grant PC to male SSC officers only in exceptionally outstanding cases, amounting to 10% aimed at enhancing their motivational level and commitment to the service.

For the others who could not be granted a permanent commission, the initial engagement of 7 years was extended to 7+2+1+4, totalling to 14 years. A proposal for engagement of SSC officers on a 10+4 pattern against the existing 7+2+1 period was taken up with the Government. Since the engagement of SSC officers was

increased gradually from 7 to 14 years, they were also considered for various professional courses within the Navy subsequently.

Induction of SSC Lady Officers. Till 1992, ladies were permitted to join in the Armed Forces only in the Medical Branch. Then in Jul 1992, the Navy started inducting aspiring ladies as SSC officers, for the first time in the Education Branch and Law/Logistics Cadres of the Executive Branch. No special status was conferred on women for entry apart from some modifications in the SSB tests like GTO tasks, OIR and Psychological tests. They competed with SS men on open merit and vacancies were filled in order of merit, based on marks obtained in SSB.

In 1992, there were 24 vacancies to be filled on open merit for male and female candidates. Of these, women filled 22 vacancies and men occupied only 02. Subsequently, Air Traffic Control duties were identified as an additional avenue for the employment of women officers. Accordingly, Government sanction was obtained in early '92 for women entry through the DE SSC scheme for ATC duties and induction began in 1993. It was soon realised that SSC was a very attractive entry scheme for women. By 1996, the SSC lady officers in the Navy increased to 71 and were anticipated to rise to 130 in 2002.

Year	Log	Ed	Law	ATC	Total
1992	10	9	3	—	22
1993	6	4	—	3	13
1994	2	2	4	6	14
1995	6	1	—	3	10
1996	4	5	—	3	12
					71

Many in the service watched the entry of ladies within the fold of the Navy, which was considered a male bastion, with skepticism. The NHQ and the Commands evolved a systematic action plan by which, personnel were first made aware of and then psychologically prepared for the induction of women officers. Training capsule on Gender Sensitisation and related issues were included at BTE, Mandovi and Shivaji. Exhaustive training capsules were conducted for officers in professional schools like CLABS. Also, the messes and living spaces were geared up to make them comfortable.

Selection of Technical Officers for Commander's Sea Time

In 1995, the policy for mandatory sea time for technical officers of the rank of Commander was reviewed at NHQ and it was decided to introduce stringent and specific norms for their selection for the important and demanding task of Commander (E/L) on board ship. Accordingly, it was decided to make the selection merit based for officers who fulfilled the following criteria:

- Past experience of at least two sea duty tenures.
- Above average record of service.
- Qualifying Professional Management Examination.

Command at Sea

In the mid '90s, there was a problem of selection of officers for Command at sea. The Navy's predicament lay in the ever-increasing number of officers coming up for selection to the rank of Cdr and Capt, even as the billets available at sea for Commands remained relatively static. A view therefore, needed to be taken whether only the very best had to be selected for commands at sea. The service also mulled the introduction of a Major Warship Command Course (MWCC) in the rank of Cdr associated with an examination and the laying down of stringent criteria for selection of officers for various types of commands. Finally, the following criteria emerged: the selection for sea command was to be merit based from officers who fulfilled the following Minimum Sea Duty Criteria:-

- Should have held at least two sea duty tenures involving independent watch keeping duties for Non-PCE Command for Lts/Lt Cdrs.
- To have held at least two sea duty tenures involving independent watch keeping duties and qualified in Major Warship Command Course for PCE Command for Lt Cdrs.
- To have done at least three sea duty tenures, of which one should be as Head of Dept/ Sub-Dept for Category 'A' Command for Commanders.
- Should have done at least three sea duty tenures for Category 'B' Command for Commanders.
- Done at least four sea duty tenures, one of which is to be command at sea as a Cdr or as 'XO' of a Capital ship (commanded by a Captain) for Category 'A' Command for Captains. They should additionally have done the NHCC and qualified in Major Warship Command Course.
- Should have done at least four sea duty tenures, one of which is command at sea as a Cdr or as 'XO' of a Capital ship for Category 'B' Command for Captains. They should additionally have done the NHCC and

qualified in Major Warship Command Course.

The other criteria were common and applied across all ranks of officers chosen for Command:-

- Overall record to be high to above average, with above average performance in sea billets.
- Should have been recommended for command from sea billets.
- Should have passed Command Exam.
- Possess high leadership qualities.

It was also decided that:-

- Command examination was to be made more exacting.
- The tenure in Command was to be of about 18 months duration with a proviso to ensure 9 months operational time.
- Scope of the PCT course was increased to include specific command functions such as administration, law, leadership, tactics, etc.

The Command Exam Debate

Since its inception in the early 70s, the Command exam had been a pre-requisite for selection of officer for Command at sea. Except for a few minor war vessels like SDB/LCU/IMS, all Sea Commands were entrusted to officers who had 'passed the command exam' and whose track record was above average.

In the 90s, there was an opinion expressed in some quarters, that in the changed maritime environment of 'Super Specialization', this philosophy needed review. Some officers with a good record of service and professional experience in their particular warfare disciplines, were thought of, as being wasted for want of passing the command examination. The arguments put forth, harped on the need to waive the CE requirement to accommodate mainly, a few submarine and aviation cadre officers who for one reason or another either failed to quality or were unable to appear for the examination.

The Navy arrived at the conclusion that the waiver of Command exam would be a retrograde step, appear motivated and show a lack of consistency in personnel policies. The authorities concluded that it would be perceived very poorly in the field and would fail to provide the stimulus to encourage professional reading amongst officers. It would also amount to acquiescing to those wayward officers who had chosen to defy the Command exams 'par se' and elected not to take the same despite all persuasions, along with being unfair to a few bright officers who in the past were wasted on account of not having qualified the exam. The requirement of passing the Command Exam was therefore, reaffirmed and not diluted in any way.

Promotions

The system of promotions in the 90s had, by and large, worked satisfactorily. But there were some concerns of its heavy reliance on numerical assessment. Nevertheless, the overall concept of the promotion system was based on comparative merit and the number of officers cleared was generally commensurate with the number of vacancies available, based on a long-term perspective.

The Personnel Branch identified parameters other than numeric, which could be assigned weightage depending on their importance (like honours and awards, performance in courses, etc). The desirability of maintaining anonymity of officers being considered by the Promotion Board was also debated. Another aspect concerned introduction of graded weightage to assessment of IO, RO and SRO.

After deliberation, it was concluded that, by and large, the system worked fine and no major changes were necessary except that for the system to be perceived as fair, anonymity could be introduced for the Promotion Boards (2 & 3).

Promotion to Captain Rank

By the mid 90s, promotions in the selection grade ranks were based on a five-year dynamic perspective-planning model where available vacancies were averaged over a five-year period. A problem however, still existed in the rank of Captain. As per the old policy, officers granted acting rank as Captain, got confirmed within a year. However, as per the new model, an acting unpaid Captain was confirmed only after about three years, which sometimes peaked to five years. Due to this, many officers found themselves in the unenviable position of having to continue on the rank of paid Acting Captain at an age when they should have been constituted Commodores. The age profile of Commodores also shifted with the consequence that some superannuated even before they could be considered for promotion. Hence many billets of Commanders were filled with officers in the rank of Ag unpaid Captains. This in turn affected the promotion prospects for Lt Cdrs and Cdrs.

The essential causes for the non-promotion of acting

unpaid Captains were:-

- Calculations of vacancies were based on the assumption that the Navy would grow at an average rate of 1% per annum, whereas the growth rate has been virtually zero.
- Actual premature retirements were lesser than anticipated.
- Setting up of Fifth Pay Commission had caused a small reduction in outgo, particularly in 'X' Branch.

Commodore/Captain Rank Structure

The unique features of the Commodore/Captain rank structure also contributed to the cadre management problems. Unlike the Army and Air Force, the Navy did not have Commodore as a Selection Grade rank. It was proposed to introduce Commodore as a selection grade rank. This was to come in effect from 01 Jan '99. The Navy, at that time, had a total of about 354 vacancies for Captains and Commodores with no clear demarcation between the two ranks. The time bound progression from Captain to Commodores took three years. The resulting imbalances in the rank resulted in delaying constitution of Commodores to four years. The service therefore, found itself having two types of Commodores on its rolls:

- **Substantive Commodores.** Constituted Commodores, who in addition to rank pay, also enjoyed the privileges of the rank.
- **CDA Commodores.** Captains who had attained a seniority of three years in the rank. They received the rank pay of a Commodore, but for all intents and purposes continued to be Captains.

Feedback received highlighted the distinct advantages of constituting 'Commodore' as rank:-

- The release of Commanders vacancies occupied by Acting unpaid Captains would improve the Promotion Factor for Lieutenant Commanders.
- Officers would be promoted to the substantive rank of Captain within one year of being placed on the Select List.
- Acting unpaid promotions could be discontinued.
- Promotion Factor for Captains to Commodores could improve and stabilise at about 85%.
- The ageing in the ranks of Captains could be reversed.

The Fifth Pay Commission, in its proposals, included creation of a senior integrated pay scale for the ranks of Commodore to Vice Admiral. This made it incumbent for the service to fall in line with the other two Services by making Commodore a selection grade rank with formal selection procedures. The Pay Commission also recommended an increase in the age of superannuation by two years. In the fixed vacancy position, which then existed, this would go on to further increase the stagnation pressures and make the solution more difficult.

The decision to constitute 'Commodore' as a separate rank was not immediately implemented pending the implementation of the Pay Commission award. However, a transition period was catered for as it was believed that time would be needed to stabilise the overbearing in the rank. Nonetheless, officers already drawing the rank pay of Commodores continued to do so until superannuation. Subsequently, the proposal to make 'Commodore' a selection grade rank was dropped.

Promotion to Flag Rank

The 90s decade witnessed several changes in the conditions of the service of Flag Officers in which, at times, extensions were given to some Flag Officers and sometimes rules were changed to increase the tenure of Rear Admirals/Vice Admirals to 4 years in addition to the inclusion of a new rule regarding the tenure of C-in-Cs.

The flexible application of rules put certain officers at a disadvantage as far as retirement age was concerned. This was especially true for officers in the Executive Branch promoted to Flag Rank before the age of 50, who then retired at the same age as Captains/Commodores. Moreover, those officers who did not make it in the first look were already 52 years of age by the time they got to their third and could retire at 56. Thus, a system existed in which an officer meriting promotion later got to serve longer. To remedy the anomaly, it was recommended that the Navy fall in line with the Army on a progressive basis and the retirement age of Rear Admirals be made 56 years and Vice Admirals 58 years irrespective of tenures.

The proposal was examined and in 1993, was approved by the MoD, but could not be implemented as the file was withdrawn by NHQ. Subsequently in 1999, a GoI directive was promulgated that enhanced the ages of retirement Rear Admirals to 58 and Vice Admirals to 60. The order changed the existing regulation of tenure-based retirement for V/ RAdms and made it time-based. As per the new directive, Flag Officers were to retire on achieving the age of superannuation.

Criteria Appointment for Flag Rank

The subject regarding the laying down of QRs for senior Flag appointments and identifying appointments, which could be classified as 'criteria appointments', was discussed at successive forums during the early 90s. During the discussions it was widely felt that it would be impractical to nominate certain appointments as 'criteria appointments' as this would severely restrict the flexibility of the Navy as an organisation and its senior officers as regards their future employability as well as career and promotion prospects. Senior appointments were to be normally decided more on the basis of an officer's vision, leadership, maturity and potential for shouldering added responsibility. Merely holding of a number of specialist appointments at lower levels did not necessarily give an officer a better claim for higher-level appointments.

Selection of Technical Officer for Senior Appointment

In 1993, NHQ decided to introduce a Flag Board for selection of technical officers for appointments as GM (R), GM (T) at ND (B)/ND (V), Cmde Supdt at NSRY (C) and NAY (C), COs Shivaji, Valsura, Tunir and Kalinga and Oi/c MGTOC. Selection for the above appointments was to be merit based, from a pool of officers fulfilling eligibility conditions:-

- Overall record of above average.
- Completed at least one afloat tenure on board Carrier/Destroyer/Frigate/other Fleet Ship or in a Submarine/Submarine Squadron.
- Recommended for command ashore/for training/ production units.
- Done NPCC/LPBC/Industrial Management Course or equivalent course.
- Qualified in the Professional Management Examination.
- Officer recommended for dockyards/production units should have at least two tenures in the Dockyard/Repair Organisation/Production Units.

Proposed Merger of E&L Branches

In 1989, there was a proposal for the integration of E&L branches. The salient features of this proposal were:-

- Technical officers to do common training in the initial phases.
- During the last phase of the basic training, officers were to specialise in various disciplines like Gas Turbine, Radars, Communications, Weapons Systems, etc.
- Officers would thereafter serve in various sea/shore appoint ments both in marine engineering and electrical fields for 2 to 3 years.
- After 5 to 6 years of service, officers would be selected for post-graduate studies and other long courses. Thereafter, they will be employed in posts that would progressively be converted into system-based demarcation, rather than discipline-based demarcation.

It was initially felt that the merger was a workable idea. However, the promotion prospects of officers carrying out E&L duties were a cause for concern. It was also felt that an outright merger of the two branches would lead to drastic changes in the functional responsibilities of the E&L branches. The proposal was finally shelved.

Study on 'Unrestricted Line Surface Warfare Officers'

In 1993, a study was carried out at NHQ on the introduction of 'Unrestricted Line Officers' concept on the lines of the US Navy. The study was restricted to the X, E & L officers of the surface Navy. The study team examined manning, training and career profile for the URL Surface Warfare Officer (SWO), identified specialisations for lateral transition to 'Restricted Line' and 'General Unrestricted Line' cadres and identified cross training requirements for existing Executive and Technical officers.

The URL Surface Warfare officer cadre was to comprise of following specialisation:-

- **Operations.** Consisting of Communication, Navigation and Tactical aspects of surface warfare.
- **Weapons.** Comprising officers responsible for Combat Systems consisting of weapons and sensors on board ships.
- **Engineering.** Comprising officers responsible for Propulsion, Control systems, Power Generation and Distribution and NBCD.

In addition to SWO cadre, URL was also to have the following cadres:-

- **General URL Cadre.** Comprising of officers who specialise in shore management and support functions like Logistics, Education, Provost, Meteorology, Oceanography, etc.
- **Restricted Line Cadre.** Comprising of Naval Constructors and NAIO and vertically specialised technical officers. This cadre would provide officers for acquisition, construction, maintenance and modernisation of ships, combat/weapon system, sensors, etc in addition to the R&D effort.

In the proposed study, ab-initio training was increased to B (Tech) and thrust was laid on 'Hands On' training at sea. It proposed trimming of SLT (Tech), Specialist and other academic courses.

The concept was debated intensively, but seemed too radical to be implemented right away.

Revitalisation of the Special Duties Cadre. In the late 80s, the Navy debated the revitalisation of SD Officers' Training. It was widely felt that training given to the officers during their post promotion courses was not adequate enough to prepare them for taking over the wide range of duties that were expected from them. As a result, employment was restricted to their narrow professional fields. It was thus, decided to revive the training by updating the Post Promotion Courses. Training for Executive Branch SD officers was increased from 9 weeks to 17 weeks. Training for Engineering Branch officers was increased by 4 weeks. It was also decided to conduct a Staff and Management capsule course at INS Hamla to ensure that officers would be better equipped to discharge their duties and also earn watch-keeping ticket at sea. In 1991, it became compulsory for all SD officers from seamen and communication branches to be posted onboard fleet ships for award of watch-keeping tickets.

Abolition of Ag SLT Rank. Following the recommendation of the Fifth Pay commission, the rank of Ag SLT was abolished in 1998 and the qualifying period specified for promotion of an officer to the rank of LT was reduced to 2 years, to which seniority gained in SLT Technical courses was applied. In the case of the Executive branch, officers were to be confirmed in the rank of Lt after they were awarded Watch Keeping Certificate. For Aviation Cadre officers, confirmation was on successful completion of pilot's course.

Cadre Management between 1990–2000

The main operative function of career management remained ensuring that the service always had officers of the requisite calibre and in the requisite numbers in each rank that it needs. The officers' cadre remained a steep pyramid, formed by sequentially reducing the vacancies in selection grade ranks to obtain a narrow apex on the wide base. The sanctioned strengths in various ranks in the 90s were as follows:

Rank	Sanctioned
Admiral	1
VAdm	15
RAdm	35
Cmde/Capt	357
Cdr	1120
Lt Cdr & Below	5689
Total	**7217**

Sub Cadre Management

Successive promotion boards in the late 90s brought out the need to resort to active cadre management. Subsequently, sub cadre management was brought in force for NAI, Hydro and Logistics cadre of the X branch. It was then realised that there were a number of other sub specialisations like Law and ATC for which, the procedure had to be introduced. Rationalisation of the Law cadre was an impending issue. Though the sanctions existed for only 11 law officers, there was a need to have a minimum of 20 officers to cater for the increased load. Measures to merge the Law cadre with Logistics or to make Law graduation an additional qualification for officers were examined.

A study was also conducted to revamp the ATC cadre. All possible options such as creating a separate specialisation for X officers, combining the specialisation with direction phase of ND, grant of PC to a larger percentage of SSC ATC officers, etc, were all examined. On the technical side too, there existed a need to consider the Naval Architect as a Sub Cadre, since their career pattern and job specifications were quite distinct from that of the Engineers. There was also an appreciation of the fact that the need to introduce the practice for submarine and hydro cadres required imminent consideration. However due to the inherent implications of the suggestions, the proposals were deferred for further deliberation.

Career Pattern of Officers of Specialised Cadre

Officers who branched off from the general service stream into aviation, submarine, diving cadres or commandos, by virtue of their continued employment within their cadre were deprived of general service exposure despite excelling in their specialised fields. Though provisions existed for their appointment in general service billets they were not spared due to tremendous expansion in their own fields. This led to their losing out on experience in the general service and eventually in their promotions. NHQ attempted to remedy this by sending as many officers of the affected cadres for sea time on surface ships, as possible. At the same time an attempt was made to ensure that the over-riding operational requirement of maintaining wartime UE of aircrews/submarine crews was not diluted.

The problem of 'General Service billets' was more pronounced in the case of NBCD specialist officers

since not a single executive NBCD specialist officer was promoted to the rank of Cdr/Capt for almost a decade. In 1998, the long NBCD course was discontinued. X/GS (including Submarines) and technical officers were nominated for the modified 16 weeks NBCD course. NBCD specialisation became an additional qualification for specialist officers of all branches and all shipwrights were trained for NBCDI functions.

New Courses/Training Schemes

Technical Management Course. In 1994, the Navy started conducting the Technical Management Course at the College of Naval Warfare at Mumbai. The course was aimed at teaching middle level technical officers the essentials of finance, material, personnel and other regulations that an officer working as a manager in various billets was likely to encounter. The course also dealt with imparting instructions on Human Resource development and the latest techniques of management as practiced by the industry at large.

C-LABS. A 'Centre for Leadership and Behavioral Studies' (C-LABS) was set up at Cochin in 1993, to provide periodic inputs to both officers and sailors at successive stages of their careers.

Naval Research Fellowship Scheme. A 'Naval Research Fellowship Scheme' was instituted under which selected universities/institutions are invited to select outstanding students pursuing studies in the fields of Electrical Engineering, Mechanical Engineering, Computer Science, Electronics and Communications, Naval Architecture, Applied Mechanics and other subjects of interest to the Navy. These students were given specific topics to take on innovative research work. They were paid scholarships to meet the contingencies connected with the research work.

Naval Higher Education Support Scheme. The NHESS was intended to encourage regular commissioned officers to achieve higher educational qualification and exposure to advanced technologies and techniques by availing PG and Higher level courses at reputed universities/institutions in India and abroad. The availing of research fellowship was also supported under this scheme.

Sailors

Issues of Sailor Shortages. The Navy continued to suffer from sailor shortages through the 90s. In 1985, the service faced a 19% shortage of sailors across all its branches. The deficit was more acute in technical branches. To add to its woes, a number of professional commitments were being met without official sanctions. Shortages were sought to be made up by increasing intake of both artificer apprentices and matric entry recruits. For a short period of time things began to improve, but then the trend quickly reversed again.

It gradually became clear that as the service grappled with the problem, a number of issues were being faced by the cadre that needed urgent redressal:-

Discrepancy in Pay Structure. During the implementation of the 5th CPC, the Artificers got a better pay revision as compared to the non-Artificers. This was particularly so, upto the rank of CPO equivalents. For a service career of 25 yrs, a life time pay differential between an Artificer (X Group) and a non-Artificer (Y Group) worked out to approx Rs 3.25 lakhs along with relatively much faster career progression of an Artificer.

Frequent Change in Promotion Policies. The promotion policies of sailors were revised in 1993 with the introduction of 'Sailors New Accelerated Promotion System' (SNAPS). There were no changes in the professional and basic qualifications such as Service/Sea Service, Swimming, VG Conduct, Medical Fitness and Education Qualifications. SNAPS was further modified in Feb 98 with the introduction of ACRs for sailors above the rank of Leading Seaman. However, the basic parameters for promotion still remained unchanged.

Residual Service for Sailors. The only major change in the promotion policy was the introduction of residual service for sailors selected for promotion to MCPO ranks. This has been brought into force due the fact that most of the sailors, particularly Artificers, leave service soon after getting their MCPO Promotion thereby creating shortages in this cadre. While these sailors availed of all the perks and privileges of higher rank, the service did not benefit from their promotion. To curb this tendency, residual service of 2 and 3 years from the date of issue of promotion orders (IN-52) was introduced for promotion to MCPO I/II respectively wef. Mar 1998.

Discrepancy in Promotion Prospects. The qualifications required for promotion were similar in all branches of Artificer cadre. Promotions upto the rank of Artificer class I were time scale and sailors were promoted by the Commanding Officer. However, there existed a disparity in time taken (length of service) for promotion to the Chief Artificer rank of Air Artificers (much more as compared to Engine Room and Electrical Artificers). The main reason for this difference is the fact that outflow from Engine Room and Electrical branches was much higher than other branches. Since the promotion rosters for all

branches were separate, certain disparity could not be avoided.

Pay Fixation of Artificers vis-a-vis Civil Diploma Holders. The Artificers felt that they got a raw deal compared with the civilian diploma holders. However, one had to take into consideration the fact that they only have a Matric level entry qualification on recruitment in the Navy. Only after 4 years of technical training at Govt expense and certain watch-keeping time period they became technically employable in the service.

Declining Attractiveness of Artificer Cadre. The Artificers felt that they should have a comparatively faster career progression and better scales of pay.

Positioning of Artificers in Shore Billets. The Artificers from Engine Room, Electrical and Shipwright branch were being retained in sea billets for prolonged duration. The main reasons for prolonged sea tenure was as follows:-

— In 1999, there was a shortage of 23%, 30% and 30% sailors in Engine Room, Shipwright and Electrical artificer cadres respectively.

— Govt sanctions for these sailors existed mainly for ships, except for a few shore billets like T&T units and MGTOC, etc.

— It took 6½ years to train a fully qualified Artificer and most of this time was spent ashore. As these sailors left service in 15 years, they needed to be gainfully utilised onboard ships for the remaining 8–9 years.

Artificers

The shortages in the case of Artificers, were a cause for grave concern. Since much better emoluments and perquisites were offered by private industry and the Merchant Navy, most senior technical artificers left the Navy after having served the minimum time. With the new technology entering service with the Russian acquisitions, the shortage of artificers became a grave issue.

Several proposals were considered to overcome the shortage. One was to recruit holders of diplomas from polytechnics as Direct Entry Artificers. Whilst this would help to meet the immediate need by avoiding the long four-year initial period of training that Artificer Apprentices underwent, it had the disadvantage of insufficient Naval indoctrination. Another proposal was to create a new rate of Master Chief Petty Officer as an incentive to sign on for longer periods after their initial engagement as also to improve the career prospects of highly trained senior sailors.

In Jan '99, a white paper on shortages of Artificers highlighted the reasons and steps being taken to overcome the deficit. Units motivated Artificers to sign on for further service. They were provided the incentive of retention at their last duty station and the option of mutually acceptance transfer to sanctioned billets.

In order to slow their exit, the provision of residual service on promotion to MCPO I/II was introduced in 1998. The sailors were required to sign for 2/3 years on being promoted to MCPO I/II respectively. This policy has ensured that they serve for a little longer than they would normally have.

Direct Entry Diploma Holder(DEDH) Scheme. In Mar 1999, after an interval of almost 12 years, the IN began inducting DEDH sailors into its ranks. The training pattern of the DEDH included a Naval Orientation Course at INS Chilka for 9 weeks, followed by 4 weeks of sea training. The sailors then underwent professional training of 48 weeks, which was then followed by equipment training onboard ships for 24 weeks. On completion of sea attachment, trainees of E/R branches were assessed for award of Auxiliary Watch Keeping Certificate and Boiler Watch Keeping Certificate followed by conformation as ERA 4. The sailors then served for an average of 9 months before appearing for the Unit Watch-Keeping Certificate. Under-trainees of other branches underwent equipment training in the respective professional schools for 24 weeks after which they were appointed onboard ships.

It was decided to continue DEDH entry on a regular basis and a case was taken up with the Govt. However, a reasonable mix of all types of entries (DEDH, AA, NEA & Mech) for Artificers was maintained. Intake of various entries was regulated so that total number of DEDH did not exceed 30% of total Artificer strength.

Change in Eligibility Conditions/Engagement Periods. In order to tap the in-house resources, the eligibility conditions of Naval Entry Artificers (NEA) and Mechanician scheme, which provides an opportunity to the non-artificers to become artificers, were revised in 1998. All Artificers were withdrawn from Headquarters and other non-professional billets. The MP of artificers of all shore establishments, except the frontline maintenance units, was reduced. Re-engagement upto 25 years was granted in steps of five years instead of three years in order to provide more stability and job security to sailors.

By 2000, induction to the Artificer cadre was through four schemes, i.e. Artificer Apprentices, Direct Entry Diploma Holders, Naval Entry Artificers and the Mechanicians.

Sailors' New Accelerated Promotion Scheme (SNAPS)

Naval Headquarters introduced the Sailors Accelerated Promotion System with effect 1 Jan 1993 as an alternative to the erstwhile Red Recommendation System. After some apprehensions were expressed from certain quarters about some of the provisions, NHQ modified the system and the Modified SNAPS came into effect from 1994 onwards. The new system was aimed at improving the career prospects, motivation factors, and to bring the overall promotion system in line with modern human resource development systems. Sailors were to be assessed annually for efficiency and a grading of SUPR A, B and C were to be awarded to percentages not exceeding 20%, in each category in each rank.

Naval Recruitment Organisation(NRO)

In the late 90s, the Navy revamped its recruitment policy for sailors. For many years the service had faced serious shortages in recruitment targets through the Army ZROs and BROs. The Army's recruitment organisation on which the Navy was totally dependent had several drawbacks — irregular practices, harassment, lengthy procedures and a generally indifferent attitude to the needs of the Navy. In order to make up for shortages the entry standards had to be diluted by various means, such as — reducing educational qualifications to 45% in Matric, releasing additional vacancies for sponsored candidates and lowering of qualifying marks in written exams to 40%. The Navy was therefore left with no choice but to set up its own recruitment organisation.

The Naval Recruitment Organisation, set-up in 1996, was on the lines of the Air Force and its salient features were:-

- 19 Naval Recruitment Establishments (NRE) were established.
- Candidates could appear at centre of their choice.
- All activities for Northern, Central and NE states were to be handled by NHQ/DMPR like receipt of applications, processing & screening, issue of call up letters, documentation, written test, PFT, Medical exam, appeal medical cases, compilation of results and enrolment.
- Similar recruitment activities for coastal states were to be handled by NREs.
- All activities were computerised.
- The system was made candidate friendly. Written test were of multiple answer type. The results are announced within a few hours and PFT and Medical are conducted the next day.
- Final selection is based on zonal-cum-all India merit.
- Sponsorship is limited to sons and blood brother of Naval personnel.

Implementation. By 1997, the NRO was fully in place and NREs were made responsible for their individual regional recruitment. Software for computerisation of applications, issue of call up letters, preparation of detailed spread sheets etc was developed and given to all NREs, together with printed computer stationery. Detailed recruitment instructions covering all aspects, to ensure standardised recruitment procedures, was also issued to all field organisations and recruitment teams.

In 2002, the existing system was reviewed and some modifications made. Recruitment of all MER, Artificer Apprentices and Direct Entry Diploma Holders were now centrally controlled by the NRO under the overall supervision of the DMPR (NHQ). Applications for all entries were scrutinised at the NRO. The NREs were tasked for the conduct of written examinations, PFT and medical examination.

General Personnel Issues

Revitalisation of the Provost Branch. The revitalisation of the Provost Branch was undertaken in 1998 after it was felt that the cadre was in need a serious overhaul. The reasons were many.

- INS Kunjali, commissioned as parent establishment for the Provost Officers and Sailors, had experienced a gradual shift in its role from that of a primarily Provost Organisation to an Aviation Base, which has led to the loss of identity of the Provost Organisation.
- Due to his multifarious responsibilities, the time spent by DPS on Provost Marshal (Navy) functions was not adequate.
- Personnel in the cadre found themselves short of the best equipment required to effectively carry out provost functions.
- Provost officers felt there was a general lack of promotional prospects in the cadre.
- There was a severe drop in the quality of Provost sailors over the years. A strong need was felt for the review of induction procedures for Provost personnel.

In 1996, the issue was taken up very strongly and remedial action recommended. In the next few years, the Provost Branch was restructured to gain more value and importance. INS Kunjali I was separated from INS Kunjali II (Aviation) and its duties and charter better defined. Induction procedure into the cadre was made stricter and more stringent. New electronic gadgets including communications sets, etc. as identified were procured. In order to give provost personnel a definite identity, changes in their uniforms were also effected.

Higher Responsibility for Senior Sailors

In the Senior Officers Conference of 1993, there was a serious discussion on the issue of optimum utilisation of senior sailors. It was felt that adequate professional responsibility was not being delegated to Senior Sailors, particularly in ships. In most foreign navies Petty Officers and above had substantial direct responsibility, including in some cases, bridge watch keeping. The job specifications and commensurate training inputs of our sailors were observed to be of a much high order as compared to those of other Navies in the world. The knowledge acquired was, however, seldom put to full use due to inadequate tasking when the sailor reports to his new billet. Also, experience had shown that there were many Petty Officers and above who are both willing and competent to shoulder higher direct responsibility.

In keeping with the growing needs of technology on one hand and shrinking budgets, on the other, there was a need to fully exploit the expertise available in the senior sailors cadre. Accordingly, senior sailors responsibilities were enhanced and additional duties for MCPOs were promulgated.

Retention of Afloat Expertise amongst Senior Sailors

In the early 90s, post-SNAPs, there were questions raised against the system of positioning Senior Sailors afloat that appeared to have several flaws.

- Many senior sailors came to sea, even in frontline ships, without adequate knowledge/previous experience afloat. As a part of SNAPS, sea service had a considerable effect, on a senior sailor's further promotion. POs and above were turned over in ships' companies at a fast rate to ensure that they all got an 'equal chance'. This resulted in some incompetent sailors occupying key billets, thereby adversely affecting the overall fighting efficiency of the ship.
- In the system prevalent there was a marked reluctance to downgrade a senior sailor's efficiency. Concurrently, service procedure dictated that a senior sailor occupy a position in the chain of command based on seniority rather than on proficiency and aptitude. It inevitably lead to a situation whereby many ships had senior sailors who were Departmental Heads and yet were unable to effectively contribute to the ship's fighting efficiency.
- In key billets where long term hands on experience is essential, e.g., SAM System Operators, Turret and Launcher maintainers, Gas turbine Artificers, etc, there was no structured process to ensure that the individual was screened and grew to be in charge of the system based on demonstrated proficiency.

To overcome these flaws and also keeping in view the needs of growing technology the following was implemented:-

- Sailors were assessed for their efficiency against laid down job specifications rather than assessing them on an abstract yardstick, which varied from ship to ship.
- Job specifications, for each rank and trade, were widely disseminated so that ship's officers were made aware of what skill levels they could expect from trained sailors.
- Sailors who were found professionally inadequate despite intensive training during workup were to be removed from the ship, their efficiency assessment reduced and a warning issued that re-engagement beyond 15 years would depend on professional progress.
- All sailors were to be assessed at 10 to 12 years of service for their potential to further professionally contribute beyond 15 years of initial engagement. An endorsement was to be made to this effect during the appropriate higher rank professional course/examination and be re-certified by the Commanding Officer of the ship where he serves after the course/examination. Re-engagement after 15 years would then be linked to afloat performance and performance during higher rank courses.

