सत्यमेव जयते

LEVERAGING TECHNOLOGY IN MARITIME – TOWARDS SMART, SAFE AND SUSTAINABLE MARITIME ADMINISTRATION

DIRECTORATE GENERAL OF SHIPPING, MUMBAI
MINISTRY OF PORTS, SHIPPING & WATERWAYS, GOVERNMENT OF INDIA

Logo and its significance

The emblem of Directorate General of Shipping signifies India's cultural heritage and is a fusion of glorious past and promising future of Indian Maritime. Each of the elements has a unique significance:

The Ship on National Coloured Waters

A proud Indian ship traversing the pristine waters of the world. It represents conventional shipping as well as new initiatives like sub-surface vessels, seaplanes, and amphibious crafts. Reaffirms commitment towards cleaner seas, preservation of marine biodiversity, and promotion of cleaner fuels.

Golden Olive Branches

Symbolize peace and friendship. Reflects the spirit of 'Vasudhaiv Kutumbukam' and cooperation with the global maritime community.

Slokam from Rig Veda

Prayer to Lord Varuna meaning "May all sea routes be easily navigable".

Anchor & Rope

The anchor symbolizes stability and strength. The rope signifies DGS instruments that guide and regulate Indian shipping growth.

Represents direction and control

Symbolizes DGS's role in guiding Indian mercantile marine with strategy and leadership.

The Reef Knot

Symbolizes cooperation and teamwork with seafarers and partners across maritime sectors—technology, trade, and modes of transport.

Shloka

सर्वे भवनतु सुखिनः
सर्वे सन्तु निरामयाः ।
सर्वे भद्राणि पश्थन्तु
सर्वे कश्चिददुःखभाग्भवेत् ॐ सर्वे भवनतु सुखिनः
सर्वे सन्तु निरामयाः ।
सर्वे भद्राणि पश्थन्तु
सर्वे कस्चिददुःखभाग्भवेत्

Vision & Mission Statement of the Directorate General of Shipping

Vision

To be recognized globally as a highly effective, efficient, responsible, and progressive maritime administration

Mission Statement

a) Provide an effective supervisory and regulatory regime conducive to:
   i. Achieve **safe, efficient, and secure Shipping**.
   ii. Protect the **marine environment**.
   iii. **All-round growth of Maritime Education and Training**.

b) Provide support to the Government of India in developing and implementing a holistic and integrated maritime development program that has a positive impact on the national economy.

c) Develop and implement policies that facilitate an environment which is conducive for promoting an investment in the expansion of a modern merchant fleet under the Indian flag and develop globally competitive shipbuilding and repair facilities.

d) Develop and sustain a high-quality human resource management catering to the needs of global, including national, maritime industry for competent seafarers.

e) Ensure good governance by adhering to the highest standards of integrity, quality, and efficiency in delivery of shipping services through constant innovation, technology upgradation, and value addition.

f) Develop measures to ensure compliance with relevant international instruments relating to the safety and security of ships, protection of environment, and welfare of seafarers.

Shri Sarbananda Sonowal,
Union Cabinet Minister

Government of India,
Ministry of Ports, Shipping and Waterways,
Transport Bhavan, 1, Parliament Street,
New Delhi, 110001

Message

Namaskar,

It gives me immense pleasure to note the significant strides taken by the Directorate General of Shipping (DGS) in driving digital transformation within India's maritime sector.

The maritime sector is the backbone of global trade and a critical pillar of India's economic growth. As the world rapidly embraces digitalization, it is imperative for India to lead this transformation through technology-driven governance, enhanced stakeholder integration, and secure, scalable digital platforms. I am proud that DGS has taken decisive steps to modernize legacy systems, implement cutting-edge technologies, and establish a unified digital maritime ecosystem.

Projects such as e-Samudra, examination reforms, learning management systems, web-based simulation training, digital record rooms, and the creation of robust cybersecurity frameworks mark a paradigm shift towards smart governance. These initiatives not only improve ease of doing business and operational efficiency but also reaffirm India's leadership in global maritime governance.

As we advance toward Amrit Kaal Vision 2047, the digital initiatives highlighted in this booklet will play a pivotal role in strengthening maritime education, safety, and international collaboration. I commend the DGS team, industry partners, and stakeholders for their dedicated efforts in making this vision a reality.

Let us continue to work together to position India as a global maritime powerhouse, underpinned by innovation, resilience, and sustainability.

Jai Hind

Shri Shantanu Thakur,
Union Minister of State

Government of India,
Ministry of Ports, Shipping and Waterways,
Transport Bhavan, 1, Parliament Street,
New Delhi, 110001

Message

Namaskar,

I am delighted to note the significant progress achieved by the Directorate General of Shipping (DGS) in advancing India's maritime governance through digital transformation. These initiatives reflect the Government's commitment to creating a modern, efficient, and technology-driven ecosystem that meets the aspirations of our maritime community and aligns with global best practices.

Digitalization is no longer optional; it is fundamental to ensuring transparency, operational efficiency, and service excellence. Efforts such as e-Samudra, digital examination systems, Learning Management Systems, Digital Record Rooms, and integrated command and control centres represent a paradigm shift toward seamless stakeholder integration and real-time governance.

These initiatives will not only enhance ease of doing business but also position India as a frontrunner in sustainable, smart maritime administration under Maritime India Vision 2030 and Amrit Kaal Vision 2047. As we advance toward Amrit Kaal Vision 2047, the digital initiatives highlighted in this booklet will play a pivotal role in strengthening maritime education, safety, and international collaboration.

I commend the entire DGS team, technology partners, and industry stakeholders for their commitment to innovation and excellence.

Together, let us steer India toward becoming a global leader in maritime digitalization.

Jai Hind

Shri T.K. Ramachandran,
Secretary

Government of India,
Ministry of Ports, Shipping and Waterways,
Transport Bhavan, 1, Parliament Street,
New Delhi, 110001

Message

Namaskar,

I am pleased to note the remarkable progress made by the Directorate General of Shipping (DGS) in spearheading the digital transformation of India's maritime sector. This IT Conclave and the initiatives presented herein reflect the Ministry's strategic vision to build a future-ready maritime governance ecosystem that is transparent, efficient, and globally competitive.

The maritime industry is witnessing unprecedented technological advancements worldwide, and India must embrace this change with agility and foresight. The comprehensive roadmap undertaken by DGS—covering e-Samudra, digital examination systems, ERP solutions, Learning Management Systems, simulator-based training, and robust cybersecurity frameworks—marks a significant step toward achieving our objectives under Maritime India Vision 2030 and the Digital India Mission.

These initiatives will not only modernize processes but also enhance stakeholder confidence, improve ease of doing business, and strengthen India's compliance with international maritime norms. It is encouraging to see a strong emphasis on user-centric service delivery, cybersecurity, and data governance, which are critical for sustaining the digital momentum.

I extend my appreciation to the DGS team, technology partners, and all stakeholders for their commitment and collaborative efforts in realizing this ambitious vision. Together, let us continue to work toward making India a global leader in digital maritime governance.

Jai Hind

Shri Shyam Jagannathan, IAS,
Director General of Shipping

Directorate General of Shipping
9th Floor Beta Building, i-Think Techno Campus, Kanjurmarg East, Mumbai, Maharashtra 400042

Foreword

Namaskar,

The Directorate General of Shipping (DGS), established under Section 7 of the Merchant Shipping Act, 1958, functions as the apex maritime regulatory authority under the Ministry of Ports, Shipping and Waterways. For over seven decades, DGS has been instrumental in shaping India's maritime governance, ensuring safety, security, and sustainability across our shipping ecosystem.

As the statutory authority, DGS regulates the manning and crewing of all merchant ships operating under the Indian flag or entering Indian ports. We also play a crucial role in maritime training and skilling, fostering a globally competent seafaring workforce that continues to strengthen India's reputation as a leading seafaring nation.

On the international front, DGS proudly represents India at the International Maritime Organization (IMO) and other multilateral platforms, ensuring alignment with global maritime conventions and advancing India's interests. Our responsibilities also extend to flag state and port state inspections, technical approvals in naval architecture, and policy frameworks that enable shipping development, shipbuilding, and innovation in the sector.

With 14 Mercantile Marine Departments spread across key maritime districts, we are committed to delivering transparent and efficient services to stakeholders nationwide. These efforts align with Maritime India Vision 2030 and Amrit Kaal Vision 2047, reinforcing our resolve to create a future-ready maritime ecosystem in line with the vision of the Hon'ble Prime Minister.

As we celebrate 75 years of service to the nation, DGS is embracing a bold and transformative agenda through digitalization, green shipping, and global collaboration. Initiatives like e-Samudra, examination reforms, Learning Management Systems, and digital record rooms are redefining maritime governance by ensuring transparency, efficiency, and user-centric service delivery.

Our unwavering mission remains: to ensure safe, secure, sustainable, and smart shipping for India and the world. I extend my heartfelt gratitude to all stakeholders—seafarers, shipping companies, training institutions, and industry partners—for their trust and cooperation in this shared journey of progress and excellence.

Together, let us steer India toward becoming a global leader in maritime governance.

Jai Hind

Shri Sushil Mansing Khopde, IPS,
Additional Director General of Shipping

Directorate General of Shipping
9th Floor Beta Building, i-Think Techno Campus, Kanjurmarg East, Mumbai, Maharashtra 400042

Foreword

Namaskar,

The Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways, has consistently worked towards strengthening India's maritime governance and operational excellence. Today, as the maritime industry undergoes a significant digital transformation, DGS is proud to lead this change by embracing advanced technologies and innovative practices to ensure seamless, secure, and efficient service delivery for all stakeholders.

Our journey from conventional systems to integrated digital platforms reflects the Ministry's commitment to Maritime India Vision 2030 and the Amrit Kaal Vision 2047. Through flagship initiatives such as e-Samudra, Examination Reforms, Learning Management Systems, Digital Record Rooms, and Web-Based Simulation Training, we are building a robust digital ecosystem that enhances transparency, fosters ease of doing business, and ensures global compliance.

This IT Conclave stands as a testament to the collaborative efforts of our teams and technology partners in redefining the future of maritime governance. The emphasis on cybersecurity, data governance, interoperability, and user-centric platforms ensures that we are not just keeping pace with global standards but are positioning India as a leader in maritime digitalization.

I extend my appreciation to the Directorate's dedicated workforce and our stakeholders for their continued trust and support. Together, let us continue to navigate this transformative journey with innovation and resilience, ensuring that India's maritime sector remains a pillar of strength for our nation's economic and strategic aspirations.

Jai Hind

Shri Deependra Singh Bisen,
Deputy Director General,
IT & E-Governance

Directorate General of Shipping
9th Floor Beta Building, i-Think Techno Campus, Kanjurmarg East, Mumbai, Maharashtra 400042

Foreword

Namaskar,

I am Deependra Singh Bisen, Deputy Director General, IT & E-Governance at the Directorate General of Shipping.

The IT & E-Governance Branch is central to transforming maritime governance through digital innovation. Our goal is to reduce manual processes, lower administrative overhead, and enable faster, data-driven decision-making. This transformation is making public administration more efficient, transparent, and responsive.

We support all DGS branches by leveraging internet-based platforms and ICT tools to streamline operations and deliver services such as tax payments, license issuance, permit applications, and business registrations — anytime, anywhere.

At the core of our initiatives is e-Samudra, a unified portal offering end-to-end maritime services for shipping companies, seafarers, training institutes, and other stakeholders.

We have introduced:

a) e-Examination for digital assessments,
b) a Digital Record Room for secure archival, and
c) a revamped Website and Social Media interface, aligned with GIGW 3.0 standards to enhance public access.
d) To support operational readiness, we are establishing:
e) a Command & Control Centre,
f) a Network Operations Centre (NOC), and
g) a Network Management System (NMS) for real-time monitoring and IT infrastructure management.

We have also deployed a Web-Based Hardware Maintenance Platform and launched the Visitor Access Management System (VAMS) for secure and seamless physical access to DGS facilities.

Further, we are developing the Indian Global Maritime Safety Platform, building ERP systems for SPFO and SWFS, and enabling emergency readiness through a Crisis Management System, a Grievance Redressal Portal, and geo-spatial analytics tools.

Together, these efforts reflect our commitment to building a future-ready, intelligent, and service-driven maritime administration.

Jai Hind

Executive Summary

The Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways (MoPSW), serves as the apex authority for regulating and facilitating India's maritime sector. It ensures maritime safety, environmental compliance, training and welfare of seafarers, and fosters the growth of the shipping industry as a strategic component of the national economy. To keep pace with global digitalization trends and the evolving needs of the maritime ecosystem, DGS is implementing a comprehensive **Digital Transformation Roadmap**, aligned with **Digital India**, **Maritime India Vision (MIV) 2030**, and **Amrit Kaal Vision 2047**.

Why Digital Transformation?

India's maritime administration has historically depended on fragmented legacy systems, which present operational inefficiencies, security risks, and limited interoperability. Addressing these challenges is not just a matter of modernization—it is a strategic imperative for ensuring regulatory efficiency, stakeholder trust, and global competitiveness. DGS's transformation initiative focuses on **building a paperless, secure, and user-centric governance ecosystem** while integrating advanced technologies to meet international maritime standards such as those set by the IMO and ILO.