Sailors Cadre Management

Misplaced Emphasis on Senior Sailors. Two Pay Commissions (III and IV) and successive cadre reviews had brought about certain structural changes on the cadre structure of the Navy, which had consequential effects on the overall manning pattern of the service. After the third Pay Commission, the appealing rationale was 'the

Navy as a high tech service was functionally dependent on well trained and motivated officers and senior sailors'. The increased emphasis, along with the morale winning formula of faster promotions, was considered a fair package of reforms and the best available option to improve service conditions. This is exactly what the cadre reviews did in 1979 and 1984 — creating greater vacancies for senior sailors.

The decision did not turn out well. As a result of the iniquitous policy, a few years down the line, the service was faced with a distorted pyramidal structure, where the base of junior sailors was inadequate to support the vastly increased number of senior sailors. The ratio of senior to junior sailors dropped from 1:4 in 1984, to as low as 1:1.6 in the early 90s, before settling at 1:2.1 in 1996. There were other complimentary factors that aggravated the situation.

Increase in Engagement Period. In 1976, the initial engagement period was increased from 10 years to 15 years to enable all sailors to qualify for pension. This had its implications on the career transition of Leadings and PO's. In the earlier days, a Leading normally required 10 to 12 years to get his promotion to the rank of PO, which was after the initial engagement period was over. In this system approximately 56% of sailors left service after initial engagement. The new system that has increased the engagement to 15 years has brought about two promotion and pension within the first engagement period.

Reduced Time for Promotion. A related feature was the reduced time for promotion to Leading rank, which earlier stood at 5 years in 1996 (down from 10–12 years in 1984). This, coupled with increased availability of vacancies ensured a quicker promotion to the PO's rank, as a consequence, eroding the availability of junior sailors.

It was decided to remedy the situation by considering implementation of the following measures:-

Re-invigorated Recruitment. The newly setup Recruitment Organisation was to be tasked to make good, progressively, the shortage of approximately 2500 junior sailors within 4 to 5 years.

Status of Petty Officers. The role and employability of Petty Officers was redefined and Petty Officer was designated as a 'working hand', whilst realigning the role of CPOs to include duties hitherto assigned to the Petty Officers.

Change in Work Ethos Onboard Ships. There was a need for a changed maintenance philosophy on board ships and consequently of a different manning pattern. Various labour saving devices and offloading of manpower intensive activities to trade were considered.

Sailors Marked 'Run'. Sailors, who had been missing over a stipulated period, needed to be periodically struck off the Navy's strength to provide some additional vacancies for recruitment.

Change Training Pattern. There was a need to space out the 2nd rate and 1st rate courses further apart, so that the 1st rate is undertaken in the PO's rank to increase the availability of junior sailors. The practice of imparting PCT and OJT for most major war vessels made this option feasible.

Career Opportunities for Sailors of Topass Branch

In 1999, Topass branch was revitalised with the implementation of the following:-

- Conduct of Special Courses on NBCD, Ship's husbandry, welding, cutting and plumbing at NBCD/Shipwright School for TOP II and LTOPs.
- Introduction of Hygiene and Sanitary Supervisor course for POTOPs.
- Extension of limit for change of branch from existing 2 to 3 years.
- Deputing maximum number of Topasses for MTD course. Starting 2000, three additional MTD courses with MTTI, A/F station Awadi were organised.

The Navy's Civilian Personnel

By and large, the Navy's civilian personnel were governed by the same structure prevalent in the Army and the Air Force. The administration of civilian cadres was as follows:-

- Groups C and Group D were administered by the Command Headquaters.
- Groups A and Group B were administered by Naval Headquarters.

From the functional point of view, the Navy's dependence on civilian manpower lay principally in the following fields:-

- In Naval Dockyards and BROs for the maintenance, repair and refit of ships and submarines, and manning yard craft.
- In the Aircraft Repair Yard for the maintenance,

repair and refit of aircraft.

- In Naval technical functions like Draftsmen, Naval technical specialists in DRDO, laboratories, etc.
- In Naval Store Depots, Naval Armament Depots and Weapon Equipment Depots — for the storage, upkeep, accounting, repair and indenting of their respective stores.
- In offices for secretarial and clerical duties.
- In the Naval shore establishments for motor transport drivers and general conservancy duties.

By 1990, with the growth of the Navy and increasing complexities of 'personnel' issues, management of civilian personnel had become an area of key concern. The administration of civilian personnel has been complicated with introduction of CAT whose rulings and judgements seemed to introduce more deviations to sort out individual problems rather than looking at issues as a complete case. Whilst personnel administration in the entire Govt of India and in most ministries and departments witnessed growth and expansion to meet the challenges Directorate of Civilian Personnel had maintained its original status with limited staff and that too through AFHQ cadre officers.

In order to keep pace with the merging trends and modernisation of Navy, there was an impetus given to meeting the basic requirements of civilian administration. Civilian personnel formed nearly 50% of Naval manpower and their contribution had a direct impact on general administration, refit and maintenance support to ships as well as material support in NAD and Store depots.

In Oct 1990, a study team, known as Khatri Committee, was formed that assessed the civilian manpower requirement for the newly created facilities of the Navy. The report highlighted the following:-

- The past performance of Dockyards revealed that only 60% of the planned refit workload was taken up.
- Unscheduled/unplanned workload was high and needed to be checked and controlled.
- Overtime was being paid as additional wages amounting to seven months, salary.

After examination of the refit workload, off loading overtime payment, degradation factor, etc. the committee gave following recommendations for re-appropriating manpower:-

	Sanctioned	Recommended	Difference
ND (V)	8212	11676	+ 3464
ND (MB)	14489	10798	- 3691
NSRY (C)	916	1235	+319
BRO(PB)	211	255	+44
TOTAL	23828	23964	+136

The committees strongly recommended that ND(MB) transfer about 3700 personnel to ND(V) to make up for their shortfall. But this drastic cut in manpower, was not amenable to ND(MB). A series of meeting helped resolve the issue to some extent with ND(MB) agreeing to surrender 895 posts of tradesmen in a phased manner to meet the requirement of ND(V). Civilian manpower shortages however, continued to plague Naval establishments during the entire 90s decade.

Manpower Planning

In order to put a definitive end to problem of civilian shortages, the Department of Personnel & Training issued a policy directive on 16 May 2001.

- Manpower requirement to be submitted to Screening Committee headed by Defence Secretary as Annual Recruitment Plan.
- Vacancies more than one year old stood abolished.
- Only one third of the vacant live posts were to be considered for approval by Screening Committee.
- Two thirds of the vacant posts stood abolished from the existing sanctions.
- Further ceiling of limiting upto 1% of total sanction, viz, 478 posts in a year, was established, which could be filled through direct recruitment.

Based on the above directive the annual recruitment plan for the year 2001–02 was submitted to the Government with the following requests:-

- A special dispensation to fill all the vacant posts due to operational/refit imperatives as a one-time measure.
- A waiver for the requirement to downsize manpower by 2% in the next 5 years, in view of planned growth of the Navy in the near future, viz. Karwar Project, acquisition of major war vessels, manning of newly created infrastructure and facilities at ND(MB) and ND(V).

Retrospect

The 90s saw a new openness in Personnel Management of both officers and sailors. There was a certain 'transparency' that came into the conduct of personnel matters. For the first time the Personnel Branch attempted to implement scientific methods of management. For instance,

- New appointment planning cards were distributed to start one to one contact with an officer and his appointer.
- 'Personnel update' was started as a newsletter to educate officers in general about rationale of personnel policies.
- CABS functions were computerised to a large extent and promotion/course rosters were published regularly.
- 'CABS Newsletter' for sailors was started on similar lines.

In balance, given the limits within which Personnel policy must operate, the achievements in the field of personnel management were impressive. Policies and guidelines, written and un-written, related to the career development of junior IN officers continued to evolve over the years, and were based on futuristic planning together with a reflection of the experiences gained from the past. The process of refinement of policy on career development indeed followed a 'closed loop', wherein a constant endeavour was made to fine tune the system in order to keep pace with the ever changing personnel environment in the Navy.

36

Naval Training

"The aim of military training is not just to prepare men for battle, but to make them long for it."

Preamble

Since the early 1950s, the Navy had been acquiring destroyers and cruisers. In 1961, an aircraft carrier was acquired, which was followed by the acquisition of Russian submarines, submarine chasers and landing ships. Then, in early 1970s, the Navy acquired more submarines, missile boats, minesweepers, landing ships and destroyers. Alongside these acquisitions, the service successfully commissioned indigenously constructed Leander class frigates and their successors.

Manning these new ships meant not just more manpower but 'capable and competent' personnel, who were proficient in meeting the challenges of the new technology, incorporated in high-tech equipment onboard the new acquisitions. To increase manpower the Navy resorted to means like increasing the number of trainees in professional schools, reduction in duration of courses, etc. But, as a consequence of this measure, training schools ended up being denied good instructors because the best men were send aboard the newest ships. Overtime, this tended to de-motivate the schools and training suffered.

In the wake of the lessons learnt during the 1971 War, measures were taken to revamp Naval training. The reform process, which was eventually implemented in 1974, undertook a comprehensive overhaul of the training system by taking some far-reaching decisions, most of which are in commission even today. The basic decisions taken were:-

- Vertical specialisation and consolidation of expertise to be achieved by the introduction of 'streams' and 'sub streams' for both officers and sailors. Three 'streams' were instituted:-
  - — 'A' stream for the equipment in new Leander class frigates for which training is to be imparted in the existing schools.
  - — 'B' stream for the equipment in old Western origin ships for which training is to be imparted in the existing schools.
  - — 'C' stream for the equipment in the Russian ships for which training is to be imparted in the Pre Commissioning Training School in Vizag.
- Institution of Professional Courses/Examinations for Executive and Supply Branch officers.
- Commencement of Seamanship courses for Leading Seaman (Qualifying) and Petty Officer rank (Qualifying) courses at the technical schools.
- Training Establishments to improvise and cope with the backlog in training created by the introduction of the 15-year initial engagement for sailors and their automatic advancement to Leading rank after 5 years.
- To offset the lack of live training equipment, training models of entire systems to be fabricated ashore so as to make up for the limited sea training then available. Training aids to be produced in-house by officers and sailors.

After the mid 1970s, as the diversity of the higher technology systems fitted in the new Russian ships being acquired came to be known, it became clear that the PCT School would not be able to cope with training load. NHQ decided to circumvent this problem by deputing a 'Training Team' to undergo training in Russia along with the crew being sent for commissioning the first ship of the class. This team, on return to India, would train replacement crews. The system worked fine and is in vogue even today. But far from the domain of hard, practical, on-job systems training, the Navy was facing another command and control issue concerning conduct of the very aspect that it sought to revamp.

In July 1986, the Navy modified its Command and Control structure. The three Operational Control Authorities (West, East and South) were reduced to two. Southern Naval

Command (SNC) was re-designated as the Navy's Training Command. Training Establishments hitherto under FOC-in-Cs West and East were placed under FOC-in-C South, who was given the responsibility for training policy formulation and implementation.

As a prelude to this restructuring, a delegation headed by the FOC-in-C South and comprising the Commanding Officers Shivaji (the Marine Engineering Training School), Valsura (the Electrical Engineering Training School) and an Executive branch Commander representing the Seaman and Communication Training Schools was deputed to the USA to study the United States Navy's training system and reorganise the Indian Navy's training system.

The delegation made several basic recommendations, the most significant of which were:-

- Each officer and sailor must be trained ashore specifically for his next job at sea.
- In view of the hi-tech diversity in the Navy's ship systems, broad-brush courses were counterproductive. During his career, every sailor should acquire expertise in one system/systems fitted in one type of ship. During an officers' career, he should progress from expertise in one system to broader knowledge of ship systems.
- Personnel trained on the above principles should stay long enough on board to acquire expertise. To enable them to develop and deepen expertise, their next sea tenure should be to a ship having the same or similar systems.

Revitalisation of Training

The measures implemented between 1986 and 1989 laid the foundation for the revitalisation of training that yielded results in the 1990s. These measures took into account the best features of the British, Russian and American systems of training and adapted them to the Indian context, keeping in mind the difficulties experienced in the past and the manning and training of foreseeable acquisitions. The erstwhile system of training 'jacks of all trades' and therefore, 'appointable' to any class of ship was finally dispensed with.

By 1990, three over-riding principles were established:-

- Every officer and sailor should be trained for his next job at sea.
- Officers should develop 'width' of knowledge and sailors should develop 'in-depth' knowledge and vertical expertise. Sailors were to specialise in one or more systems fitted in a class of ship.
- Officers and sailors in ships under Stabilised Operational Manning Cycle/Pre Commissioning Training (PCT) were to be recycled for the same systems in successive sea tenures.

For every new acquisition, a balance had to be struck between the cost of setting up new training facilities ashore or learning 'on the job'. The problem with the latter was that the wear and tear caused degraded the life of operational equipment. Eventually 'Pre Commissioning Training' (PCT) came to be accepted as preferable to 'On Job Training' (OJT).

Despite the high cost of live equipment for training personnel in schools ashore, each of the branch schools were provided with the minimum essential live equipment and simulators they needed to train personnel.

Changes in Command and Control of Training

Prior to 1986, various directorates at NHQ were performing the role of controlling Directorates for designated training establishments. After the command structure was reorganised in 1986, the 'controlling directorates' concept was dispensed with. Thereafter, the involvement of professional directorates at NHQ with training was through DNT and HQSNC.

The exceptions, at that stage were the specialised training of aviation and submarine cadres, which were controlled by Flag Officer Naval Aviation (FONA) and Flag Officer Submarines (FOSM). The Medical, Provost and Musician training which, being located with HQWNC at Bombay, continued to remain under FOC-in-C, West. On the same analogy, the Shipwright School at Vizag remained under FOC-in-C, East.

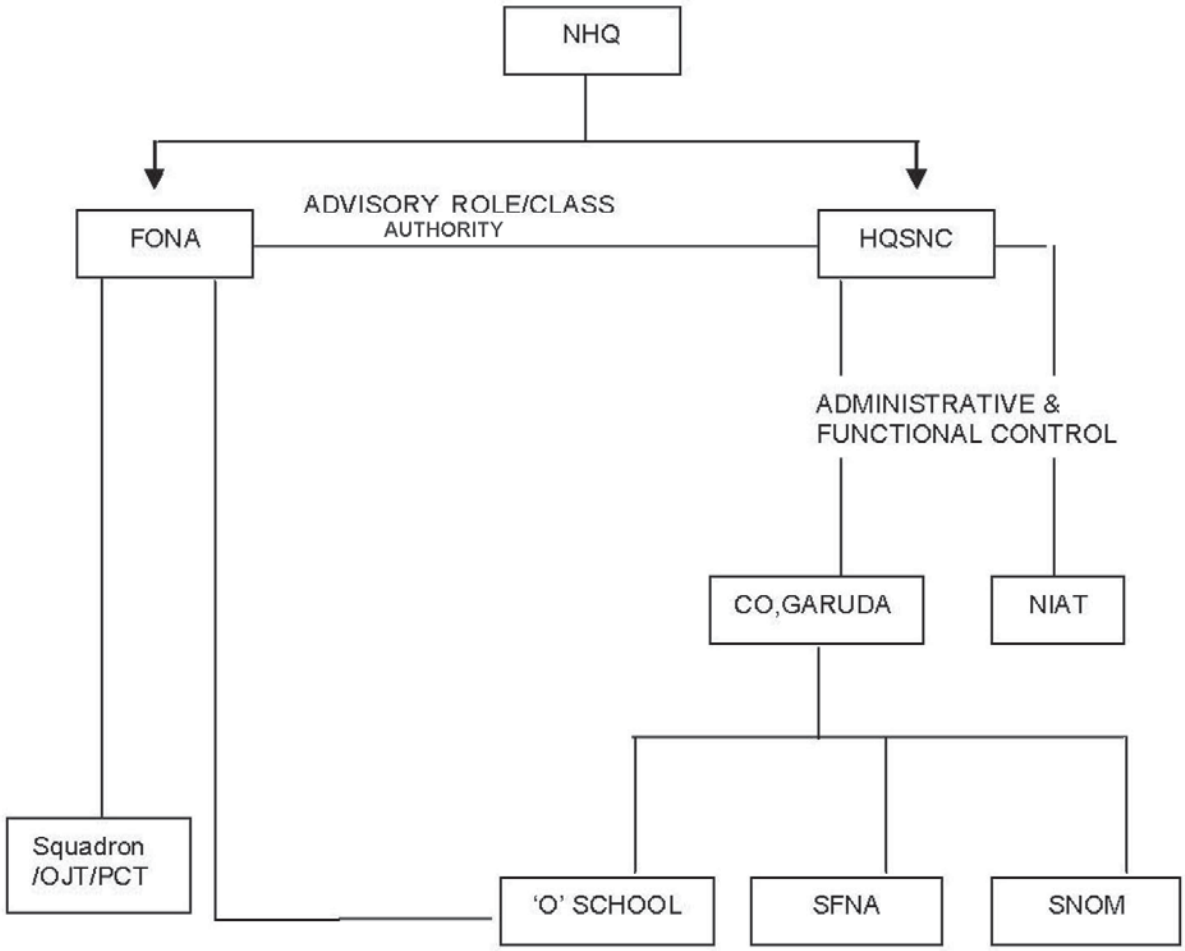
Aviation Training

In 1999, Aviation Training carried out in the following schools was placed under FOC-in-C, South:-

- Naval Institute of Aeronautical Technology (NIAT)
- School for Naval Airmen (SFNA)
- Observer School ('O' School)
- School of Naval Oceanology & Meteorology (SNOM)

The Flag Officer Naval Aviation (FONA) continued to be responsible for:-

- Advice on all aspects of flight safety.
- Provision of air effort pertaining to aviation training conducted at 'O' School.
- Advice on training issues related to schools except SNOM.



Revised Organisational Chart — Aviation Training

- Professional assistance to FOC-in-C South in the conduct of inspection of NIAT, SFNA and 'O' School.

Director of Naval Oceanology & Meteorology (DNOM) was to advise FOC-in-C South on training issues and in the conduct of inspection of SNOM. Naval Headquarters continued to issue policy directives related to aviation training.

Submarine Training

In 1999, Submarine Training was placed under FOC-in-C South. The Submarine Training School and Escape Training School at INS Satavahana were placed under the functional control of HQSNC and HQENC continued to provide administrative support.

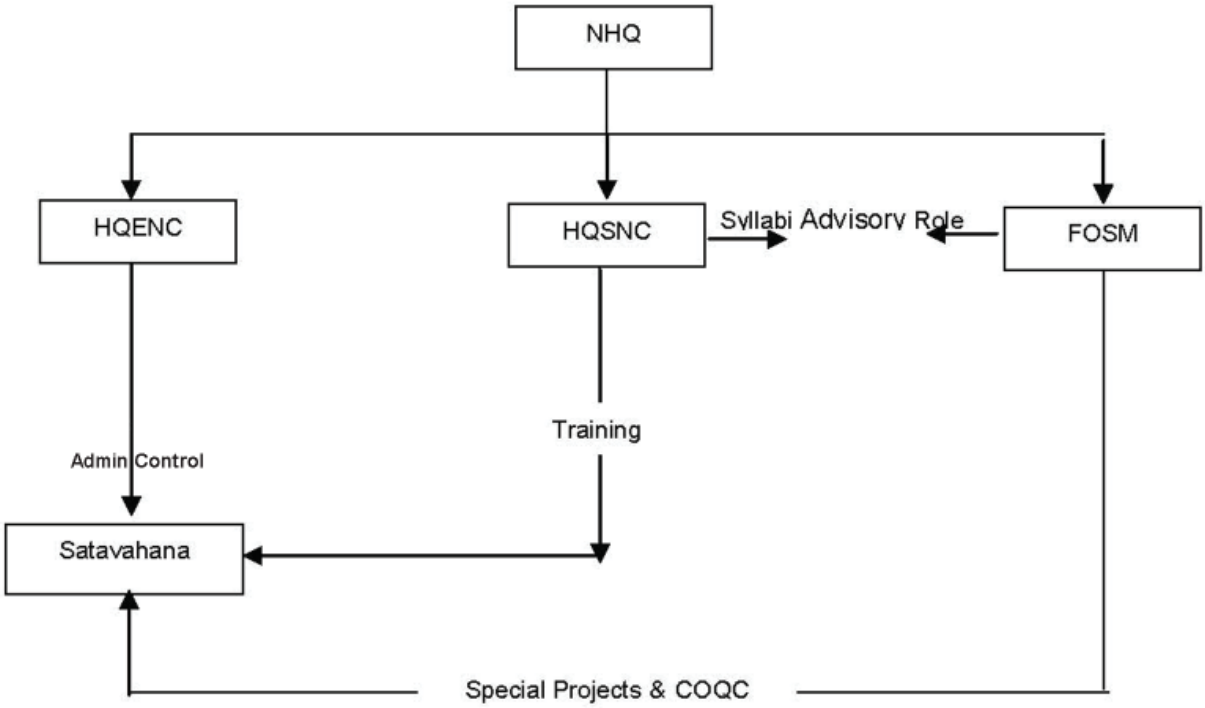
The Flag Officer Submarines was made responsible for:-

- Endorsement of all syllabi pertaining to these Schools.
- Advice FOC-in-C South on professional and technical issues related to training.
- Conduct of submarine PCOQC (Principal Control Officer 'Q') and COQC course for officers.

In 1989, INS Satavahana in Vizag was equipped and designated as the School for Submarine Warfare. The command and control/attack simulator was installed in 2002–03. The attack simulator for the Shishumar class SSKs was installed at INS Vajrabahu in Bombay.

Training of Officers

In the 90s, the Navy decided to remedy the shortage in the officer cadre by ramping up the intake through two new schemes: 10+2 (X) scheme (to augment the existing



Revised Organisational Chart —Submarine Training

scheme of officer entry through NDA and GSES at Naval Academy, Goa) and the 10 +2 (Tech) Scheme.

The 10+2 (Executive) Scheme. In 1989, officers were inducted in the Executive Branch under the 10+2 (Executive) Cadet Entry scheme. Sanction was obtained for a maximum of 100 cadets to be recruited in two six monthly batches of 50 each. All 10+2 (X) cadets underwent a 3-year BSc course during their training period at NAVAC.

10+2 Tech Cadet Entry Scheme. The process of inducting officers into the Engineering and Electrical branches via the 10+2 Technical Cadet Entry Scheme, also got underway in 1989. Candidates inducted under the scheme were to undergo Naval Orientation Training for 6 months that was to be followed by a 4-year Engineering Course at the Naval College of Engineering at INS Shivaji. On successful completion they were attached on board ships for a watchkeeping or competency certificate and thereafter undergo specialisation courses at INS Shivaji/Valsura, on the same lines as other cadet entry technical officers. The cadets were promoted to the rank of Midshipman after completion of 3½ years of service and Ag SLT upon completion of an additional 6 months period.

Pattern of Training for Executive Officers

The initial training pattern of officers of all cadres of Executive branch in the 90s decade, remained common till completion of Sub Lts technical courses. Thereafter the officers branched out into different cadres/sub specialisations.

Ab-initio Training. All entries except GSES underwent ab-initio training of 3 years at either NDA or NAVAC leading to the award of a degree with inputs in basic Naval subjects. GSES cadets did a six months Naval Orientation Course (NOC) at NAVAC.

Initial Training. Ab-initio training was followed by 2½ years of initial training comprising cadets afloat training, midshipmen training, Acting SubLt sea attachment and Acting SubLt technical courses. The afloat training as cadet/midshipman was aimed at building up a cadre of reliable watch keeping Lieutenants. It included extensive exposure to seamanship and navigation supplemented by Action Information Organisation (AIO), weapons and technology update during SubLt technical courses.

Midshipmen Afloat Training. Allocation of ships for midshipmen training was based on the cadet's merit and the availability of ships in the fleet. Hydro cadre midshipmen were assigned to survey ships. On completion of sea training, midshipmen were examined by a board of officers.

Midshipmen were promoted to Ag SLts on completion of six months service as midshipmen after which they underwent technical courses of 64 weeks duration. In 1998, in accordance with recommendations of the 5th pay commission, the Ag Slt rank was abolished.

Award of Watch Keeping Certificate. On completion of Sub Lts (X) technical courses, officers were appointed to fleet ships for obtaining Watch Keeping Certificate. Officers are required to serve on board for at least four months prior to grant of Watch Keeping Certificate.

Ag SLts Seatime. In the late 80s, there was a strong feeling among senior ranks that the training of junior officers at sea was inadequate and practical skills were not up to the required standards. This was based on reports from Commanding Officers, who noted with concern that junior officers were neither showing the aptitude nor appreciation of basics at sea. It was clear that a certain amount of dilution had taken place with regard to sea training of junior officers. Therefore, with effect from 01 Jul 1991, Executive officers were required to undergo six months of further sea attachment as Ag. SLTs before officers proceeded for their technical courses. Consequently, the minimum period of earning the watch-keeping certificate was reduced to 4 months. On completion of watch keeping, officers were posted onboard small ships for non-specialist appointments.

Specialisation. An officer of 2 to 3 years of seniority as a Lieutenant was selected to undergo a specialisation course in Gunnery(G), Anti-Submarine Warfare (ASW), Communications (C) or Navigation & Direction (ND). On completion, the officer served as a specialist in a sea/ shore billet till he was selected for Command or second in command (Executive Officer) of a small ship. In Jul 1994, NHQ undertook a review of long courses syllabi. The duration of the courses was also fixed at 52 weeks.

Logistic Officers' Training

The Logistic Cadre was formed as part of the Executive branch on 15 Aug '89, with :

- Volunteers from the existing general list officer's up to the rank of Commander. Officers with previous experience in logistic functions and those who had qualified in various management oriented courses were given preference.
- SD list officers of Stores, Writer and Catering specialisations.

The various types of entry in the Logistics cadre were:-

Cadet Entry. About five cadets from the cadet training ship were allocated to the Logistic cadre. They underwent six months afloat training as Midshipman(Log). On completion, they were examined by a Midshipman (Log) board at INS Hamla. Subject to passing the Midshipman (Log) board they were promoted to Ag SLt (Log) and did a 29 week basic professional course at Hamla followed by a 17 week Sub Lts courses in non weapon subjects such as ND, C, L, E, NBCD, E and D&M. They were then attached to logistic organisations such as NPO, MS(B) and BVY(B) for four weeks before moving on for their appointments.

Lateral Entry. Officers who opted for logistics in the rank of Lts underwent a 23 weeks 'Abridged Logistics Cadre Course' (ALCC). As lieutenants of 2 to 3 years seniority, cadet entry officers undergo Long Logistics Management Course (LLMC) of 45 weeks duration to qualify for ashore and afloat middle level logistic billets.

SSC Entry. The Navy started inducting Short Service Commissioned officers into the Logistics Cadre in 1991. In Jul 1992, for the first time in the Indian Navy, aspiring ladies were inducted as SSC officers in Logistics Cadres of the Executive Branch. All SSC Officers (including women) underwent a 16 weeks Naval Orientation Course at NAVAC followed by a 26 weeks professional course. On completion of initial training, SSC entry officers were generally appointed to shore billets (as opposed to cadet entry officers, who were appointed to various billets both ashore and afloat).

Technical Officers' Training

By the mid-90s, officers in the technical branches of the Navy, viz. Engineering (E) including Naval Architect (NA) and Electrical (L), were inducted through the following schemes of entry:-

Type of Entry	Branches
Cadet Entry (NDA)	E/L
10+2 (Tech) Cadet Entry	E/L/NA
Direct Entry	E/L
Direct Entry	NA
University Entry (UE)	E/L/NA

Cadet Entry (Ex NDA/NAVAC). The induction of technical officers is mainly through Cadet Entry and 10+2 (Tech) Entry schemes. On passing out from NDA, Cadets joined 1st Training Squadron (TS) for afloat training of six months. The branches were allocated during afloat training. Normally five cadets each were allocated to the 'E' and 'L' branches. These cadets joined INS Shivaji for the three year Basic Engineering Course (BEC) which lead to the award of a B Tech degree in Mechanical or Electrical Engineering

from Jawaharlal Nehru University (JNU). Cadets were promoted to the rank of midshipmen on joining and to the rank of Ag SLt after six months and were confirmed in the rank of Sub Lt after a further period of one year.

10+2 Tech Scheme. Under the scheme, cadets underwent a four years Naval Engineering Course (NEC) at Shivaji, leading to the award of B Tech degree in Mechanical or Electrical Engineering from JNU. During the 3-year Basic Engineering Course at Shivaji, 'E' and 'L' officers underwent combined training for the first two years. During the third year classes were conducted separately. 'L' officers proceeded to INS Valsura, while 'E' officers continued training in Shivaji. On completion of this course, BEC and NEC (10+2 Tech) officers conjoined for specialisation.

Afloat Attachment. Cadets were sent for afloat attachments for four weeks at the end of the second term and for five weeks at the end of the fifth term of the NEC.

Short Service Commission (SSC) Officers Training

The SSC entry, that started in 1991 was the Navy's other 'big idea' to tide over its problems of officer shortages. The plan was put into effect in 1991, when officers were inducted through SSC into Logistics, Law, ATC and Education branch. They served initially for a period of seven years extendable to 10 years at the discretion of CNS, with the consent of the officer concerned. Presently, officers are inducted for 10 years initially extendable to 14 years.

SSC Officers underwent a 16 weeks NOC at the Naval Academy. Thereafter, the officers did their professional as well as Sub Lt courses for a duration varying from 22 to 26 weeks. The officers were confirmed in the rank of Sub Lt on successful completion of Sub Lts courses or one year from the date of commission, whichever was later.

Rationalisation of NBCD Training. New challenges in the NBCD domain necessitated a rationalisation of training and cadre. A number of initiatives were taken and the following implemented with respect to NBCD Training.

- **Long NBCD Course.** The Long NBCD Course was to be subscribed to specialist officers (X, E, L) after completion of two post specialisation tenures as an added qualification. The duration of the new Long NBCD Course was 4 months.

- **NBCD Course for Shipwrights.** As per the new policy, introduced in 1999, all shipwright sailors were to undergo a 7-week NBCD course so that they could carry out NBCD duties on board ships.

SD List Officers' Training

All sailors selected for Special Duties List promotion underwent a pre-promotion course in their respective professional subjects varying from 11 to 29 weeks.

Sailors' Training

The Navy suffered sailor shortages through out the 90s decade. Shortages were sought to be made up by increasing intake of both Artificer Apprentices and Matric Entry Recruits. At the same time the service had to contend with the requirements of galloping technology. Consequently, the pattern of training changed drastically during the decade.

Seamen Sailors' Training

Seamen, communication and non-artificer technical sailors were recruited as Matric Entry Recruits (MER). On induction, these sailors underwent a 24 weeks Basic and Divisional (B&D) training at INS Chilka and were allotted various branches as per the mid term results and the NPRU test. On passing out of INS Chilka, Seaman and Communication MERs were deputed for sea training for a duration of six and eight weeks respectively.

Professional Courses. On completion of sea training, recruits reported to the Seamanship School and Signal School respectively. In the Seamanship, Professional and Signal School, MERs underwent ab-initio and third-rate professional training. Subsequently, these sailors underwent second rate/LRO'Q' course and first rate/POR'Q' courses at respective professional schools. These courses, known as higher rank courses, were conducted in three phases, viz. seamanship, basic, professional and equipment phases. In addition, these sailors did the 'PO Leadership' and 'CPO Management' courses.

Higher Rank Courses — Seaman Sailors. The training during 1st and 2nd rate Qualifying ('Q') courses for Seaman sailors commenced with the seamanship phase. Under the revised scheme, the seamanship and basic professional phases were delinked from equipment-specific training during higher rank courses. Accordingly, the sailors who were positioned afloat on completion of 2nd and 1st rate courses underwent all the three phases of training including the equipment phase in the specified group. The remaining sailors who were positioned ashore on completion of the course, did only the seamanship and basic professional phase of training. These sailors underwent the equipment phase of training prior to their appointment on board, when so required for sea time.

Leadership Courses

- **PO Leadership.** Sailors were deputed for a four week PO Leadership course at Agrani on promotion to the rank of Petty Officer. Qualifying in the PO Leadership Board was one of the prerequisites for consideration for promotion to CPO.

- **CPO Management.** In order to enhance their supervisory capability and efficiency, a four-week CPO Management Course was introduced at Agrani from 1987 onwards. From 1989 onwards, this course was made a pre-requisite for consideration for promotion to MCPO II.

Technical Sailors' Training

The pattern of training, as it existed in the late 90s, was as enumerated in the following paragraphs:-

Direct Entry Mechanical Engineers(DEME)

Ab-initio Professional Training. On completion of B&D training at INS Chilka, the Direct Entry ME (DEME) sailors underwent afloat acquaintance of eight weeks to gain ship experience and their sea legs followed by 22 weeks of ab-initio Professional Training (DEME course) at INS Shivaji. On completion they were appointed to ships in the rank of ME II. The sailors were promoted to the rank of ME, depending on the aggregate seniority gained in courses.

LME 'Q' Course. The sailor joined INS Shivaji for 11 weeks LME 'Q' course as a ME I or Acting LME.

POME 'Q' Board. Whilst in the rank of LME, sailors appeared for the POME 'Q' board after completing two years as LME.

CHME 'Q' Course. On completion of two years as a POME, the sailor was eligible for the CHME 'Q' course, at INS Shivaji for six weeks and was examined by a Board.

Electrical Branch Non-Artificers

Ab-Initio Professional Training. On completion of B&D training at INS Chilka, and afloat acquaintance of eight weeks, sailors underwent a 32 week DEEM course at INS Valsura. During the course, they were divided into Power and Radio specialisations based on requirement and their results. On completion, they were appointed as EM(P/R) II in afloat billets.

LEM(P/R) 'Q' Board. Sailors reported to INS Valsura for the 26 week LEM(P/R) 'Q' course, as an EM I or Ag LEM (P/R).

POEL (P/R) 'Q' Board. The promotion from LEM to POEL was based on the sailor qualifying in the POEL'Q' board convened by the respective Administrative Authorities.

CHEL 'Q' Course. The nominated POEL (P/R) sailors joined INS Valsura for a 14 weeks CHEL 'Q' course. Apart from a subject-wise examination, sailors were examined by a board of officers. Sailors also needed to undergo the PO Leadership Course at INS Agrani prior to promotion as Chief Artificer.

Artificer Apprentices

Artificer Apprentices of the Engineering and Electrical branches were selected through a common entrance examination held twice a year on an all India basis.

B&D Training and Branch Allocation. Selected candidates (approximately 80 per batch) joined INS Chilka for 9 weeks of B&D training. During this phase, based on the aptitude test, they were allotted Engineering, Electrical and Shipwright branches.

Afloat Acquaintance. On completion of B&D training, the sailors underwent 8 weeks afloat acquaintance. On successful completion, they were deputed to INS Shivaji, INS Valsura or Naval Shipwright School, depending on their branches, for 193 weeks of professional training.

Professional Training of ERAs. The professional training of Engine Room Artificer (ERA) apprentices at INS Shivaji comprised eight terms (A to H) of average duration of 24 weeks each. During this training, an academically oriented above average sailor was moulded into a highly skilled technician. On completion of the four years apprentice training at INS Shivaji, which is recognized by the Government of India as equivalent to a Diploma in Mechanical Engineering, the sailor was promoted to the rank of ERA 5.

Developments in Training

Optimisation of Basic and PCT Courses. Far-reaching changes in the training scheme of seaman sailors were implemented from 1993–94 whereby PCT level equipment inputs were included within the syllabi of higher rank courses. Consequently, a large number of PCTs were abolished. The objectives of the training schemes were:-

- To impart equipment oriented training within the designated group from the ab-initio level itself, i.e. IIIrd rate qualifying courses.
- To reorient the equipment phase from ship-specific groups to equipment-specific groups.
- To rationalise the large number of equipment-oriented PCTs in respect of Communication sailors,

requisite inputs are provided during the basic course itself.

- To provide flexibility in intra as well as inter ship placement of sailors.

Leading Qualifying Board. In 2001, the Navy revised its training-cum-promotion policy in respect of sailors. Consequently, the part II qualification courses for Seamen, Communications, Aviation (non-tech) and Logistic sailors conducted by respective professional schools was discontinued. As per the new policy, sailors of Sea I/equivalent rank eligible for promotion to the rank of Leading/equivalent were to appear before a Leading Qualifying Board. The Board consisted of two parts — the seamanship/airmanship board and the professional board. Logistics and Communication sailors were to appear only before the professional board. The board evaluated the sailors both in written as well as oral examinations and were constituted in each command, as well as NHQ, biannually.

Revitalisation of Logistics Cadre

In 1990, the training pattern of logistics sailors was revised to make it more need based and responsive to job requirements. The revised scheme envisaged a three-tier pattern of training.

New Entry Courses. On completion of basic training at Chilka, the sailors were to undergo specialisation courses.

- Writers and stores — 18 weeks
- Cooks and Stewards — 20 weeks

Leading 'Q' courses. Sailors undergo a 4 week Leading 'Q' course at INS Hamla, including promotion boards. Writers and Store sailors were required to undergo a three week EDP course.

PO 'Q' Course. Logistics sailors were required to undergo a PO'Q' professional course for about 12 weeks. There are no further promotion linked courses for these sailors.

Instructor Cadre

The Instructor Cadre in Seaman and Communication branches was in existence until the mid 70s. Apart from the professional role, the 'I' sailor was also responsible for the organization and preparation of the Watch and Quarter Bill of his department. However, the 'I' Cadre slowly faded away and was finally abolished. A number of reasons contributed to the demise of the cadre:-

- The proliferation of weapons/equipment in the Navy, which led to an impossible situation of training one individual to the level of expertise demanded of an 'I' sailor.
- The concept of vertical specialisation, which led to a sailor being trained for his job only.
- The concept of 'action post manning', which downgraded the importance of the 'I' sailor as the troubleshooter.

Need for Reintroduction. The abolition of the 'I' Cadre in the 80s, led to the emergence of young first-rate sailors who, though, trained thoroughly on particular aspects of weapon/system, had hardly any knowledge of departmental organisation. The service slowly began to feel the strain of the absence of Instructor sailors. By 1990, so severe was the need to introduce 'I' cadre sailors in the Seaman and Communications branches that it was unanimously decided to revive the cadre.

The Instructor Cadre comprised GI (Weapons), ASWI (Sensors), GI (Sensors), PRI, SI and WI. Potential instructors were selected through a screening test at the end of the first rate courses and placed on a rooster by CABS. They were then appointed to sea billets for a minimum period of two years followed by 'I' course of 24 weeks, subject to their maintaining superior level of performance in the Part II specialisation and their being recommended by the Commanding Officers.

At the time of reintroduction in 1992, the requirement of five years residual service on completion of the course was reduced to 3 years in 1994. The 'I' Cadre sailors wore a black leather wristband with a single brass star on the right arm on qualifying the 'I' course. They were awarded special incentives for promotion to higher ranks.

Unit Watchkeeping Certificate for E/R Sailors

In 1999, the eligibility criteria for ER sailors to appear in Unit Watch Keeping Certificate was reviewed with a view towards tiding over anticipated shortages in the Artificer Cadre as also to resolve the anomaly in stipulated service as ERA 4 prior to appearing for UWKC. Since the qualitative standards of recruits for all entries were considered superior due to refined selection procedure and experience gained by the centralised Naval Recruitment Organisation, the eligibility criteria was reduced from 18 months to 12 months as ERA 4 acting and confirmed. Sailors of rank ERA 4 who qualified for award of UWKC were eligible to carry out independent watch keeping duties.

Professional Training of EAAs

The duration of the professional training of Electrical

Artificer Apprentices at INS Valsura was increased to 193 weeks spread over 8 terms, as in the case of ERA apprentices. On completion of Basic term, sailors for the Naval Aviation branch were selected by INS Valsura. These sailors underwent the balance apprentice training at NATS. At the end of C term, sailors of the general electrical branch were divided into Power and Radio specialisation and underwent afloat training of 23 weeks.

Revised Electrical Artificer Training Scheme

With effect from 1993, a revised Electrical Artificer training scheme was introduced to train Artificers for vertical specialisation in a group of equipment. The entire inventory of weapons and sensors was divided into broad groups, namely, Radar & EW, Sonar, Fire Control Systems, Mountings, Navaids and Engine Room Controls. Each of these groups were sub divided into a number of sub-groups providing flexibility in appointing sailors to different classes of ships which had similarity in equipment fit.

On allotment of sub-groups, the Apprentices were sent to ships fitted with equipment pertaining to their allotted subgroups. They underwent another afloat training for 8 weeks followed by vertical specialisation training at INS Valsura and various professional schools at Kochi. The sailors also undergo training as EA V onboard ships fitted with the equipment of their sub-group during their training.

E/R Mechanician Course. Non-artificer engineering sailors who obtained more than 75% marks aggregate during LME 'Q' course were identified as Potential Mechanician candidates and deputed for Mechanician 'Q' Course at INS Shivaji for 90 weeks. On completion, the sailors were promoted to the rank of Ag Mech 4.

Electrical Mechanicians. The selection of sailors for Mechanician courses was similar to that of the Engineering branch. The duration of the courses at INS Valsura was 94 weeks comprising of a technology phase of 39 weeks, followed by two terms of 24 weeks each of equipment training.

Navy Entry Artificers (NEA)

Engineering Branch. The NEA scheme was introduced in Jun 1990 to provide deserving non-artificer sailors of the Seaman, Communication, S&S including Medical, Engineering and Electrical branches (including Hydro and Aviation cadres) an opportunity at a young age to absorb the desired level of knowledge required for Artificers. However, they were to be under 25 years, secured minimum 65% marks in ab-initio courses and completed minimum 3 years of service. The sailors were selected through an open written examination.

The ME sailors undergo 116 weeks course at INS Shivaji and sailors of branches other then Engineering undergo a conversion course of 22 weeks. On completion of the NEA course, a sailor is promoted to the rank of Ag ERA 4.

Revitalisation of Training. Revitalisation of training of Engineering branch saw major initiatives being taken:-

- **Training on Instrumentation and Control.** Streamlining of training on maintenance, monitoring and control equipment, instrumentation of propulsion and auxiliary machinery, cross training of E/R and electrical personnel on the instrumentation and control aspects. A cross training capsule on instrumentation 'Q' control was introduced at INS Shivaji for Apprentices.
- **Semester System for Apprentices.** Reduction of administrative effort and streamlining of training of Apprentices.

Electrical. The eligibility, selection and training pattern of electrical NEA sailors was similar to that of their engineering counterparts. The equipment phase of NEA course comprised three terms, each of 24 weeks duration, like in the case of Apprentice courses.

Ship Wright Branch. The selection, B&D training at INS Chilka, branch allocation and initial afloat acquaintance were similar to that for apprentices of Engineering and Electrical branches.

The duration of the professional training of Shipwright Artificer Apprentices including the B&D training was four years at Navy Shipwright School, Visakhapatnam. On completion, the sailors were appointed onboard as SWA 5. The promotion board for promotion to SWA 4 and SWA 3 are convened by the concerned Commands. The sailors underwent a 4 weeks CHSWA 'Q' attachment at the Shipwright School prior to promotion to the rank of CHSWA.

Logistics Sailors' Training

Entry into the Logistics branch was through NMER for Cooks and Stewards and MER for Writer and Store Sailors. The duration of basic training for Cooks and Stewards is 15 weeks and for Writers and Store sailors, 24 weeks, followed by four weeks of sea training. A 3-tier training pattern is being conducted to professionally train the sailors.

Writer/Store Sailor. Sailors were trained for 18 weeks at Hamla on completion of which they serve in ashore/afloat

billets in the rank of SA II/WTR II. They are promoted to SA I/WTR I on completion of 3 years after adjusting seniority gained.

Leading 'Q' course. SA I/WTR I of about four years seniority underwent Leading 'Q' course of seven weeks duration. After completion of the course and when of five years seniority, they were promoted to Leadings and serve in billets ashore and afloat.

PO 'Q' Course. LWTRs/LSAs of 8 to 9 years seniority underwent the PO'Q' course of 15 weeks duration. They were promoted to POs at about 10 years seniority.

MCPOs Capsule Course. MSCPO II and MCPO WTR II undergo a Capsule course for four weeks to update themselves on the latest trends/developments in the branch.

Cooks/Stewards. On completion of Basic training at Chilka, NE Cooks/Stewards joined Hamla for professional training for 20 weeks. On completion of training they were promoted to Std II/Cook II and were appointed in afloat/ashore billets. They were promoted to STD I/Cook II on completion of three years after adjusting the seniority gained.

Leading 'Q' Course. STD I/Cook I's of four to five years seniority underwent the Leading 'Q' course for four weeks and were promoted to Leadings in the fifth year of service.

PO(L) and CPO(M) Course. Sailors also undergo the PO Leadership and CPO Management courses. However, they did not have any written examination in the PO Leadership course and were orally examined. Domestic sailors in CPO(M) course were grouped separately for class room instructions.

Catering Management Course. MCPO STD II/MCPO CK II of 21 years of service, undergo a 6 weeks course in Catering Management to update themselves on the latest developments taking place in the branch.

Swimming Training for Sailors

In 1995, the NHQ made it compulsory for all sailor ranks to clear the swimming test before promotion to the next rank. So high was the emphasis that to ensure that sailors maintained the requisite confidence and ability in the discipline, it was made compulsory for all sailors undergoing higher rank courses to be tested for proficiency in swimming during the first week of their reporting for their course. As it stood, the Navy had two tests for swimming ability:-

- The 'Provisional Test', carried out in a swimming pool.
- The 'Standard Test', carried out, fully booted and clothed, in the open sea.

Passing either of these tests was 'acceptable' for promotion purposes. Over the years, the Navy had to grapple with the problem of sailors who were unable to pass the Provisional Test during basic training. Holding them back in the basic training establishment created a cascade of problems for their ensuing professional training. The task of helping sailors to pass the provisional swimming test was passed on to the professional training schools.

Standard tests, posed more of a problem. The Commanding Officer needed to justify the cost of a sea sortie just for conduct of standard test and it required a sufficient number of sailors to be made ready and assembled to take the test in the open seas. Since this was impractical and sailors' promotions could not be held back indefinitely, sailors continued to be promoted on NQ (i.e. not fully qualified) basis.

When Southern Naval Command assumed the role of Training Command, it proposed mandatory passing of the Standard Swimming Test (SST) for promotion to the rank of Petty Officer and directed:-

- INS Chilka to give extensive coaching in swimming. A percentage, based on numbers of trainees, was also laid down to qualify in swimming.
- All units who conducted follow on training were to accord special emphasis on training of non-swimmers.

Pre-Commissioning Training

Inception. The concept of PCT was started with the induction of Soviet origin ships in the Indian Navy. PCT School was formed in Apr 1986 by combining the sanctions of the Training Teams for Missile Boats, Durg class rocket boats (SNRs) and Rajput class destroyers (SNFs). The original concept was to train the complete replacement crew. This involved not only equipment training but also common subjects like ship's knowledge, NBCD and cross training with different departments of the ship type. It also provided an opportunity to the officers for organising their department, administratively and professionally well before joining the ship. However, for a variety of reasons, the system of replacement of complete crew got diluted and a concept of changing 50% officers and 33% of the ships company annually was evolved. With this, the concept of PCT training also evolved into equipment training.

The equipment for training of SNR, SNF & Godavari class of ships was fitted in the various professional schools under

Project Vajra. Consequently in 1990, the PCT for SNF, SNR and Godavari classes of ships was devolved to Gunnery, ASW, ND and Signal Schools. With the devolution of PCTs for Khukri, 1241 RE & PE class of ships to Gunnery and ASW School, the PCT School became redundant.

In the mid 90s, the conduct of the PCT was reviewed and efforts were made to provide equipment inputs as part of basic and higher rank courses. Consequently, personnel undergoing basic and higher rank courses were grouped to cater to classes of ships with commonality of equipment, and each group was provided with the relevant equipment inputs which were earlier given during PCTs.

CO/XO PCT Courses. CO/XO designates were appointed to ships after a considerable lapse of time from their previous sea tenures. In the interim, they were normally employed in staff jobs that were not necessarily ship oriented. Also a large number of officers from aviation and submarine cadres were being appointed as CO/XO of surface ships. There was a real and imminent need to provide all-round exposure, updated information/ policies on relevant subjects and prepare officers for sea. The concept of conducting CO/XO course was thus, introduced.

The CO/XO courses were categorised into two categories. One included equipment training that was ship specific and was called CO/XO PCTs. Courses were conducted for PCT ships, viz. SNF, Godavari, SNR, SNM, Khukri, 1241 RE/PE and Missile Boats. The second category was the CO/XO non-PCT courses conducted for Aircraft Carriers, Leanders, Tankers, Kamortas, OPV's, survey ships LST/ LCU and SDBs.

Revision of Syllabus. Gradually, a need was felt to compress the syllabus of the OJT for the following reasons:-

- Unlike in the past, a large number of personnel remained on board to provide continuity.
- A majority of personnel were re-cycled within ships of same class.
- On completion of OJT, personnel joined their respective ships, which in most cases, carried out their individual work up.

Reduction in the duration of OJT would have led to the following advantages:-

- Assured availability of a ship for dedicated OJT/ Work up for the shorter period (there is currently a reluctance to spare ships from operational commitments for the larger duration of four weeks).
- Improved availability of manpower.

The duration of the OJT was reduced to 2 weeks. The responsibility for OJT was however placed with the respective Fleet Commander. In the case of newly commissioned ships and those rejoining the fleet after a prolonged refit, the four weeks OJT period was retained.

Major Training Establishments

INS Mandovi. The Naval Academy functioned from INS Mandovi, Goa. Since 1986, its role was to conduct ab-initio training for cadets and officers of the Navy and also for the Asst Comdts of the Coast Guard who were inducted through various schemes, barring those joining through the NDA.

In its above role, the Naval Academy conducted training for:-

- **Graduate Special Entry Scheme.** 20 weeks orientation course.
- **10+2 (Executive) Officers Scheme.** 3 years training. An affiliation with Goa University for the award of BSc(Spl) degree.
- **10+2 (Tech) Officers Scheme.** A 26 weeks orientation course.
- **Direct Entry Scheme.** A 16 weeks orientation course.
- **SSC/Women Trainees.** 16 weeks orientation course.
- **CG Asst Comdt GD(P)/(N) and (Tech).** 20 weeks orientation course for the former and a 16 weeks orientation course for the latter, twice a year.
- **Medical Officers Orientation Course.** A four weeks orientation course for newly inducted medical officers twice a year.

Ist Training Squadron (1TS). The 1TS trained cadets of the Indian Navy. In the early 90s, the Squadron comprised of INS Tir. It was joined by INS Krishna a few years later.

The ships conducted afloat training for 24 weeks during which the cadets were given practical training in Seamanship and Navigation with about 42 days of sea training.

INS Chilka. INS Chilka conducted ab-initio training for sailors of the Indian Navy and Coast Guard. In achieving the role set out, the establishment conducted basic training for:-

- Matric Entry Recruits (MER) and Naviks (General Duty) for 24 weeks.

- Non Matric Entry Recruits (NMER) and Naviks (Domestic Branch) for 15 weeks.
- Artificer Apprentices and Yantriks for 9 weeks.
- Acting Petty Officers for 12 weeks.

Centre for Leadership and Behavioural Studies (CLABS). C-LABS was established in 30 Mar '94 to provide the desired thrust and impetus towards the development of leadership qualities amongst officers. The centre conducted:-

- Course on Leadership and Behavioural Studies for officers of all branches undergoing SLts courses.
- Course on L & BS for Lts (X) doing specialisation course.
- Capsule on L & BS during CO/XO courses.
- Leadership Workshops in Commands.

In addition to the above, the centre also:-

- Functioned as parent school for all Sub Lts courses at Kochi (excluding LSTs at Dronacharya).
- Co-ordinated Midshipmen afloat training.

INS Hamla. INS Hamla, the premier training establishment of the Logistics cadre officers and sailors, trained personnel in logistics and computer disciplines. The following courses were conducted by the establishment:-

- Basic and higher rank courses for Writers, Store sailors, Stewards and Cooks.
- Basic, mid level and specialisation courses for Logistics cadre officers.
- Divisional and Management course for all SLts.
- Computer application course for SLts.
- Basic computer and EDP 'I' courses for sailors.
- Long EDP course for officers.

Training was mainly carried out in three faculties, viz. Professional studies, Management studies and EDP School. Consequent to the introduction of New Management Strategy (NMS) for budgetary control, capsule courses for various categories of officers and sailors were also started.

INS Shivaji. Located at Lonavla, Pune, the premier Technical Training Establishment conducts:-

- Ab-initio and professional/specialisation Marine Engineering courses for personnel of technical branches of Indian Navy, Coast Guard and friendly foreign navies.
- Marine Engineering orientation and acquaintance courses for personnel of other branches.
- Pre-Commissioning Training (Engg and PGD) for various classes of ships.
- Higher rank qualifying, refresher, mid career courses for Engineering branch personnel.
- NBCD training.

By 1993, INS Shivaji had grown and expanded steadily and was conducting training under four separate and exclusive wings. Naval College of Engineering (NCE) was responsible for conducting undergraduate level Basic Engineering Course (BEC) and Naval Engineering Course (NCE). The college was recognised by Jawaharlal Nehru University (JNU) for the award of B Tech degree in Mechanical and Electrical Engineering in Jul '83. In May 94, the college was formally recognised by All India Council for Technical Education (AICTE). It had three main faculties, namely Mechanical Engineering faculty, Electrical Engineering faculty and Basic Sciences faculty. There was also the Centre of Marine Engineering Technology (CMET) where courses were conducted for Naval Architecture (NA) and Naval Technical Administration. Besides that, there was a PCT school and NBCD school.

INS Valsura. INS Valsura trained officers, sailors and civilian personnel of the Navy and Coast Guard in Electrical, Electronics, Computer and Weapon Engineering disciplines. The establishment conducted the following courses for officers:-

- Electrical specialisation course of 96 weeks for Ex-BEC and NEC officers (on completion of basic course at INS Shivaji) and DE/UE/CW/SSC(L) officers twice a year.
- Mid Level Update Course (MLUC) of 6 weeks for 'L' officers once a year.
- SLt (X) tech course attachment of 13 weeks.
- Pre and post promotion courses of 15 and 18 weeks respectively for Electrical SD list cadre.

The establishment conducts the following courses for sailors:-

- Four years Electrical Apprentice course with two batches each year.
- Mechanicians Course of 94 weeks for Power and Radio sailors.
- Navy Entry Artificer (NEA) course of 139 weeks.
- Two batches of DEEM course of 32 weeks.

- Higher rank courses of electrical non-artificers for Ldg (Q) and Chief (Q) and of Artificers for Chief (Q).
- PCT course for Godavari and Project 25 ships.

The Basic Electrical School (BLS) imparted training on basic subjects such as Mathematics, Electricity and Magnetism, Basic Electronics and electronic circuits to the non-artificers and artificer classes.

The Electrical Technology School (LTS) conducted training on technology incorporated in the Naval shipborne equipment to officers and sailors undergoing specialisation, orientation and higher rank courses.

The Electrical Equipment School (LES) imparted training on various equipment fitted onboard naval ships. The equipment installed in the school was mainly Western origin equipment along with some of the Soviet origin equipment supplied under Project Vajra.

The Advanced Technology Adaptation Cell (ATAC) focused on student projects and identification of advanced technology areas, preparation of project specifications and working models.

INS Agrani. INS Agrani, in the 90s, conducted Leadership and Management training for sailors of all branches. Among the courses that it conducted were:-

- Leadership training of POs.
- CPO Management course.
- Pre SSB coaching for CW and SD list candidates.
- Training of Indian Naval Musketry team.

Retrospect

Major systemic corrections, along with organisational changes, helped gradually improve Naval training. On ground, the real focus of the Navy's endeavours was to make sure that training schools were able to provide trained officers and men in every field of activity so that fleets were manned to satisfactory standards. Responsibility of training was placed squarely with the SNC in the discharge of which, it was assisted by the Directorate of Naval Training (DNT).

The schools geared themselves with equipment and faculty and endeavoured to impart quality professional education. Officers were trained to develop 'width' of knowledge and sailors were given 'in-depth' knowledge and vertical expertise. Perhaps, for the first time emphasis was laid on developing leadership skills among sailors. The concept of PCT/OJT was a great innovation. In many ways, it encapsulated the new approach of the Navy — 'system specific' and 'intensive equipment oriented' training. The renewed emphasis on afloat training was of enormous importance and continues to bear rich dividends.

37

The New Naval Academy at Ezhimala

Developments Until 1990

Conceptual Requirements for the New Naval Academy

The 'essential' requirements was for a site of 100 acres in the vicinity of the sea or a lake for seamanship and watermanship training and adjacent to a railhead, yet removed from the township. The 'desirable' requirements were that the location should be within a short distance of a naval port and have a moderate climate.

The Choice of Ezhimala

The sites considered for the new Naval Academy were Aruvankadu in the Nilgiri hills near Wellington and the Pykara Dam Lake, the Lloyds Dam (Bhadgarh) situated off the Poona–Kolhapur road, Hassergate Lake near Bangalore, Porbandar on the Saurashtra coast, Chingleput near Madras and Ezhimala on the Kerala coast.

In 1979, the Government accepted the need for a permanent Naval Academy. The Kerala Government offered the Navy 960 hectares of land at Ezhimala,[1] north of Kannur (Cannanore) in northern Kerala.

The Kerala Government undertook to arrange, at no cost to the Navy, all the essential infrastructure facilities like drinking water, water for construction, electricity, approach roads and bridges, capital dredging of the Kavvayi backwaters (for basic watermanship training), building of a seawall to prevent erosion and augmentation of the nearest railway station at Payyanur, etc.

In 1982, the Government approved the site at Ezhimala and gave the Kerala Government a soft, medium term loan for acquisition of land and rehabilitation of evacuees.

Selection of Design Architects

Naval Headquarters took the view that a Naval Academy is built by a nation only once. From this institution would emerge the Admirals of the future. Therefore, the nation's best private architects should be invited to compete for the design of the prestigious Naval Academy.

This led to a contretemps in 1985. The Navy insisted that the Army's Military Engineering Service (MES) not be associated with this project because it was bound by mandatory, procedural constraints that had evolved over the decades for austere, economical, standardised, defence construction. These constraints conflicted with the Navy's vision for how the newest Naval Academy should look. Even the Prime Minister desired that the new Naval Academy should be a national monument, which the entire nation should be proud of.

The MES expressed its inability to be associated with the project on this basis or even to compete with the private architects. The MES' stand was that they would only undertake supervision of the project if they were associated right from the design stage.

Prime Minister Rajiv Gandhi laid the foundation stone on 17th January 1987. The Government approved that the Naval Academy be designed by private architects and constructed through consultants.

In 1988, a two-stage, all-India, architectural design competition was conducted without the involvement

---

1. Historical records indicate that Ezhimala had been a landfall for Arabian and Chinese seafarers since time immemorial. Vasco da Gama's pilot knew that the first land to be sighted on the Indian coast would be 'a great mountain which is on the coast of the Kingdom of Cannanore.'

   The topography of Ezhimala, with Mount Dilli abutting on the Arabian Sea has, since ancient times, inspired the local people to weave a number of legends. The most popular is the one connected with the Ramayana tradition. At one stage in the war between Rama and Ravana, many of Rama's forces, including his brother Lakshman, were killed. An anxious Rama consulted Jambavan, the senior most in the Vanara sena. It was decided to bring four medicinal herbs, shalya karani, vishalya karani, sandhana, karani and mritha sanjivani from the Himalayas for removing the arrows, healing the wounds, stitching the cuts and finally bringing the dead to life. Hanuman was entrusted with the task of collecting these herbs and he at once set out for the Himalayas. On reaching the Himalayas, however, Hanuman realised that he was unable to recognise the ayurvedic herbs. So he did the next best thing - he plucked the entire Rishabadri Mountain itself and flew back. On his way southwards, a piece of the mountain fell down near the sea and that is Ezhimala. The local people believe that Ezhimala still possesses these rare ayurvedic herbs.

of the MES. It was however ensured, discreetly, that the adjudging jury, headed by the Vice Chief of the Naval Staff[2] and comprising eminent private architects, had from the MES side, the Director General Works and the MES' Chief Architect. The winning firm was appointed as Consultant to the project.

In 1989, the MES agreed to supervise the project provided it was done under 'Engineer in Command'. The Navy declined to agree to the MES' stipulation to exercise total control over the project and recommended that a Public Sector Undertaking (PSU) management consultant supervise the project. The Navy's recommendation was approved.

Developments 1991 to 2000

Sanction for Phase I and Delineation of Responsibility

The financial crisis of the early 1990s, led to delay in the project. During this period, discussions were held on how best to resume momentum and the scope of the project was pruned down.

By 1991, the MES was persuaded to soften its stand — it was too prestigious a project. The MES offered to supervise the construction, even though private architects had designed it. In the larger interest, the Navy agreed to associate the MES with the project, but under the control of a Project Management Board (PMB) headed by the Defence Secretary and the Project Management Authority (PMA) headed by the Director General Naval Academy.

In 1993, the Project Management Board approved the Master Plan and Detailed Project Report prepared by the architects. The Government approved Phase I of the project in 1995, to be executed over a period of eight years.

The delineation of responsibilities was:-

- Architects to provide comprehensive architectural and engineering services and prepare documents to invite tender.
- MES to scrutinise and forward tenders to PMB for approval. The Chief Engineer to be directly responsible to the PMB through the PMA for the execution of the project.
- MES to be responsible for soundness and quality of work.

Between 1995 and 1999, procedural issues were resolved — consultancy agreements, fees for the architects, clearances by the Environmental Research Resource Centre, topographical surveys, soil tests, material surveys, concept designs for roads, water supply, area drainage, electric power supply, accommodation statements, detailed architectural and design drawings, etc.

Preliminary work on soil investigation and material survey were completed. Conceptual design of Cadets' accommodation, Cadets' mess and external services were approved by the Project Management Board. The work was likely to commence by March 2000 to be executed in 48 months. It was also decided to expedite the Naval Academy project by executing it under the "Fast Track Procedure".

Developments After 2000

Concept of Training

In 1995, approval was accorded for a training load of 600 cadets in the Bachelor of Science (Special) curriculum that was hitherto being followed.

In 2002, the Navy obtained approval for major improvements to this basic concept:-

- To upgrade the initial training curriculum level of Executive officer cadets from the 3-year "Bachelor of Science (Special)" level to the 4-year "Bachelor of Technology (Electronics, Telecom & IT) level so as to better cope with advancements in technology.
- To shift to Ezhimala, the 10+2 "B Tech" training of Engineering and Electrical cadets that was being carried out at the Naval College of Engineering in INS Shivaji. These officers would conjoin with the Executive officers "B Tech course" at Ezhimala. As a result, the training load would increase from 600 to 750 cadets.

Commissioning of the Academy and Commencement of Training

Phase 1 of the Academy was completed when INS Zamorin was commissioned on 6 April 2005 as the Academy's 'parent naval establishment'.

Training commenced in Aug 2005, with the basic training facilities having been completed.

At the time of writing, the project is expected to be completed in 2010.

2. The author was the Vice Chief of the Naval Staff.

38

Flag Officer Sea Training

Workup Organisation

The concept of systematic work up of ships was introduced in the Indian Navy in Oct 1977 by setting up a Weapons Workup Organisation (WWO) to enhance the weapons efficiency of ships. In Nov '81, the team graduated to Warship Workup Organisation at Bombay, WWO(B). In Jun '88, a second WWO was formed at Vizag, WWO(V) for workup of ships of the Eastern Fleet. To cater for workup of ships under FOMA, a Local Flotilla Workup Team, LWT(B) was constituted in Mar '92.

Ships therefore, had three workup teams, viz. WWO(B), WWO(V) and LWT (B) functioning under FOCWF, FOCEF and FOMA respectively. Submarines were worked up by COMSUBs, in accordance with SGMs and aircraft under the aegis of FONA.

To maintain battle efficiency standards throughout the Navy, the need was felt for a common controlling authority.

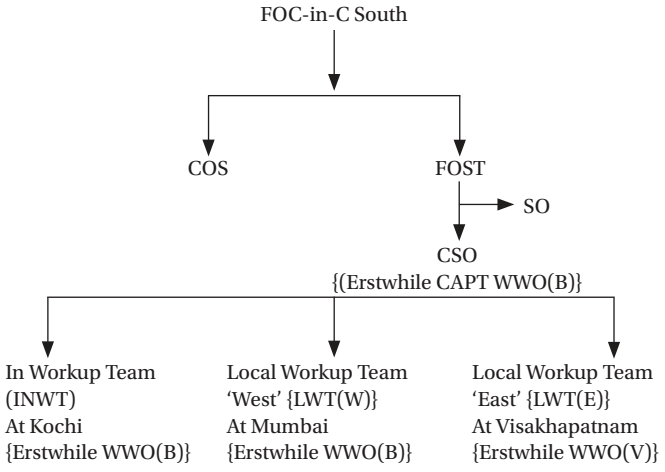
Creation of FOST

It was decided to appoint a Flag Officer Sea Training (FOST) in the Indian Navy as a single authority responsible for Operational Sea Training (Workup) of all ships, analogous to the British Navy's concept of FOST, in Portland, UK.

In Nov '92, the Govt approved the establishment of FOST, an officer of the rank of Rear Admiral (X), to be based at Kochi under the overall operational and administrative control of the Flag Officer Commanding-in-Chief, Southern Naval Command. Apart from the workup of ships, FOST became the class authority on matters pertaining to Operational Sea Training (workup) in respect of all ships.