Strategic Objectives

The transformation program has been structured to achieve the following objectives:

a) Seamless Stakeholder Integration through interoperable platforms connecting seafarers, shipping companies, Maritime Training Institutes (MTIs), ports, and regulatory authorities.
b) Digital Maritime Governance by transitioning from fragmented systems to a unified, cloud-based architecture with real-time data exchange and decision-making capabilities.
c) Enhanced Transparency and Efficiency via process automation, data standardization, and centralized dashboards.
d) Cybersecurity and Compliance aligned with MeitY guidelines, DPDP Act 2023, and ISO 27001 norms, ensuring resilience against emerging cyber threats.
e) User-Centric Service Delivery through intuitive digital platforms, multilingual interfaces, mobile-first designs, and integrated grievance redressal.
a) Key Digital Initiatives

The roadmap includes more than **25 strategic projects**, categorized under governance, safety, training, and infrastructure prominent being

a) **E-Samudra**: A flagship e-Governance platform unifying all services for seafarers, shipping entities, and internal departments through a single-window portal.

b) **Examination Reforms**: End-to-end digital examination system for maritime certifications with AI-based remote proctoring and automated evaluation to ensure a integral assessment and certification system free from any human ambiguities.

c) **Learning Management System (LMS)** and **Web-Based Simulation Training**: Modernizing maritime education through interactive digital platforms and simulators for real-time assessments.

d) **Enterprise Resource Planning (ERP) Solutions**: For Seafarers' Welfare Fund Society (SWFS) and Seafarers' Provident Fund Organization (SPFO), enhancing financial and administrative efficiency on a web-based interface.

e) **Digital Record Room**: Digitization and secure archival of critical regulatory and administrative records.

f) **Maritime Single Window**: Enabling global interoperability and India's active participation in international maritime governance based on the universal FAL Committee recommendations.

g) **I.M.O Strategic Engagement Platform:** To engage with the International Maritime Organisation (IMO) with online interaction of shadow committees, paper preparation, deliberations and finalisation. It also involves the collaboration with the Inter sessional group/ Correspondence groups.

h) **Indian Global Maritime Safety Platform:** Featuring maritime safety and security while fostering a culture of '*Suraksha Sarvapratham Hamesha'* and a repository of videos interactive advisories addressing '*Safety first always'*.

i) **Extensively Informative Social Media Engagement:** Ready updates and informative disseminative social media handles with real time updates for all stakeholders.

j) **DGS Website:** A one stop interactive digital interface which will obviate routine physical interactions and gravitate all processes to a process and time bound e- enabled services.

k) **Cybersecurity Program & Data Standards Development**: Establishing robust frameworks for data integrity, privacy, and risk mitigation.

l) **Network Operation Centre (NOC) & Integrated Command and Control Centre (ICCC)**: For real-time maritime monitoring, analytics, and crisis response.

Strategic Outcomes

By 2030, DGS aims to:

a) Achieve full digitalization of maritime governance workflows.
b) Deliver real-time operational visibility through command centres and integrated dashboards.
c) Provide anytime-anywhere access to services for stakeholders.
d) Foster innovation and R&D through Maritime Knowledge Clusters and simulation-based learning platforms.
e) Position India as a global leader in digital maritime administration by 2047.

This transformation is not just a technology upgrade; it is a **structural, process-driven shift** toward smarter, sustainable, and inclusive maritime governance. It will strengthen India's compliance with global mandates, improve **Ease of Doing Business (EoDB)** rankings, enhance seafarer welfare, and ensure the maritime sector's readiness for future challenges.

Table of Contents

1. Directorate General of Shipping

1. Introduction

The **Directorate General of Shipping** functions as the statutory national authority for the governance, regulation, and facilitation of India's maritime sector under the section 7, of the Merchant Shipping Act 1958. Operating under the **Ministry of Ports, Shipping and Waterways**, the DG Shipping plays a pivotal role in ensuring maritime safety, environmental compliance, training and welfare of seafarers, and the development of shipping as a key strategic sector of the national economy. Its core mandate is to uphold India's maritime interests while aligning with international maritime laws and standards.

1.1 Legal and Regulatory Framework

Directorate General of Shipping primarily functions under the **Merchant Shipping Act, 1958**, which empowers it to enforce safety, certification, environmental, manning, and welfare regulations across the Indian maritime domain. It also implements the rules below:

a) The Coastal Shipping Policy

b) International conventions including SOLAS, STCW, MARPOL, MLC 2006, and UNCLOS

c) Provisions under the Ship Recycling Act, 2019, aligned with the Hong Kong International Convention (HKC) for Safe and Environmentally Sound Recycling of Ships

d) DG Shipping acts as India's representative at global bodies like the International Maritime Organization (IMO) and International Labor Organization (ILO), ensuring that national policies align with international obligations.

1.2 Executive Framework

Directorate General of Shipping operates through a robust administrative structure for efficient governance and field-level implementation. The framework includes:

A. Headquarters (Mumbai)

a) The Directorate General of Shipping is headed by an officer of the rank of Additional secretary to Govt. of India.

Supported by:

i. Nautical Adviser to the Government of India

ii. Chief Surveyor

iii. Chief Ship Surveyor

iv. Deputy and Assistant Directors General for distinct portfolios like STCW, MLC, RPSL (Recruitment and Placement Services License), ship recycling, offshore, etc.

B. Allied Offices

a) 14 Mercantile Marine Departments (MMDs) at major ports (e.g.,Chennai, Tuticorin, Visakhapatnam, Kandla, Jamnagar, Kochi, Mangalore, Kolkata, Port Blair, Haldia, Paradip, Mumbai, Goa, Noida) headed by Principal Officers.

b) Responsibilities include:

i. Conducting oral and written examinations

ii. Issuing seafarer documentation

iii. Survey and inspection of ships

iv. Investigation of maritime incidents and casualties.

v. Ship registration

C. Technical Institutions and Partners

a) Under a Memorandum of Understanding with Recognized Organization, the Indian Register of Shipping (IRS) for classification, surveys, and statutory certification of Merchant Vessels.

b) Oversee the functioning of:

i. Maritime Training Institutes (MTIs) and Indian Maritime University (IMU) and its campuses.

ii. Skill development agencies and industry stakeholders.

D. Inter-Governmental Coordination

Collaborates with:

a) IWAI for inland water transport

b) Directorate General of Hydrocarbons (DGH) for offshore safety

c) Coast Guard and Navy for maritime security and Maritime rescue coordination and maritime casualty response including oil spills

d) Ministry of External Affairs for treaty implementation and seafarer processes

e) State Maritime Boards for local maritime governance and facilitating shipping development

This executive network ensures seamless policy implementation, enforcement, and capacity building across India's vast maritime ecosystem.

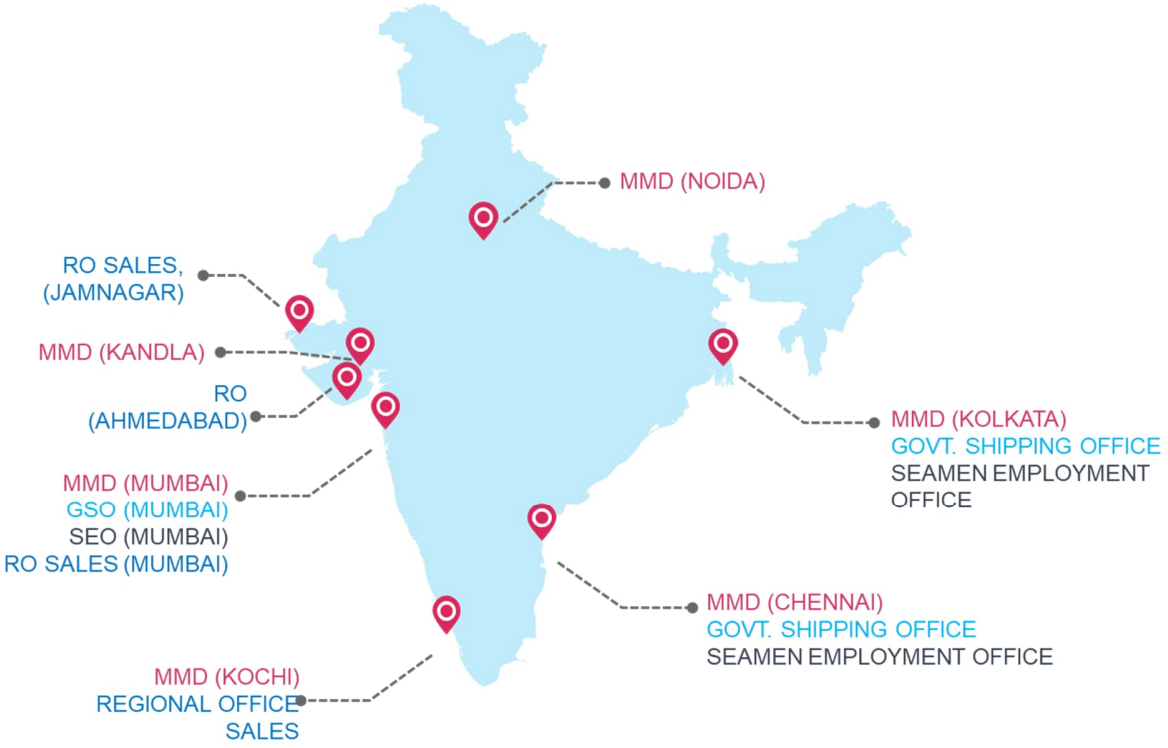


Figure 1 DG shipping and its allied offices

1.3 Core Functions and Responsibilities

A. Statutory and Regulatory Oversight

a) Registration of Indian ships and enforcement of maritime safety and pollution control norms.
b) Certification of vessels and crew in accordance with national and international regulations.

B. Maritime Safety and Coastal Security

a) Oversight of Flag State Inspection (FSI) and Port State Control (PSC).
b) Investigation of marine casualties, enforcement of navigational safety.
c) Coordination with Indian Navy, Coast Guard, and MHA for maritime and coastal security frameworks.

C. Crisis Management and Emergency Response

a) It is also responsible for coordinating responses to maritime emergencies, including oil spills, ship collisions, and natural disasters.
b) It works closely with the Indian Coast Guard and other agencies for search and rescue (SAR) operations, ensuring timely and effective intervention.

D. Seafarer Welfare, Training, and Certification

a) Regulation and certification of Indian seafarers under STCW guidelines.
b) Accreditation and monitoring of Maritime Training Institutes (MTIs).
c) Welfare enforcement under MLC, including working conditions, safety, and social protection.

E. Ship Recycling and Marine Environment Protection

a) Enforcement of MARPOL protocols to prevent marine pollution.
b) Regulation of ship dismantling under the Ship Recycling Act, 2019.
c) Certification of recycling facilities and compliance with HKC standards.

F. Promotion Of Renewable Energy and Green Shipping

a) Facilitation of the adoption of clean maritime fuels (e.g., methanol, LNG, hydrogen, and ammonia).
b) Support for offshore renewable energy platforms, especially wind energy installations.
c) Development of energy-efficient vessels and carbon-reduction initiatives in shipping.

G. Development Of Indian Shipping and Shipbuilding Industry

a) Promotion of Indian tonnage and support for shipping companies under ease-of-doing-business reforms.
b) Collaboration with public and private shipyards like Cochin Shipyard, Mazagon Dock, and L&T Shipbuilding to enhance domestic shipbuilding capacity.
c) Advocacy for Make in India and Atmanirbhar Bharat in ship manufacturing and design.
d) Supervise and implement the Ship Building Financial Assistance Programs

H. International Representation and Maritime Diplomacy

a) Representing India at the IMO, ILO, and regional maritime forum.
b) Ratification and implementation of international conventions and treaties.
c) Promotion of bilateral maritime cooperation for seafarer certification, ship registry recognition, and dispute resolution.

1.4 Organogram of Directorate General Shipping

The Directorate General Shipping of Shipping under the provision of the proposed Merchant Shipping Bill, 2025 shall transition to the Directorate General of Maritime Administration wherein the present focus on the Mercantile Marine (Merchant Shipping) shall be encompassing the Central Maritime domain wherein Port Operations, Ship Yards, Ship Recycling Centers, Inland Navigation and Operation and Offshore operations shall be engaged with to ensure sustainable and safe operations.

The Proposed reorganized organogram of the Directorate General of Maritime Administration is as follows-

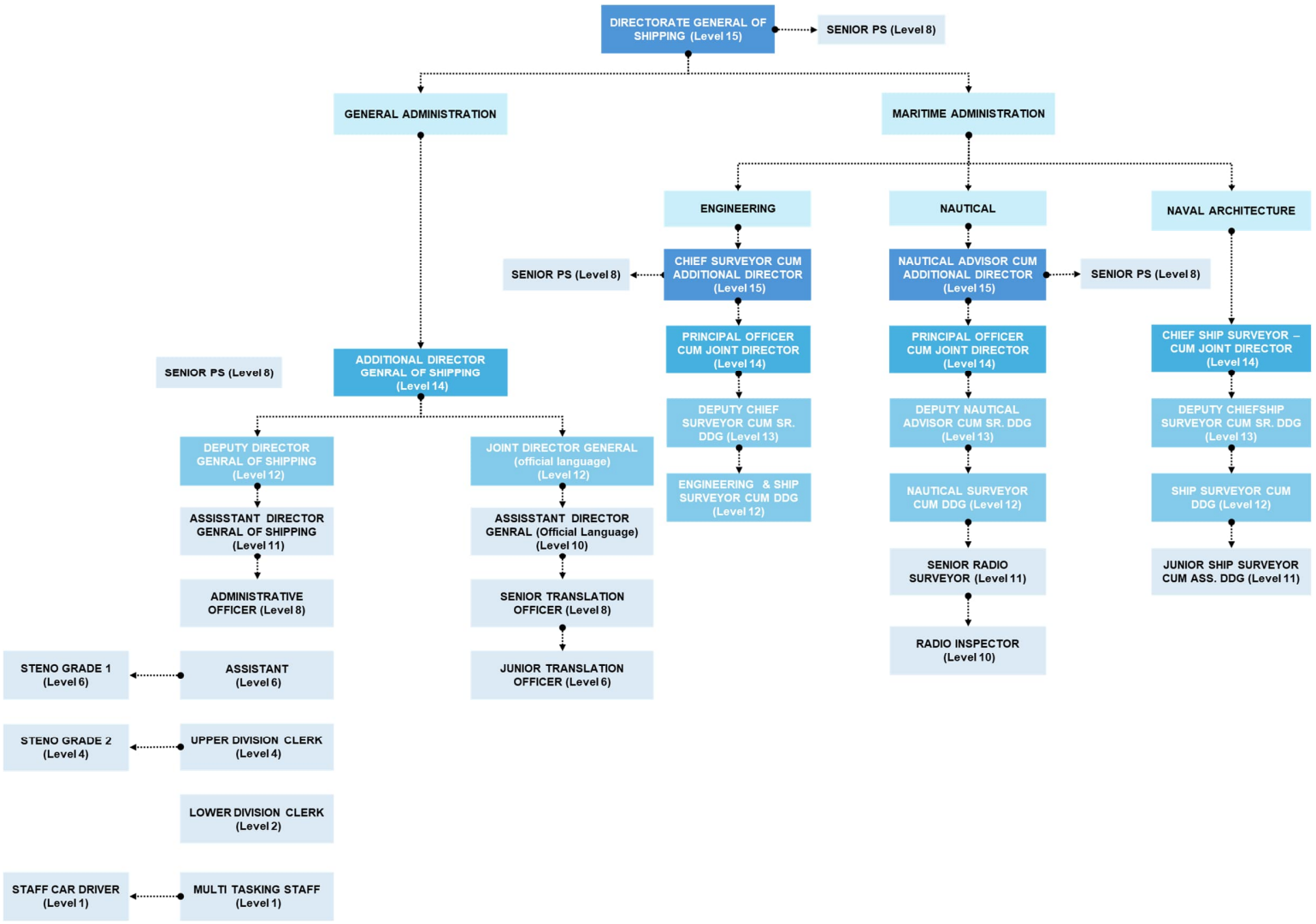


Figure 2 Organization Structure of DG shipping

1.5 Key Responsibility Framework of the Directorate

All the processes are organized according to their primary stakeholders i.e. *Seafarers, Ships and Others (including SPFO, SWFS and DGS allied organizations*), *Internal departments (Head Office)* was added to the list to ensure comprehensive coordination thereof.