Command and Control

The Command and Control structure of FOST is:-



INWT — Administrative Control of C-in-C (S), Operational Control of FOST

LWT(W) — Administrative Control of C-in-C (W), Operational Control of FOST

LWT(E) — Administrative Control of C-in-C (E), Operational Control of FOST

39

Morale and Discipline

"An army without morale is a helpless horse — its hoofs shorn of shoes;
A force without discipline is a powerless tiger — its paws deprived of claws."

Preamble

Morale and discipline are central to a military's basic ethos. Fighting forces across the world will testify to these two elements being the cornerstone of their operating philosophy and the bedrock of their efficiency and competence. The Indian Navy realised early on that 'Morale' was an indispensable element of warfare. It affected the psychological well-being of personnel and thus, needed to form an essential part of the operating philosophy. 'Discipline', was the underlying basis of the whole concept of military operations and was therefore, equally critical.

However, despite all its attempts towards the preservation of these two critical components of service life, the Navy, through the 90s, grappled with issues that were to have a future impact on its functioning, growth and the trajectory of its policy. Prime among them were:-

- The inability to attract the 'right kind' of officer entrant into the Navy.
- The reports from the Services Selection Boards that they had 'no option but to lower their minimum acceptable standards' if the numbers required by the Navy were to be met.

The remedies were seen to lie in making a career in the Navy as attractive as that in the civil sector. These led to the improvements in pay scales and allowances, free rations, longer tenures in service, assured schooling facilities for children, construction of more residential accommodation, Cadre Reviews and so on.

More importantly the formulation of a Strategic Personnel Policy commenced in this period. The essential features of this policy were:-

- The long-term perspective timeframe of various programmes such as hardware plans, surface ship induction plans, the submarine building programmes, etc.
- Focus on formulating policies, which were dynamic in nature, to suit the circumstances, the environment, the challenges, the needs and the opportunities.
- Involved partnerships with the DRDO, Dockyards and similar organisations.
- Recognition of the need to adequately reward people with atleast 10 to 12 years hands on experience in an area.
- The acknowledgement that there need not be a particular path or a set of assignments to reach the top and there need not be one particular route where everybody has to do everything.

The personnel issues confronting the Navy were therefore tackled both from an immediate and a long-term perspective. The major issues and the remedies proposed are discussed below.

Officer Like Qualities (OLQ) and Discipline

While it was appreciated that the young officers of the Indian Navy during the 90s were professionally sound, gentlemanly attributes were on the decline and issues of indiscipline surfaced. A concerted effort was made to address the issues holistically and revamp existing policies.

A team was appointed in the early 90s to analyse the reasons for the erosion. Of the many reasons that it pointed out, an interesting one was the shifting of emphasis in training establishments from 'inculcation of service values' to 'general academic performance'. There was increased stress on providing the trainees with higher academic inputs in a limited time, as opposed to ensuring the all round character development. To strike a balance, it was decided to implement some remedial measures:-

- Officers/instructors who came into contact with

cadets/trainees were to be of the highest calibre, who would set the right examples necessary for character building. Accordingly, only Lieutenants of 5 to 6 years seniority were appointed in NDA/NAVAC as Divisional Officers.

- The service training would be restructured to lay much greater emphasis on social attributes and provide broader service-oriented inputs relevant to the prevalent social, economic conditions and to the demands of a disciplined service. This was, all the more, important because young men joining the service were from very varied backgrounds.
- Academic inputs would be restructured to provide a much broader academic horizon and all round education on the lines similar to some front running educational institutions and service academies abroad.
- Young men would be conditioned from the very start to accept an 'honour code' and give them an OLQ exposure that will not falter when they step in the mainstream of naval and social life.

Leadership and Morale

There was a definite recognition of the problems of leadership that the service faced in the 90s. In the wake of the adverse publicity on the various court cases by senior naval officers, it was widely felt that the crisis needed to be dealt with squarely and swiftly. Certain actions were initiated to enable focussing of attention on aspects of leadership and sense of values:-

- Nomination of a team to visit the Commands and conduct workshops on leadership and Naval value system.
- Introduction of a leadership capsule as a part of each training course to inculcate the right sense of values and leadership at various levels. A course titled 'Leadership and Naval Value System' was introduced in the syllabi of long courses for officers and in the higher rank courses for sailors.
- Greater emphasis was given to the talent and leadership requirements of the operational ships, submarines and aircraft.

Channels of Communication

It was realised that much of the dissatisfaction, which existed at the lower echelons, arose from a lack of adequate and authentic information, which, in turn, led to misconceptions, speculation, and rumour mongering.

There was a pro-active effort to share the deliberations of NHQ that aimed at enhancing operational efficiency, improving service conditions and bettering the quality of life in the service. The messages that were communicated were:-

- The Navy is an open system in which every endeavour is made to ensure fairness and equity.
- Promotions are based purely on officers' ACRs which may or may not conform to popular opinion regarding the officer.
- To remove any suspicion of arbitrariness, selection for command, courses and foreign appointments were done by a Board of Flag Officers.

C-in-Cs and Flag Officers were directed to address the officers and senior sailors at least once a quarter to ensure proper dissemination of information down the line. Senior officers were also urged to mingle and speak with junior officers at every available opportunity so that the channels of communication remained open.

Sports and Adventure

Sports and adventure continued to play an important part in naval life during the 90s. Sailing, Trekking, Rafting, Motorcycle Expeditions, Environmental Study Camps, Walkathons, Microlite Rally, High Altitude Diving Camp, Hot Air Ballooning, Powered Hang Gliding, Para Sailing, Skydiving, Wind Surfing, Kayaking, Mountaineering and Skiing were undertaken for naval personnel and their families. Naval personnel also participated as officials/ judges in national/international events including the Olympics.

A 34-foot yacht 'Sameer' was inducted into the Navy on May 15, 1996 for promotion of Ocean/Coastal sailing expeditions.

Naval sportsmen participated in national and international events of Tennis, Yachting, Weightlifting, Boxing, Golf, Body Building, Wrestling and Shooting.

The Navy Adventure Foundation functioning under the Directorate of Naval Training at Naval Headquarters organized the conduct of adventure activities.

Physical Fitness. In terms of physical fitness, there was a renewed emphasis on trim military appearance, smart uniforms, elegant postures and tidy turnouts. To improve the general fitness and appearance of Naval personnel, qualification in the Physical Efficiency Test (PET) was

made compulsory and linked with promotion.

Sky to Ocean Expedition. A multi-disciplinary expedition from Indira Col (Siachen) to Indira Point (Andaman & Nicobar Islands) named "Sky to Ocean" was conducted by the Army with naval participation from August to November1998. The expedition encompassed 14 disciplines of adventure activities.

Motorcycle Expedition. A team of three officers and four sailors undertook a motorcycle expedition from Mumbai on 6 July 2000 to Kargil and back to pay homage to the Kargil martyrs and spread the message of peace and solidarity. Enroute, the team received 6000 messages and greeting cards from the public, which were handed over to the troops. The team hoisted the tri-colour atop Sands Post.

International Achievement of Sportsmen. Naval sportsmen participated in various international fixtures and brought laurels to the country by winning medals in various events. NG Dingko, Petty Officer and D Wilson, Petty Officer participated in boxing and weightlifting respectively at the Commonwealth Games — 1998, in Malaysia.

Board of Inquires and Disciplinary Issues

Boards of Inquiry

In a Navy of the size of ours, incidents are bound to occur which will call for investigation in order to ascertain the facts and initiate corrective policy and administrative measure. The measure of efficiency of administration lies in quick, effective remedial action that is fair and just.

With respect to Boards of Inquiry, it was felt that few areas required to be addressed more closely at all levels: the yearly increase in the number of BOIs, delay in processing, the time bar for disciplinary action and incomplete/poorly conducted BOI.

To reduce the instances of poorly conducted BOIs, it was decided to:-

- Avoid potential delays in pending BOI especially connected with MES organisation.
- In instances of clear-cut acts of commissions/ omissions, disciplinary action should be initiated by Summary Trial or Court Martial.
- Terms of reference of BOI are to be carefully drawn up and members of the BOI be made aware of the procedures and legal rights of the prime witness.
- Selection of the President and members of the Board be done carefully especially with regard to the seniority of the President and the accused.
- Adherence to a specified time schedule so that administrative/remedial/disciplinary proceedings initiated have its desired effect on ground.
- Whenever clear cut offences are made out, appropriate disciplinary proceedings commensurate with the offence to be initiated, to act as an effective deterrent against repetition of similar incidents.

Disciplinary Issues

Though relatively rare, the Navy experienced a few distressing cases of officers' discipline involving misappropriation, embezzlement, misconduct or moral turpitude. A particular matter for concern was the contagion of dishonesty from the commercial world into vulnerable members of the naval service. Where officers failed to live up to the high standards expected of them, they were tried by Court Martial and if found guilty, dismissed and sentenced.

The continued interference of High Courts in Courts Martial was another matter of concern. On analysis, it was found that the deficiency lay within the system in that the Convening Authority of court martials was not being correctly advised.

This decade also witnessed the invoking of Article 310 of the Constitution by the President of India on 30 December 1998, in respect of Admiral Vishnu Bhagwat, then Chief of the Naval Staff. The matter was extensively covered in the press and in several books[1] that present a perspective from different points of view.

Retrospect

By their very nature, 'discipline' and 'morale' are issues of enduring concern for the defence services. At every step of every stage, there is a constant need for progressive, continual and affirmative action to deal with issues related to these vital and key areas.

---

1. *Betrayal of the Defence Forces - The Inside Truth* by Admiral Vishnu Bhagwat.
   An Admiral's Fall by Wilson John.
   Sacked or Sunk by Brig RP Singh and Cmde Ranjit B Rai.
   Vishnu Bhagwat Fiasco: Lessons to the Nation by Pratap Thorat and Shripad Halbe.

Conflicting ambitions and competing aspirations among the officer rank, most often leads to a breakdown of the mechanism of redressal. The resentment, the bitterness, and the controversy that follows is, but, a 'rite of passage' for any service and its baptism by fire. The 90s were a trying period for the Navy, but it dealt with the situation with calm, trying hard to maintain a sense of balance and equity. Given the enormity of the task that it faced, the Navy's efforts to get its house in order were commendable.

The service began to place a premium on its officers being 'able and fit gentlemen'. An endeavour was made to instil leadership qualities among young officers and imbue them with the values and ideals of the service. As a part of this effort, leadership capsules were conducted at various levels. Emphasis was given on physical fitness and on inculcating a spirit of adventure.

After a spate of controversies, the Navy also began a process of redefining its relationship with the media. Officers were cautioned against the hazards of unauthorised leakages to the media and its ensuing complications. While it was good to be transparent, open and accountable, it was just as important to be judicious, prudent and discreet in providing any information.

In balance, it was indeed a period of trial but one that did much to mature its ranks greatly.

Reference Notes

Historical Overview of the Management of Defence

(Extract from the report of the committee constituted under Mr Arun Singh)

The extract is revealing of the dichotomy in position and status of the Military Headquarters vis-à-vis the Ministry of Defence and traces the history of their uneasy relationship since the British first introduced the system of dual control in the mid-19th Century.

Pre-Independence

Evolution. By the early 18th century, the British East India Company had established a Presidency system where locally employed personnel were organised on military lines. There were three Presidencies — Bombay, Madras and Bengal — each under its own Governor and with its own Army. The Governor reported directly to the Company's Directors in London.

The Presidency Armies were under the control of the Governor, who, in the beginning, also used to be the C-in-C. In 1748, the C-in-C of Bengal Army was also appointed C-in-C in India. His control over the Bombay and Madras Armies was slender as they functioned independently under their own Governor. Gradually, however, he started exercising greater operational control as operations from maritime bases proceeded inland and the territories of the Presidencies got linked by land under control of British power.

The first contingent of British troops arrived in India in 1754. There were now three categories of Armies in the country, the British regular Army, the Company's European troops and the Company's Indian levies. The C-in-C in India was in overall command of all these forces. There was no C-in-C of the Indian Army. The process of unification of the three Presidency Armies started only after the 1857 Uprising and was completed in 1895 when an Indian Army came into being.

Throughout the British era, there was no C-in-C of the Indian Army as such, but a C-in-C in India. He commanded both the British and Indian Armies located in the country. Generals from the British Army and the Indian Army were alternately appointed to this post. The last two British Cs-in-C in India were Field Marshals Wavell and Auchinleck. The former was a British Army General and the latter an Indian Army General.

In 1773, the British Parliament passed the Regulating Act under which a Governor General was appointed for India and he became the supreme authority in the country. The Governors of the three Presidencies were placed under him. The Governor General was given a Council of four members. The C-in-C was one of the four members of the Governor General's Council.

In 1786 a Military Department was constituted under a Military Member. He was also included in the Governor General's Council. The Military Department was required to communicate the orders of the Governor General in Council to the three Presidency Armies. All proposals coming from these Armies for consideration by the Governor General in Council had to be sent through him. The Military Department became the link between the Governor General and the three Presidency Armies.

The three Presidency Armies retained their independent identity for over a century. The control of the C-in-C was confined primarily to operational matters. This underscored the need for the Military Department. As the Presidency Armies started getting amalgamated into a unified Indian Army, the necessity for continuing with this arrangement became debatable. However, when campaigns had to be conducted deep inland in the country and the C-in-C had to be away from the capital for long periods, this arrangement ensured that military advice was readily available to the Governor General.

The concept of the supremacy of the Civil over the Army, an essential requirement of democracy, took some time to get fully established in the 19th Century. However, in India the question of supremacy of the civil got settled fairly early. In 1832, the new C-in-C, General Sir Edward Barnes found it impossible to accept a subordinate role to Lord Bentinck, the Governor General. The Secretary of State intervened, supporting the Governor General and General Barnes was recalled.

The supreme authority for governance and control of the military administration in India always remained vested in the Governor General in Council. As already mentioned, there were two Army officers in the Governor-General's Council: -

- The C-in-C was much senior in rank being a full General and, some times, a Field Marshal. He was responsible for command and executive functions like Operations, Training, Personnel Management and so on. He had under him three Principal Staff Officers (PSOs) — the Adjutant General, the Quarter Master General and the Principal Medical Officer.
- The Military Member was much junior to him. He was in the rank of Major General and was responsible for logistics. The Director General of Ordnance, the Director General of Works and Director General of Supply and Transport functioned under him. He was also the link between the Government and the Army.

There was not only divided control over the Army with operations and logistics controlled by different officers, but also duality of functioning. The Military Member commented on all proposals sent by the C-in-C to the Governor-General, before the Government took a decision and communicated the Government's decision to the Army.

Divided control and duality of functioning created problems. Philip Mason, a distinguished civil servant of the Defence Department during the Second World War, criticised this arrangement. *"The carefully considered proposal which had the C-in-C's approval would be turned down after long delay, by a curt note that the Government of India did not approve, sometimes signed by a Captain of the Army (Military) Member's staff. Delays had become more and more outrageous".*

A very distinguished C-in-C of the 19th Century, Lord Roberts was very critical of this style of Defence functioning. He wrote in 1989, "A fresh evil has been growing in the shape of excessive noting and criticism in the Military Department on purely military aspect of proposals which are submitted with the weight and authority of the C-in-C, whereby unnecessary delay is caused and the main issue is frequently obscured by a mass of irrelevant criticism. The evils of this arrangement are palpable. All the work involving reference between Army Headquarters and the Military Member has to be done twice over. Neither the C-in-C nor the Military Member of the Council see the arguments on which the opinion of the other is based and the Viceroy is apt to see the side of the Military Department in every case.

Curzon–Kitchener Controversy

Curzon (the Viceroy) was keen to effect improvements in the Army and asked for Field Marshal Kitchener, the most distinguished soldier of the British Empire to be sent out to India. On arrival in India, Kitchener set about introducing reforms and modernising the Indian Army. He wanted to bury the 1857 Mutiny syndrome, which still pervaded military thinking in India. He explained that the Indian Army's main task was not to support the civil power in the districts, but to guard the frontiers against external aggression. This required wide ranging re-organisation, which had to be completed expeditiously. Kitchener found the style of functioning in Government, most unsatisfactory causing inordinate delay. He wrote *"In war, the system must break down and unless it is deliberately intended to court disaster through divided counsels, divided authority and divided responsibility...it must be abolished".*

Curzon maintained that by destroying the position of the Military Member, the Kitchener plan was in reality a plan to subvert the civilian authority of the Government of India as a whole and substitute for it "military autocracy" in the person of the Commander-in-Chief.

Kitchener argued that this could not happen as the ultimate check was with the Secretary of State for India in England.

The British Government under Prime Minister Balfour felt that the real Government of India was in the House of Commons, a position Curzon was not willing to accept. He considered that military issues in India were an internal matter of the Government of India. Kitchener felt that Indian Military Policy should be controlled by the Committee for Imperial Defence (CID) and not the Government of India. This position enabled him to get support from England, which Curzon did not get.

The Governor-General-in-Council submitted the conclusions to the Secretary of State for India, in these terms: *"We dissent to the creation of an organisation to*

which no parallel exists, as far as we know, in any army or any administration in the world, which would create a military despotism in surroundings where, in the absence of Parliamentary or public control, it would be fraught with the maximum of danger, and which would, in our opinion, lead to a disastrous breakdown as soon as it was tested in practice."

The British Cabinet accepted the proposals of Kitchener. The Military Member was dropped from the Viceroy's Executive Council. The C-in-C was now the only military officer in the Council. He secured the right of direct access to the Viceroy.

The erstwhile Military Department was re-designated as the Army Department and placed under an Army Secretary in the rank of Major General. This Department came under the C-in-C.

A General Staff Branch was created at Army Headquarters under a Chief of the General Staff. He became the senior Principal Staff Officer. A Department of Military Supply was created under the other Member in Council whose functions were essentially those of a civil administrator, and an Army Department was created under the Commander-in-Chief.

The new organisation introduced at the instance of Kitchener, remained operative for the remaining years of British rule in India up to 1947. This rationalised the functioning of the country's Defence organisation; allowed reforms to be executed expeditiously, and prepared the Indian Army to participate in two World Wars with success.

The abolition of the appointment of Military Member led to a change in the pattern of Finance Management. In 1906, the Military Accounts Department, which had functioned under the Military Member, was replaced by a Military Finance Department. This also provided a check on the authority of the C-in-C who had now become all powerful in military administration after the 1906 reorganisation. This arrangement was the beginning of the concept of Associated Finance in Defence which by and large continues to obtain to this day, even though recently some reforms have been introduced towards Integrated Finance.

Esher Committee

After the indifferent performance of the British Army in the Boer War at the turn of the 20th Century, a committee under Lord Esher was set up in 1903 to reorganise the British War Office. As a result of the recommendations of this Committee, the appointment of C-in-C of the British Army was abolished and the Army Council system was introduced.

After the First World War (1914–1918), Esher was sent out to India to examine the Higher Defence Organisation of this country. Two Indians, Sir KG Gupta, a distinguished lawyer and Sir Umar Hyat Khan, a prominent landlord of Punjab, were also included as members of this Committee. One of the terms of reference of the Esher Committee in India was, *"To examine the position of the C-in-C in his dual capacity as head of the Army and Member of the Executive Council and to make recommendations".*

The Committee in its report took note of the fact that under the present system, *"All the work connected with the administration of the Army, the formulation and execution of military policy of the Government of India, the responsibility for maintaining every branch of the Army, combatant and non-combatant in a state of efficiency and the supreme direction of any military operations, based upon India, were centred in one authority, the C-in-C and the Army Member".* It supported the change introduced after the Curzon–Kitchener controversy.

The Esher Committee was unanimously of the opinion that the C-in-C alone should have the right to offer military advice to the Government of India, and that he should have no military colleague on the Executive Council. The Committee also considered and rejected the scheme to have a civilian member of the Executive Council for the Army or an Army Council with collective responsibilities, as unsuitable to Indian conditions.

After the 1919 Montagu–Chelmsford Act, the Central Legislative Assembly could discuss Defence matters but could not vote on Defence demands. The C-in-C was an ex-officio member of the Central Legislative Assembly Council and the Army Secretary of the Central Legislative Assembly.

The merger of Army Headquarters and Army Department on the UK pattern was not considered necessary in India as the C-in-C was the head of both these bodies. However, the Esher Committee recommended the setting up of a Military Council with the C-in-C as its President and, the Chief of the General Staff, the Adjutant General, the Quarter Master General, the Defence Secretary and the Financial Adviser as its members. This would ensure integrated functioning.

The Committee noted that as per the Rules of Business of that time, the Army Secretary, like all other Secretaries of Government of India, had to report directly to the Viceroy, once a week. The Army Secretary was a serving Major

General. This could provide an additional avenue for the Viceroy to get advice on Military matters. To obviate this, it recommended that the appointment of the Army Secretary be made tenable only by a civil servant. This was accepted and from 1921, officers from the Indian Civil Service started being posted to this appointment, which was now re-designated as Defence Secretary.

Inter Service Co-ordination

In 1924 a Chiefs of Staff Committee (COSC) with no permanent Chairman, comprising the three Service Chiefs was set up in the UK. The Salisbury Report prescribed for this Committee "individual and collective responsibility for advising on Defence policy as a whole, the three constituting, as it were, a super Chief of a War Staff in commission".

About the same time, a COSC was also set up in India. The Chief of General Staff, Flag Officer Commanding Royal Indian Navy (FOCRIN) and AOC were members of this Committee. The CGS was the permanent Chairman and reported to the C-in-C. The FOCRIN and the AOC were given the right of access to the C-in-C and the Viceroy.

The growth of the three Services before Independence was related to the requirement of British Imperial strategy and not to any policy formulation in India. The British relied on their Royal Navy and they had little requirement for expanding the Indian Navy. The Indian Air Force was a nascent Service of a few years standing when the Second World War started.

So far as the Indian Army was concerned, the British needed Indian manpower to hold India and expand their Empire. During the two World Wars, the Indian Army was expanded to a force of over a million in the First World War and over two million in the Second World War.

Second World War — 1939–1945

The movement for India's Independence had been gathering momentum and provincial autonomy had been conceded in 1935. Under pressure from US President Roosevelt, the British Government sent a Cabinet mission led by Sir Stafford Cripps, to resolve the political deadlock in India and secure Indian co-operation for the war effort.

The Cripps offer stipulated that Defence would be a reserved subject under the Viceroy and control over it was not to be handed to any Indian Member. This became a bone of contention and the Congress rejected the Cripps offer. Sir Stafford Cripps stated in the very first Press Conference held in Delhi that Defence could not be transferred, even if all the parties joined in making a united demand in that behalf. That clinched the decision of the Working Committee of the Congress to reject the Cabinet's proposals.

In 1942, the British divided the Defence Department into two Departments. The War Department under the C-in-C remained responsible for Operations, Training, Personnel Management and Administration of three Services. The Defence Department under an Indian Member of the Executive Council was established to deal with subjects like printing of stationery and forms, military lands and cantonments, soldier boards, prisoners of war and Army, Navy and Air Force Lists. Soon after the War, these two departments were again merged into one Department.

Until 1946, the Commander-in-Chief and the Defence Member of the Viceroy's Council were the same person and this led to the final unity of command at the top.

However, there were various points of control outside and above the authority of the Commander-in-Chief exercised from the War Office at London, and from the office of the Secretary of State for India. The issue of final co-ordination and resolving of differences of view were taken care of not in India, but by the British Government in London. The armed forces in India were an extension of the British war apparatus and the Commander-in-Chief of India was seen as a Theatre Commander.

Interim Government

In October 1946, the Interim Government came to power and for the first time control over Defence was handed over to an Indian. Sardar Baldev Singh became the Defence Member of the Executive Council with the Defence Secretary and the Defence Department under him. Field Marshal Auchinleck now ceased to be a member of the Executive Council and worked under the newly appointed Defence Member. However, he continued to be the professional Head of the three Services. No other changes were introduced in the Higher Defence Organisation till August 1947, when India attained Independence.

Post-Independence

The First Decade. With the dawn of Independence, for the first time after centuries, Indians assumed full responsibility for the Nation's defence policy. The ad-hoc arrangement introduced a few months earlier to meet the requirements of the Interim Government had to be refined to serve the needs of the Nation's democratic polity. Organisational and functional changes in the Defence High Command had to be synthesised to meet the new requirements.

It was fortunate that there were two individuals present in India in 1947 who had vast experience of Defence functioning at the highest level. Lord Mountbatten had been a Supreme Commander during the Second World War and was now the Governor General of India. His Chief of Staff, Lord Ismay, had considerable experience of Management of Defence at the national level and had been invited to the USA to advise on the reorganisation of Defence at the national level in that country.

Ismay was asked to examine the Indian "higher defence organisation" and suggest changes to meet the requirements in the wake of Independence. He had to take into account the highly disturbed conditions prevailing in India at that time. North India was engulfed in Partition riots. The three Services were undergoing a surgical operation to be partitioned into the Defence Services of the two newly independent nations. Within weeks of Independence, the Army was drawn into fighting a war in Kashmir. Against this backdrop, a radical reorganisation of the higher defence apparatus was not possible. Ismay recommended a series of committees for higher defence control, which would ensure the supremacy of the civil, provide maximum co-ordination between the Services and reduce red tape, cutting out avoidable delays.

At the highest level, there was the Defence Committee of the Cabinet (DCC) under the Chairmanship of the Prime Minister. The Defence Minister and certain selected Ministers were members of this Committee. The three Service Chiefs, the Defence Secretary and the Financial Adviser were required to be in attendance at all meetings of the DCC.

Functioning under the broad directions of the DCC was the Defence Minister's Committee. This was the apex body in Ministry of Defence. The Defence Minister presided over this Committee and its members were the three Service Chiefs, the Defence Secretary and the Financial Adviser. There were also two specialised committees, the War Book Committee and the Appellate Committee presided over by the Defence Minister with Service Chiefs as their members.

The Chiefs of Staff Committee (COSC) was the highest body for giving professional advice to the Government and co-ordinating the functioning of the three Services. There was to be no separate Chairman Chiefs of Staff Committee. One of the serving Chiefs was to be made Chairman and this appointment would go by rotation to the Service Chief who had served longest in the Chiefs of Staff Committee. Thus the Army Chief in four star rank had often to function under the Chairmanship of the Naval or Air Force Chief in three star rank. The Chiefs of Staff Committee had no governmental authority and could only make recommendations to the Government.

Several Inter-Service committees were set up. Two of these Committees, the Principal Personnel Officers Committee (PPOC) and the Principal Supply Officers Committee (PSOC) were different form the other Inter-Service Committees. Apart from having the PSOs of the three Services dealing with personnel and supply matters, these Committees had representatives of Ministries of Defence and Finance (Defence). PPOC and PSOC were to report directly to the Defence Minister's Committee. The unanimous decision of these Committees could carry the weight of Governmental authority and recommendations of these Committees were not required to be subjected to scrutiny in the Ministry. This arrangement was meant to cut out delays. However, these Committees have remained largely ineffective.

The reorganisation suggested by Ismay, without integrating the Service Headquarters with the Ministry, provided for integrated functioning. Shri HM Patel, the then Defence Secretary, objected to Ismay's proposal for "direct access to the DCC by the Chiefs of Staff and, if necessary, through the DMC". His objection was accepted in the DMC on 20th December 1947. "The Chiefs of Staff could now go only to the Defence Minister and normally only through him to the DCC". In December 1947, all the three Chiefs of Staff were Britishers. Shri Patel probably did not want them to bypass the then Defence Minister Sardar Baldev Singh.

On 27th May 1952, the then Defence Secretary (HM Patel) forwarded to the then C-in-C Army (Gen KM Cariappa) the draft of a document titled "Organisation, Functions, Powers and Procedure of Defence Headquarters, 1952". This draft stated, inter alia, that the status of Armed Forces HQ vis-à-vis MoD "Corresponds to that of an 'Attached Office' of the Secretariat on the civil side". The Defence Secretary asked the General to communicate his comments as early as possible and proposed, nevertheless, to send the draft for publication "on or before 16 Jun 1952" (a total period of 20 days).

Gen Cariappa and the other two Chiefs prepared their comments and reverted to the Defence Secretary on 13th June '52 indicating serious disagreement with "the proposed practice in procedure" and suggested an informal discussion.

On 7 July '52, Defence Secretary responded with MoD's rebuttals to the comments and stated he would

only be able to entertain a discussion a few weeks later. No further discussion or correspondence occurred and the draft, without amendment, was published as the final document under the auspices of the Cabinet Secretariat in 1952 itself. No correspondence or interaction took place between the Chiefs and the political authority on this vital issue.

This decision has ensured that the Services Headquarters are not part of the Departmental structure of the MoD but only 'attached' offices to the Department of Defence and this fact has created its own problems. Attached offices are generally responsible for providing executive direction required in the implementation of the policies laid down by the Department to which they are attached. They also serve as the repository of technical information and advise the Department on technical aspects of questions dealt with by them. Thus Services Headquarters operate in a purely advisory role even on 'technical questions', which related to purely military issues.

In 1955, the Service Chiefs who had continued to carry the designation of C-in-C were re-designated as Chief of Staff of their respective Service. A Chief of Staff in all democratic countries is part of the Defence Ministry and not a separate identity outside the Ministry. A similar arrangement was visualised in India when the appointment of Service Chiefs was re-designated. Announcing this in the Parliament on 25 March, 1955, Prime Minister Jawaharlal Nehru stated *"It would be better if in future the designation of the Commander-in-Chief should be dropped and they should be called the Chief of Staff....It is proposed that the Heads of the Services in future be called Chief of the Army Staff, Chief of the Naval Staff and the Chief of the Air Staff, and in the course of a few days, orders to this effect will be issued. In some countries they do not have these Commanders-in-Chief in this manner; in fact, in most democratic countries they have some kind of Defence Councils...No doubt it may be desirable for us also to form these Councils...We are going into this matter and hope gradually to develop these Councils."*

The Service Chiefs in India voluntarily chose to continue to be operational commanders of their respective forces instead of being Chiefs of Staff and delegating the operational functions to the Commanders below. They wanted to be cited as separate juridical entities in the Army, Navy and Air Force Acts and to have a legal status outside the Government. This was on the basis of a note prepared by General JN Chaudhuri, then Chief of General Staff.

The opposition to the Army, Navy and Air Force Councils came from the Chiefs of Staff. They did not approve the idea of their PSOs and themselves attending a council meeting under the Chairmanship of the Minister and their views being only one of the views expressed and their PSOs having freedom of expression before the Minister. Their concept of the Chiefs being operational commanders and not Chiefs of Staff would not permit them to accept the Council system.

The 1958 Estimates Committee of the Parliament, under the Chairmanship of Shri Balvantrai G Mehta in its report on 'Organisation of MoD and Services HQ' was of the view that the existing system did not make for economy or efficiency in administration as there was considerable amount of duplication and even instruments of the Defence Organisation tended to function in a compartmental manner rather than jointly and comprehensively with a common objective.

The Committee report also highlighted the prevalent imbalance in the distribution of 'responsibility and authority' between the Services HQ and MOD. It called for comprehensive review of the existing powers, and delegation of more power to Service HQ. An organisation based on the Council System (as obtaining in the UK) was recommended to overcome to a large extent, the shortcomings of the existing system.

Appreciating the need for speed and efficiency in the MoD for effective scrutiny and examination of proposals forwarded by Service HQ, review and streamlining of the existing procedures was called for. The amalgamation or common Finance and Accounts Organisation for the three Services to achieve economy, uniformity and greater co-ordination was recommended.

1962 was a watershed year in India for Defence and we had to come to terms with harsh realities. However, in so far as Management of Defence was concerned, we failed to rectify adequately the ills of the system. The DCC was replaced by the Emergency Committee of the Cabinet (ECC). DCC had dealt exclusively with Defence matters. The three Service Chiefs were always in attendance at its meetings and the Military Wing always provided secretarial support.

The changed nomenclature of ECC signified that this Committee covered a bigger canvas than the DCC. The ECC came into being in the uncertainty about the nature and duration of war. The Cabinet Secretary was designated as Principal Defence Secretary for some time. The procedure for ECC was different from DCC; papers were not circulated in advance; Ministers were given briefs at the time of the meeting and decisions were taken and

the papers were collected back. This lasted only for a few months after which the normal procedure was reverted to and the ECC functioned on the model of the DCC.

Yet another development affecting the Services after 1962 was the introduction of the appointment of Cabinet Secretary with higher protocol status than the Service Chiefs. For the first time, a civil servant became senior to the Service Chiefs and this affected the style of functioning in the Secretariat. Service Chiefs who had objected to serving as members of the stillborn Defence Secretary's Committee could not object to attending meetings of the Committee of Secretaries presided over by the Cabinet Secretary. Principal Secretaries were also equated with the Cabinet Secretary and became senior to Service Chiefs. For a short time after the 1971 War, there was a Principal Secretary in the MoD, when KB Lal was elevated to that rank.