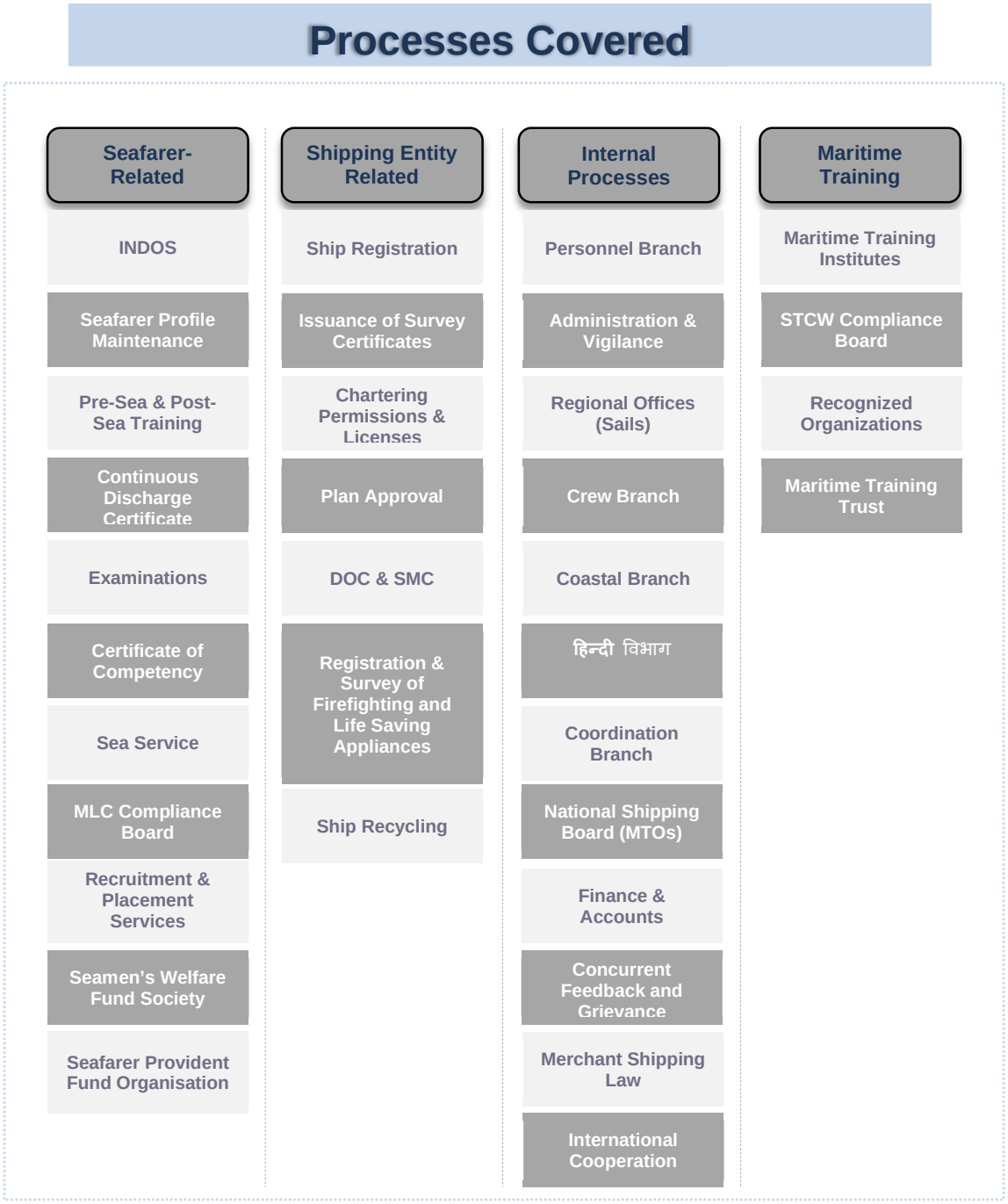


Figure 3 Different Processes covered under the Directorate

2. Existing IT Landscape of DG Shipping

2. Existing IT Landscape of DG Shipping

2.1 Current E-Governance System

The Directorate General of Shipping has implemented a range of IT and E-Governance solutions across its headquarters and allied offices, serving a diverse group of stakeholders, including seafarers, shipping enterprises, multimodal transport operators, Maritime Training Institutes, and Recruitment and Placement Service providers.

Consistent with its dedication to service excellence and operational efficiency, DG Shipping is actively engaged in several IT and e-Governance initiatives, encompassing implementation, system upgrades, and strategic planning for future deployment.

The existing IT & e-Governance solutions of DG Shipping are mentioned below –

Table 1 Existing e-Governance system of DG Shipping

A. Existing E- Governance Modules	
1. INDOS	16. Licensing & Chartering
2. CDC Management	17. Ship Survey & Certification
3. CoC as Cook	18. Training
4. Seafarer Profile Update	19. Recruitment and Placement Services
5. Request for Personal Details Correction in Seafarer Profile	20. Specified Categories
6. Examination	21. Sailing Vessel Identity Card
7. Certificate of Competency (CoC)	22. MTO
8. COC Revalidation	23. Medical Fitness
9. DC Endorsement	24. Faculty Identification Number
10. GMDSS Radio Operator	25. Watch Keeping CoP
11. Basic CoP for IGF Code	26. DC Basic CoP
12. e-Migration declaration for Master & Chief Engg.	27. Able Seafarer CoP
13. Grievance Redressal for Women Seafarer	28. Anti - Piracy Escort
14. Grievance Redressal Mechanism for seafarers	29. Utilities to upload the Certificate details issued offline
15. Ship Registration	30. Indian Navy Module
B. Ship Building and Financial Assistance (SBFA)	
C. Flag State Inspection	
D. BSID Application- CDAC	
E. Swachh Sagar Portal - IRS	
F. RO Audit Module - IRS	
G. DGCOMM & LRIT	

H. DGS Website
I. MTI Exit Exam
J. E- Learning - ADU
K. Ratings Examination
L. E- Pariksha

2.2 Legacy systems In-efficiencies

All DGS systems must adhere to a unified Data Standard and Cybersecurity Framework, ensuring compliance with the guidelines and regulations set by the

a) Ministry of Electronics and Information Technology (MeitY)
b) National e-Governance Division (NeGD)
c) Digital Personal Data Protection (DPDP) Act
d) National Critical Information Infrastructure Protection Centre (NCIIPC)

These standards will be seamlessly integrated into all IT & e-Governance solutions of the Directorate, with strict adherence enforced through Service Level Agreement (SLA)-based contracts to uphold data integrity and security, ensuring ensure a robust, secure, and resilient IT and e-Governance ecosystem.

Upon review of the current technology infrastructure, it has become evident that several systems are outdated and unsupported by their original manufacturers, leading to critical security risks that are compounded by the lack of STQC audits and VAPT. The following inefficiencies are noted below –

I Outdated Systems:

a) Several systems within the current technology infrastructure are outdated and no longer supported by their original equipment manufacturers.

b) This obsolescence leads to critical security risks, as these systems do not receive necessary updates and patches.

II User Experience and Accessibility Challenges:

a) The current interfaces designed years ago, do not fully align with modern UI/UX standards.

b) Accessibility on mobile devices is limited, especially impacting seafarers on board or in remote locations.

III Fragmented Data and Reporting

a) Data is dispersed across multiple platforms with inconsistent formats, making comprehensive analytics and policy-driven decisions difficult.

b) Lack of real-time dashboards or intelligent reporting tools for stakeholders.

Lack of Audits: The absence of Standardization Testing and Quality Certification (STQC) audits and Vulnerability Assessment and Penetration Testing (VAPT) further compounds these security risks.

IV Service Level Agreements (SLAs):

a) The current SLAs with vendors do not meet the guidelines set by the Ministry of Electronics and Information Technology (MeitY).

b) Existing vendor contracts are rudimentary and insufficiently detailed, lacking clear directives on data management and effective contract management.

c) These contracts fail to incorporate MeitY's stipulated clauses, leaving us without a framework for data standards and accountability.

V Monitoring and Data Integrity:

a) There is a significant shortfall in protocols for monitoring system downtime, which affects our ability to maintain continuous operations.

b) Lack adequate protocols for capturing and addressing data integrity issues, which is crucial for maintaining the accuracy and reliability of data.

c) The necessity for established data management standards is underscored by the requirements of the Digital Personal Data Protection Act 2023.

VI Intellectual Property Rights (IPR):

a) The current considerations for Intellectual Property Rights (IPR) are not in line with existing legislation.

b) This misalignment poses legal risks and potential conflicts regarding the ownership and use of intellectual property.

The IT and e-Governance applications suffer from a lack of cohesion, with no documented processes for data and version control. There is a void in cybersecurity and data standards, rendering systems vulnerable to attacks and breaches. It is imperative that these issues are addressed promptly to fortify our IT and e-Governance framework.

In light of the above findings, the Directorate General of Shipping (DG Shipping) is taking swift action to rectify deficiencies and ensure that all technology solutions adhere to the highest standards for IT and e-Governance initiatives. To overcome the problems identified in the legacy systems, a new e governance system has been proposed and planned for DG shipping. The digital transformation at DGS is not just a technological upgrade — it is a strategic shift to build a **future-ready maritime governance ecosystem**, under the umbrella nomenclature of E- Samudra. The new initiatives aim to:

a) Deliver seamless and secure services to all maritime stakeholders (seafarers, shipowners, MTIs, RPSLs, surveyors, etc.)

b) Ensure real-time compliance and monitoring

c) Enable data-driven decision-making at the national and international level

d) Align with the broader goals of Digital India, Maritime India Vision 2030, and Amrit Kaal Vision 2047

e) Build a smart, transparent, and interoperable ecosystem, fostering India's leadership in the global maritime domain

Additionally, several other initiatives have been proposed which will enhance the smooth functioning of DG shipping.

3. Vision for Digital Transformation

3. Vision for Digital Transformation

The Directorate General of Shipping (DGS) envisions a **modern, technology-driven maritime administration** that ensures operational excellence, transparency, regulatory efficiency, and seamless stakeholder experience. This vision is firmly rooted in India's broader digital transformation goals outlined under the **Digital India mission, Maritime India Vision (MIV) 2030, and Amrit Kaal Vision 2047**.

In today's interconnected maritime environment, digital readiness is not only a regulatory necessity but a strategic imperative. DGS aims to reimagine governance through IT innovation, transitioning from fragmented, legacy systems to a **centralized, interoperable, secure, and citizen-centric digital ecosystem**.

As per MIV 2030 outlines vision and initiatives for India to emerge as a top seafaring nation supported by world class education, research, and training

I **Current landscape:** India contributes 10–12% of global seafarers but lags competitors like the Philippines in curriculum modernity, international partnerships, and research output

II **Strategic Vision:** Establishing a Maritime Knowledge Cluster anchored in leading institutions—National Technology Centers, IMUs, MTIs—to nurture collaborative research, innovation labs, and Global R&D linkages

3.1 Strategic Vision

DGS aims to build a paperless, seamless, and integrated digital maritime ecosystem that

Figure 4 Vision towards Digital Maritime Ecosystem

This vision aligns with global mandates such as the IMO's push for e-navigation, single window systems, and digital certification, while also serving as a lighthouse of innovation within India's broader maritime strategy. This transformation is anchored in the principles of ease of doing business, regulatory efficiency, stakeholder empowerment, and data-driven decision-making, and aligns with key national initiatives such as Digital India, Maritime India Vision 2030, and Amrit Kaal Vision 2047.

3.2 Key Pillars of DGS Digital Vision

A. Seamless Integration Across Stakeholders

a) Build a unified digital architecture connecting ports, shipping lines, seafarers, Maritime Training Institutes (MTIs), flag and port state control systems, and regulatory bodies.
b) Promote data interoperability using APIs, open standards, and cloud-native systems.
c) Enable convergence with platforms like Maritime Single Window (MSW), Gati Shakti, Sagarmanthan Platform.

B. Sustainability and Digital Innovation

a) Leverage AI, IoT, GIS, blockchain, and predictive analytics for enhanced maritime governance.
b) Enable green shipping, emission tracking, and port sustainability in line with IMO's decarbonization engagement.

C. Cybersecurity and Resilience

a) Implement a robust cybersecurity and data governance framework aligned with:
b) Digital Personal Data Protection (DPDP) Act 2023
c) MeitY Guidelines
d) ISO 27001 and NCIIPC norms
e) NIST 8123 Standards
f) Appoint a Chief Information Security Officer (CISO) and establish a Cybersecurity Cell.
g) Conduct regular STQC, VAPT, and CERT-IN empanelled security audits.

D. User-Centric Governance

a) Roll out integrated platforms like e-Samudra to centralize services for seafarers, MTIs, and shipping firms.
b) Promote mobile-first, multilingual, and accessible interfaces.
c) Digitize processes for certifications, grievances, approvals, and training through LMS, Digital Simulators, ERP, and real-time dashboards.

3.3 Anchoring in MIV 2030 – Education, Research & Training

The Chapter 10 of Maritime India Vision 2030 outlines a blueprint for India to emerge as a top seafaring nation through world-class education, R&D, and innovation.

Strategic Initiatives Aligned with Chapter 10:

a) Establish a Maritime Knowledge Cluster through partnerships with IMUs, IITs, NTCPWC, MTIs, and international research institutes.

b) Foster collaborative R&D on port operations, shipbuilding, inland/coastal navigation, and emerging marine technologies.

c) Create Living Labs and Simulation Facilities to prototype and validate advanced maritime digital solutions

Table 2 Outcomes Targeted by 2030

Objective	Expected Outcome
Seafarer Readiness	Anytime-anywhere access to certification, exams, and learning
Operational Visibility	Real-time command centre dashboards, alerts, and analytics
Regulatory Efficiency	AI-driven inspections, digital clearance, and paperless documentation
Knowledge Leadership	Research labs and global R&D partnerships via Knowledge Cluster
Ecosystem Collaboration	Joint task forces linking DGS, MTIs, IMUs, and industry bodies
Green & Smart Shipping	Geo-spatial emission monitoring and compliance frameworks
Security Compliance	ISO 27001 certified digital infrastructure, periodic audits

3.4 From Legacy to Leadership

The legacy systems of DGS were characterized by outdated technologies (Java 1.4, Oracle 10g), low scalability, and poor cybersecurity readiness.

In response, DGS is executing a phased digital modernization strategy that includes:

a) Migration to cloud-native infrastructure

b) Adoption of ITIL/EITM-aligned governance standards

c) Enforceable SLA-bound contracts for improved vendor accountability

d) Centralized digital command Centre for situational awareness and decision-making

3.5 Envisioned Outcome by 2030

By 2030, the Directorate General of Shipping will evolve into a globally benchmarked digital maritime regulator, ensuring:

a) Full automation of all administrative and regulatory workflows

b) Real-time monitoring of maritime operations, incidents, and compliance

c) Enhanced transparency, accountability, and citizen engagement

d) A resilient, secure, and scalable national maritime digital infrastructure

e) A digitally empowered workforce and a leadership position in global maritime innovation

4. Key Digital Initiatives

4. Key Digital Initiatives

In an era where digital transformation is pivotal for operational efficiency and strategic growth, the Directorate General of Shipping (DG Shipping) is committed to embracing innovative IT initiatives. These initiatives are designed to enhance our technological infrastructure, streamline processes, and ensure robust cybersecurity measures. By adopting cutting-edge technology solutions, DG Shipping aims to set new benchmarks in IT and e-Governance, fostering a secure, efficient, and transparent maritime sector.

Our strategic focus includes the formulation of comprehensive data standards and cybersecurity frameworks, the engagement of top-tier cybersecurity professionals, and the establishment of dedicated cells for data protection and cybersecurity. These efforts are aligned with national guidelines and international best practices, ensuring that our digital infrastructure is resilient, compliant, and capable of supporting our mission to safeguard maritime interests. Below table mentions the IT initiatives and infrastructure that have been proposed as per different divisions of DG Shipping.

Table 3 Proposed IT initiatives under the Digital Transformation of DG shipping

Division	E-Governance Solution
IT & E-governance	E- Samudra Project
	Network Operation Center (NOC)
	Command Control Centre & KPI based decision support system
	DGS Website & social media
	IT capacity building, training and change management
	Web Based Hardware maintenance platform
Administration Wing	Digital Record Room
	Visitor Access Management
International Cooperation	IMO Strategic Engagement Platform – Shadow Committee Module
Crew Branch	ERP solution for SWFS
	ERP solution for SPFO
	Crisis Management, 24 x 7 Grievance Redressal and RPSL Module
Training Branch	Examination Reforms
	MTI Module
	Learning Management System
	Web Based Simulator for Engine and Deck simulation assessment and COC orals
	Induction of 360-degree Bridge and Engine Simulator integrated
Naval Architecture Wing	Ship-building Financial Assistance Portal (SBFA)
	Comprehensive Ship Building Portal
Engineering Wing	Ship Recycling Portal
	Port Decarbonization
	Swachh Sagar Portal

Division	E-Governance Solution
Coastal Branch	National Database for Coastal Shipping
Nautical Wing	Indian Global Maritime Safety Portal
	Casualty Management Portal
	DG-COMM and LRIT Upgradation
	Maritime Knowledge Cluster
	Geo Spatial Platform for ISPC/ NSPC
	Upgradation of Maritime Single Window
	SSAS Integration with IFC-IOR
	Indian Maritime Compliance Code Platform

4.1 Functional Landscape of Directorate General of Shipping

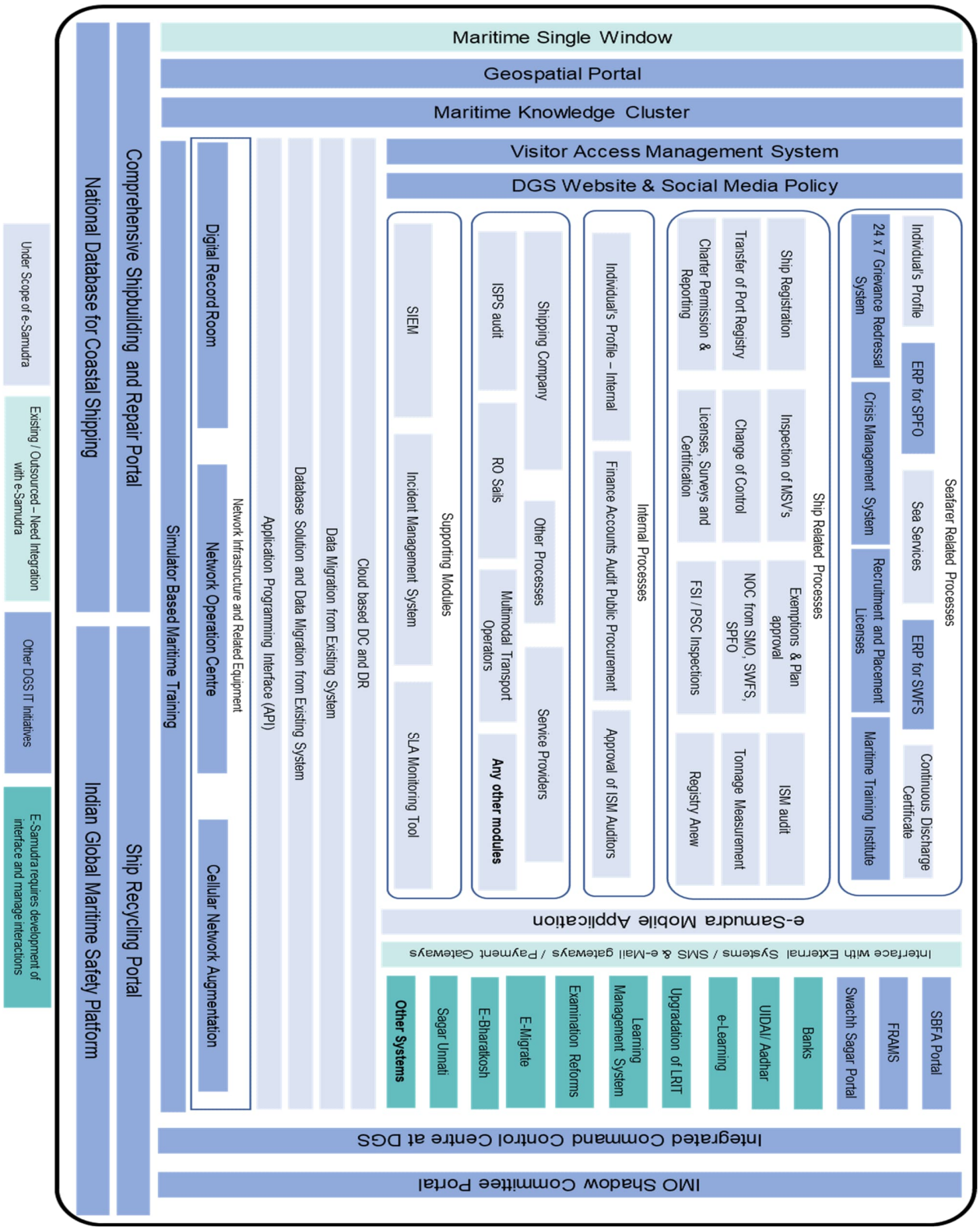


Figure 5 Proposed IT Landscape of DG shipping


DIRECTORATE GENERAL OF SHIPPING
MUMBAI
INDIA
सागराः सुपन्थानः सन्तु
E-Samudra

4.2 E-Samudra

A. About the Project

The Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways, has embarked on a transformative journey to modernize and digitize its operations through the launch of the **"e-Samudra" project**.

The vision of this initiative is to establish a **technology-driven**, **paperless**, and **transparent governance ecosystem** that aligns with global maritime standards. By adopting a comprehensive e-Governance platform, DGS aims to enhance the efficiency and effectiveness of service delivery across all its departments and regional offices. The goal is to create **a future-ready digital infrastructure** that enables seamless interaction among stakeholders including seafarers, shipowners, training institutes, and government agencies, while upholding the highest standards of safety, compliance, and environmental stewardship.

The implementation and oversight of the e-Samudra initiative are led by the dedicated IT & e-Governance Division of the Directorate General of Shipping. This division works closely with various technical and administrative branches of the Directorate, including the Nautical, Engineering, and Administrative Wings. Additionally, the initiative is being developed in collaboration with external system integrators and IT consultants under the strategic guidance of the Ministry of Ports, Shipping and Waterways. The Directorate's digital transformation is being coordinated at the national level, encompassing all Mercantile Marine Departments (MMDs), Seamen's Employment Offices (SEOs), and allied offices to ensure uniformity and scalability across India.

B. Objectives

The primary objective of this envisaged project is to undertake an IT transformation exercise and enable all the processes in the organization through the **implementation of Comprehensive E-Samudra (e-Governance) solution**.

The system objectives are:

I. To move towards a paperless regime

II. Improve transparency and provide speedy service delivery through adoption of web-based communication, and latest technology advances

III. Computerize and automate all its functions related to Shipping and Seafarer operations and maintenance and internal administration

IV. Facilitate integration with the Ministry of Ports, Shipping and Waterways' IT systems for data exchange enabling the creation of unified dashboards for different stakeholders

V. Enhance the existing e-Governance operations and processes with ease of accessibility and resolution of existing issues with the same

VI. Improve the user interactions, integration channels, and enhance Ease of Doing Business

VII. Provide support to initiatives and align with the vision and objectives, of the Ministry of Ports, Shipping and Waterways

VIII. Assist the Ministry of Ports, Shipping and Waterways and DGS to advance the Data Governance Quality Index (DGQI) of the Ministry of Ports, Shipping and Waterways.

IX. Upon implementation of the solution, it is expected that the system will establish proper information flow to help and support decision making. The implementation will result in increased customer satisfaction, better financial results, transparency and consistency in business operation and processes.

C. Strategic Alignment

01

Digital Maritime Ecosystem Aligned with National Visions

The e-Samudra project, a flagship initiative of the Directorate General of Shipping (DGS), represents a significant advancement in creating a modern, digital maritime regulatory system in India. It aligns with the Maritime India Vision (MIV) 2030 and Amrit Kaal Vision (MAKV) 2047, supporting ease of doing business, digital governance, and global maritime leadership.

02

Ease of Doing Business

Enhancing Ease of Doing Business e-Samudra simplifies maritime operations by removing redundant processes and offering real-time, user-friendly digital services. With features like automated workflows, electronic submissions, and integrated grievance redressal, stakeholders benefit from faster service access, reduced compliance burden, and lower operational

03

Fulfilling MIV 2030 Goals

The platform achieves key MIV digital transformation targets by digitally integrating regulatory functions like seafarer certification, ship registration, training approvals, and grievance redressal. Promoting operational efficiency and transparency for better stakeholder experience. Supporting seafarer welfare through digital training approvals, e-certification, and real-time tracking of welfare mechanisms.

04

Advancing MAKV 2047

Digital-first maritime administration using technologies like AI and analytics. An Atmanirbhar maritime ecosystem with a secure, indigenous IT platform. Global leadership in seafarer supply through robust certification and training quality standards.

D. Key Features of the Project

E-Samudra is a scalable, interoperable, and cloud-ready digital platform being developed to digitize the operations of the Directorate General of Shipping. This single-window solution will unify various legacy applications into one streamlined portal, offering seamless service delivery to internal and external stakeholders. It features user-centric design, mobile responsiveness, and advanced analytics capabilities for better decision-making. The initiative is designed to facilitate real-time integration with other government platforms such as Digi Locker, e-Office, Aadhaar services, and the Ministry's unified dashboards. It also includes modules for automated certificate generation, digital records management, and stakeholder communication.

Key Features / Functional Modules

The platform comprises several interlinked modules catering to the diverse needs of the maritime ecosystem. Key features include:

a) A Unified Web Portal serves as the single point of access for all services.

b) Digital Seafarer Profile Management to maintain individual career histories and documentation.

c) Training Institute Accreditation and Course Management for regulatory compliance.

d) Ship Survey and Inspection Modules to facilitate scheduling, reporting, and certification.

e) E-Payment Integration for secure and seamless transactions.

f) Real-time MIS Dashboards for monitoring service delivery and compliance.

g) Integrated Grievance Redressal System with tracking and feedback loops.

h) Stakeholder Messaging and Alerts for real-time updates and notifications.

The image below encompasses the nodal branches from DGS that shall be in charge of various process covered in the modules that are going to be developed under the new DGS e-Samudra System.