The war in 1965 brought to the fore the lack of co-ordination among the three Services even given the existence of the COSC and its supposedly collegiate decision making capability. One change resulting from the war was the creation of the post of Air Chief Marshal in the Air Force. This was followed in 1968 by the institution of an Admiral of the Navy. From then on all three Chiefs were 4 star officers.

In 1967, the Government of India set up an Administrative Reforms Commission. There were two committees on Defence, headed by Nawab Yawar Jung and SN Misra. While both supported integration of Ministry of Defence with Services Headquarters, they differed over the appointment of Chief of Defence Staff in India. In formation of an integrated Headquarters the Committee observed:-

"The subordination of the Military to the Civil Power should be interpreted in the political and not in the bureaucratic sense...There is the factor to consider seriously of duplication of work, which constitute a waste, both financial, and in terms of talent and time. Such duplication occurs mostly in the name of co-ordination and supervision — it contributes little except delay. We recommend that the principle of civilian control over the Defence machinery should be interpreted to mean not bureaucratic or civil service control but essentially ultimate political control by the Parliament and the Cabinet".

On the formation of a Chief of Defence Staff, SN Mishra expressed his opposition to the idea, whilst Ali Jung observed, *"The Services should retain their separate identities, but all operational matters need to be co-ordinated and operations eventually integrated. This alone would establish a single line of ultimate professional responsibility; without it, the Services would not be able, all of a sudden, to bring about the effective unified command, which is required in war. We believe that there is a need for a Chief of Defence Staff who would be the co-ordinator and the executive at the top echelon of all the three operational commands. The structure in peace time should conform to the requirements of war.* The CDS idea was also opposed by the then Navy and Air Force Chiefs.

In 1978, a Committee of Defence Planning (CDP) came into being under the Chairmanship of the Cabinet Secretary. The members of this Committee were the Service Chiefs, Secretary to the Prime Minister, the Defence Secretary, the Foreign Secretary, the Finance Secretary, Secretary Defence Production and Secretary Planning Commission.

Two new features in the CDP are significant:-

- With the absence of the political executive in the CDP, there was to be no direct interaction between the Ministers and the Service Chiefs in this committee.
- For the first time, a committee had been constituted under the Chairmanship of a civil servant, with Service Chiefs serving as members of that Committee. However, the CDP was a Committee to advise the Defence Minister and was constituted by the Defence Minister. It was meant to expedite defence planning, largely equipment procurement. The initial secretariat was provided at the level of Additional Secretary in the Cabinet Secretariat.

Reference Notes

Training of Foreign Naval Personnel

Region	Country	No of Personnel trained from 1991 to 2000	No of Personnel trained from 2001 to 2006	Total Trained since 1991
Indian Ocean	Maldives	64	96	160
	Mauritius	237	54	291
	Seychelles	35	37	72
South Asian Seaboard	Bangladesh	62	55	117
	Myanmar	07	18	25
	Sri Lanka	939	945	1884
South East Asian Seaboard	Cambodia	—	08	08
	Indonesia	08	05	13
	Malaysia	43	27	70
	Philippines	02	—	02
	Singapore	05	01	06
	Thailand	—	01	01
	Vietnam	—	12	12
South West Asian Seaboard	Iran	04	—	04
	Kuwait	—	10	10
	Oman	50	—	50
	UAE	12	—	12
East African Seaboard	Kenya	39	11	50
	South Africa	02	18	20
	Tanzania	04	02	06
	Zanzibar	—	02	02
West African Seaboard	Gambia	01	—	01
	Ghana	93	06	99
	Namibia	—	05	5
	Nigeria	19	22	41

SECTION V

In Unison

Associated Organisations, Collaborative Efforts and Reference Data

Preamble

"Nothing remains, neither the state nor wealth nor valour without the security provided by the Armed Forces. One should never forget that the strong control all and the weak have many enemies".

— Shukra Niti (ancient Indian scripture)

The contribution of associated services in assisting the Indian Navy in safeguarding the SLOCs cannot be overstated. The principle collaborator in the 90s decade was the Coast Guard. The CG, that is considered the fourth arm of defence, enforces national legislation in the Maritime Zones of India; takes care of the policing, surveillance and patrolling of India's EEZ, our coastline, the island territories and our offshore installations. There were many instances in the decade, when the Navy operated jointly (sometimes in remarkably coordinated operations) with the CG, begetting favourable results. With its stellar support, the Navy accomplished its stated objectives with élan.

Organisations carrying support functions also contributed in no small manner. The Naval Hydrographic Department (now renamed the National Hydrographic Department) assisted in the conduct of "Project Surveys" undertaken for various State Governments, private companies, and foreign surveys, as part of their "Revenue Earning Measures". Amongst these were surveys for the Sethusamudram project, Charting of Antarctica Waters, and Coastal Zone Management Surveys. The Naval Hydrographic School, re-designated as the National Hydrographic School 1997 undertook dedicated courses to train personnel in the art of hydrographic surveys. In 1999, the school's Basic Hydrographic Course was ratified by IHO and the school ranks amongst the finest in the world attracting students from several overseas countries.

In 1982, the institution of the Directorate of Naval Oceanology and Meteorology (DNOM) at Naval Headquarters led to coordinated efforts of scientific research in partnership with the Department of Ocean Development (DOD) in its expeditions to Antarctica. The expedition marked a high point for the Navy that has only made more confident and productive forays, ever since.

The decade was also significant for the Reviews of the Fleet[1] by the President, Presentation of Colours[2] and the activities of Indian Naval Bands. The Indian Navy's 'Central Band'[3] brought glory for the service by performing in prestigious international events such as International Military Music Festival at Albertville in France and Modena in Italy and Germany and in Symphonic Orchestral concerts in Malaysia, Singapore, Shanghai, South Africa, Eritrea, etc.

In keeping with the Navy's adventurous spirit, there was a sharp increase in the sailing/yachting expeditions undertaken in the decade. For the first time perhaps, there was concerted focus on imparting sailing training that offered first hand experience of wind, weather and the vagaries of the sea thereby fostering a nicety of judgment and helping develop a basic "sense of the sea". The period also saw Yachting voyages being undertaken by non-training Ships Varuna, Samudra, and Tarangini.

---

1. A naval review displays a nation's naval might, both to its own citizens and to naval adversaries. The President of India reviews the Indian Fleet once during his/her tenure in office. In ceremonial significance, the Navy's Presidential Review is second only to the Republic Day Parade.
2. The *Presentation of Colours* is an ancient tradition for armed forces which accomplish meritorious and outstanding service, to be presented with "Colours" to engender pride and esprit-de-corps. These Colours are paraded by the recipients on special occasions to add dignity and stature to their parades and guards of honour.
3. The band was commissioned in Bombay in 1945 with a complement of 50 musicians has grown into a Naval Central Band with a 125-piece Symphonic Orchestra.

The Fifth Pay Commission, appointed in 1994 also marked a 'first' for the service. Unlike any other commission in the past, the Fifth Pay Commission was asked to examine the terms and conditions of service of Armed Forces personnel and to recommend the reforms necessary to bring about desirable changes in work methods, environment and attitudes, aimed at promoting efficiency in administration, reducing redundant paperwork and optimising the size of Government machinery. Its terms of reference were much wider in their ambit and scope than those of its predecessors and there was just a sense of greater purposefulness in its tasking and mandate. It submitted its report in 1997 that finally resulted in improvements in pay scales and allowances. In the backdrop of the harsh conditions, in which Armed Forces personnel have to operate and the corollary effect that has resulted in a dire need to attract and retain the talented youth in the Armed Forces, this was indeed a significant first.

On the welfare front, several measures were initiated in the last few years of the decade to improve the quality of life, including setting up of additional schools and new educational institutions, approval of a hospital modernisation programme and steps to improve the accommodation for personnel at family stations.

40

The Coast Guard

Preamble

The Indian Coast Guard came into being on 1 February 1977. At the time of its inception, the Coast Guard was created in the context of three basic assessments:-

- Naval Force Levels were inadequate for non-military tasks like the protection of life and property at sea and law enforcement in India's maritime zones.
- 'Hi-tech' naval ships and highly trained naval personnel should not be wasted in carrying out the non-military tasks.
- The Navy should only be utilised for its wartime and traditional oceanic naval roles.

The Coast Guard Act of 1978

The Act specified the duties and functions of the Coast Guard:-

- It shall be the duty of the Coast Guard to protect the maritime and other national interests in the maritime zones of India. The measures referred to provide for:-
  - — Ensuring the safety and protection of artificial islands, offshore terminals, installations, other structures and devices in any maritime zone.
  - — Taking measures to preserve and protect the maritime environment and to prevent and control marine pollution.
  - — Providing protection to fishermen, including assistance to them at sea while in distress.
  - — Assisting the Customs and other authorities in anti-smuggling operations.
  - — Enforcing the provisions of the act in the maritime zones.
  - — Safety of life and property at sea and collection of scientific data.
- The Coast Guard shall perform its functions in close liaison with Union agencies, institutions and authorities.

After the enactment of the 1978 Act, the Coast Guard was constituted as an Armed Force of India.

The Maritime Zones of India

Regulation of Fishing By Foreign Vessels Act 1981

Poaching is prevalent in the waters around the Andaman & Nicobar Islands, in the approaches to the Hooghly River at the head of the Bay of Bengal, along the East coast between Visakhapatnam and Chennai, in the Palk Strait between India and Sri Lanka, along the West coast between Kochi and Mumbai and in the waters off the Gulf of Kachch.

The Regulation of Fishing by Foreign Vessels in the Maritime Zones of India Act came into force on 2nd November 1981. It laid down the procedure to regulate fishing by foreign vessels in India's Exclusive Economic Zone (EEZ) and provided for deterrent punishments like levying fines, confiscation of craft, imprisonment of master, etc for illegal fishing in the EEZ.

Concurrently, notifications were issued extending the provisions of the Criminal Procedure Code and the Indian Penal Code over the EEZ.

The Coast Guard thus became the principal organization for enforcing all national legislation in the Maritime Zones of India:

- Policing, Surveillance and Patrolling the EEZ of 2,013,410 square kms that extends 200 miles from the shoreline (1,418,193 sq kms EEZ of the mainland and Lakshadweep and 595,217 sq kms EEZ of the Andaman & Nicobar Islands).
- The Continental Shelf submissions being pursued by the Ministry of Earth Sciences, may further increase India's EEZ by about 0.5 million square kms.
- Policing, surveillance and patrolling the coastline comprising a total of 7517 kilometres (5423 kms of the mainland, 1962 kms of the Andaman & Nicobar

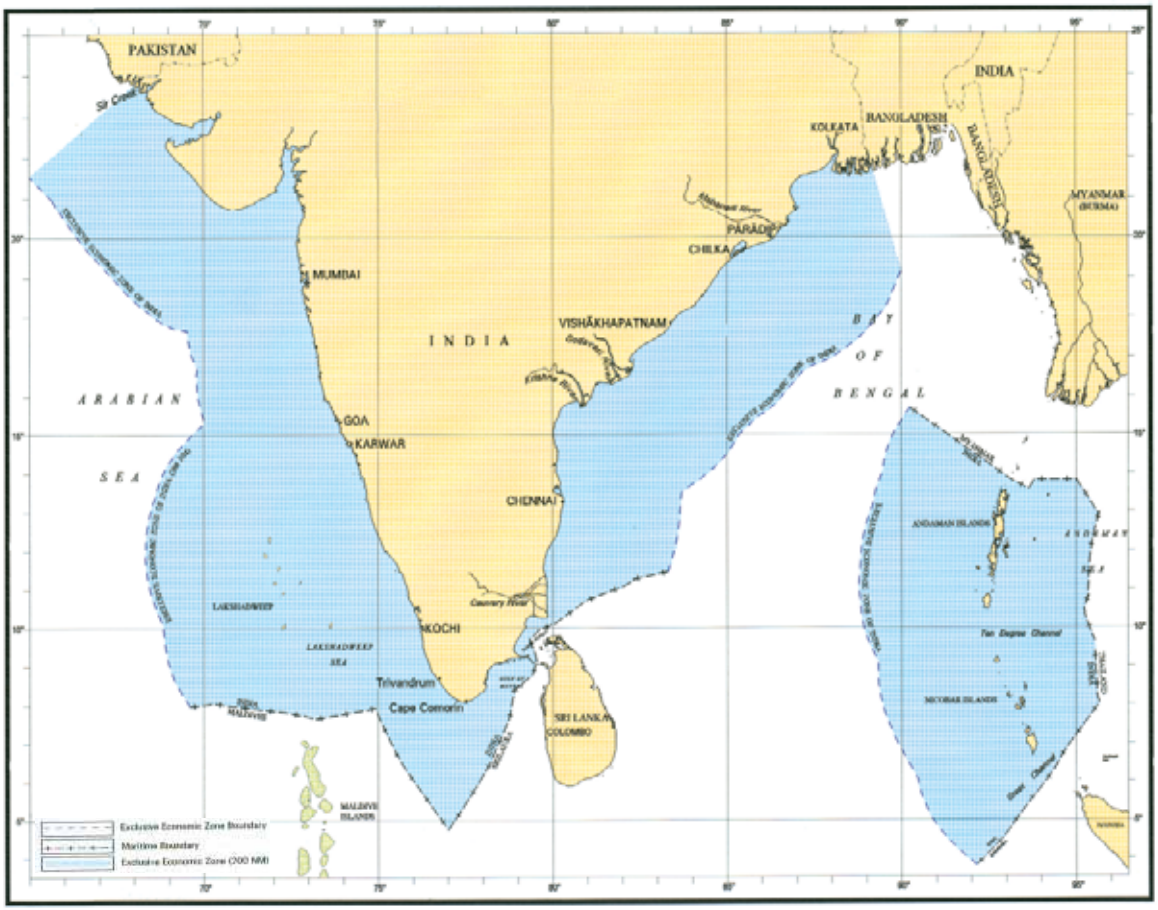
Islands and 132 kms of the Lakshadweep Islands).

- Policing, Surveillance and Patrolling the Island Territories (598 islands near the shore, 572 islands in the Andaman & Nicobar Group and 27 islands in the Lakshadweep Group).
- Policing, Surveillance and Patrolling the Offshore Installations off Mumbai and the Tamil Nadu coast to ensure their security, working in close liaison with other Government authorities.
- Safety of the Territorial Waters that extend 12 miles from the shoreline and the 155,889 kms of the shoreline's gulfs, bays, creeks, inlets and swampy marshy areas.

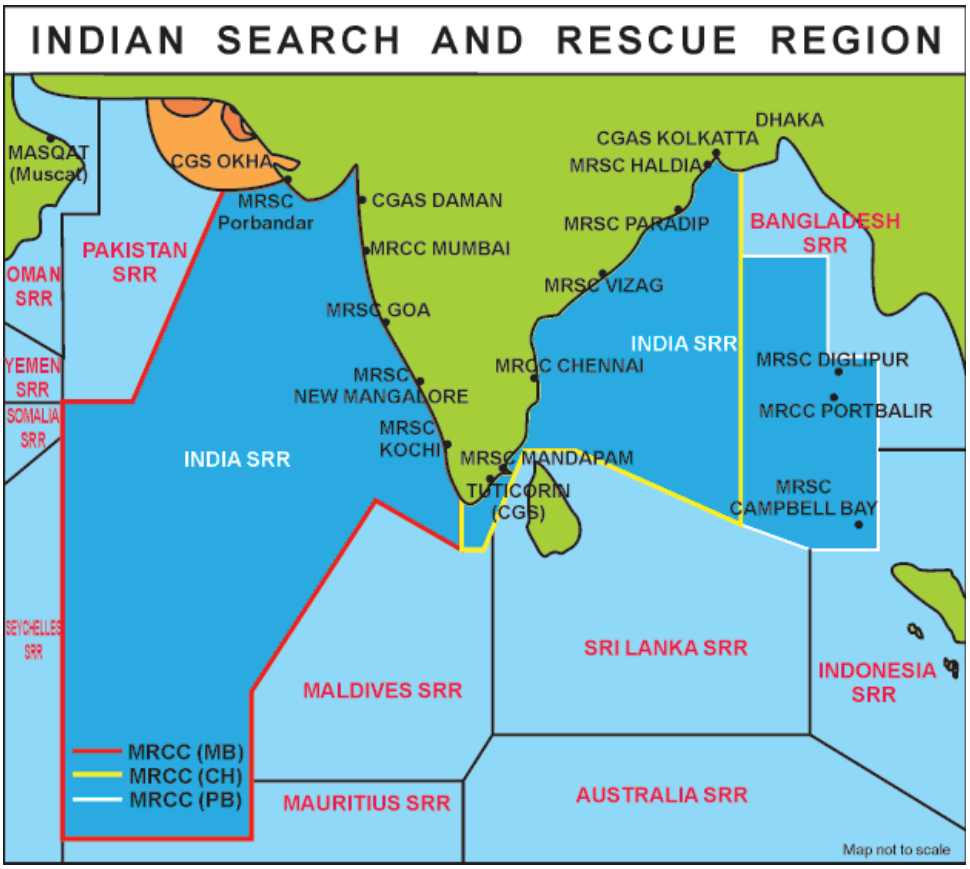
In the implementation of the above, the Coast Guard is:-

- The national coordinating authority for Maritime Search and Rescue in the Indian Search and Rescue Region (ISRR). This region extends from longitude 60° East in the Arabian Sea to longitude 97° East in the Bay of Bengal down to latitude 6° South in the Indian Ocean and covers a region of over six million sq kms.
- The national coordinating authority for Oil Spill Disasters in sea areas of its jurisdiction.
- The head of the Ministry of Petroleum and Natural Gas' National Committee for Offshore Security Coordination which prepares, rehearses and executes contingency plans for offshore security.

In 1986, a Coast Guard Advisory Committee was constituted to harmonise the role and jurisdiction of the Coast Guard with those of other Government agencies. The Committee's recommendations helped to optimise the utilisation of available resources and obtain clearer accountability by the numerous agencies performing similar functions in fishery protection, intercepting foreign fishing trawlers, search and rescue operations, assisting the Customs in anti-smuggling operations including



India's Exclusive Economic Zone



The ISRR

arrest, apprehension and prosecution-related activities, protection of marine environment, control of marine pollution and security of offshore installations.

Coast Guard Resources

Surface Vessels

In successive 5-year Plans, the Coast Guard has built up its resources in indigenously constructed offshore, inshore and fast patrol vessels, interceptor boats, interceptor craft and hovercraft.

The 1200-tonne 22-knot Offshore Patrol Vessels (OPVs) started entering service from 1983 onwards. They had indigenous Chetak helicopters for aerial reconnaissance and Search and Rescue (SAR). For armament, each OPV had a hand-operated single-barrelled 40 mm gun and two heavy machine guns. In the later OPVs, the 40 mm gun was replaced by a single-barrelled automatic 30mm gun mounting. After nine of these OPVs were built, construction commenced of the Advanced OPVs (AOPVs).

From 1983 onwards, 180-tonne 25-knot Inshore Patrol Vessels (IPVs) were imported from Japan and Singapore for anti-smuggling tasks in shallow territorial waters.

Eight indigenous 215-tonne Fast Patrol Vessels (FPVs) started entering service from 1991 onwards. Their tasks in the EEZ were patrolling and monitoring the movements of merchant ships and foreign warships, protection of oil exploration and fishing areas and patrols/operations for immigrant interdiction, anti-smuggling, anti-poaching and anti-piracy. In addition to two heavy machine guns, they were armed initially with the 40 mm gun which was replaced later by the automatic single-barrelled 30mm gun mounting. To cope with faster adversaries, two 260-tonne water jet propulsion variants entered service in 2002. There are 15 FPV's existing in service, as on date.

Six 70-tonne, 50-knot hovercraft (Air Cushion Vehicles — ACVs) produced indigenously under license entered service from 2000 onwards. Their tasks were high speed patrolling and interdiction in shallow waters, marshy areas, mud flats, beaches and creeks, and quick response to deep sea SAR.

70-tonne 25-knot water-jet-propelled Interceptor Boats (IBs) entered service from 1993 onwards along with two faster 75-tonne 45-knot for shallow water interception, coastal patrol in gulfs, bays, channels and Search and Rescue.

The larger, 2000-tonne, 22-knot AOPVs started entering service from 1996 onwards. They could operate the larger twin engined indigenous Dhruv Advanced Light Helicopter (ALH). They had the indigenous, single barrelled, 76.2 mm gun mounting and two heavy machine guns. They were designed for all-weather surveillance of maritime zones upto the continental shelf, sea–air search and rescue, fire fighting at sea, towage and salvage assistance and pollution control against oil and chemicals.

The Air Wing

The Coast Guard's Air Wing has Dornier 228 surveillance aircraft, Chetak and Dhruv helicopters:

- Chetaks were inducted in the service in 1982. Between 1983 and 1997, they carried out visual maritime reconnaissance with two F 27 Fokker aircraft taken on dry lease from Indian Airlines.

  The indigenous, license-produced, lightweight, multi-role Chetak helicopters are capable of carrying under-slung equipment to rapidly neutralise oil slicks by dispersing anti-pollutant spray over an area of 30 square miles, of carrying two stretchers in ambulance configuration in the casualty evacuation role, of hoisting three persons in a single lift in the SAR role and are fittable with a machine gun for the interdiction role. These helicopters are capable of rough and restricted area landings on land and are embarked in OPVs and AOPVs for SAR and utility roles.[1]

- In 1987, three Dorniers 228–101 manufactured in Germany, were inducted into service. The Dornier's characteristics of short take-off and landing by day and by night, its relatively long endurance, its maritime surveillance radar, its advanced navigation systems for multiple roles, its ability to carry under-wing gun pods, its ability to air-drop large seven-man life rafts during search & rescue, its ability to carry under-wing pylons to spray dispersal agents over polluted oil spill areas, made it very suitable for all-weather coastal patrols and surveillance of offshore oil installations and exploration areas.

Regional Organisation

Each of the three regions of the Coast Guard has a Regional Headquarters under each of which there are several District Headquarters, Coast Guard Stations, Coast Guard Air Stations and Coast Guard Air Enclaves, Refit & Production Teams, Store Depots, etc.

- The Western region comprises the coastal states of Gujarat, Maharashtra, Goa, Karnataka, Kerala and the union territories of Daman & Diu and Lakshadweep.
- The Eastern region comprises the coastal states of Tamil Nadu, Andhra Pradesh, Orissa and Bengal.
- The Andaman & Nicobar Island region comprises these two groups of islands.

Activities in Peacetime

Coast Guard vessels:-

- Participate in the joint Navy–Coast Guard patrols in the Palk Bay (Operation Tasha), off the Maharashtra and Gujarat coasts (Operation Swan) and around the Andaman and Nicobar Islands.
- Assist in cyclone, flood and earthquake relief operations.
- At the national level, the Director General Indian Coast Guard (DGICG) is the Chairman of the Offshore Security Coordination Committee (OSCC).
- The maritime SAR coordination in the ISRR has been entrusted to the Indian Coast Guard in the year 2002 after India ratified the IMO SAR 79 convention. The DGICG has been nominated as the Chairman of the National SAR Board.
- The Indian Coast Guard is the Central Coordinating Authority for taking measures to address oil pollution response in the Maritime Zones of India and the DGICG is the Chairman of the National Oil Spill Disaster Committee.
- The Government has ratified the Regional Agreement for Combating Piracy and Armed robbery against the ships in Asia (ReCAAP) which came into force in 2004. The Maritime Rescue Coordination Centre,

1. Advanced Light Helicopters (ALH) were inducted in 2002. It is fitted with surveillance radars, a Forward-Looking-Infra-Red (FLIR) surveillance system, a cabin-mounted gun, troop seats and a life raft for SAR. This new indigenously designed and produced multi-role Advanced Light Helicopter fulfils a variety of missions.

Mumbai is the nodal point in India for ReCAAP. The Director General Indian Coast Guard is nominated by the Government as the Governor in the Governing Council of the Information Sharing Centre (ISC).

The Coast Guard participates in a number of peacetime activities in these maritime zones which include joint Search and Rescue exercises and conferences on issues like piracy and Search and Rescue. Over the years:-

- Coast Guard ships and aircraft have exercised with ships of Indonesia, Italy, Japan, Mauritius, Maldives, Seychelles, Singapore, Sri Lanka and Thailand.
- Since 1991, regular training exercises named 'DOSTI' (Friendship) have been carried out with the Maldives Coast Guard to help enhance confidence levels and understanding on joint law enforcement, oil pollution response, search and rescue, etc.

The Coast Guard has also interacted with maritime organisations like the ASEAN Regional Forum Workshop on Maritime Piracy and the International Maritime Search and Rescue Conference.[2]

Activities during Hostilities

As is done by other Coast Guards of the world, India's Coast Guard would function under the overall operational command of the Navy.

During the Kargil War from May to July 1999, Coast Guard vessels and aircraft provided invaluable support to the Navy's Operation Talwar in the Arabian Sea.

Director Generals of the Coast Guard Since Inception

Since its inception and until 2000, senior Vice Admirals were the Director Generals of the Coast Guard. This facilitated close interaction between the Navy and the Coast Guard.

Period	Director General[3]
1978–80	Vice Admiral V A Kamath, PVSM
1980–82	Vice Admiral S Prakash, PVSM, MVC, AVSM
1982–84	Vice Admiral MR Schunker, PVSM, AVSM
1984–85	Vice Admiral S Jain, AVSM, NM
1985–87	Vice Admiral IJS Khurana, PVSM
1987–90	Vice Admiral H Johnson, PVSM, VSM
1990–92	Vice Admiral SW Lakhar, PVSM, NM, VSM.
1992–95	Vice Admiral K K Kohli, AVSM
1995–96	Vice Admiral P J Jacob, AVSM, VSM
1996–99	Vice Admiral R N Ganesh, AVSM, NM
1999–01	Vice Admiral J C DeSilva, PVSM, AVSM

2. 2000. The Coast Guard reached out as far as Japan to participate in an Indo–Japan Coast Guard Exercise.

   2005. A Memorandum of Understanding was signed between the Indian Coast Guard and the Pakistan Maritime Security Agency to discuss matters of maritime safety, security and environment protection.

   2006. A Memorandum of Cooperation was signed between the Indian and Japanese Coast Guards providing for mutual assistance for SAR, pollution response and trans-national counter-crime efforts.

   A Memorandum of Understanding on anti-piracy and SAR operation was signed between Indian and Korea Coast Guard on 13 Mar 2006, which contemplated Joint Exercise between ICG & KCG alternatively in each others water as an annual feature.

3. Post 2000, after Coast Guard become eligable to hold the post, 2 officers have briefly been the helm: DG Rameshwar Singh, PTM (2001–01), DG Dr P Paleri, PTM, TM (2006–06).

41

Naval Hydrography and Marine Cartography

Overview

The Marine Survey of India was established in 1770 to carry out hydrographic surveys. In 1874, a Marine Survey Department was created at Calcutta. The department shifted to Dehradun in 1954 and was renamed as the Naval Hydrographic Office in 1964.

INS Investigator was the sole survey ship when the Navy was partitioned in 1947. Its immediate tasks were to update the surveys of the approaches to the naval berths in Bombay and Cochin. Surveys were carried out in the approaches to ports on the east and west coasts, in the Gulfs of Kutch and Cambay, Bombay Harbour, the Mahanadi River entrance and the offshore island territories in the Andaman, Nicobar and Lakshadweep Islands. Survey Charts were hand drawn and then engraved on copper plates.

Since sea surveys were disrupted during the monsoon, the "survey season" was between November and April. The months from May to September became the "drawing season" and were spent in converting the sea surveys into drawings in the Drawing Office at Conoor in the Nilgiri hills of South India.

Until 1953, the results of the surveys used to be forwarded to Britain's Hydrographic Office for publication. The printed charts received from Britain were issued to ships from the Chart Depot located in the Naval Dockyard, Bombay.

On 1st June 1954, a new Hydrographic Office was established in Dehradun in north India, proximate to the office of the Surveyor General of India. It started producing new charts, issuing Notices to Mariners[1] and publishing Sailing Directions, the Indian List of Lights, etc.

The Hydrographic Department got a boost in 1964 with the induction of the indigenously built survey ship Darshak. The modernisation of the department commenced with the Sandhayak class of ships in the early 1980s, the Investigator class in early 90s, the Darshak and Sarvekshak class in 2001. Today, the survey flotilla comprises eight ships. A few more craft are expected to join by late 2009.

On 1st April 1956, India became a member of the International Hydrographic Bureau in Monaco.

By the middle of 1960, progress was made in charting Indian waters and streamlining the Navy's Hydrographic Department. In 1965, the survey flotilla comprised four ships; three converted from old frigates and one new indigenously constructed ship, Darshak, designed specifically for survey work. Incidentally, Darshak was the first small ship in the Indian Navy to carry an integral helicopter onboard and was the first one to be air conditioned (partially). Steps were initiated to overcome the shortage of survey officers, survey recorder sailors, civilian surveyors and hydrographic assistants, but availability remained short of the requirement.

In 1964, the Chief Hydrographer was re-designated as the 'Chief Hydrographer to the Government of India.'

The intake of officers into the Hydrographic Cadre used to be from general service volunteers. However due to various reasons, a number of officers reverted to the General Service after a short stint of surveying. To overcome this, direct recruitment to the Hydrographic Cadre was resorted to at times.

In 1971, the International Hydrographic Bureau (IHB) assigned to the NHO the responsibility of preparing nine bathymetric plotting sheets, based on source material received from data centres the world over.These were incorporated in the General Bathymetric Chart of the Oceans (GEBCO).

After the 1971 War, surveys were carried out at the entrances to the riverine ports of Bangladesh to assist the restoration of shipping traffic.

An Environment Data Unit was established at the

1. The first Indian Notice to Mariners was issued in 1958.

Hydrographic Office in 1974.During 1975, this unit processed, analysed and interpreted the data received from:

- Darshak's Oceanographic Expedition of 1973–74.
- The USA's National Oceanographic Data Centre.
- The International Indian Ocean Expedition.

By the mid 1970s, approval was accorded for three new survey vessels and four survey craft. Modern survey equipment began to enter service. The chart production facilities of the Naval Hydrographic Office was modernised.

The 1982 UN Convention on the Law of the Sea (UNCLOS)

The deliberations of the Third Conference on the Law of the Sea spread over nine years. The Conference adopted the Convention on 30th April 1982. It came into effect twelve years later on 16th November 1994 after all the countries had formally ratified it. The essential features of the convention were:-

— Twelve miles as the uniform width of "territorial waters".

— An "Exclusive Economic Zone (EEZ) of two hundred (200) miles within which the coastal state exercised sovereign rights and jurisdiction for specified economic activities. (India's EEZ of two million square kilometres is the twelfth largest in the world).

— A "continental shelf" extending to the outer edge of the continental margin with reference either to three hundred and fifty (350) nautical miles from the baseline of territorial waters or to one hundred (100) nautical miles from the 2500 metre isobath.

— Regimes for the abatement and control of marine pollution, for marine scientific research and for unimpeded transit passage through straits used for international navigation.

Passage of Foreign Warships through Territorial Waters. From the naval point of view, the main issue left undecided was that of the passage of foreign warships through territorial waters.

In 1958, India had proposed that the passage of foreign warships through the territorial sea of a coastal state should be subject to prior authorisation by, and notification to, the coastal state. This proposal was not accepted and therefore not incorporated in the 1958 General Convention on the Territorial Sea and Contiguous Zone.

In protest, India declined to ratify any of the Geneva conventions. By 1973, India's stand mellowed. The requirement for prior authorisation was watered down to prior notification for the innocent passage of foreign warships through territorial waters.

In the 1970s, the Cold War between America and Russia (then Soviet Union) was at its peak. Both powers vehemently opposed every proposal that might jeopardise the secrecy of their warships' movements. There is, therefore, no provision in the 1982 Convention that requires foreign navies to notify, in advance, the passage of their warships and submarines through the territorial waters of a coastal state. The operational implications of this problem have had to be dealt within each Navy's 'Rules of Engagement'.

Meanwhile, between 1974 and 1977, India's neighbouring coastal nations — Pakistan, Bangladesh, Sri Lanka and Myanmar enacted maritime legislation requiring prior authorisation and notification for the passage of foreign warships through their respective territorial seas. India's Maritime Zones Act of 1976 required only prior notification (but not prior authorisation). It did, however, require submarines and other underwater vessels to navigate on the surface and show their flag while passing through Indian territorial waters.

After the 1982 Convention, the Governments of the United States, Britain and West Germany lodged diplomatic protests, the gist of which was that two provisions of India's Maritime Act 1976 were against established International Law and not covered by the Law of the Seas, namely:-

— Requirement of 'Prior Notification' by foreign war vessels, before passage through India's territorial waters.