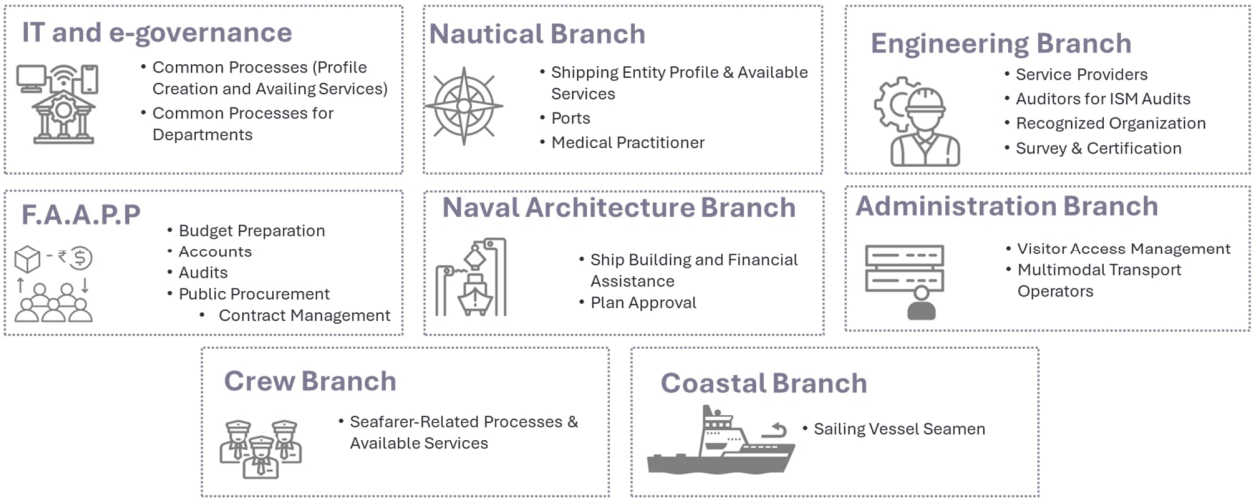


Figure 6 E Samudra processes under different branches

Following are the different modular processes of E- Samudra

Table 4 Modules and Processes Covered in E- Samudra

SN	Module	Processes Covered
1	Seafarer-Related Processes & Available Services	a) Creation of (Applicant) Seafarer Profile (New User)- Indian Seafarer/ Foreign Seafarer b) Continuous Discharge Certificate (CDC) & COC as Cook c) Notifying for Pending Certificate/Payments etc.
2	Shipping Entity Profile & Available Services	a) Creation of Shipping Entity Profile (New User) b) Plan Approval c) Tonnage Measurement d) Ship Registration e) Certificate of Registry f) Registration and Discharge of Mortgage g) Registry Anew h) Transfer of Port of Registry i) Continuous Synopsis Record (CSR) Certificate j) MMSI and Call Sign Issuance (IV and Fishing Vessels) k) NOC from SMO, SWFS and SPFO prior to closure of registry l) Closure of Registry m) International Safety Management Code (ISM) audits and Domestic Safety Management (DSM) Code Audits n) Charter Permissions and Licenses o) Charter Permission for foreign flag vessels p) Exemptions, Dispensations, and Extensions q) Tonnage Taxation
3	Sailing Vessel Seamen	a) Creation of Profile for Sailing Vessel Seaman (Issuance of ID Cards) b) Renewal of ID Cards c) Duplicate ID Cards d) Tindal Certificate e) Sign On f) Sign Off g) Cancellation of ID Cards
4	Multimodal Transport Operators (MTO)	a) Application of MTO license b) Renewal of MTO license

SN	Module	Processes Covered
5	Auditors for ISM Audits	a) Creation of Profile b) Available services for Auditors
6	Medical Practitioner	a) Creation of Profile for medical practitioner (Approval of medical practitioners) b) Renewal of approval as DG approved doctor c) Issuance of medical certificates
7	Ports	a) Profile creation of Ports b) Navigational Safety of Ports Committee (NSPC) Clearance c) International Ship and Port Facility Security Audits (ISPS Audits) d) Available Services for Ports e) Renewal of NSPC Clearance f) Shore electricity/ Power g) Port reception facilities for waste handling h) Berth Addition
8	Service Providers	a) Approval of lab to conduct particular test on cargo b) Registration & Survey of FFA/ LSA service stations c) Approval and assessment of entities for 'Verified Gross Mass Method 2' d) Accreditation for Bunker Suppliers e) Inspection/ Audit of Bunker Suppliers f) Approval of becoming an insurance provider for ships g) Processes of approval, purchase and service for Lift raft service stations
9	Recognized Organization	a) Creation of RO Profile b) Generation of Certificates by RO from the Directorate's portal c) Audit of RO d) Renewal of RO Profile
10	Common Processes (Profile Creation and Availing Services)	a) Creation of Profile b) Existing Users c) New Users d) Correction of Profile e) Feedback/Complaint

SN	Module	Processes Covered
11	Common Processes for Departments	a) Logging into Profile b) Approval of Application c) Approval of Flag State Officers d) Approval of Port State Officers e) Delegating Access f) Sending a Query to the Applicant g) Suspension/Debarment of Seafarer h) Suspension/ Debarment of Officer
12	Survey and Certification	a) Flag State Inspection & Port State Control b) Issuance of Certificates by MMD/ the Directorate (issued by ROs as well): c) Technical Clearance d) Safe Manning Document Issuance e) Passenger Ship Certification Module f) Cargo Ship Certification Module g) Annual/ Intermediate/ Renewal Inspection of Cargo Ships by MMDs h) Inspections of MSVs i) Inspection of vessels for Petroleum License j) Towing Inspections k) High Speed Craft Module l) River Sea Vessel (RSV) Module m) Indian Coastal Vessel (ISV) Module
13	Finance, Accounts, Audits and Public Procurement (F.A.A.P.P.)	a) Budget Preparation b) Accounts c) Audit d) Public Procurement (including Contract Management)
14	Ship Building Financial Assistance Portal	a) Shipyard Registration b) Change in Shipyard Information c) In- Principal Approval d) Release of Financial Assistance
15	Visitor Access Management System	a) User Identification b) Track of visitors in office c) Schedule appointments with Officials

E. Technology Stack

The project leverages a modern technology stack designed to ensure scalability, security, and user-friendliness. The key components include:

a) **Frontend Technologies:** HTML5, CSS3, and JavaScript frameworks (React or Angular) for creating responsive and intuitive user interfaces.

b) **Backend Technologies:** Node.js or Java Spring Boot for server-side development, ensuring robust performance and scalability.

c) **Database Management:** MySQL8.3 for efficient data storage and retrieval, supporting both relational and non-relational data models.

d) **Cloud Infrastructure:** AWS or Azure for hosting services, providing flexibility and reliability in resource management.

e) **Security Frameworks:** Implementation of OAuth2 and JWT for secure authentication and authorization processes.

F. Project Timelines and Costing

The project has been structured into two major phases:

a) Implementation Phase and

a) Operations & Maintenance (O&M) Phase

The Implementation Phase is targeted for completion within 12 months from the award of the contract, followed by a 5-year O&M Phase.

The total project cost is around 55 Crores, encompassing software development, cloud infrastructure, cybersecurity certification, IT facility management, training, and change management. The project will be delivered by CMS Computers Ltd. as the System Integrator selected through the Quality cum Cost Based Selection (QCBS) method, ensuring both technical competence and financial efficiency.

G. Project Governance

As per letter No. G-24017/1/2017-MA (325627) dated 14.10.2024 from Ministry of Ports, Shipping and Waterways, 3 committees have been constituted to look after implementation of e-Samudra project of DGS.

Criteria	Technical Advisory Committee	Administrative Committee	Steering Committee
Role	a) To ensure that the deliverables are as per the RFP / Agreement & technical specifications are followed b) To advise on technical matters in e-Samudra project implementation	a) To manage all contractual matters, milestones achievement & progress monitoring, make appropriate recommendations in e-Samudra project implementation	a) To ensure that the e-Samudra project implementation progresses smoothly and timely

H. Project Status

The project is currently in the development and testing phase, with pilot launches expected in the last quarter of 2025.

Development of New DGS Website and Social Media Platform

4.3 Development of New DGS Website and Social Media Platform

A. About the Project

In the context of a digital-first governance paradigm, DGS recognized the critical need for a modern, secure, and inclusive digital communication platform. Historically, the DGS website and communication systems served as the primary interface between the Directorate and its stakeholders, including seafarers, shipping companies, maritime training institutes (MTIs), and allied government bodies. However, the existing website architecture had become outdated, lacking mobile responsiveness, accessibility features, robust security, and real-time integration with social media or content workflows. This presented significant barriers to timely information dissemination, regulatory compliance, and citizen service delivery.

The revamped DGS website will **strengthen governance**, **stakeholder engagement**, and **digital empowerment**, aligning seamlessly with the objectives of **Digital India**, **Maritime India Vision (MIV) 2030**, and **Amrit Kaal Vision 2047**.

The development and rollout of the revamped DGS Website and Social Media Ecosystem is a multi-stakeholder effort led by the **E-Governance and IT Cell** of the Directorate General of Shipping. This initiative exemplifies strong inter-departmental collaboration, ensuring that digital transformation is anchored in functional needs, technical accuracy, regulatory integrity, and citizen service delivery. All Wings and Branches of DG Shipping have been actively engaged in content population, review workflows, media material, and stakeholder coordination.

B. Objectives

The primary objective of this initiative is to overhaul the existing DGS website and social media ecosystem to:

I Achieve full GIGW 3.0 compliance, including cybersecurity, accessibility, and multilingual content.

II Establish a dynamic and decentralized CMS (Content Management System) to empower departmental content ownership.

III Create a user-friendly, mobile-responsive interface for all categories of users: Government (G2G), Business (G2B), and Citizens (G2C).

IV Enable seamless integration with social media platforms and support multimedia campaigns.

V Build a comprehensive, searchable repository for circulars, regulations, orders, and notices from 1998 onward.

VI Facilitate digital engagement, transparency, and real-time public service information.

C. Strategic Alignment

01

Maritime India Vision 2030 & Amrit Kaal Vision 2047

These policy visions aim to modernize maritime infrastructure and governance. The revamped DGS platform supports this by introducing paperless, efficient digital systems, real-time information sharing, and a platform for international collaboration.

02

Ease of Doing Business

The project simplifies compliance, licensing, and approvals for seafarers, shipping companies, training institutes, and other stakeholders. By automating workflows and integrating online submissions, it reduces bureaucratic delays and manual intervention.

03

IMO Convention Compliance

The new website allows for the immediate publication of regulatory updates, IMO guidelines, and safety notices—ensuring stakeholders are aligned with international standards in safety, training, ship recycling, and environmental regulations.

04

Environmental Sustainability & Digital Governance

Moving towards a fully digital ecosystem significantly reduces the need for physical documentation, contributing to sustainability. The digital-first approach aligns with national climate goals and the larger Digital India initiative.

05

Cybersecurity & Data Governance (2022–2027)

The platform's design is based on robust data protection protocols, including ISO 27001 compliance, SSL encryption, secure login, and audit trails. This ensures resilience against data breaches while maintaining transparency and accountability.

06

Capacity Building through Digital Learning

Future enhancements will include e-learning modules for internal DGS training and public maritime education, fostering skill development and compliance awareness across the sector.

07

Seafarer Welfare and Public Outreach

With user-centric design and multilingual content, the platform ensures better access to welfare schemes, grievance redressal mechanisms, and safety-related announcements. Verified social media handles enhance reach, especially during emergencies.

08

Emergency Response & Crisis Communication

Integrated social media and digital notification systems ensure that stakeholders are informed in real-time during maritime accidents or policy updates—supporting the national maritime surveillance and response framework.

D. Key Features/ Modules of the Project

The new DGS website has been built on a secure, scalable, and government-compliant digital architecture with the following modules and features:

I **Compliance and Governance**

a) Fully aligned with GIGW 3.0 and STQC standards.

b) ISO 27001-based security protocols including role-based access control, audit trails, and data backups.

c) Hosted on CDAC cloud infrastructure with disaster recovery support.

II **Content Management System (CMS)**

a) Role-based CMS architecture: Content Creator → Reviewer → Approver.

b) Auto-expiry, archival, and rollback features for version-controlled content governance.

c) Metadata tagging and AI-based smart search indexing.

III **User Interface and Accessibility**

a) Mobile-first responsive design with seamless navigation across all devices.

b) Accessibility features in compliance with WCAG 2.1, including screen reader support, contrast settings, and keyboard navigation.

c) Bilingual content (Hindi & English), in accordance with the Official Languages Act.

IV **Smart Repository and Search Engine**

a) Advanced search with filters by year, category, issuing authority, and keywords.

b) Document preview, download, and historical archiving for over 25 years of records.

c) HTML conversion of older circulars (1998–2015) for digital indexing.

V **Multimedia Integration**

a) Dedicated section for videos, speeches, awareness reels, and campaign banners.

b) Backend support for content upload, tagging, and social channel publishing.

E. Key Functions incorporated in the Revamped DGS Website Homepage

Figure 7 Homepage of the Revamped DG shipping Website

The **redesigned homepage** of the Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways, aligns with GIGW 3.0 and Digital India standards.

This section of the revamped DGS website offers streamlined access to maritime Acts, Orders, Circulars, and Notices via an intuitive tabbed interface.

I Official Government Identity

a) The homepage prominently displays the Government of India Emblem, the Directorate General of Shipping logo, and uses a secure and authentic ". gov.in" domain, ensuring official credibility and user trust.

II Smart Navigation & Audience Segmentation

a) A simplified and structured menu categorizes users into key stakeholder groups such as Seafarers, Shipowners, Training Institutes, and Maritime Authorities.

b) A dedicated "What's Latest" section is active for circulars, DGS orders, and public notices, auto updated through CMS.

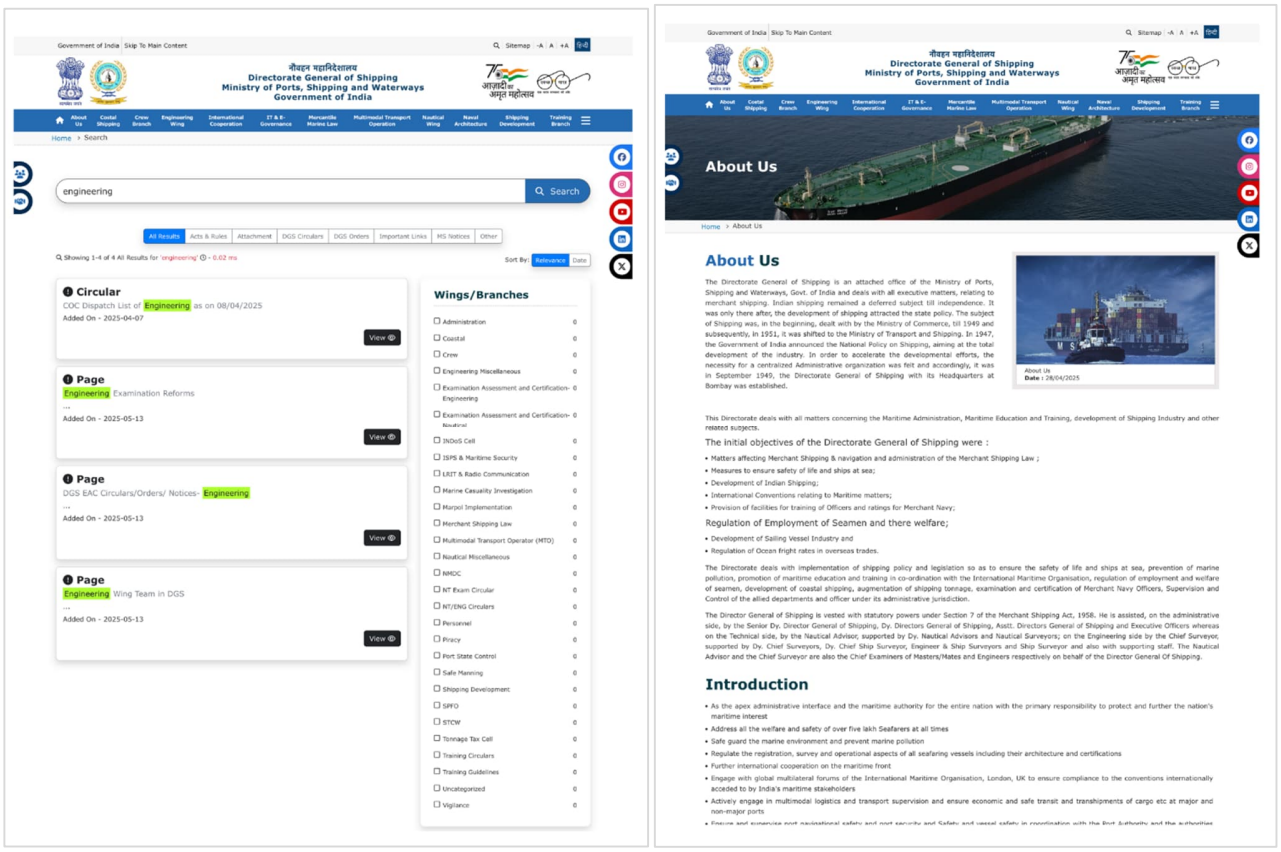


Figure 8 Search Engine view and About Us page

III Smart Search Engine

a) A fully integrated smart search feature allows users to filter by year, issuing branch, keyword, and document type, covering documents from 1998 to present.

b) The search supports bilingual queries and includes autocomplete suggestions, enhancing discoverability.

IV Mobile-First & WCAG 2.1 Compliant Design

a) The entire website is built on a responsive framework ensuring seamless experience on mobiles, tablets, and desktops.

b) Accessibility features such as screen reader support, contrast toggling, keyboard navigation, and font scalability are fully implemented.

V **Language Accessibility**

a) A prominent language toggle feature is provided on the homepage, enabling instant bilingual access (Hindi & English) in line with the Official Languages Act.

VI **Content Ownership and Freshness**

a) All pages and notices display “Last Updated” timestamps and departmental ownership, aligned with GIGW 3.0 metadata standards.

b) Content is auto-archived when outdated and regularly reviewed through department-wise CMS workflows.

VII **Dynamic Media Gallery**

a) A visual carousel section on the homepage features DG(S) speeches, video messages, maritime campaigns, and safety awareness films.

Seamless integration with verified social media handles including YouTube, X (Twitter), LinkedIn, and Facebook ensures multimedia continuity.

VIII **One-Stop Citizen & Stakeholder Services**

a) The homepage includes links to certificate applications, grievance redressal, internship portals, public feedback forms, and other key online services.

b) A quick links section is embedded for fast access to commonly used services and documents.

IX **Cybersecurity and Privacy Assurance**

a) Trust indicators such as ISO 27001, STQC clearance, WAF implementation, and CERT-IN audit compliance are displayed to assure data security and platform integrity.

b) Privacy Policy, Terms of Use, and Disclaimer links are clearly visible in the footer.

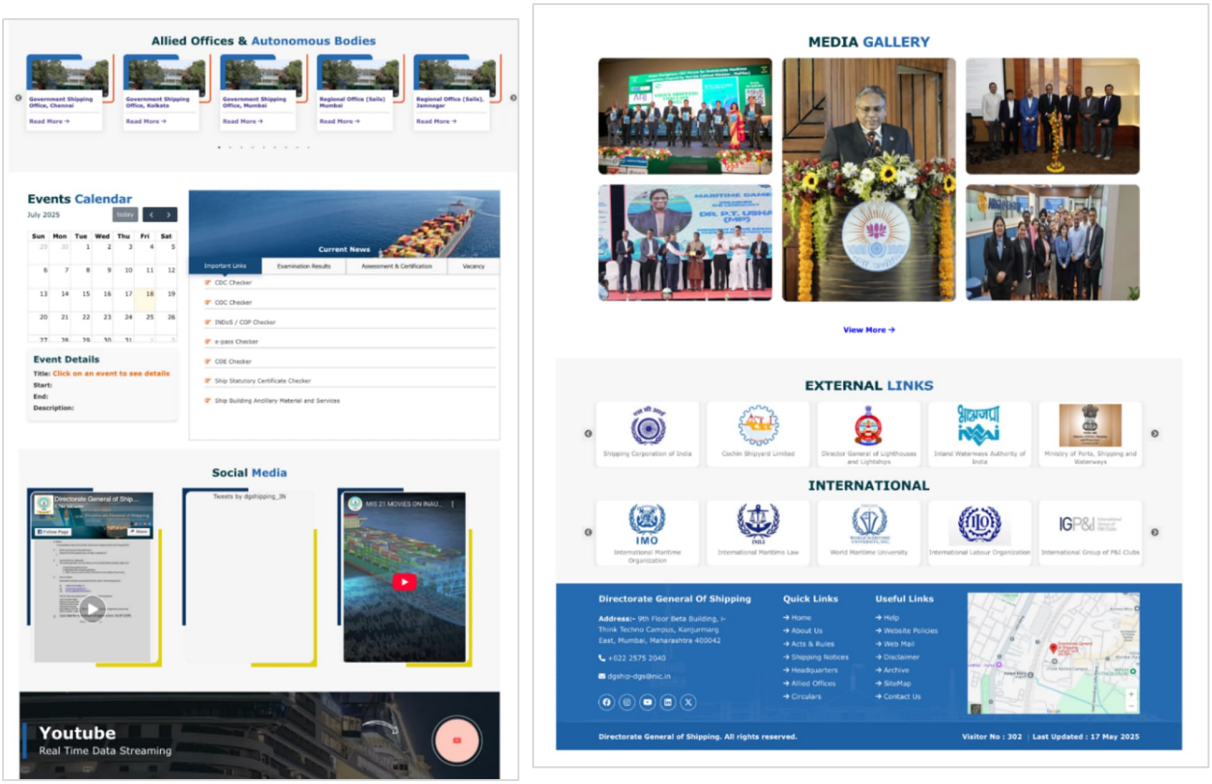


Figure 9 Redesigned Page of Media Gallery and Other different aspects

X **Digital India Integration**

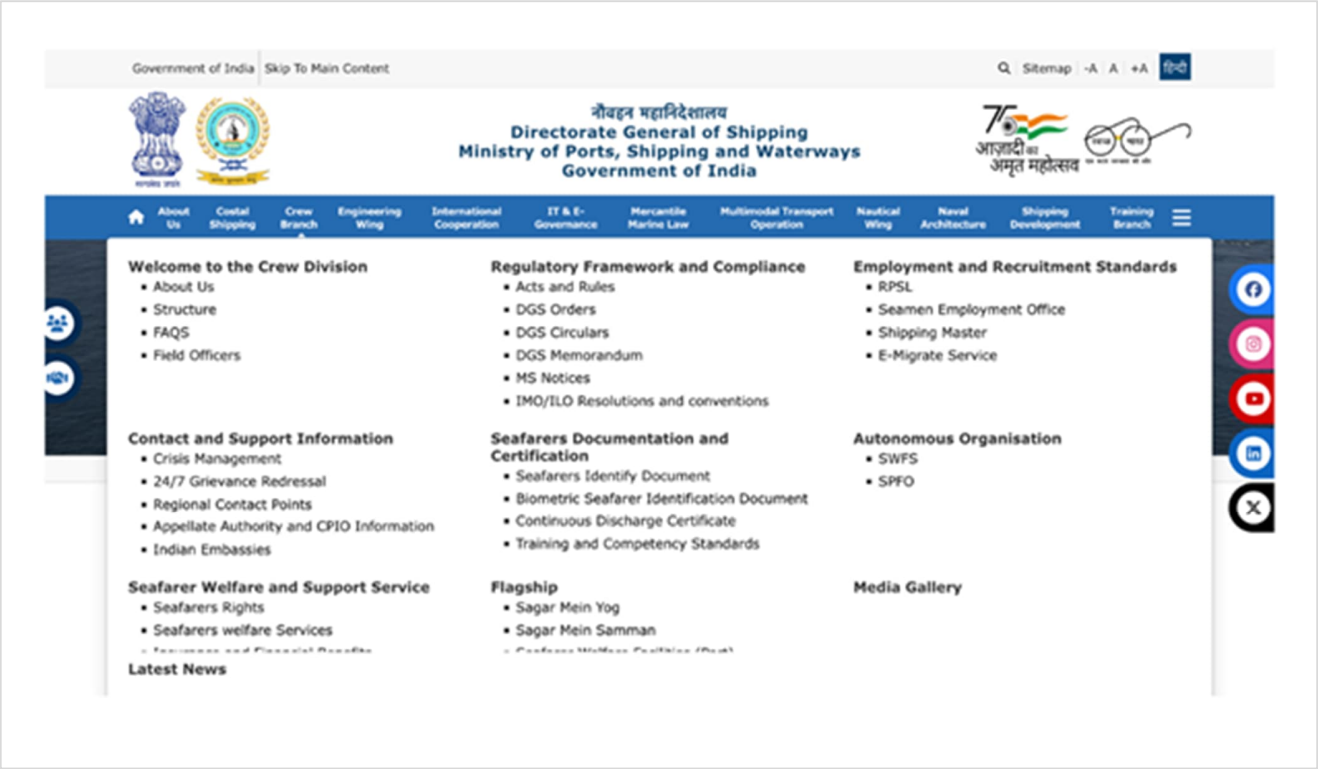


Figure 10 Menu Bar showing the different processes and pages of DG shipping

F. Social Media Ecosystem: A Strategic Communication Arm

As part of the digital transformation, DGS integrated social media as a critical outreach and engagement tool.

I **Strategic Goals**

a) Disseminate real-time updates, circulars, press releases, and policy announcements.

b) Raise awareness around training requirements, safety regulations, and welfare schemes.

c) Engage with seafarers, stakeholders, and the public through visual storytelling, campaign messaging, and event highlights.

II **Implementation Components**

a) Verified handles on X (Twitter), Facebook, LinkedIn, Instagram, and YouTube.

b) Weekly content calendar aligned with events such as Maritime India Week, National Seafarers Day, and IMO observances.

c) Deployment of a digital studio in DGS with chroma walls, DG-branded backdrops, and video production setup.

d) Tools such as Meta Creator Studio, Buffer, and GA4 for scheduling and analytics.

III **Media Content**

a) DG speeches, event coverage, training explainers, awareness campaigns, and testimonials.

b) Department-wise content themes and visuals curated under a centrally managed social calendar.

G. Technical Stack and Architecture

The revamped website and digital communication platform are powered by a modern, secure, and scalable technology stack, in full alignment with MeitY, GIGW 3.0, and STQC standards. Designed with future readiness, modularity, and high availability in mind, the platform leverages robust open-source frameworks, government cloud infrastructure, and seamless integration capabilities.

I **Backend & Infrastructure-** To ensure performance, flexibility, and cost-efficiency, the system is deployed on a government-approved cloud infrastructure and built on enterprise-grade technologies:

a) **Hosting Environment:**

i. NIC Cloud (earlier phase)

ii. Transitioned to CDAC Cloud to optimize hosting costs and enhance support scalability.

b) **Backend Framework:** PHP 8.3, using the Laravel Framework, offering a secure, modular, and high-performance foundation.

c) **Databases:** MySQL / PostgreSQL used for content and document storage, optimized for query performance and large data sets.

d) **API Layer:** RESTful APIs built for seamless integration with core maritime systems including:

i. INDoS (Indian National Database of Seafarers)

ii. e-Samudra Portal

iii. SBFA and other DGS e-governance modules

II **Frontend & UI/UX**

The frontend is built for high responsiveness and accessibility across devices and user categories (seafarers, shipping firms, training institutes, officers):

a) **Languages and Libraries:** HTML5, CSS3, JavaScript, and Bootstrap for lightweight, responsive design.

b) **Dynamic Interfaces:** Built using Vue.js and React, allowing modular loading, real-time search capabilities, and interactive dashboards.