— India's right to declare certain areas in the continental shelf and EEZ as "Security Areas".

To date, India has adhered to its stand.

Maritime Boundary Agreements

Maritime boundaries are based on charts prepared after detailed hydrographic surveys. After technical discussions and mutual consent on the boundary between the countries concerned, these charts are annexed to each Maritime Boundary Agreement.

The 1982 Conference was unable to reconcile the opposing viewpoints of whether the criteria for delimiting the boundaries of the EEZ and continental shelf between

"adjacent" and "opposite" states should be based on "equitable principles" or based on the "equidistance" line.

Despite the ambiguity inherent in the word 'equitable', India concluded maritime boundary agreements with the five "opposite" states:

- India and Sri Lanka signed their agreement on maritime boundaries in the Gulf of Mannar and the Bay of Bengal on 23rd March 1976 and another agreement on 22nd November 1976 extending their maritime boundaries in the Gulf of Mannar up to the tri-junction of India, Sri Lanka and Maldives.
- India and Maldives signed their maritime boundary agreement on 28th December 1976.
- India and Indonesia signed their agreement on maritime boundary in 1974 and another agreement in 1977 extending the boundary up to the tri-junction point with Thailand.
- India and Thailand signed their boundary agreement in 1978.
- India and Myanmar signed their boundary agreement in 23 Dec 1986.

In these agreements, the "equidistance" principle was used and minor modifications were negotiated amicably to meet the needs of equity or for other special reasons.

The maritime boundaries between India, Pakistan and Bangladesh are yet to be delineated. The reference in the 1982 UN Convention to "equitable principles" appears likely to prolong settlement of maritime boundaries with these two adjacent states.

Surveys of National Importance

The Deep Water Route in the Gulf of Kutch to the Salaya Oil Terminal. In 1974, surveys were carried out for a deep water channel to the off-shore oil terminal at Salaya for use by the 270,000 ton Very Large Crude-oil Carriers (VLCCs) that brought crude oil from the Persian Gulf to the refineries in Gujarat. The channel was declared open in 1978.

The Sethusamudram Project. In 1985, an exploratory survey was carried out to find a suitable stretch of seabed between India and Sri Lanka that could be deepened sufficiently to enable medium draught vessels to transit between the west and east coasts of India, without having to go all the way around Sri Lanka. The project commenced in 2005.

The Survey Flotilla

Modernisation of the survey flotilla commenced in the early 1980s with construction of the first indigenously designed and built survey vessel, Sandhayak. Every successive ship of the Sandhayak class were fitted with latest available equipment and facilities for hydrographic work.

In addition to Sandhayak class, four survey craft were also built at Goa Shipyard in the mid 1980s. The role of these craft was to undertake surveys in coastal waters in conjunction with survey ships and also independently carry out survey of ports, harbours and their approaches. The hull design of these survey craft could not provide the stability required for survey work, except when the weather was calm. Despite this limitation, the craft, the enthusiasm and perseverance of the young crews of these craft often succeeded in completing offshore surveys for which larger and more stable survey ships were generally tasked.

Survey Ships

Survey Ship/Craft	Commissioned	Class	Shipbuilder
Sandhayak	26 Feb 81	Sandhayak Class	GRSE
Nirdeshak	04 Oct 83	Sandhayak Class	GRSE
Makar	31 Jan 84	Survey Craft	Goa Shipyard
Mithun	31 Mar 84	Survey Craft	Goa Shipyard
Meen	23 Jun 84	Survey Craft	Goa Shipyard
Mesh	31 Oct 84	Survey Craft	Goa Shipyard
Nirupak	14 Aug 85	Sandhayak Class	GRSE
Investigator	11 Jan 90	Improved Sandhayak	GRSE

Old Ships Decommissioned

Survey Ships	Commissioned	Decommissioned	Years in Service
Sutlej	23 Apr 41	31 Dec 78	37
Jamuna	13 May 41	31 Dec 80	39
Darshak	28 Dec 64	15 Jan 90	26

Developments 1990 to 2000

Hydrographic Surveys for Continental Shelf Claims

The 1982 UNCLOS entitled coastal states to claim a continental shelf (over and above the 200 mile EEZ) extending to the outer edge of the continental margin, to be delimited with reference to either 350 nautical miles from the base line of territorial waters or 100 miles from the 2500 metre isobath. Claims were to be submitted to the United Nations within ten years.

To substantiate claims, two types of surveys had to be carried out:-

— Bathymetric surveys, which depicted the topography of the seabed (Survey ships completed these surveys in 2001).

— Seismic surveys, which mapped the sedimentary thickness below the seabed to delineate the continental shelf. (These surveys, undertaken by the Department ofOcean Development, are still in progress).

The coastal states needed time to carry out the extensive surveys on which their claims could be assessed. Time limits were extended, initially from 1994 to 1999 and thereafter till May 2009.

To undertake these extensive surveys of the continental shelf, new naval survey ships needed to be sanctioned to replace the aging survey ships.

In the 1990s, there was a shortage of resources in the Navy budget.On the other hand, there was an urgent requirement for survey ships to carry out continental shelf surveys. It was decided that the Ministry of Shipping and Transport would provide the funds for two ships (later named Darshak and Sarvekshak). These two ships were fitted with survey equipment a generation more advanced than that fitted in the preceding three ships of the Sandhayak class.

It was also decided to permit "Revenue Earning Measures". From 1995 onwards, the Hydrographic Department embarked on "Project Surveys" for various State Governments and for private companies, as well as foreign surveys, on payment.

New Survey Ships

Ship	Commissioned	Class	Shipbuilder
Jamuna	31 Aug 91	Improved Sandhayak	Garden Reach
Sutlej	19 Feb 93	Improved Sandhayak	Garden Reach

New Hydrographic Units

In Oct 1994, a Naval Chart Depot was set up in Visakhapatnam to distribute charts and hydrographic publications to naval ships on the East Coast.

In Oct 1996, a Survey Unit was set up in the Naval Ship Repair Yard at Kochi, analogous to the unit in the Naval Dockyard Mumbai and placed under Headquarters, Southern Naval Command.

Foreign Surveys. The survey ships, Jamuna, Sutlej undertook Navigational Survey of the Northeast Coast of Oman 1993/94.

Major Inductions of Technology

	Hydrographic Office	In Survey Ships
1992	International Safety Net Service became operational	Global Positioning System (GPS)
1993	Digital Survey & Processing System	Digital Survey & Processing System (earlier known as Automated Data Logging)
1996	Automatic Cartographic System	Differential GPS[3] with Trisponder
1997	Image Setter for Printing Charts	Multi-beam Swath Echo Sounding System[4]
		Digital Side-scan Sonar
		Dynamic Motion Sensors
1997	Dissemination of Navigational Area VIII, Maritime Safety Information/Warnings through worldwide Global Maritime Distress, Safety and Rescue Services Scheme (GMDSS).	
2000	All National Hydrographic Office paper navigation charts were made available in the form of Electronic	

3. With sub-metre positional accuracy at a distance of up to 700 kms, Differential Global Position System enhanced the accuracy of surveys for offshore resources, determination of maritime boundaries and the Continental Shelf and contract surveys.

4. This system provides a three dimensional view of the under water area and near complete insonification of the sea bed resulting in better quality of surveys.

Navigation Charts (ENCs) in IHO format for use in the Electronic Chart Display and Information System (ECDIS) worldwide.

Charting of Antarctica Waters

Commencing 1994, the Naval Hydrographic Department started participating in the annual expeditions to Antarctica: -

— To collect hydrographic data for delineating the ice shelf and co-producing with Russia, two INT navigational charts to cover the sea approaches to the land route to India's permanent Antarctic Research Station at Maitree.

— To collect oceanographic data for the Navy.

Coastal Zone Management Surveys

The Coastal Zone Regulation Act of 1991 required that the area between the High Tide Line and the Low Tide Line be kept free of human habitation. The National Hydrographic Office was to demarcate these lines. Commencing 1996, Coastal Zone Management Surveys were carried out whenever requested by the coastal states.

The Naval Hydrographic School, Goa

To overcome constraints of space, the fledgling Hydrographic School that had started in Bombay in 1959 shifted to Cochin in 1961. In 1965, approval was obtained for establishing a permanent school in Cochin. Cochin was not an ideal location and it was decided that the school should be located in Visakhapatnam.Eventually, in 1975, sanction was accorded to establish the permanent Hydrographic School in Goa.

The new Hydrographic School was constructed in Goa within INS Gomantak and between 1978 and 1989 and was commissioned in three phases — Wing I in 1977, Wing II in 1983 and Wing III in 1989.

In 1980, the UNDP gave the School a grant of $3.5 million to acquire modern survey training equipment and equip it to become a Regional Training Centre. In 1982, the School received Category 'A' certification from the International Hydrographic Organisation (IHO) for the conduct of the Long Hydrographic course, making it the third institution in the world to get this recognition, (the other two being the Royal Naval Hydrographic School in Britain and the French Ecole National Superiere des Ingenieurs des Etudes et Techniques d'Armament (ENSIETA) of the Service Hydrographique et Oceanographique de la Marine).

In 1984, the School was designated as the Regional Hydrographic Training Centre for South East Asia and African countries.

In 1995, the School's Category 'A' status was re-affirmed by IHO for a further period of 10 years for continued excellence in training and in-date syllabi.

In 1997, the Hydrographic School was re-awarded the Cat 'A' Certificate by the IHO for the specialist course 111. This deals with industrial Offshore Surveying under Edition 7.0 of IHO/ FIG International Advisory Board.

In 1997, the Naval Hydrographic School was re-designated as National Hydrographic School.

In 1998, the School obtained affiliation with the University of Goa for award of a Masters degree in Hydrographic Surveying for the 'Long Hydrographic' Category 'A' course.

In 1999, the School's Basic Hydrographic Course was ratified by IHO as a Category 'B' course making the School one of the few in the world to offer both Category 'A' and Category 'B' courses.

On 19th April 2000, the School was certified as an ISO 9001 Institution.

Courses for Foreign Personnel

Since 1963, the Basic Hydrographic Course has been availed by personnel from Bangladesh, Indonesia, Iran, Iraq, Kenya, Malaysia, Maldives, Mauritius, Myanmar, Nigeria, Seychelles, Singapore, Sri Lanka, Sudan, Tanzania, Thailand and Vietnam.

Since 1983, personnel from Bangladesh, Indonesia, Iran, Malaysia, Nigeria, Oman, Sri Lanka and Vietnam have availed the Long Hydrographic Course.

Since 1998, the School has been imparting free Hydrographic training, every year, under the Ministry of External Affairs' ITEC scheme.

INT Charts

In 1996, India became the coordinator of the International Charting Scheme for the North Indian Ocean 'Area J'. These INT charts, on Medium and Large scale, are designed to facilitate safe coastal navigation and better access to major international ports. Of the total of 143 charts for Area J, India was required to produce a set of 53 INT charts.

Electronic Navigation Chart

Paper nautical charts are widely known and used in the maritime field. They are a fundamental requirement of safe navigation and are a legal record in the event of marine

accident investigations. They are graphic representations of a specific geographic situation drawn on paper corresponding to navigational requirements. Advancement in the field of Geographical Information Systems has opened a way towards creation of electronic charts for safe navigation at sea using latest information. These charts are made in compliance with International Hydrographic Organisation (IHO) S-57 transfer standard, and can be displayed on a special Chart Display System called ECDIS (Electronic Chart Display and Information System).

National Hydrographic Office is emerging as a leading charting agency, which has been producing the ENCs in the North Indian Ocean Region. National Hydrographic Office has been in the business of ENC production since 1999 and the product was released in 2004. The ENC creation consisted of various stages using GIS software. The input for ENC creation as per existing practice is the paper chart (dgn file) or digital hydrographic data. Prior to release in the market the ENC cells are checked for its quality using Inspector software and the correction applied to the cells. The encrypted cells will be forwarded to the respective VARs for further distribution to the end user.[5]

Bay of Bengal Pilot[6]

The National Hydrographic Office had crossed many a milestones and earned National and International fame and respect for the quality of its products namely Navigational Charts and Publications.

Change in Nomenclature of the NHO

In keeping with the national responsibilities entrusted to it, the Naval Hydrographic Office was renamed as the National Hydrographic Office, in 1997.

North Indian Ocean Hydrographic Commission (NIOHC)

The NIOHC was formed in 2000 by the initiatives of the Naval Hydrographic Department under the aegis of the International Hydrographic Organisation to encourage hydrographic cooperation among the countries of the Indian Ocean littoral region. India has retained the chairmanship of the Commission since its inception.

The growth of the Naval Hydrography and Cartography has been impressive.[7]

Retrospect

Over the years, Naval Hydrography and Cartography have kept pace with advances in technology and are now adequately equipped to cope with their tasks:

— The survey flotilla comprises eight ships, of which five have entered service after 1990.

— Charts are being generated on computers and paper charts have been supplemented by paperless Electronic Navigation Charts for use with the Electronic Chart Display Information System (ECDIS).

— Substantial UNDP assistance has enabled the National Hydrographic School Goa to impart excellent training and become a Regional Hydrographic Training Centre.

5. By April 2008, 236 ENC cells covering the Indian waters were in the world market. These electronic charts have been marketed through M/s C-MAP, Norway and UKHO.

6. The Bay of Bengal Pilot (INP-2) was published on 16 Mar 2007. It covers the entire East Coast of India from Point Calimere to Sunderbans, the entire coast of Bangladesh, Myanmar and major part of Thailand till Chong Pak Phra including Andaman & Nicobar Islands. The latest information regarding major ports has been included and adequate importance has also been given to minor ports. It amplifies charted details and contains information needed for safe navigation, which is not available on charts or other Hydrographic Publications. The aim of this publication is to assist the mariners using Indian Charts with details, which cannot be depicted in these charts. It includes a description of the coast, harbours, anchorages, recommended approaches/tracks and dangers to navigation as well as facilities provided by the port authorities and other useful information about the ports. Efforts are on to create an e-pilot where digital publication is used in ECDIS.

7. Post 2000. In 2001, a deep-water navigation channel was surveyed and delineated in the Gulf of Khambat (Cambay) for 18-metre draught crude oil tankers to ply to the Single Buoy Mooring at Hazira.

   INS Darshak and INS Sarvekshak, of the New Darshak Class were constructed by Goa Shipyard and commissioned in 28 Apr 01 and 14 Jan 02.

   In 2002, Darshak represented India in the 16th International Hydrographic Conference in Monaco. It was the first time that an Indian survey ship flew India's naval ensign at this international occasion.

42

Naval Oceanology and Meteorology

Developments Until 1990

An important step in the growth of Meteorology in the Indian Navy was the training of four instructor officers and four sailors in Meteorology in 1952 to meet the requirements of Naval Aviation in the new establishment Venduruthy II which was later commissioned on 11 May 1953 as INS Garuda.

The Environmental Data Unit in Dehradun

In 1977, an Environmental Data Unit was set up in the National Hydrographic Office. It started receiving data from:

— International agencies like the National Oceanographic Data Centre (NODC), USA and the Intergovernmental Oceanographic Commission (IOC).

— National agencies like the National Institute of Oceanography (NIO), the Central Marine Fisheries Institute (CMFRI), the Oil and Natural Gas Commission (ONGC), the Indian Meteorological Department (IMD), the Geological Survey of India (GSI), the Naval Physical and Oceanographic Laboratory (NPOL), Survey ships and fleet ships.

School of Naval Oceanology and Meteorology

The meteorological training requirements were met by the meteorological section of INS Garuda since its commissioning in 1953 till formation of Meteorological Training Section in 03 Jun 1968.

History of the School

11 Sep 1952	Commencement of Meteorological services in Indian Navy under Venduruthy II.
11 May 1953	Change of Met services under INS Garuda.
03 Jun 1968	Formation of Meteorological Training Section at Kochi.
18 Oct 1974	Redesignation as Meteorological Training School.
01 Nov 1985	Redesignation as School of Naval Oceanology and Meteorology (SNOM).

The Oceanographic Forecasting Cell, Cochin

In 1981, an Oceanographic Forecasting Cell (OFC) was established at Cochin under the operational control of the FOC-IN-C SOUTH. This marked the beginning of oceanographic studies and forecasting in the Navy. The OFC was located in the premises of the Met School and headed by the officer who had been trained by the US Navy.

The OFC has liaised with the National Physical and Oceanographic Laboratory (NPOL) located in Cochin and:

- Provided a general description of the major oceanographic and acoustic factors affecting a specified area of operation for a specified forecast period; the sea state at the beginning of the forecast period and significant changes expected during the forecast period.
- Collected, collated and processed oceanographic data in the form of atlases, charts and reports issued by the NPOL and the Chief Hydrographer.
- Collected oceanographic information, records and research outputs from agencies like the National Institute of Oceanography and ONGC.
- Provided forecasts of thermal structure and salinity profiles based on the available past data and current oceanographic observations received from fleet ships during exercises.
- Devised and standardised codes for transmission of oceanic data and forecasts.
- Undertaken selective studies in oceanography to update and validate the forecasting techniques developed by NPOL.

- Undertaken studies on air sea interaction in collaboration with NPOL and other agencies.
- Assisted the Met Training School in the training of naval personnel in Oceanography.

Directorate of Naval Oceanology and Meteorology (DNOM)

In 1982, a new Directorate of Naval Oceanology and Meteorology (DNOM) was established in Naval Headquarters, concurrently with the creation of the Department of Ocean Development and India's first expedition to Antarctica. Thereafter, DNOM became NHQ's nodal agency for dealing with all aspects of naval Oceanology and Meteorology. The Directorate has:-

- Coordinated the Navy's help for Indian Scientific Antarctica Expeditions.
- Consultancy for the design of polar research vessels for the Department of Ocean Development.
- Monitored the progress of oceanographic research undertaken by the DRDO and by CSIR's scientific organisations.
- Participated in UNESCO's Inter-Governmental Oceanographic Commissions at Paris.

Collection, Collation and Dissemination of Oceanographic Data

The Navy's need is for instant, accurate and reliable predictions of anomalous propagation above the sea surface and of acoustic propagation below the sea surface. At the national and international level, considerable cooperation takes place to coordinate oceanographic and meteorological data from as wide a spectrum as possible. NHQ focuses on greater density and authenticity of data in the Navy's areas of interest.

Oceanographic Forecasting Cell

The Oceanographic Forecasting Cell is the Naval Centre for archiving and dissemination of Bathythermograph (BT) data. Data collected by all naval vessels is compiled in this cell.

Oceanographic data acquired by participation in the cruises of the Department of Ocean Development's Oceanographic Research Vessel (ORV) Sagarkanya are archived from 1980 onwards.

The Oceanographic Forecasting Cell provides the Navy and National agencies with Sonar Atlases and Oceanographic Charts containing information on Sea Surface Temperature, Mixed Layer Depth, Below Layer Gradient, Sonic Layer Depth, surface current, wind and wave data.[1]

Bathymetric Charts

The International Hydrographic Bureau had assigned to the National Hydrographic Office the responsibility of preparing nine bathymetric plotting sheets, based on source material received from other data centres in the world. These were incorporated in the General Bathymetric Chart of the Oceans (GEBCO), which were first published in the 1970s.

Subsequently, responsibility was accepted for ten more sheets. By 2000, the National Hydrographic Office had published sixteen GEBCO charts.

Monsoon Experiments BOBMEX and ARMEX[2]

Experiments to study the vagaries of the monsoon, last held in 1979, were resumed under the aegis of the Indian Climate Research Programme.

Bay of Bengal Experiments (BOBMEX), 1998. The pilot experiment was carried out in October–November 1998 in the central and south Bay of Bengal. The main BOBMEX was carried out in July–August 1999.

Prediction of Regional Weather using Observational Meso-Network and Atmospheric Modelling (PRWONAM)

PRWONAM sponsored by ISRO, is a combined effort to make measurements of mesoscale dynamics, clouds, radiation etc. and to use them in modelling of prediction of weather. The output forecast is used for deciding the launch of satellites by ISRO. Indian Navy is an active participant and provides surface and upper air data of aviation bases

1. Two erstwhile operational units Oceanographic Forecasting Cell (OFC) and IN LOFAR Centre were merged and a new unit, Naval Operations Data Processing and Analysis Centre (NODPAC) was commissioned on 22 Feb 02 at NPOL, Kochi. The functional control of NODPAC rests with HQSNC and professional advice is provided by IHQ, MOD(N)/DNOM, DSR on oceanographic and LOFAR matters respectively.
2. In 2002-2003 Arabian Sea Experiments (ARMEX) were carried out. The main objectives were to study: -
   - Arabian Sea convection associated with intense rainfall events on the west coast of India.
   - The evolution, maintenance and collapse of the Arabian Sea Warm Pool and pre-onset phases of the monsoon.

like Dega, Rajali, Garuda and Hansa. ISRO has a Mini Boundary Layer Mast and a GPS Radiosonde equipment installed at Rajali for the purpose.

Severe Thunderstorm Observational & Regional Modeling (STORM)

Project STORM sponsored by DST, is a combined effort of major National Met Institutions across the country. Met observations on a close grid over West Bengal, Bihar and Bay of Bengal are collected during the experiment. The data is used to prepare numerical models for prediction of thunderstorm activities. Indian Navy had provided 84 GPS Radiosondes for this programme.

Induction of State-of-the-Art Met Equipment

Met offices of Indian Navy and certain selected ships were provided with State-of-the-Art Met equipment:-

- Upper Air Sounding Systems
- Automatic Visual Range Assessor
- Automatic Weather Stations (Free of cost by ISRO)
- Automatic Weather Observation Systems
- World Space Receivers
- Lightning and Thunderstorm Detectors
- Expendable Bathy Thermograph
- Automatic Picture Transmission Receiver

Indian Naval Met Analysis Centre (INMAC). Fully automatic met analysis centre is being established at SNOM, Kochi for weather forecasting. This centre aims to receive, plot and analyse data and incorporate Numerical Weather Prediction models for weather forecasting by using a customized software. The information obtained would be used by Naval Met Offices (NMOs) and ships at sea through a Naval Satellite, when in place.

Setting up of Met Facilities at Dwarka. Met facilities at Dwarka and Porbandar for providing Met coverage for UAV operations is in progress.

Oceanography Course at SNOM. First course in Advance Oceanography was conducted at SNOM (K) in 2006 aimed at providing requisite expertise to METOC officers for the Operational Oceanography and the techniques of oceanographic forecasting using various numerical models.

Miscellaneous Courses. Short courses are also conducted for naval officers:-

Course	Institute
Seismology	India Meteorological Department, New Delhi
Numerical Weather Prediction	National Centre for Medium Range Weather Forecasting, NOIDA (UP)
Radio Meteorology	National Physical Laboratory, New Delhi
Rainwater Harvesting & Water Management	National Water Academy, Pune
ANN/MLD Model	National Remote Sensing Agency, Hyderabad
Satellite Met Course	SNOM, Kochi

43

Naval Ceremonial

Reviews of the Fleet by the President

In the British Navy, the Fleet Review has been a tradition of assembling the fleet before the monarch. The first review is purported to have been held in 1400 AD.

In the late 19th and early 20th Centuries, Fleet Reviews became a tradition adopted by large navies. More recently, ships from other navies are invited to 'International Fleet Reviews' that are held to celebrate significant national centenaries and jubilees.

The aim of a review is to display a nation's naval might, both to its own citizens and to naval adversaries. On this grandest of naval ceremonial occasions, the King/ Queen/Head of State/Supreme Commander embarked in a special vessel, sailed past the ships participating in the Review, dressed overall, and anchored in neat lines off a main naval base. The ceremonially dressed officers and sailors of each ship give three cheers/'jais' for the inspecting dignitary as his special vessel goes past each of the lines.

The first ever participation of an Indian-manned ship was the escort vessel HMIS Indus — she represented the Royal Indian Navy at the British Navy's 1937 Coronation Review held at the Spithead anchorage off Portsmouth harbour.

Fleet Reviews in India

The President of India reviews the Indian Fleet once during his tenure in office. Except for the 2006 Review held off Visakhapatnam, the preceding reviews have been held in Bombay harbour.

In ceremonial significance, the Navy's Presidential Review is second only to the Republic Day Parade. Naval ships and ships from maritime organisations like the Coast Guard, the Merchant Navy, the National Institute of Oceanography, the Oil and Natural Gas Commission, Merchant Navy Training Ship Rajendra and Naval Yard Craft are precisely anchored in neat lines and dressed overall.

The President embarks in a naval ship nominated as the Presidential Yacht which flies the President's Colour. After receiving a 21-gun salute, the President reviews the Fleet by cruising past each line of ships. Each ship's side is manned by her ships company in ceremonial uniform. As the Presidential Yacht passes by, each ships company, in unison, take off their caps in salutation and give three resounding 'Jais'. The President returns the salute.

At sunset, all ships at the anchorage participate in a fireworks display. As darkness descends, all ships, in unison, switch on their garlands of lights which accentuate their silhouettes.

Particulars of reviews after independence[1] are tabulated below:-

Date	Naval Ships	Submarines	Naval Aircraft/ Helos	Coast Guard Ships	Coast Guard Aircraft Helos	Yard Craft	Mercantile Marine & Others Ships	Reviewed By President
11 Jan 76	43	05	05	—	—	—	06	Fakhrudin Ali Ahmed
12 Feb 84	45	03	32	02	05	07	09	Giani Zail Singh

1. An International Fleet Review was held in Mumbai between 15 and 19 Feb 2001, with 23 ships and 01 submarine participating from foreign navies.

   On 12 February 2006, the President Dr. APJ Abdul Kalam reviewed the fleet at Visakhapatnam.

Date	Naval Ships	Submarines	Naval Aircraft/ Helos	Coast Guard Ships	Coast Guard Aircraft Helos	Yard Craft	Mercantile Marine & Others Ships	Reviewed By President
15 Feb 89	48	08 (Incl INS Chakra)	29	02	08	04	10	R Venkataraman
9 Mar 97	22 (02 for patrol)	04	—	03	—	01	05 police launches	Shankar Dayal Sharma

Notes: No Fleet Review was held for President N Sanjiva Reddy during his tenure from 25 July 1977 to 24 Jul 1982.

Presentation of Colours By The President

It is an ancient tradition to present "colours" to armed forces (and elements thereof) which accomplish meritorious and outstanding service, to engender pride and esprit-de-corps. These Colours are proudly paraded by the recipients on special occasions to add dignity and stature to their parades and guards of honour.

In countries, that have the monarchical system of Government, the colours are presented by the monarch. In countries that have the presidential form of government, the colours are presented by the President.

In 1951, colours were presented to the Navy by President Rajendra Prasad. Between 1976 and 1990, 'colours' identical to those earlier presented to the Navy, were presented to the Naval Commands:

Formation[2]	Date of Presentation	By President
Southern Naval Command	26 November 1984	Giani Zail Singh
Eastern Naval Command	25 March 1987	Giani Zail Singh
Western Naval Command	22 February 1990	R Venkataraman
Western Fleet	09 March 1997	Shankar Dayal Sharma

Naval Bands

In ancient times, marching was sustained by the beat of drums. In later times, martial music enhanced the effect of drums. Today each major naval training establishment has a band. In addition, bands are positioned in New Delhi and Port Blair to meet ceremonial commitments. Naval bands are located in:-

- INS Chilka for the new entry sailor training establishment in Orissa.
- INS Circars for ceremonial and training requirements in Visakhapatnam.
- INS Dronacharya for the Gunnery training school in Fort Cochin.
- INS Hamla for the Logistic, EDP and Cookery schools in Marve (Mumbai).
- INS India for ceremonial requirements in Delhi.
- INS Jarawa for ceremonial requirements in Port Blair.
- INS Kunjali for ceremonial and training requirements in Mumbai.
- INS Mandovi for the Naval Academy in Goa.
- INS Shivaji for the Engineering training school in Lonavla.
- INS Valsura for the Electrical training school in Jamnagar.
- INS Venduruthy for ceremonial and training requirements in Cochin.
- INS Viraat, the aircraft carrier, for ceremonial requirements.

These bands fulfill diverse roles:-

- Ceremonial parades.
- Training commitments.
- Entertainment of personnel on land and onboard ships.

2. On 13 February 2006, the Eastern Fleet was presented colours by Dr. APJ Abdul Kalam.

- Prestigious band concerts in concert halls.

Over the years, in addition to its traditional parade and ceremonial commitments, this band widened its scope by:-

- Performing with civilian choirs and orchestras.
- Developing into a symphonic concert band, introducing traditional Indian musical instruments and including string instruments like violins, violas, cellos and string basses.

The Naval Central Band. The Indian Navy's Central Band was commissioned in Bombay in 1945 with a complement of 50 musicians, most of who had earlier belonged to the bands of India's princely states. INS Kunjali in Mumbai became home to this band and to the Navy's School of Music.

Overseas Deployments. Today, the Naval Central Band has grown to a 125-piece Symphonic Orchestra. From martial music, successive conductors of the band have increased the Band's repertoire to include overtures, solos, duets, concertos and other forms of contemporary music including Indian classical and Indian and Western pop music.

Naval musicians have also been borrowed by prestigious local orchestras like the Mumbai Philharmonic Orchestra, the Delhi Symphonic society and the Symphony Orchestra of India.

Bands embark ships going on goodwill visits abroad like the annual Seychelles and Mauritius Independence Day celebrations and also for goodwill visits. The prestigious international events at which naval bands participated are:-

- International Military Music Festival at Albertville in France and Modena in Italy and Germany.
- Naval Symphonic Orchestral concerts in Malaysia and Singapore.
- Review of the Fleet by His Royal Highness the King of Malaysia.
- Overseas deployments to Shanghai, South Africa, Eritrea.

In India

- Symphonic Orchestra concerts at metropolitan cities, viz. Kolkatta, Chennai, Bangalore, Visakhapatnam, Mysore, Pune, Kochi.
- Band performance for our troops located at the borders between Pakistan and India, China & India, and at Dehradun, Chandigarh, Ooty.
- Youth Commonwealth Olympic Games at Pune.
- MILAN, the biennial six navies meet in Port Blair.
- Presidential Fleet Review at Visakhapatnam, 2006.

The Naval bands have developed versatility by introducing new instruments to play in ensemble with the band and Orchestra and also introducing Indian melodic and rhythmic instruments. Indigenisation of music by experimenting with ragas, creating fusion music has been their forte. Naval musicians have participated in ensemble with bands of the US Marines, the French Police bands, the bands of Britain's Royal Guards, etc.

44

The National Cadet Corps and its Naval Wing

Genesis of the National Cadet Corps (NCC)

During the closing years of the 1914–1918 World War, the British Indian Army experienced a severe shortage of officers. The "University Corps" was created under the Indian Defence Act 1917 to make good this shortage.

When the Indian Territorial Act was passed in 1920, the University Training Corps (UTC) replaced the University Corps. UTC officers were taken from the teaching staff and selected through Selection Boards. UTC cadets had no commitment for war service and the scheme was voluntary.

The Second World War started in Europe and at the start of the war, successful volunteer cadets were granted the Kings Commission with the same privileges as were available to Kings Commissioned Indian Officers. Japan entered this war in December 1941 with its attack on the American Fleet in Pearl Harbour. Within a few months, Japan had overrun East and Southeast Asia, Malaya, Burma, the Andaman & Nicobar Islands and by 1942, was knocking at the gates of Northeast India. To counter this threat, the British started mobilising in India and as part of this activity, renamed the UTC, as the "University Officers Training Corps" (UOTC) in 1942, remodelling on the lines of Britain's officer corps. The Indian Air Training Corps was started in 1943, followed by the Sea Scouts Corps and the Womens Auxiliary Corps (India).

In 1946, India's freedom from British rule was clearly foreseeable. A Committee was set up under Shri HN Kunzru to examine the transformation of the UOTC into a national level youth organisation. The broad objective was to train young boys and girls, not just from universities, but also from schools, to be better citizens and future leaders in all walks of life, including the defence forces.

Based on the recommendations of the Kunzru Committee, the NCC came into being under the Ministry of Defence. The NCC Act of 1948 stated its aims:-

- To develop character, ideals of service and capacity for leadership in the youth of the country.
- To stimulate interest in the defence of the country by providing service training to youth and motivate them to join the Armed Forces.
- To build up a reserve to enable the Armed Forces to expand rapidly in a national emergency.

The Development of the NCC

In 1948 with a total of 167,000 cadets, the NCC was only for boys and was wholly Army oriented. School students entered the Junior Division and were given elementary drill and weapons training while college students joined the Senior Division and were trained as potential officers for the Army. The Girls Division started in 1949. The Air Wing & Naval Wing started in 1950 and 1952 respectively.

In 1952, at the behest of Prime Minister Nehru, the NCC curriculum was broadened to include 'social service' which was later renamed as 'community development'.