c) **Content Management System (CMS):** Hybrid CMS architecture leveraging Drupal and Laravel CMS, with:

i. Role-based dashboards (Creator → Reviewer → Approver)

ii. Department-level content control and publishing rights

iii. Auto-archival, tagging, version control, and rollback features

III **Security and Performance**

Security and business continuity are embedded at the architectural level, aligning with **ISO 27001** and **CERT-In** guidelines:

a) **Core Security Measures:**

i. Web Application Firewall (WAF)

ii. SSL/TLS encryption for all transactions

iii. Session-based authentication, password policies, and login auditing

iv. Data masking to protect sensitive user details

b) **Disaster Recovery (DR) & Uptime:**

i. Regular cloud backups, failover-ready architecture, and 99.9% uptime

ii. DR setup enabled at CDAC Tier-II data center to ensure business continuity

IV **Analytics & Reporting**

To promote transparency, measure performance, and enable evidence-based decisions, the platform incorporates powerful analytics tools:

a) **Google Analytics 4 (GA4):**

i. Deployed across the site (excluding admin paths)

ii. Real-time user tracking, page views, bounce rate, heatmaps

b) **Social Media Dashboards:** Integrated reporting of likes, shares, impressions, and post engagement across all DGS handles

c) **Management Reporting:**

i. Monthly performance dashboards for DG-level oversight

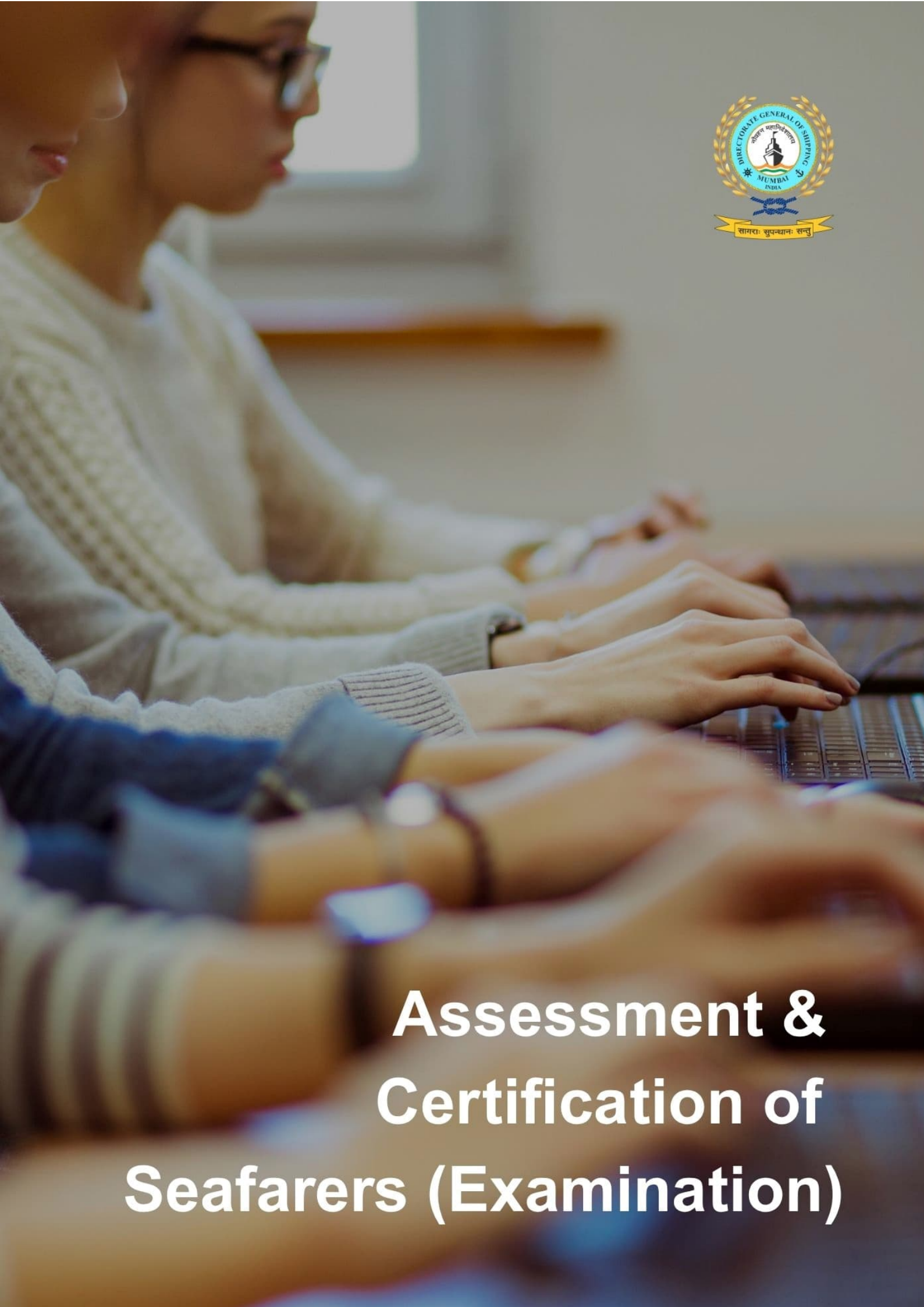
ii. Department-wise engagement metrics and feedback loops

V **Scalability and Integration-Readiness**

The modular and API-first architecture ensures that the platform can be easily scaled and integrated with:

a) Upcoming services such as Chatbots, Mobile Applications, and Grievance Dashboards

b) External platforms like CPGRAMS, National Maritime Logistics Portal, and international maritime databases.



Assessment & Certification of Seafarers (Examination)

4.4 Assessment and Certification of Seafarers (Examination Reforms)

A. About the Project

The Directorate General of Shipping (DGS) has launched a comprehensive initiative to establish an end-to-end digital examination platform that redefines the assessment ecosystem within the maritime domain. This initiative is designed to enhance the efficiency, transparency, and reliability of the examination process through the integration of advanced digital technologies and streamlined administrative workflows. It aims to automate critical functions thereby minimizing manual intervention and administrative delays.

A key focus of the initiative is to strengthen monitoring and oversight mechanisms throughout the assessment lifecycle, ensuring real-time supervision, accurate performance tracking, and strict adherence to established protocols. To uphold the integrity and credibility of examinations, the platform will incorporate state-of-the-art security features that safeguard against malpractice and unauthorized access. Through this initiative, DGS seeks to build a robust, scalable, and secure examination framework aligned with global standards of competence and governance.

The implementation and governance of the examination reform initiative are being jointly led by the IT & e-Governance Division of the Directorate General of Shipping, while working closely with the Nautical, Engineering and Training Branch, under the supervision of Chief examiners (Chief Surveyors & Nautical Advisor). These branches serve as the core institutional anchors, contributing domain expertise and regulatory insight essential for shaping the end-to-end digital assessment framework. Working in close coordination, they oversee the technical, academic, and operational dimensions of the reform to ensure coherence, quality, and compliance across all components. Their unified approach facilitates the successful rollout of examination modernization efforts at the national level, reinforcing the Directorate's commitment to transparency, efficiency, and global best practices in maritime competency assessment.

B. Objective

The primary objective of the Examination Reform Initiative is to design and implement a robust, technology-enabled system that strengthens the overall assessment ecosystem under the Directorate General of Shipping. The initiative seeks to drive operational efficiency, transparency, and integrity in the conduct of examinations through the following key objectives:

I To develop a comprehensive end-to-end digital platform for the administration, conduct, and evaluation of Certificate of Competency (CoC) and other maritime-related examinations.

II To streamline administrative functions such as candidate registration, seat allocation, attendance tracking, and result processing through automated workflows, thereby reducing manual intervention and improving turnaround time.

III To establish advanced monitoring and control mechanisms for real-time surveillance, reporting, and analytics of all examination activities to ensure compliance, fairness, and accountability.

IV To implement strong data security and encryption protocols for the protection of question banks, candidate data, and exam results, ensuring confidentiality, integrity, and non-repudiation.

V To introduce standardized practices for examiner evaluation and candidate assessment, enhancing objectivity and consistency across examination centres.

VI To enable seamless coordination among stakeholders including exam administrators, evaluators, observers, and technical teams through centralized dashboards and communication channels.

VII To facilitate interoperability with the Directorate's existing IT ecosystem and future integration with national academic platforms and the Ministry's centralized data systems.

VIII To ensure scalability and adaptability of the solution for nationwide implementation across all Mercantile Marine Departments (MMDs), enabling uniform service delivery and ease of access for candidates and institutions.

IX To support the Directorate's strategic goals of digital transformation, Ease of Doing Business, and improved Data Governance Quality Index (DGQI) performance.

Through the implementation of this initiative, DGS aims to establish a modern, responsive, and trustworthy examination framework that enhances the quality and credibility of maritime certifications, while aligning with global standards and regulatory expectations.

C. Strategic Alignment

01

Alignment with Maritime India Vision 2030

a) A fully online platform for Certificate of Competency (CoC) and modular examinations has been developed to allow anytime-anywhere access.

b) Manual and redundant processes have been eliminated, reducing paperwork and administrative delays.

c) The transition enhances ease of doing business for Indian seafarers and aligns with MIV 2030's objective of modernizing maritime governance.

02

Alignment with Amrit Kaal Vision 2047

a) Modernize and digitize examination infrastructure across maritime training institutions.

b) Integrate AI-based proctoring and secure digital evaluation tools to improve exam integrity.

c) Ensure that India's maritime certification system matches international standards, thereby increasing the global employability of Indian seafarers.

d) Contribute to building India as a maritime talent hub for the world.

03

Alignment with STCW Convention

a) Adopting technology-driven, standardized, and verifiable examination methods.

b) Establishing uniformity and transparency in the conduct and evaluation of examinations.

c) Ensuring consistency in competence certification aligned with international maritime safety and operational standards.

D. Key Features of the Project

The project introduces a robust and comprehensive digital examination platform to manage the full lifecycle of maritime competency assessments under the Directorate General of Shipping (DGS). Engineered with a focus on security, scalability, and user-centricity, this platform is a critical step in modernizing India's maritime certification framework.

It caters to all stakeholders—candidates, examiners, administrators, and policy-makers—through an integrated suite of functional modules. The system also incorporates advanced security protocols and monitoring mechanisms to ensure the integrity, fairness, and efficiency of the examination process.

I **Secure Registration & Candidate Lifecycle Management**

a) Unified digital registration portal for CoC and modular exams

b) Candidate profiling, eligibility validation, and scheduling

c) Application tracking, admit card issuance, and result publication

II **Multi-User Role Functionality**

a) Role-based access for candidates, examiners, invigilators, and administrators

b) Permissions and workflows tailored for each user group

c) Enables decentralized operations with centralized oversight

III **Centralized Controller of Examination Dashboard**

a) Real-time monitoring of exam sessions across centers

b) Data analytics for performance insights, candidate trends, and bottlenecks

c) Central control over scheduling, resource allocation, and reporting

IV **Advanced Security & Monitoring**

a) AI-enabled remote proctoring with facial recognition

b) Browser lockdown, screen recording, and audit logs

c) Secure exam paper handling and encrypted data transmission

V **Question Bank & Evaluation Framework**

a) Standardized digital question bank repository with tagging by subject/competency

b) Randomized question generation to minimize bias and malpractice

c) Digital evaluation tools with structured rubrics and auto-calculation of scores

VI **Operational Oversight & Support Systems**

a) Automated notifications and grievance redressal mechanisms

b) Integrated helpdesk support for technical and administrative issues

c) MIS and audit trails for compliance and regulatory checks

The modules in the comprehensive end-to-end digital solution for the examination reform of the DGS and the processes involved are:

Table 5 Different Modules of the end-to-end digitization processes of Examinations

#	Module	Sub Module	Process
1	User Registration	Registration of Candidates	Development of a user-friendly interface for candidates to create accounts on the proposed system

#	Module	Sub Module	Process
			Design and implementation of a secure authentication system for candidates to create accounts and access registration services
		Profile Management	Provision of options for candidates to upload and manage supporting documents, such as identification proof, certifications, medical records, and employment history
			Provision of a Controller of Examiner dashboard view which will be handled by a competent authority of DGS, namely the Chief Examiner
		User Authentication and Roles	Implement user authentication to verify the identity of users logging into the system
			Utilize role-based access control (RBAC) to define different levels of access privileges.
			Designate super administrators with elevated permissions for accessing and modifying sensitive data
		Audit Logging Middleware/Interceptor	Develop middleware or interceptors within the backend application to capture actions initiated by administrators.
			Design a database scheme to store audit logs.
			Implement access controls to restrict access to audit logs to authorized users only.
2	Eligibility Assessment	Document Submission and Verification	Integration of document upload functionality, allowing candidates to submit scanned copies or digital documents as part of their registration process
			Provision of secure logins by competent authority of DGS to check the required documents for each examination the candidate has opted for
		Application Tracking and Status Update	Development of a tracking system to allow candidates to monitor the status of their registration applications in real-time.
			Configuration of status updates to inform candidates about the progress of their applications, including approval, rejection, or pending review
3	Seat Booking	Seat Reservation System	Development of an interface for seafarers to view available seats and make bookings
			Integration of real-time seat availability updates and dynamic booking calendars
		Booking Management	Design and implementation of booking management features, allowing users to search for available seats, select preferred dates, and make reservations
			Provision of options for users to view seating charts, select specific seats, and customize their booking preferences

#	Module	Sub Module	Process
		Payment Gateway Integration	Integration of payment gateway services to facilitate online payments for seat reservations.
			Implementation of secure payment processing mechanisms, including encryption and fraud prevention measures.
			Configuration of multiple payment options, such as credit/debit cards, online banking, and digital wallets.
		Confirmation and Notification System	Development of automated confirmation emails or SMS notifications to confirm seat bookings and provide booking details to users.
			Implementation of cancellation and refund policies, allowing users to modify or cancel their bookings as needed
		Issuance of Admit Card	Provision for candidates to view, download and print their admit cards
			Implementation of security features, such as watermarks and barcodes, to prevent tampering and unauthorized duplication of admit cards.
4	Question Bank and Question Paper preparation	Identification and approval of question paper setters and Subject Matter Experts (SME's)	Identification process documentation outlining selection criteria and methodology
			Approval documentation for selected question paper setters and subject matter experts.
		Question Bank	Question bank content creation and refinement documentation.
			Quality assurance reports ensuring the quality, relevance, and accuracy of questions
			Compliance documentation demonstrating alignment with DGS standards and requirements
			Seamless integration of the approved question bank into the examination system
			Periodicity and quantification of replenishment of the question bank through the system as approved by DGS
		Question Paper Creation	Fully developed module within the examination system for generating question papers using the question banks.
			User interface design for question paper creation, including options for selecting subjects, difficulty levels, and question types
			Backend functionality for accessing and retrieving questions from the question banks based on specified criteria