By 1960, the NCC had taken firm roots. There was growing demand from schools and colleges to set up NCC units. This was met by setting up the National Cadet Corps Rifles (NCCR) as a parallel organisation.

In 1963, after the 1962 hostilities with China, steps were taken to expand the Armed Forces. NCC training, which had hitherto been voluntary, was made compulsory for a period of three years, covering the entire student population of college boys in the age group of 16 to 25 years. In 1964, the NCCR was merged with the NCC. In 1967, the period of compulsory training was reduced to two years.

Compulsory training soon became unwelcome as students felt that it eroded the time available for their studies. Parents felt that excellence in academics was more important for the success of their children in a competitive environment and schools, colleges and Universities succeeded in persuading the Government. In 1968, NCC training was made voluntary and has remained so to this day.

After the 1971 Indo–Pakistan War, a Committee was constituted in 1972, under Pune University's Vice Chancellor Mahajani, to update the aims of the NCC. The new 'Aims and Objectives' were approved in 1974:-

- To develop leadership, character, comradeship, spirit of sportsmanship and ideals of service.
- To create a force of disciplined and trained manpower which, in a national emergency, could be of assistance to the country.
- To provide training for students with a view to develop in them officer-like qualities, thus also enabling them to obtain a commission in the Armed Forces.

In 1986, the Lt Gen (Retd) Thapan Committee was constituted to review the working of the NCC. It recommended several improvements. Only those that had minor or no financial implications were implemented.

In 1996, to attract more students into the NCC and to tap their sports potential, it was decided to include games and sports in the curriculum.

Instructional Staff for the NCC

The nationwide spread of the NCC led to the formation of a centralised academy to train good quality instructional staff.

In 1957, an Officers Training School was started in Kamptee. The Girls Wing for conducting pre-commission and refresher training for Lady Officers of the Corps was added to the school in 1959. The Girls Wing was shifted to Gwalior in 1965 and renamed Women Officers Training School (WOTS).[1]

The NCC Today

With 13,00,000 cadets, the NCC today is the world's largest uniformed youth organisation. Its cadets have risen in all walks of life — Governors, Cabinet Ministers, Chief Ministers, Members of Parliament, Chiefs and Vice Chiefs of the Services, senior bureaucrats, technocrats, educationists and corporate heads.

Statistics	1948	Today	Drawn from
	Round numbers		
Junior Division (Class 8 & 9)	135,000	800,000	8000 schools
Senior Division	32,500	500,000	4800 colleges
Trained by 657 Army, 59 Naval and 58 Air Force units all over India			

Activities

Institutional Training

- Weekly Parades and Camps to inculcate discipline, orderliness, punctuality and smartness.
- Basic military training in Army, Navy or Air Force subjects.
- Drill, shooting, physical fitness, map reading, first aid, civil defence, boat pulling and sailing, gliding and powered flying.
- Camp Training that, by outdoor and community living in austere conditions, helps to develop camaraderie, team work, group cohesion, character, leadership, self confidence and self reliance.
- All-India Camps, which bridge cultural, regional, religious and language barriers in annual National Integration Camps, Leadership Camps and Special Integration Camps.
- Navy Camps, Air Force Camps and Army Attachments.
- Republic Day and Independence Day Camps.

Camp Training[2]

Each cadet in the NCC is to attend at least one camp to complete the Training Syllabus. Camps develop camaraderie, team work, leadership qualities, self-

1. In 2002, both training schools were renamed – Officers Training Academy (OTA) Kamptee and Officers Training Academy (OTA) Gwalior. Teachers and other civilian staff who join the NCC from the schools and colleges are trained at these institutions. Commissioning courses for Associate NCC Officers (ANOs) and regular refresher courses are also conducted at these institutions.
2. Input from MoD Annual Report 1994-95.

confidence, self-reliance and appreciation of the dignity of labour in cadets. The important types of camps are:-

Annual Training Camp (ATC)

ATCs are held within the State for a duration of 12 days.

Centrally Organised Camps (COC)

These camps are of an all India nature and selected cadets are given additional leadership training.

National Integration Camps

These camps are conducted on an all India basis and help bridge the cultural gap between the youth from the various states of India.

Attachment Training

To familiarise the cadets with the service conditions and to motivate them to join the Armed Forces, 10,000 cadets are attached to service units every year for 15 days.

Hospital Attachment for Girl Cadets

Girl cadets are attached with Armed Forces Hospitals attachment training.

Republic Day Camp

The culmination of annual NCC activities takes place during the Republic Day Camp at Delhi every year. The camp is attended on an all India basis by more than 1700 cadets (boys and girls), which culminates with the prestigious Prime Minister's Rally.

Social Service

Social service is adopted by the NCC as a key result area with a view to inculcate amongst cadets, appreciation of the dignity of labour, importance of self help and need to assist and uplift weaker sections of our society. This is brought about through a well co-ordinated programme, involving an adult literacy drive, social service and local welfare programmes.

Community Development

These activities sensitise cadets to the needs and problems of fellow citizens, inculcate values of care, selfless service, compassion, nationalism and enrichment of community life. They include:-

- Structured programmes for Social Service like adult literacy drives and anti dowry, anti drug, anti leprosy, HIV and AIDS awareness.
- Assistance to the needy, voluntary blood donation, eye donation, works in Cheshire Homes.
- Developing wastelands, constructing roads and planting saplings (each NCC cadet plants one sapling a year making a total of 13,00,000 saplings every year).

Adventure Training/Activities

To foster and encourage the spirit of adventure the NCC conducts:-

Scuba Diving

Scuba diving training which was conducted only at Delhi and Bombay every year has been extended to Visakhapatnam and Cochin also.

Sailing Expedition, Wind Surfing & Kayaking

Each directorate plans and executes at least one sailing expedition, as part of the Republic Day Banner competitions.

Rowing Activities

Rowing training started at Pune in January 1993. Cadets and staff learn to row single sculls and coxless pairs and correct rowing techniques.

Trekking Expedition

Trekking expeditions, rock-climbing and mountaineering activities are scheduled every year.

Slithering Demonstration

Senior Division and Senior Wing (Girls) cadets participate in slithering demonstration during the PM's rally.

Mountaineering Expeditions

NCC conducts two mountaineering expeditions every year — one for Senior Division boy cadets and other for NCC Senior Wing girl cadets during May-June and August–September.

Mountaineering Courses

NCC cadets do mountaineering courses at the Nehru Mountaineering Institute (NMI), Uttarkashi, Himalayan Mountaineering Institute (HMI) Darjeeling and Mountaineering and Allied Sports Institute, Manali every year.

Sports and Games

From 1997 onwards, these activities were focussed to make the NCC more attractive to students and to help spot and groom sports talent in a hitherto untapped source

of India's youth. Annual all-India NCC Sports Camps are held on the 15th of August (Independence Day) in which the best boy and girl cadets from amongst over one million cadets participate.

Youth Exchange Programme

To promote international understanding and awareness, the NCC participates with the Youth Organisations/NCCs of twelve countries — Australia, Bangladesh, Bhutan, Britain, Canada, Maldives, Nepal, Russia, Singapore, Sri Lanka, Trinidad & Tobago and Vietnam. The programme enables mutual visits for periods upto three months during which cadets carry out development work and study the history, culture and the socio-economic conditions of their host countries.

NCC Cadets Welfare Society

NCC Cadets Welfare Society was formed in Feb 1985 to give financial relief and assistance to NCC cadets in case of death or disability during NCC activities. The source of income of the Society is an one time membership fee of Rs. 4/- paid by each cadet on enrolment.

A scholarship scheme was introduced from the academic year 1992–93 onwards. 250 scholarships of Rs. 2000 each are awarded to meritorious cadets during every financial year. The number of scholarships allocated to the Directorates are on the basis of enrolled strength of the cadets.

Prospect

Of today's 1.3 million NCC cadets, 90% are boys. With the increase in job opportunities for girls in the Armed Forces, para-military forces and civilian uniformed-services, girls can now aspire to increase their participation in the NCC from the present 13% to 33% by 2010 and 50% by 2015. Moreover, the present total of 1.3 million cadets is just 4% of the total NCC eligible student population of 30 million.

The Naval Wing of the NCC

There are 59 Naval units covering all the states and Union Territories. These units can enrol up to a total of 75,000 naval cadets in the ratio of 60% Junior Division and 40% Senior Division. The average strength of the Naval Wing has been 45,000 school-going cadets in the Junior Division and 14,000 college-going cadets in the Senior Division. The boys and girls are organised in their respective Senior and Junior Divisions.

During their two years in the Junior Division, concurrent with training in parade drill, health, hygiene and leadership, junior naval cadets are trained in basic watermanship, seamanship and navigation, communication, gunnery, damage control and ship safety. Every year, selected cadets are attached to ships and establishments for short durations.

The pattern of training for senior naval cadets during their three years is broadly similar to that in the Junior Division but in greater detail. Senior naval cadets attend annual naval camps at state level, during which, depending on their earnestness, aptitude and performance, selections are made for: -

- Sea outings in naval ships.
- Foreign cruises in the Navy's cadet training ships.
- Attachment with the Naval Academy.
- The annual Enterprise class Yachting Regatta at INS Chilka.
- The Annual Naval Camp at Visakhapatnam.
- The Annual Leadership Camp at Tuticorin.

As part of the adventure Activities:-

- Naval Diving Teams conduct scuba diving courses at Kochi, Visakhapatnam, Mumbai and Delhi.
- Wind surfers and kayaks are available with all naval units.
- For sailing expeditions in rivers/at sea, cadets are trained in boat pulling and sailing and are taught teamwork and seamanship skills.
- A white water rafting facility is available at Rishikesh.

Naval NCC cadets can join the Navy:-

- Officer aspirants must have passed the 'C' Certificate of the NCC and have to qualify in a Services Selection Board. Successful aspirants can avail of vacancies reserved for NCC cadets, without having to write a UPSC examination.
- Sailor aspirants are given weightage in the results of the all-India sailor recruitment examination.

45

Sailing and Yachting

Preamble

In India, sailing is as ancient as its history. Sailing vessels carried India's merchandise as far east as China and as far west as the Red Sea and the east coast of Africa.

From the naval point of view, sail training imparts first hand experience of wind, weather and the vagaries of the sea and fosters nicety of judgment and the quality of "sea sense." Its unique value lies in its ability to develop initiative, courage, comradeship, teamwork and endurance, particularly in rough weather. It is for this reason that the Navy imparts sail training to its cadets as soon as they embark on their naval career.

Until the Navy could acquire a proper seagoing sailing vessel, sail training at sea used to be imparted in the vicinity of naval harbour in small naval sailing boats called Whalers and cutters.

Sea Cadet Sail Training Ship (STS) Varuna

By 1979, the Sea Cadet Corps (SCC), headquartered in Bombay, which had close relations with the Navy for decades, built up funds through annual Sea Cadet Balls which, supplemented by donations for this worthy cause, enabled the SCC to place an order for a sail training ship in which sea cadets could actually be put to sea.

The 110-ton, 29-meter long vessel was built by Alcock Ashdown in Bhavnagar, at a cost of Rs 32,50,000. Its design had been chosen for its capacity to allow the maximum number of cadets to be trained, without their having to handle unduly heavy sails and having the facilities for acquiring skills in navigation, engineering and communication. She was the first new square-rigger in Asia. She had 5,000 square feet of sail — six square sails and six fore and aft sails. She had a bunk each for 21 cadets, a modern galley and a chart house well equipped with navigational aids. Her normal speed under sail was 6 to 7 knots though she could make upto 10 to 12 knots with all sails rigged. She was fitted with two diesel engines for maneuvering in harbour and for use when wind conditions were unfavourable. She could sail for 8 to 10 days at a stretch. On 20th April 1981, the then Chief of the Naval Staff, Admiral RL Pereira commissioned her as Sail Training Ship (STS) Varuna.

Since Varuna had to have an alongside berth and the (young school children) sea cadets came for training only on weekends, the Navy undertook to man and maintain Varuna as a tender to the training cruiser Mysore.[1] In return, the Navy used Varuna for three days a week for the sail training of Mysore's naval cadets.

Voyage to Australia. On 26 January 1988, Australia was to hold the bi-centennial celebrations to commemorate the landing of the first Australian settlers in and around the port of Sydney. As part of these celebrations, a "Tall Ship" race was scheduled from Hobart (Tasmania) to Sydney in which 250 square-rigged ships took part. The Indian Naval Adventure Foundation sponsored Varuna for these celebrations.

After being refitted in the Naval Dockyard Bombay, Varuna sailed on 14 September 1987 on her first oceanic 29,600 km voyage, manned by seven naval officers, five senior naval sailors, sixteen naval cadets and two Sea Cadets. She returned to Bombay on 15th April 1988, having completed a 15,000 mile voyage in seven months.[2]

---

1. Apart from an interest free loan from the Navy, the Prime Minister contributed Rs 100,000 annually from the National Defence Fund for the maintenance of Varuna.

2. On the outward journey, Varuna called at Goa, Cochin, the Indonesian ports of Padang, Cilacap and Bali, and the West Australian ports Port Headland, Carnarvon, Geraldton, Fremantle and Melbourne. Despite damage to her masts in heavy weather, she participated in the Tall Ship event with improvised 'jury masts' and arrived at Sydney on the 14th January 1988, as planned, for the Tall Ships Parade. Varuna departed from Sydney on 29th January 1988. On the return journey, she called at Melbourne, Adelaide, Esperance, Fremantle, Carnarvon, Christmas Island, Jakarta, Singapore, Penang, Campbell Bay, Cochin and Goa.

Indian Naval Sailing Vessel (INSV) Samudra

In 1987, the Navy acquired the 13-metre sailing yacht Samudra. In 1988, it was decided to send Samudra on a Tri-Service expedition to circumnavigate the globe. The first leg of 7590 miles was from Vizag on the east coast of India to Dakar on the northwest coast of Africa. The second leg of 9735 miles was from Dakar to Hawaii in the middle of the Pacific Ocean. The final leg of 10660 miles was from Hawaii back to Vizag.

Flying the Blue Ensign of an Indian Naval Fleet Auxiliary, Samudra set sail westbound from Cochin on 15th November 1988, manned by six officers — four from the Navy and one each from the Army and the Air Force.

On the first leg, Samudra called at Aden, Port Said, Malta, and Cartagena and arrived at Las Palmas (in the Canary Islands) on 2nd February 1989. She set sail from Las Palmas on 6th March and after calling at Cayenne, Georgetown, Trinidad and La Guaira arrived at Panama on 5th May where a new engine was fitted. She sailed from Panama on 24th May for San Cristoba (Ecuador). To avoid the hurricane season off the west coast of Mexico, Samudra was re-routed via the South Pacific Ocean.

After calling at the Galapagos Islands, Nikuhiva and Tahiti, she arrived at Rorotonga on 26th July where she remained until 9th September when she sailed for Port Villa. After calling at Port Moresby, Darwin, Surabaya and Port Blair, she arrived at Vizag on 4th December 1989. During her 52,000 km voyage round the world, Samudra visited 27 ports in 18 countries.

Samudra's Bali Yatra. In November 1992, the Navy, in collaboration with the Government of Orissa, sent Samudra on a sailing expedition to Bali in Indonesia to commemorate the trading links and the sailing route used by traders during the period of the Gupta Dynasty.

Sail Training Ship, INS Tarangini

In June 1995, the keel was laid for the Navy's first sail training ship, a three-masted barque. Square rigged on the fore and main masts and fore and aft rigged on the mizzen mast, she was designed by Mr Colin Muddie, a reputed British naval yacht designer and built by Goa Shipyard Ltd. Reputed British firms supplied the sailing rig of twenty sails (eight square and twelve fore and aft) having a sail area of 965 square meters.[3]

She was launched on 1st December 1995 and commissioned two years later on 11th November 1997 as Naval Sail Training Ship Tarangini.[4]

In 1999, a contract was arranged for Lt Cdr Frank Scott of the British Navy to be the Sailing Master of the Tarangini and train the crew in the handling of her sails. During her 28 days sailing work up, Tarangini covered 3000 miles from Cochin, around Sri Lanka to Madras, thence to Port Blair in the Andaman Islands, thence to Vizag and back to Madras, having covered the square rig syllabus of the Nautical Institute.

Tarangini is built for long voyages.[5] She can keep at sea continuously for twenty days. She has a complement of six officers and twenty-seven men as permanent crew and can accommodate and impart sail training to thirty cadets at a time.

In addition to the sail training of naval cadets after they leave the Academies, she conducts sail training capsules for cadets of the National Defence Academy, the Naval Academy and technical cadets from INS Shivaji.

Chronology of Activities

1990

- In Asian Games Yachting in Beijing, Lt F Tarapore won the Bronze Medal in the 470 class event. Lt Cdr H Motivala and Lt P K Garg won the Bronze Medal in the Enterprise event. Lt PK Garg received the Arjuna Award.
- Tri-Service and Coast Guard Indian Ocean Sailing Expedition in Indian Naval Sailing Vessel Samudra from Vizag to Mauritius to Seychelles and back to Cochin in Aug 90.

1991

- Lts F Tarapore and KS Rao won the Gold Medal in the Enterprise class World Championships held in Bombay.

---

3. India is the 5th country to have built its own square rigged sail training ship.
4. The name Tarangini derives from the Hindi word 'Tarang' meaning waves. The commissioning Commanding Officer was Commander Homi D Motivala, a sailor of considerable experience; he had been the XO and Sailing Master of the Sea Cadet Corps' Sail Training Ship Varuna during her voyage to Sydney to participate in Australia's Bicentennial celebrations in 1987/88.
5. Displacement 513 tonnes, two 320 horsepower diesel engines, Length overall 54 metres, Beam 8.5 metres, Draught 4.5 metres, Height of Foremast above water line 33.6 metres, Height of Mainmast above water line 34.5 metres, Height of Mizzenmast above water line 29.8 metres.

1992

- Samudra sailed on the expedition to Bali.

1993

- Lt Cdr HD Motivala and Lt PK Garg won the Gold Medal in the Enterprise class World Championships held in Zimbabwe. They received the Rajiv Gandhi Khel Ratna Award in the same year.
- Lt Cdr Motivala won the silver medal in the Asian Games in Japan and also received the Arjuna Award.

1994

- Lt Cdrs F Tarapore and K S Rao won the Bronze Medal in the 470 class event in the Asian Games Yachting in Hiroshima. Cdr H Motivala and Lt Cdr P K Garg won the Bronze Medal in the Enterprise class event.

1995

- Lt Cdr F Tarapore and Lt V Meherishi won the Bronze Medal in the Enterprise class World Championships held in South Africa.

1996

- Lt Cdr KS Rao received the Arjuna Award.

1997

- While Lt Cdr PK Garg won the Silver Medal, Lt Cdr (Retd) F Tarapore and Lt V Meherishi won the Bronze Medal in the Enterprise class World Championships held in Goa.

1999

- Lt Cdr R Mahesh won the Silver Medal in the Enterprise class World Championships held in South Africa.

The Naval Sailing Club, Mumbai

The Naval Sailing Club Mumbai (Watermanship Training Centre Mumbai) is the largest yachting complex in India. It houses the National Sailing Institute of the Sports Authority of India. It hosts national sailing championships and international sailing and yachting regattas and championships. Today, the joint, co-located facilities of the Naval Sailing Club Mumbai and the Sea Cadets' "stone frigate" Training Ship Jawahar are amongst the finest in the world for conducting international sailing regattas and championships.

The Indian Naval Sailing Association (INSA)

The Indian Naval Sailing Association was established in 1961. Its aims were:-

- To promote the sport of sailing and yachting amongst naval personnel.
- To encourage the growth of naval sailing clubs in ports and, where facilities exist, in naval bases and establishments.

INSA started off with four Naval Sailing Clubs (now designated as Watermanship Training Centres) at Bombay (in INS Angre), Visakhapatnam (in INS Circars), Cochin (in INS Venduruthy) and Goa (at Dona Paula). Since then centres have been inaugurated in INS Shivaji (the Engineering School in Lonavala), INS Valsura (the Electrical School in Jamnagar), INS Hamla (the Logistics, Management, Computer and Catering School in Marve, Bombay), INS Agnibahu (the parent naval establishment in Karanja, Bombay), INS Gomantak (the parent establishment in Vasco-da-Gama, Goa), INS Mandovi (the interim Naval Academy in Panjim, Goa), INS Chilka (the Sailors Training Establishment on Chilka Lake in Orissa) and INS Jarawa (the parent naval establishment in Port Blair in the Andaman Islands).

INSA conducts annual intra Navy championships and fields individuals and teams for national championships.

Training at Indian Naval Watermanship Training Center (INWTC)

Training on Windsurf

46

The Fifth Central Pay Commission

Fourth Pay Commission

The Fourth Pay Commission was constituted on 01 Sep 1983 and submitted its recommendations in Jun 1986. The Government announced the new emoluments wef 01 Jan 1986. The Pay Commission for the first time gave consideration and recognition to the Armed Forces pyramidal cadre structure, stringent promotion criteria, rigorous and hazardous service life, truncated career, rigid disciplinary code, frequent moves and separation from family. However, the Commission did not recommend additional 'Military Service Pay' to compensate for the above factors. Running Pay band was introduced for officers and the concept of rank pay was created. The improvements recommended by the Fourth Pay Commission brought about a qualitative change in the induction profile and to some extent the aspirations of the rank and file. However, inflation and the rising cost of living soon negated the gains. This was compounded by the fact that stagnation, poor career prospects and incorrect relativities continued to be irritants to Armed Forces Personnel.

Constitution of Fifth CPC

Unlike previous two Pay Commissions, who were mandated to only revise the Pay, Allowances and Pensions, the Vth Central Pay Commission was constituted on 09 Apr 1994 and was for the first time, tasked to examine the 'Conditions of Services' of Armed Forces. It was also for the first time that the three Services jointly formulated their proposals for consideration by the Vth Central Pay Commission and submitted a Joint Services Memorandum (JSM) to this effect. The JSM was based on the views from various units, field formations of the three Services and represented the collective aspirations of the Armed Forces. The leitmotif of the JSM was to put in perspective the hardships and deprivations suffered by Armed Forces personnel, the provision of adequate compensation for the risks and hazards to which they are exposed, the imperative need to attract talent to the Armed Forces and to ensure that the personnel remain motivated throughout their service career.

The Vth CPC Award

The Vth CPC presented their recommendations to the Government on 30 Jan 97. Whilst recommending the revision of Pay & Allowances, the Vth CPC had adopted a factor of 3.2 times for pay revision and had generally doubled the rate of existing allowances. Exceptions were, however made in respect of certain allowances admissible to the Armed Forces, such as the Submarine, Flying and Siachen Allowances which were enhanced more than two times.

The COSC reacted quite sharply at the partisan treatment meted to the Armed Forces by the Vth CPC. The disappointment of the Armed Forces on the Vth CPC award and major concerns were conveyed to the Government. The Government in Jul 1997, taking due note of concerns expressed by the Armed Forces, approved, among others, the following improvements in the Pay Scales and Allowances of the Armed Forces personnel:-

- The Pay scale of Commodores/equiv was enhanced from Rs 15,350–17,600 recommended by the Vth CPC to Rs 16,700–18, 050 (plus Rs 2400 as Rank Pay).
- Submarine Allowance, Flying Allowance for fighter pilots and Siachen Allowance was enhanced to Rs. 7000 PM from Rs. 3000 PM. Subsequently, all pilots were included for grant of Rs 7000 PM upto the rank of Commodore/equiv.
- Monthly grant of Technical Pay/Allowance at double the existing rates was granted as against Vth CPC recommendation of 'One time grant' to technical officers of the three Services.
- Sailors and equivalent in other two Services were granted the minimum of Pay scale on completion of Training with retrospective effect, instead of recruits pay, as hitherto for.
- Ration in kind was retained as against Vth CPC recommendation of grant of monthly ration allowance in lieu for officers of the three Services.

- Pay/trade group of PBOR was rationalized based on entry Educational Qualification of Diploma, Matric & Non-Matric and were assigned into 'X', 'Y' & 'Z' pay groups wef 10 Oct 97.
- Lt Cdrs/equiv who had become substantive Lt Cdr/ equiv on or after 01 Jan 1996 were granted pay scale of Commanders/equiv on their stagnation for one year in the pay scale of Lt Cdr/equiv.
- ClLQ was granted to NC (E) of Air Force who were inadvertently omitted by the Vth CPC.
- House Rent Allowance (HRA) was granted to officers at par with civilian Group 'A' officers when not provided with Govt. accommodation.
- Stipend granted to Cadets during last year of training prior to Commission was converted to 'Pay' with all attendant benefits albeit with retrospective effect i.e. on grant of Commission.

Discontent in the Armed Forces

As brought out above, enhancement of Flying Allowance to Rs 7,000 PM and payment of additional amount of Rs 2,000 PM to Fighter pilots only disturbed the existing parity between the other categories of pilot and other officers in the three Services. This partisan enhancement of Flying Allowance led to widespread discontent in the three Services, particularly in the Air Force, which was widely reported in the print and electronic media. Certain other disparities and anomalies were also brought to the notice of the Govt by the three Service Headquarters. The Govt taking cognizance of the unprecedented negative reaction of the service personnel, constituted a High Level Committee on 24 Dec '97, under the Chairmanship of then Defence Secretary Shri Ajit Kumar, with the three Vice Chiefs of Staff and the Financial Adviser (Defence Services) as members.

High Level Committee Deliberation

A High Level Committee (HLC) was tasked to examine the anomalies identified by the Service HQs, specially those related to risk, technical and Flying Allowances and trade rationalization of PBOR. In addition, the committee was to examine grievances and anomalies received directly by them. The three Service HQs collated all the anomalies and grievances and submitted a total of 36 issues for consideration by the HLC. The HLC subsequently visited Air Force Station, Bangalore, Western Naval Command, Mumbai, Air Force Station, Chandigarh and Army Stations in Srinagar. After the visits of HLC, the issues were categorised under three heads i.e. Pay & Allowances, Managerial and Organizational issues and miscellaneous issues. After in-depth analysis of 36 recommendations to the Govt on 23 Apr 1998, the HLC resolved all the issues projected, to the satisfaction of the three Service HQs.

Recommendations of the Group of Officers (GOO)

On receipt of HLC recommendations, the Govt remitted the same to a Group of Officers Committee on 21 May 1998, under the Chairmanship of the then Cabinet Secretary with three Service Chiefs, Defence Secretary, Secretary Home, Secretary DOP&T & Secy Expenditure as its members. The Group of Officers further examined the recommendations of the HLC in greater details, particularly in view of impact of HLC recommendations on other Central Govt employees. After taking into account all aspects of the issues under consideration, the Group of officers submitted their report to the Govt in Jul '99. The Govt accepting the Group of Officers report issued letters approving the recommendations of Group of Officers on the anomalies and grievances of the Armed Forces. Majority of the issues were finally resolved through a clutch of Govt letters issued on 29 Mar 2000.

47

Gallantry Awards

Gallantry Awards are given for individual acts in the following areas:-

- Conspicuous acts of gallantry that placed service before self and saving the lives of others in hazardous conditions.
- Acts of valour in the face of enemy fire as in Operations and low intensity conflict situations.
- Individuals involved in various expeditions far from Indian shores and those who participated in various operations in life threatening situations and exacting circumstances are also rewarded for their courage and dedication to duty. Notable activities in this decade are:-

Antarctica Expeditions

After the research ship berthed alongside the Antarctic ice shelf, naval Chetak helicopters were used to transport personnel, stores, fuel and construction material to inland sites. Of the average of 70 to 75 days that the research ship can stay in Antarctica, there are storms, blizzards, very strong winds and zero visibility conditions for 35 to 40 days, leaving only 30 to 40 days for helicopters to ferry men and material to the permanent station and research locations several miles inland.

Naval Operations

- **Tasha**. Consequent to the withdrawal of the IPKF from Sri Lanka, patrolling of the Tamil Nadu coast against infiltration by LTTE militants was entrusted jointly to the Navy and the Coast Guard. Operation Tasha was launched in June 1990 to curb smuggling of arms and ammunition, poaching, illegal immigration and malevolent activities of Sri Lankan Tamil militants in the Palk Bay. Operational patrols were carried out by shallow draught, minor war vessels like SDBs, LCUs and Coast Guard patrol craft. Air patrols were carried out by Naval and Coast Guard aircraft and naval helicopters. Marine commandos won awards for gallant actions against militants.
- **Swan**. Operation Swan was launched in April 1993, after the terrorist bomb blasts in Bombay, to patrol sensitive areas off the coast of Gujarat and Maharashtra on the west coast of India to intercept the landing by terrorists of arms, ammunition and explosives.
- **Operation Muffet off Somalia.** Pursuant to the decision of the United Nations for a multilateral initiative in Somalia to supervise and oversee the distribution of humanitarian aid, a Naval Task Group was deployed off the coast of Somalia from September 1993 to December 1994.
- **Operation Leech in the Andaman Sea**. Patrolling by Naval vessels commenced as part of Operation Leech to intercept arms and ammunition being smuggled by sea into Burma via Bangladesh for onward dispatch to insurgents in India's north-eastern states.
- **Operation Rakshak.** Marine Commandos deployed in Kashmir's Wular Lake to apprehend infiltration of terrorists.

Abbreviations

LST	:	Landing Ship Tank	Div	:	Diver
LCU	:	Landing Craft Utility	SD	:	Ships Diver
CGv	:	Coast Guard Vessel	SAR	:	Search and Rescue
CD	:	Clearance Diver	Oi/c	:	Officer-in-Charge
ACD	:	Air Crew Diver	i/c	:	In–Charge

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
1989			
Lt Cdr SPS Cheema (01704-Y)	CO, INS Nishank during Acceptance Trials in Russia — Sep '89. A massive blast in the aft part of the ship immobilised the ship.	Despite the advice of the Soviet specialists to abandon ship he mobilised the local resources and brought the fire under control.	Nau Sena Medal
Lt Cdr SP Singh (40859-K)	Engineering Officer, INS Nishank — Sep '89.	Brought fire under control by starting the DA for fire main water supply and operated the chemical fire fighting system.	Nau Sena Medal
Narpat Singh, MCERA II (201359-K)	Chief ERA, INS Nishank — Sep '89	Accompanied and assisted the Engineer Officer in the above action.	Nau Sena Medal
Lt Siddhartha Panda (02803-W)	Oi/C, Marine Commando Detachment at Trincomalee — Oct '89	While under hostile LTTE threat at Batticaloa, carried out beach reconnaissance, during Operation Pawan. He successfully completed the underwater survey, established transit markers and secured the beach-head before the LST's arrived with troops & tanks	Nau Sena Medal
1990			
Cdr PS Chakravarty (40579-Z)	INS Sandhayak drifting powerless in a severe cyclonic storm — May '90	As Engineer Officer, restored emergency power supply and main engine propulsion in spite of total darkness and communication failure.	Nau Sena Medal
Ranvinder Singh, Ag CHERA 190797-F	-do-	Accomplished the above task with the Engineer Officer.	Nau Sena Medal
Cdr SK Damle (01168-B)	Flight Pilot, Naval Air Squadron 300 — Oct '90.	Safely belly-landed his Sea Harrier aircraft in spite of non-deployment of undercarriage and auto-stabilization system.	Nau Sena Medal
Lt Cdr SK Jha (01866-R)	A survey motor boat suffered damage while lowering, endangering lives of two sailors — Feb '90	Jumped into the sea and rescued both injured sailors. Used his clothes to plug the hole in the boat and brought the flooding under control	Nau Sena Medal
Lt Cdr RS Gill (01781-Y)	Skipper of IN Sailing Vessel Samudra in the Tri-Service and Coast Guard Indian Ocean Sailing Expedition from Vizag to Mauritius to Seychelles to Cochin — Aug '90	A gale in the Bay of Bengal caused leaks in the forward part of the 13 metre hull. Carried out emergency patch work repairs and sailed to safety in Galle in Sri Lanka.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
Lt Dinesh Rai (02726-W)	Foundering of INS Andaman - Aug '90	Prevailed upon hesitant sailors to abandon ship in rough seas, gave his life jacket to another officer, supported a non-swimmer till he reached a nearby ship.	Nau Sena Medal
MJ Shankar, LME, (Posthumous) (149454-W)	-do-	After abandoning ship, assisted an officer to stay afloat until both reached the rescue ship, both without life jackets. By this time, he was exhausted and was swept away by a wave.	Nau Sena Medal
1991			
Cdr VK Vadhera (01235-F)	Skipper of IN sailing vessel Samudra from Visakhapatnam to Aden in the World Sailing Expedition.	Navigated the voyage devoid of modern navigational aids, carried out emergency repairs.	Nau Sena Medal
Cdr Balrajwant Singh (01425-N)	Skipper of IN sailing vessel Samudra from Aden to Las Palmas.	-do-	Nau Sena Medal
Cdr Praveen Kumar (01294-R)	Skipper of the IN Sailing vessel Samudra on World Sailing Expedition	-do-	Nau Sena Medal
Cdr Anup Singh (01424-K)	-do-	-do-	Nau Sena Medal
Cdr Jose Verghese (02379-F)	-do-	-do-	Nau Sena Medal
Cdr Brijesh (01250-R)	CO, INS Udaygiri — Jun '91.	Saved many lives by conducting rescue operations in spite of bad weather when deployed to Maldives Islands after a tidal wave.	Nau Sena Medal
Cdr Ranveer Singh (01708-F)	Captain of Aircraft IL 38 — Apr '91	Flew to the limit of aircraft endurance, located MV NAJD II with 803 passengers, adrift for 18 hours. Passed its position to naval ships and facilitated rescue.	Nau Sena Medal
Lt Cdr SG Karve (02055-W)	Helicopter Pilot — Apr '91.	In hazardous flying conditions flew relief material and a medical officer to MV NAJD II in successive sorties.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
Surg Lt Cdr VK Mohindra (75272-Y)	Medical Officer, INS Vindhyagiri — Apr '91	Two infants had died of suspected cholera and 50 children were affected on board MV NAJD II. Water, intravenous fluid and oral re-hydration powder were contaminated. The officer single-handedly brought the situation under control and saved lives of 120 children.	Nau Sena Medal
Lt PR Kumar (03228-K)	Helicopter pilot in the 10th Antarctica Expedition — Jan '91	In the face of an unexpected blizzard, rescued four scientists stranded 65 miles from the ship.	Nau Sena Medal
Sub Lt MC Joshi (03598-A)	O i/c Boarding Party on board captured vessel — Nov '91.	Brought the seized LTTE vessel, its explosives and contraband to Madras despite unreliable compass, steering system and unstable vessel.	Nau Sena Medal
Cdr SB Anand (01678-N)	Skipper of IN Sailing Vessel Samudra in the Tri-Service and Coast Guard Indian Ocean Sailing Expedition from Cochin to Muscat to Bandar Abbas to Cochin — Oct '91.	Carried out emergency patch work repairs of the yacht that was damaged in high seas and sailed safely to Muscat.	Nau Sena Medal
Cdr PK Chaterjee (01701-R)	CO, INS Shankush — Jun '91	When dived, the submarine experienced a hazardous equipment failure which rendered several crew members unconscious. Successfully contained the gas leak and completed the tasks assigned.	Nau Sena Medal
Lt (SDC) PM Mathew (81967-N)	Leader of the 8th Wintering Team in Antarctica — 1990–91	Maintained the Maitri – India HF communication link throughout the winter and helped rescue a vehicle that got detached from its convoy.	Nau Sena Medal
Lt Cdr S Sharma NM (01664 –F)	O i/c Naval Boarding Party for fire fighting operations on board MV Zakir Hussain off Bombay High — Nov '91.	Shifted the vessel away from the endangered submerged gas pipe line, brought the fire under control, recovered burnt bodies and helped render the vessel safe for repairs.	Shaurya Chakra
1993			
Lt RS Dahiya (02781-W)	O i/c Diving Team	Recovered the debris of a 'Prithvi' missile that had ditched off Sriharikota after prolonged diving and poor underwater visibility.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
Dilip Singh, LEMP (114123 Y)	INS Viraat	Removed, repaired and reinstalled the exhaust blower starter after hours of work in temperatures of 60 to 70°C in the boiler room.	Nau Sena Medal
Cdr AR Vardhan, NM (01498-B)	CO, INS Kirpan and Commander of a Task Force to apprehend an armed LTTE vessel carrying contraband — Jan '93.	An LTTE vessel was captured and brought off Madras. The terrorists set their vessel on fire and jumped overboard. They were captured and handed over to the police.	Bar to Nau Sena Medal
Cdr Abhimanyu Mehrotra (01601-N)	CO, CGS VIVEK in the Task Force to capture an LTTE vessel — Jan '93.	Detected the LTTE vessel and persuaded it to steer for Madras. Brought the fire under control, off Madras.	Nau Sena Medal
Lt Cdr PM Joshi (02114-B)	Chetak Helicopter Pilot on board INS Kirpan — Jan 93.	Rescued eight hard core militants by winching them despite closeness to the burning ship and risk of ammunition explosion.	Nau Sena Medal
Lt Cdr Arvind Singh, MVrC (02283-N)	Oi/C MARCOS deployed for capturing terrorists from the blazing ship off Madras — Jan '93.	Led his team of commandos into the booby trapped burning ship, recovered three charred bodies and evidence to prove the ship was carrying illegal arms.	Nau Sena Medal
Lt Cdr CSS Deopa (02310-Z)	Member of MARCOS team — Jan '93.	Provided fire cover to Lt Cdr Arvind Singh. Recovered large quantity of hand grenades and ammunition.	Nau Sena Medal
Yadav, PO CD 1 (143003-H)	Senior sailor of MARCOS — Jan 93.	Provided fire cover to Lt Cdr CSS Deopa. Recovered large quantity of hand grenades and ammunition.	Nau Sena Medal
AK Thapa, POAF (SD) (146043-T)	Jagathapattinam village fire — Apr 93.	Rushed into a hut under fire and rescued two trapped children and pulled the bamboo hut down and beat out the fire.	Shaurya Chakra
Lt Cdr MS Prakash (02142-T)	Communication Officer in the 9th Antarctica Wintering Team — Nov 91 to Mar 93.	Helped extinguish fire that engulfed the power generation room and endangered living accommodation and food dump despite burn injuries, at Maitri. Undertook urgent underwater inspection of the pump house in the sub-zero lake.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
Lt Cdr SP Verma (02244-Z)	Flying Instructor, Seaking helicopter — Mar 93.	Safe landing despite loss of stabilisation and control after an electrical fire in flight.	Nau Sena Medal
Lt Cdr Susheel Kurup (02331-Y)	Observer Instructor, Seaking helicopter — Mar 93.	Extinguished electrical fire and enabled aircraft return safely to base despite dense smoke and helicopter instability.	Nau Sena Medal
Lt NV Shankar, (Posthumous) (41500-T)	River Mutha upstream of the NDA — Feb 93.	Lost his life trying to rescue a lady and her son from a raft adrift in dangerous river currents.	Nau Sena Medal
RS Yadav, CPO QA1 (053515-A)	INS Viraat. CPO in-charge of the Foxle Party — Feb 93.	Averted a major mishap by slackening fully taut wire and nylon ropes on the verge of parting due to excessive strain, where he would have been killed/maimed when entering dock in Cochin.	Nau Sena Medal
Cdr JJ Varma (01819-H)	CO, INAS 330, Seaking helicopter pilot — Jun 93.	Rescued seven stranded crew from MV Feromina Harvest which was loaded with fuel and was on fire.	Nau Sena Medal
Lt Rajiv Rawal (03282-H)	IN Diving Team for underwater demolition of blockage in River Sutlej in Himachal Pradesh — Jul 93.	Blasted off huge boulders in the near-freezing water, in strong river currents. The blockage was causing a loss of 30 lakhs per day in electricity revenue.	Nau Sena Medal
B Mohan, LS(CD 2) (162696-R)	-do-	Blasting off a 100 ton boulder in near freezing waters.	Nau Sena Medal
Lt Roopan Bembey (03361-N)	Staff Pilot — 321 Rajali Flight — Nov 93.	Rescued 04 stranded family members in floods in river Gundar near Mela Kondulavi risking personal safety.	Nau Sena Medal
Lt AK Aukta (03170-B)	Oi/C Diving Team	Recovered 33 bodies and the bus which fell down in Krishna river at Beechupalli. Recovered bodies of the Army Jawans and truck fallen into the river Teesta, Sikkim.	Nau Sena Medal
1995			
Lt Cdr GS Sekhon (02611-H)	Flight Pilot, Oi/C Naval Contingent, 12th Antarctica Expedition — 95	Transported more than 600 personnel and 36 tons of material and flew 177:10 hrs in harsh weather conditions. Rescued two scientists stranded at Dakshin Gangotri.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
Lt Sheshadri Srivatsava (03717-Y)	Staff Pilot, Naval Contingent, 12th Antarctica Expedition — 95.	As Flight Pilot, flew 174:35 hrs clocking over 10 hrs a day on numerous occasions. Rescued two scientists stranded at Dakshin Gangotri.	Nau Sena Medal
Lt TP Ashok (03252-R)	Flight Pilot, 13th Antarctica expedition, Naval Contingent	Flying in harsh weather conditions, saved the life of the Chief Mate who fell into a crevasse and safely ferried seven members at the wintering station.	Nau Sena Medal
Rajeevan Gopinathan ERA 2 (187509-H)	INS Ranjit — Fire in forward engine room.	Sustained burn injuries during fire fighting in engine room but averted a major disaster.	Nau Sena Medal
Kirpal Singh, LS CD II (113939-B)	Diving Boat Sentry ND (Bombay) — Fire alongside INS Godavari.	Displayed exceptional courage in fire fighting and averted a major disaster.	Nau Sena Medal
1996			
Lt Cdr Deepak Daniel Pant (02485-Y)	CO, SDB T–57. Anti-terrorist mission against LTTE	Brought his ship out unscathed in the face of attack by four LTTE ships.	Nau Sena Medal
M Yadav, PO UWI (AD) (POSTH) (112853-K)	INS Savitri — Jul 96.	Disentangled the complicated hose line in hazardous condition, suffered injuries and died due asphyxiation, during fuelling ops at sea.	Shaurya Chakra
Dashrath, LS CD II (173801-B)	Member of MARCOS — Op Rakshak, Aug 96.	Snatched tactical advantage from militants causing death of a militant and apprehended one militant alive.	Shaurya Chakra
Lt GS Salkar (03342-W)	Team Commander MARCOS — Op Rakshak, Aug 96.	Saved the 13 RR Battalion from the onslaught of militant's fire and forced them to surrender.	Nau Sena Medal
Lt Samir Mittal (03549-R)	Leader of MARCO Prahars — Op Rakshak, Aug 96.	Evacuated wounded Army jawan from water front to an ambulance at grave risk to own life.	Nau Sena Medal
Cdr AK Dixit (02108-R)	Seaking Helicopter Pilot, IN 514.	Rescued 11 crew member of MV Mariner II affected by severe flooding and dragging anchor.	Nau Sena Medal
Cdr AK Sinha (02338-N)	Helicopter Pilot — Jul 96.	Rescued 28 Seamen from the Ukrainian Ship MV Romaksha which ran aground off Bombay.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
Lt Cdr VK Shukla (02984-F)	Seaking Helicopter Pilot — Jun 96.	Rescued a seamen severely burnt in an accident on board MV Cury in the absence of helo-deck onboard.	Nau Sena Medal
KS Katock, LS(QA) ACD (113785-B)	Winch operator in Sea King helicopter – IN 514.	Attached himself to the deck harness while half leaning out of the aircraft to give clear indications to the pilot to maintain position.	Nau Sena Medal
1997			
Lt Cdr Kamal Singh (02728-Z)	Major Explosion at HPCL — Sep 97	Fought the fire fearlessly for over 48 hrs which minimized loss of vital national property.	Shaurya Chakra
Lt Cdr VK Jha (02761-Z)	-do- Duty Officer, MOC(V)	-do-	Shaurya Chakra
Cmde A Chinaveriya, YSM (01095-N)	-do- Command Works Officer	Directed fire-fighting operations and prevented explosion of six other storage tanks.	Nau Sena Medal
Lt Cdr VS Pandav (02553-A)	-do-	Carried out fire-fighting operations, setup communication with Port Defence Headquarters and control at HPCL gate.	Nau Sena Medal
Lt HK Pillai (51026-T)	-do-	-do-	Nau Sena Medal
RK Ojha, POA(AH) (149935-N)	-do-	Assisted fire fighting operations.	Nau Sena Medal
Manish Kumar, LME (166162-T)	In-Charge Fire Fighting Team	-do-	Nau Sena Medal
Ag Capt(Army) Manish Mehta (SS-35539H)	Op LEECH	Apprehended three Burmese poachers operating in the North Andaman, recovered one power boat and large quantities of contraband.	Nau Sena Medal
Lt TR Thakur (03719-A)	O/iC MARCOS Op Rakshak — Jul/Oct 97	Intercepted the escaping terrorists and killed one terrorist.	Nau Sena Medal
Lt SL Narayan (03798-F)	SAR Helicopter Pilot	As Flight Pilot, ensured safe recovery of two survivors of MV Arcadia Pride, a small boat.	Nau Sena Medal
SG Vasant, Air Artificer III (193132-N)	Fire in acetylene gas cylinder — NAY, Goa	Carried out fire fighting operation in repair workshop of Naval Aircraft Yard, Goa and averted a major disaster.	Nau Sena Medal

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
1999			
Lt (SDR) Jitender Kumar (87609-K)	—	Rescued a man from drowning in sea at Mumbai.	Nau Sena Medal
Lt (SDAV) SK Rana (84618-N)	INS Garuda	Took charge of the rescue team voluntarily and ensured no further damage to the building due to a crashed aircraft.	Nau Sena Medal
Sub Lt SD Sabnis (41921-Z)	INS Jyoti — Explosion in ballast tank	Rescued two persons risking personal safety.	Nau Sena Medal
NK Sreeram, LS CD II (175015-N)	Member of Diving Rescue Team	Rescued one child and recovered a few bodies from turbulent Yamuna river which was in spate.	Nau Sena Medal
Sanjay Kumar, SEA I CD III (115247-A)	Ship's Boat Diver, Langkawi Harbour, Malaysia	Saved one Malaysian and one Indian sailor from drowning at night between the pontoons and the manoeuvring of a 70 metre long catamaran.	Nau Sena Medal
Lt Cdr Anurag Chettri (02658-R)	Chetak Helicopter Pilot, INS Garuda	Medical evacuation of an ill patient from an oil tanker off Kochi in extreme weather conditions.	Nau Sena Medal
Sulaiman Saji, ERA III (193252-K)	Chief-in-Charge, ND Sub-control Murud, Gujarat	Sailed in adverse weather condition and traced out four missing fisherman.	Nau Sena Medal
Manoj Jacob, LEMP (172841-Y)	Major fire onboard INS Amba	Carried out fire fighting in the Forward Engine Room averting a major disaster.	Nau Sena Medal
2000			
Lt DS Pathania (04004-Z)	Team Commander, MARCOS – Op Rakshak	Killed four hardcore Afghani terrorists and saved the lives of the assault group.	Shaurya Chakra
Lt Ravindra Kothiyal (04033-R)	Team Member MARCOS deployed to eliminate four hardcore militants holed up in a house	Killed one terrorist and led to the elimination of four hardcore militants thus saving the assault group from the onslaught of terrorist fire.	Nau Sena Medal
Lt Varun Singh (04073-F)	Leader of MARCOS team– Ops Rakshak	Intercepted escaping terrorists, killed one terrorist at point blank range and wounded another.	Shaurya Chakra

Rank, Name & Personal Number	Appointment/Function/Activity / Event	Action performed under hazardous conditions and risk to life	Gallantry Award
VS Rawat, LME (SD) (176601-T)	Member of MARCOS team-Ops Rakshak	Killed two terrorists in a fierce close encounter and rescued his wounded leader.	Shaurya Chakra
KK Shinde, SEA I CD II (177214-K)	Member of MARCOS team-Ops Rakshak	Killed one militant and forced the militants to flee into the nallah.	Nau Sena Medal
Dalel Singh, LEMR (SD) (174333-N)	Member of MARCOS team-Ops Rakshak	-do-	Nau Sena Medal
Lt DS Sihag (POSTH) (04173-H)	Commander of MARCOS team-Ops Rakshak	Defused two landmines to clear the team route, lost his life while defusing the last mine which was detonated by terrorists using a remote firing device.	Nau Sena Medal
Mahavir Singh, POCD I (POSTH) (166745-T)	Member of MARCOS -Ops Rakshak	-do-	Nau Sena Medal
Mahattam Ram, MCERA II (SD) (191906-A)	Member of MARCOS	Saved lives of team members, eliminated one foreign terrorist and fatally injured others.	Nau Sena Medal
KS Majgaine, LSCD II (178567-K)	-do-	-do-	Nau Sena Medal
Lt Cdr Utpal Datta (03364-W)	Helicopter Pilot & Captain of Aircraft	Evacuated casualties in turbulent conditions under direct enemy shelling at an altitude above 14500 feet.	Nau Sena Medal
Lt Cdr Uday Kumar Sondhi (02897 H)	321/Hansa Flight	Displayed exemplary fortitude, determination & professionalism in flying with an artificial leg for 10 years and saving many lives in SAR missions.	National Award by Ministry of Social Justice & Empowerment

48

Welfare

Welfare lists high among the Navy's list of principal obligations. The service reacts with empathy and alacrity when issues affect the well-being, health and safety of its men. Welfare of men and their families has been the most effective way of keeping its ranks motivated and less anxious about families, when at sea. The 90s decade saw some path-breaking initiatives in the critical area of welfare. Developments in schooling, improved and new educational programmes, setting up of family welfare centres and enhancement of health facilities are examples of a renewed endeavour to improve the lives of men. Policies concerning welfare continually evolved and received the highest priority, as new ways were worked out to make families happier.

Education

IGNOU–NAVY Educational Project (INEP)

Avenues are provided for sailors to further their educational qualifications for promotions through service examinations like HET, ET1 and ET1(M). The sailors who joined with higher educational qualification aspired for graduation and post graduations on their own with colleges closer to the place of work on the Distance Learning mode. However, many of them never completed their courses due to frequent transfers, operational deployments and non availability of avenues at the new stations. A need was felt:

- To provide opportunity to serving officers, sailors and their dependants to enhance their academic qualification though distance education.
- To facilitate sailors to acquire graduation degree to qualify for SD list selection.
- To maintain continuity to avoid transfer turbulences.
- To improve post retirement opportunities view early retirement age of sailors.

A Memorandum of Understanding (MoU) was signed between the IGNOU (Indira Gandhi National Open University) and the Indian Navy and the IGNOU–Navy Educational Programme (INEP) came into force in September 2000. Eight programmes are provided through this initiative: Master in Business Administration (MBA), BCA (Bachelor of Computer Application), Certificate in Computing, Bachelor of Library and Information Science(B Lib Sc), PG Diploma in Journalism and Mass Communications, Bachelor of Science(B SC), Bachelor of Commerce(B Com) and Bachelor of Art(BA).

Four regional centres were set up in Mumbai, Vizag, Kochi and New Delhi. Each of them has a Study Centre housing course and reference material and audio–video Library. The Regional and Study Centres are administered by concerned Command Education Officers and the overall administration is controlled by PDNE at NHQ. The Study Centre looks after the enrolment, payment of fees, provision of study material, conduct of counselling sessions, examinations etc. Students could migrate from one Regional Centre to the other with ease.

Naval Institute of Technology (Mumbai)

Frequent transfers of service personnel left their wards at a disadvantage with regards to higher and professional education. To impart quality vocational education to the children of naval personnel a Naval Institute of Technology (NIT) was established on 25 Sep 1996 at Colaba, Mumbai. The institute is self sustaining with full fledged laboratories and training facilities and is recognised by AICTE and MSBTE. NIT offers two courses with an intake of 60 seats for each course.

- Hotel Management & Catering Technology
- Computer Engineering.

Students who get their diploma from NIT could enroll for BSC (Hospitality) or BE degree courses.

Naval Maritime Academy(NAMAC)

Naval Maritime Academy(NAMAC) was set up at Visakhapatnam and Mumbai in Jul 1999 under the aegis

of Naval Educational Society(NES) and is administered by the respective Command Headquarters. The academy conducts a 4 year BSc(Tech) course in Marine Engineering. The trainees are provided practical training on ships deployed at sea and in the respective Naval Dockyards.

The Naval Maritime Academy has been recognised by the D G shipping, India and a B.Sc (Tech) Degree is awarded by Andra University (AU). Cadets on completion of the course are eligible to take up appointment as Trainee Marine Engineers (Equivalent to Vth Engineer) onboard merchant vessels.

A Memorandum of Understanding was signed with the Andhra University in Feb 2000 and the National Ship Design Research centre (NSDRC) to offload about 60% of B.Sc (Tech) curriculum and simulator based training. The first batch of cadets passed out of the academy in Jun 03. However, admission to courses at NAMAC(V) was stopped in Aug 2007.

Welfare Activities

Family Support Centres. It was felt that while professional issues concerning sailors were addressed by the Divisional System, there was a need for a mechanism to deal with personal issues too. The need for family support services for servicemen and their families, which fell outside the Divisional System was taken cognisance of and Family Support Centres were set up in Commands and various stations thereby ensuring a quality of life for men and their families.

Modernisation of INHS Asvini, Mumbai. A prestigious Rs 100 crore project called Modernisation of Naval Hospital, INHS Asvini (825 Bedded Hospital) was taken up at Mumbai. Sanction was accorded by the Government for Rs 63.86 crore (Phase I) on Dec 1997 and 8.71 crore (Phase II) on Sept 1998. The project involved incorporation of latest medical facilities in the hospital. The facilities were designed to conform to the existing architecture and make optimum use of the present complex. The project was planned to be completed by the end of the year 2001.

As part of this modernisation, a Hospital Management System project was started in 1998. A 160 node Hospital Management System was installed at New Block in INHS Asvini. This project was considered as a pioneer system and was to be implemented in other major naval hospitals for maintenance of medical records at NHQ through a central database.

Naval Officers' Mess at New Delhi. Work on single officer's accommodation at New Delhi was commenced at a cost of 806 lakhs. The project comprised of a main mess building including external services and allied facilities such as swimming pool, recreation grounds and sports complex courts. The project was completed in April 2000.

Accommodation for Junior Sailors. Accommodation for naval personnel has always been a great concern. Though there was considerable improvement in the satisfaction level in terms of accommodation, the deficiencies in accommodation of junior sailors increased. This was a result of upward revision of their accommodation scales from 14% to 35% in the Fifth Pay Commission. Efforts were undertaken to make good the deficiencies through Annual Works Programmes (AWPs). It was decided to provide 1057 dwelling units by AWP 2000–2001. The balance numbers are proposed to be sanctioned in subsequent years.

Pay Disbursement Through Banks. Pay disbursement for officers and sailors was through cash till late 1997. Since bulk cash handling and storage had its own inherent risks, it was decided to make bank remittance compulsory both for officers and sailors with the exception of payment on account of leave and transfer and payment to under trainee officers and sailors owing to their frequent movement to different training establishments and ships. Negotiations were carried out with certain public and private sector banks to centrally disburse all payments to the naval personnel posted all over the country.

Efforts were made to avail the Electronic Clearing Service (ECS), which was jointly sponsored by the Indian Banker's Association and the Reserve Bank of India. This system involved a sponsor bank such as RBI or SBI with which all major establishments and units operate their imprest accounts, a clearinghouse operated by RBI or its representative's bank and the various destination banks, which are on the ECS network. The consolidated salary cheque presented by NAVPAY or BLOGO to a sponsor bank, along with the destination bank accounts details would afford direct credits to the destination accounts.

To begin with, this system was successfully tried out at Chennai. Initially, disbursement of pay to officers was implemented and the same was extended to sailors. This was a morale booster since personnel were able to draw their pay irrespective of their presence in station and also reduced the major work of manual pay disbursement in units and ships.

Welfare Funds

The Directorate of Non-Public Funds. In July 1985, a new Directorate of Financial Planning (Non Public Funds)

was established under the Chief of Personnel. It was to be guided by an Investment Advisory Committee chaired by the Vice Chief of the Naval Staff and comprising the Chief of Personnel, the Assistant Chief of Logistics and the Director of Non-Public Funds for profitable investment of non-public funds namely the Naval Group Insurance Fund, the INBA, the IN Amenities Fund, the Naval Officers Contributory Education Fund, etc.

Indian Naval Benevolent Association. The objective of the Indian Naval Benevolent Association (INBA) is to relieve hardship and distress among serving and retired naval personnel and their families. Requests for assistance received are examined every week by the Relief and Finance Committee chaired by the Director Non-Public Funds.

Naval Group Insurance Scheme

Concerned about the financial security of bereaved naval families, the Navy made a modest beginning with a self-help Family Assistance Scheme in 1969 with officers contributing Rs 10 and sailors Rs 2 per month. In December 1975, the Navy initiated its Naval Group Insurance Scheme 1975 under the aegis of the INBA in association with the Life Insurance Corporation of India (LIC). In 1976, the three services were permitted to run departmentally individual Group Insurance Schemes under Section 44 (f) of the LIC Act 1956. Constant efforts were undertaken to enhance the insurance cover to ten times the annual average salary of the members as per global norms.

Disability Cover. The disability cover was introduced for the first time in 1980. It was felt that individuals medically boarded out from service were not able to get absorbed for employment in civil life directly affecting their earning capacity. In order to provide additional benefit, the disability cover was increased to 75% of full General Group Insurance to enable individual to utilize disability insurance amount in any private venture to assist himself and the family.

PRIDES 82. The Post-Retirement Death Insurance Scheme (PRIDES) was introduced in 1982. The Scheme provides insurance cover for death up to 15 years after retirement or 70 years of age, whichever is earlier, for officers and sailors with a one time non-refundable premium. Since few of the officers and especially sailors retire at a much younger age of 40 years, the PRDIES cover was extended to 30 years after retirement or 75 years of age whichever was earlier, so that practically all got the maximum benefit of insurance cover post retirement. The following table shows the change in the PRIDES cover over the years:-

	OFFICERS		SAILORS	
FROM	PREMIUM	COVER	PREMIUM	COVER
01.01.82	3,650/-	1.00	--	--
28.09.84	4,050/-	1.20	1320/-w.e.f Apr 90)	0.60
01.04.91	3,200/-	1.50	1200/-	0.80
01.09.97	8,000/-	2.50	--	--
01.04.01	11,020/-	2.50	--	--

NGIF Housing Loan Scheme

In 1987, Government expressed its inability to extend the benefit of a housing loan of Rs 2.5 lakhs to service personnel as was being given to civilian central government employees. To meet the essential requirement for a dwelling unit, a Housing Loan Scheme, directly financed from NGIF, was introduced in 1988.

The aim is to ensure that officers and sailors does not have to take loans from banks at floating rates which is attractive initially but spirals to abnormal levels in 10-20 years. NGIF offers housing loan at fixed rate with every possibility of reducing downward based on the market scenario.

With the phenomenal escalation in prices of housing sector, affordable housing has gone beyond the reach of officers/sailors. To enable our members to obtain maximum benefit from Group Insurance, the housing loan has been increased to Rs 25 lakhs for officers and Rs 12.5 lakhs for sailors.

INBA Subsidiary Fund

In 1988, a separate INBA Subsidiary Fund was instituted for the welfare of ex-naval personnel and their families. It started with an initial corpus of Rs 1 crore from the IN Amenities Fund and marked a watershed in the history of the INBA to alleviate financial distress and provide succour to naval pensioners in distress.

The fund was given an annual allocation from the IN Amenities Fund to augment its resources. Existing schemes were improved and new schemes introduced:

- The enhancement in a phased manner of financial assistance for specialised medical treatment from Rs 10,000 to Rs 2 lakhs each for member and spouse towards surgery and treatment for cardio vascular diseases, cancer, renal transplant and complete hip / knee joint replacement.

- Enhancement in a phased manner of the ex-gratia grant on death to the next of kin to Rs 20,000 for officers and Rs 10,000 for sailors.
- Introduction of ex-gratia grant for the marriage of daughters of widows of naval personnel who die in service or as pensioners.
- Enhancement in the annual scholarship for higher education to the children of naval pensioners to Rs 3,000 for day scholars and Rs 6,000 for boarders.
- Introduction of Grant for obtaining M.Phil, PhD degrees on own accord.
- Reimbursement of coaching fee for JEE of IIT, MBBS, MBA and MCA for serving sailors children.
- Incentive for excellence in sports at state, national and international level.

INBA Benefits to Retired Naval Personnel

- Scholarships for post 10+2 education.
- Scholarships for handicapped children.
- Lump Sum Grant on death.
- Travel/Incidental Expenses of naval pensioners required to be transferred from one service hospital to another out station service hospital for medical treatment.
- Rehabilitation Grant to sailors invalided due to TB/ Paraplegia/Leprosy, etc.
- Assistance for Self Employment.
- Grant for Marriage of Daughters of Widows.
- Treatment for serious diseases in civil hospitals. The INBA Medical Benefit Scheme considers reimbursement of balance of medical expenses incurred on serious diseases depending upon the financial status of the ex-naval personnel.
- Special scholarship for education of children of naval personnel who die in harness. The full cost of education is reimbursed under this scheme.

Resettlement

The Directorate of Ex-Servicemen Affairs

In June 1988, a new Directorate of Ex-Servicemen Affairs (DESA) was established under the Chief of Personnel to assist ex-servicemen and their families in making a smooth transition to civil life and expeditiously deal with their problems like settlement of pension and other dues, release of land and accommodation and finding suitable avenues for resettlement.

Since its inception, the charter of DESA has diversified many folds:

- Resettlement/rehabilitation of retired/released naval personnel.
- Publicity of job opportunities through placement service.
- Liaison with DGR for employment of servicemen disabled in action/harness.
- Handling representations of ex-servicemen, windows and dependants.
- Co-ordination of financial assistance to ex-servicemen.
- Publicity of measures taken by Govt. and the Navy for welfare of ex-servicemen.

Select Bibliography

Title	Author	Publication
Nuclear Weapons & Indian Security — The Realist Foundations of Strategy	Bharat Karnad	MacMillan India, 2000
My Presidential Years	R Venkataraman	Indus-Harper Collins India, 1994
Maritime History of India	RAdm Sridharan	Publication Division, GoI
Blue Print to Blue Water : The Indian Navy 1950–1965	RAdm Satyindra Singh (Retd)	Lancer Publishers, New Delhi, 1992
Transition to Triumph : The Indian Navy 1965–1975	VAdm GM Hiranandani (Retd)	Lancer Publishers, New Delhi, 1998
Transition to Eminence : The Indian Navy 1975–1990	VAdm GM Hiranandani (Retd)	Lancer Publishers, New Delhi, 2004
The Story of Pakistan Navy	History Section	Naval Headquarters, Islamabad, 1991
In Confidence	Anatoly Dobrynin	Times Books, New York, 1997
Open Secrets — India's Intelligence Unveiled	MK Dhar	Manas Publication, New Delhi, 2005
In the Line of Fire: A Memoir	Gen Pervez Musharaff	Simon & Schuster, 2006
From Surprise to Reckoning: Kargil Review Committee Report	Kargil Review Commitlee	Sage Publications, New Delhi, 2000
Kargil : From Surprise to Victory	Gen VP Malik	Harper Collins, New Delhi, 2006
The Pictorial History of the Submarine Arm	—	Naval Headquarters
War in the Indian Ocean	VAdm MK Roy	Lancer Publishers, New Delhi, 1995
Grooming Tomorrow's Leaders: The National Cadet Corps (1917–2006)	Lt Col RS Chhetri	Lancer Publishers, New Delhi, 2006
Ministry of Defence Annual Report (1990–2000)	—	Ministry of Defence
Betrayal of the Defence Forces : The Inside Truth	Adm Vishnu Bhagwat	Manas Publication, New Delhi, 2001
An Admiral's Fall: The True Account of Vishnu Bhagwat's Dismissal	Wilson John	Hr-Anand Publishers, New Delhi, 1999
Sacked or Sunk	Brig RP Singh & Cmde Ranjit B Rai	Manas Publication, New Delhi 2000

Index

VAdm Gulab M Hiranandani, PVSM, AVSM, NM, PhD

29 June 1931 - 01 September 2009

The author, VAdm GM Hiranandani (Retd) veteran of the 71 war and pre-eminent historian of the Indian Navy bade adieu to the material world and departed for his heavenly abode on 01 Sep 09, after a brief illness.

A prominent intellectual and erudite scholar, renowned for his in-depth knowledge and insightful views on Naval issues, Admiral Hiranandani had earlier authored 02 books on the history on the Indian Navy that are now part of Naval folklore. Considered to be the most definitive accounts of the happenings within the Navy, the two books now constitute part of the official syllabus of the Naval Academy and the Defence Services Staff College and are prescribed as compulsory reading for all officers.

He was an active member of Navy Foundation, Delhi Charter and was the editorial consultant of the 'Indian Defence Review' and 'Defence Watch' and contributed regularly to many other defence journals.

Appointed as Officer on Special Duty for compiling the history of the Indian Navy 1995, Admiral Hiranandani remained dedicated to the completion of his assignment till the very end. With little regard for material comfort or physical well-being he was virtually at work till his last day, completing work on his third book when he received his maker's final call. But, by then, he had completed his mission.

He thus departed, satisfied that he had well and truly answered his calling, with the *'Music inside him'* out for all to hear.