#	Module	Sub Module	Process
			Development of algorithms to select questions randomly from the question banks while considering their difficulty levels (easy, medium, difficult)
			Integration of the randomization algorithm into the question paper creation module to ensure dynamic selection of questions for each paper.
			Configuration of the module to access and retrieve questions from the approved question banks
5	Conduct of Examination	Written Examination	Design and implementation of user interfaces for candidates to log in to the system and access the question paper
			Provision of laptops/scanners at the examination centres for students to undertake the examination
			Implement a scanning system equipped with dedicated hardware for scanning offline answer sheets
			Configure scanning parameters to ensure accurate image capture and quality
			Provision for scanned answer sheets to be embedded in the system
		Proctoring System Development	Development of a proctoring system integrated into the examination platform to monitor candidates during the exam
		CCTV Surveillance and Integration	Integration of CCTV cameras into the examination venue for additional surveillance coverage
		Oral Examination	Implement video-conferencing feature for conducting oral examination for two-way interaction between candidate and examiners (internal as well as external)
			Module for internal examiner to update the score of the individual candidate
		Exit Examination	Development of a secure and user-friendly online platform for conducting computer-based MCQ tests
			Creation of an intuitive interface for candidates to navigate through the examination process.
			Development of an automated grading system to evaluate candidates' responses to MCQs
			Validation of answers against the correct solutions to ensure accurate scoring
			Generation of immediate results upon completion of the examination
			Inclusion of a timer feature to monitor and display the remaining time for the examination

#	Module	Sub Module	Process
			Addition of an auto-submit button for candidates to submit their responses automatically upon completion or when time expires
		All India Exit Examination for GP Ratings and CCMC	Development of a secure and user-friendly online platform for conducting computer-based MCQ tests
			Creation of an intuitive interface for candidates to navigate through the examination process.
			Development of an automated grading system to evaluate candidates' responses to MCQs
			Validation of answers against the correct solutions to ensure accurate scoring
			Generation of immediate results upon completion of the examination.
			Inclusion of a timer feature to monitor and display the remaining time for the examination
			Addition of an auto-submit button for candidates to submit their responses automatically upon completion or when time expires.
		Submission of answer sheets	Provision of high-resolution scanners to scan answer sheets at each examination centers
			Development and integration of a digital submission system within the examination platform
			Implementation of a mechanism to automatically map scanned answer sheets to the corresponding candidate profiles
			Implementation of encryption and access controls to protect the integrity and confidentiality of the answer sheets
6	Evaluation and Re-evaluation Module	Evaluation System	Design user interfaces for examiners to access and evaluate answer sheets and implement features for marking, commenting, and scoring
			Implement scoring mechanisms within the evaluation system to calculate scores based on the established criteria
			Provision for moderation within the system
		Re-evaluation request handling system	Provision within the system for managing re-evaluation requests submitted by candidates dissatisfied with their assessment outcomes.
7	Misconduct	Misconduct Reporting Form	Develop a misconduct reporting form where examiners can input details of identified misconduct cases.
			Include fields for capturing relevant information such as candidate details, description of misconduct, evidence, and severity level

#	Module	Sub Module	Process
		Approval Workflow	Design a two-level approval workflow for reviewing misconduct reports.
			Allow Chief Examiner to review and either approve or reject misconduct reports submitted by the concerned examiners
			Implement a mechanism for routing approved misconduct reports to the chief examiner for final review and decision.
			Allow the chief examiner to review the details of each misconduct case, including examiner comments and evidence provided.
			Provide options for the chief examiner to approve, reject, or escalate misconduct cases for further investigation if necessary.
		Communication	Notification of approval/rejection of logged in misconducts to candidates and examiners
8	Result publication and Issuance of Certificate	Result Publication System	Provision within the system to publish candidates' assessment results
			Design interfaces for candidates to access their results within the system
			Through API integration push the results on to the e-governance portal
		Issuance of Certificate	Create a certificate generation module within the system for producing official certificates of competency
			Integrate candidate information and examination results into certificate templates automatically
			Implement mechanisms for issuing digital certificates of competency to candidates electronically
			Ensure compatibility with digital signature standards and encryption protocols for certificate authenticity and security
			Provide options for candidates to download and verify their digital certificates through secure channels

E. Project Timeline and Costing

The Project is being implemented through a phased rollout strategy, beginning with a pilot phase to ensure comprehensive testing, stabilization, and optimization of the digital platform.

Pilot Implementation – MMD Noida

The pilot phase has commenced at the Mercantile Marine Department (MMD), Noida, serving as the testbed for full-scale deployment. This phase will validate the operational readiness of the end-to-end examination system, including candidate registration, digital assessments, evaluation workflows, and real-time monitoring tools.

Once the platform demonstrates stability, scalability, and stakeholder satisfaction in this controlled environment, the system will be progressively scaled to other MMDs and examination centers across the country over the next phases.

The total project cost is approximately ₹34 Crores for a 3-year period. The project cost encompasses technology development, deployment, maintenance, and examination logistics, and is distributed across two key implementing agencies:

I **Centre for Development of Advanced Computing (C-DAC)**

a) Lead agency for the design, development, and technical management of the digital examination platform

b) Responsible for software architecture, data security, user management, and platform maintenance

II **National Testing Agency (NTA)**

a) Entrusted with the conduct of examinations and logistical operations across centers

b) Brings extensive expertise in large-scale standardized testing, invigilation, and test security protocols.

The Assessment & Certification of Seafarers, specifically for the Certificate of Compliances (written and oral) is being engineered as an end-to-end digital solution with complete integrity and multiple layers of validation and redundancy to provide a high-end technology solution by the strategic partners, being, the Directorate General of Shipping, CDAC and NTA. The proof-of-Concept pilot is presently underway at Noida.

Figure 11 Pilot Implementation

F. Architecture of the Platform

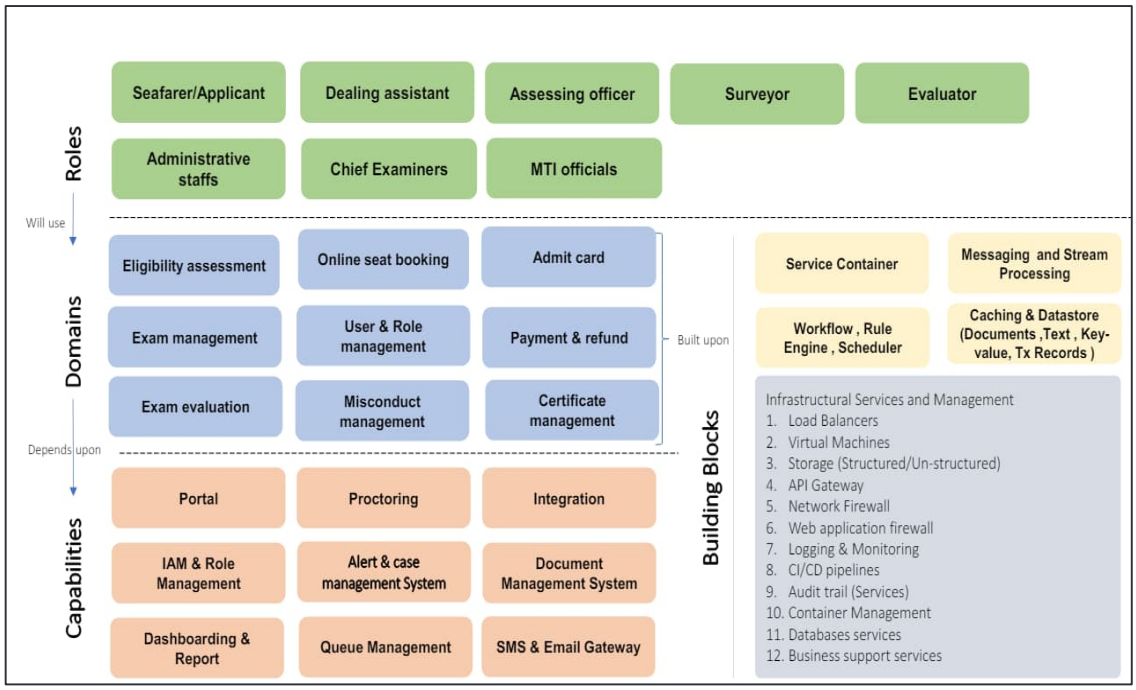


Figure 12 Functional Architecture of the Examination Reform

The digital examination platform under the Examination Reform Initiative is built on a secure, modular, and role-based architecture designed to serve a diverse set of stakeholders, including seafarers, examiners, administrators, and training institutes. The system integrates core functional domains such as eligibility assessment, online seat booking, admit card issuance, examination management, evaluation, certification, payment processing, and misconduct management. These functions are supported by a robust technological backbone comprising capabilities like identity and access management, proctoring, dashboarding, document and case management, SMS/email gateways, and queue management. The platform is further strengthened by foundational building blocks including service containers, messaging and stream processing, workflow engines, and caching/datastore systems, all running on a scalable infrastructure that utilizes virtual machines, load balancers, CI/CD pipelines, API gateways, and secure storage. This layered design ensures seamless operations, enhances examination integrity, and aligns with global digital governance standards, positioning India's maritime examination system for future-ready, nationwide adoption.

The proposed Written and Oral Examination System under the Examination Reform Initiative introduces a structured and automated digital framework that spans the full examination lifecycle—from user registration and eligibility verification to exam conduct, result management, and certification. It features user-centric modules for secure login, profile and document verification, seating and payment management, question paper creation and publishing, and digital invigilation. The system integrates rule-based configurations for eligibility and QP management, incorporates AI-based proctoring, and enables automated scanning, evaluation, and grading of answer scripts. Result processing is streamlined through consolidated grading, re-evaluation management, and digital issuance of certificates via the eGovernance portal. The platform also includes provisions for misconduct reporting and escalation workflows, supported by real-time alerts and notifications. Analytical dashboards provide multi-format performance insights through KPIs, tabular summaries, and custom reports. A maturity milestone framework ensures iterative testing, user feedback, and go-live readiness, positioning this system as a modern, scalable solution for maritime certification in India.

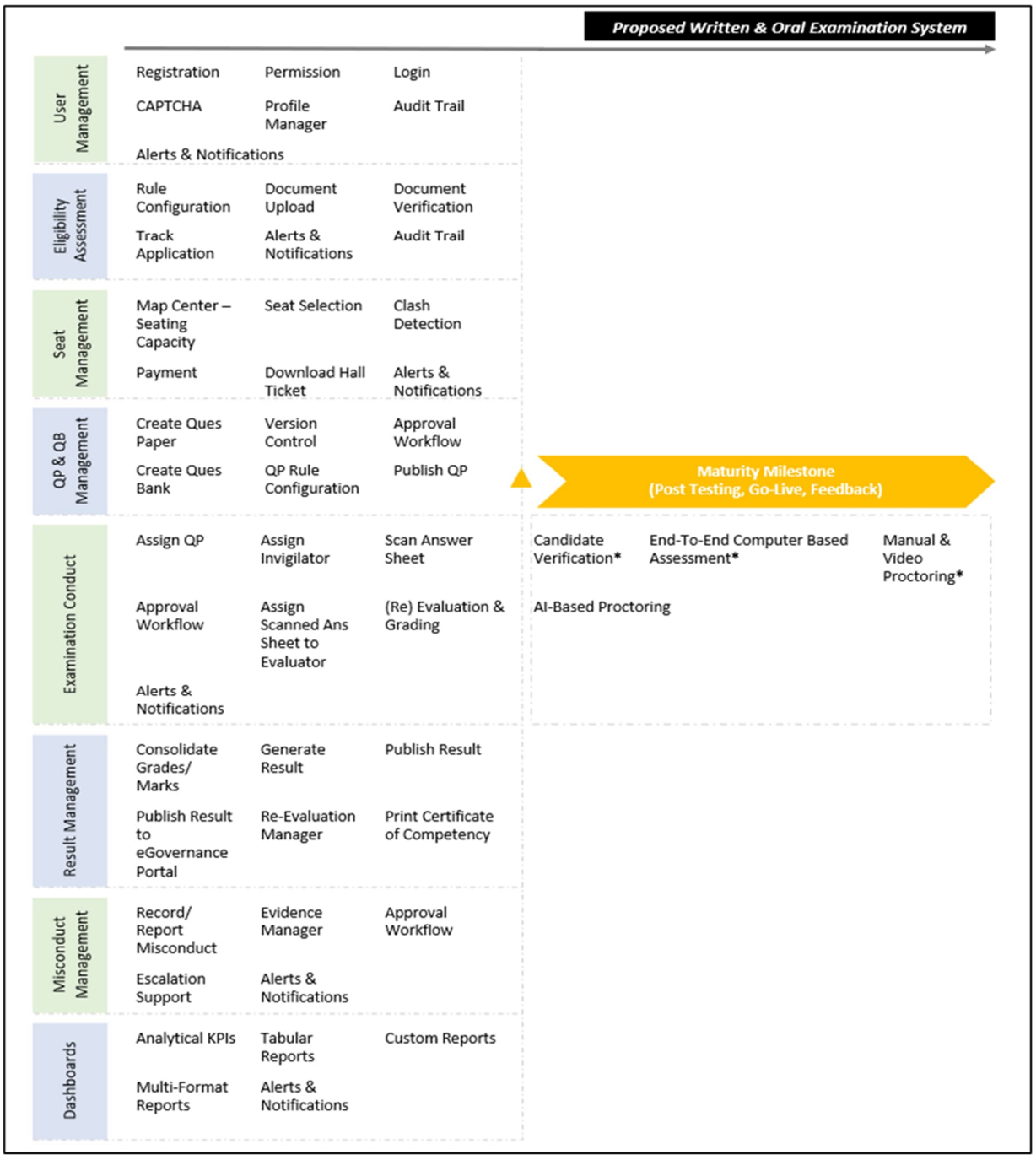


Figure 13 Proposed Written and Oral Examination of DG shipping

G. Project Status

As of June 2025, the Examination Reform Initiative has successfully entered its pilot implementation phase at the Mercantile Marine Department (MMD), Noida, with operations commencing on April 1, 2025. This marks a major milestone in the Directorate General of Shipping's journey toward a fully digitized maritime examination system.

The pilot phase covers both Nautical and Engineering streams and is focused on testing the core functionalities of the digital platform in a live environment.

I **Core Modules Deployed in Pilot Phase**

Three essential modules have been made live and are currently undergoing iterative testing and refinement:

a) **Conduct of Examination** - Digital test scheduling, candidate login, and AI-enabled proctoring systems.

b) **Evaluation and Re-evaluation -** Online assessment tools, structured grading workflows, and re-evaluation provisions.

c) **Result Publication -** Real-time result processing, approval dashboards, and secure digital access to results.

d) These modules are being continuously optimized to enhance system performance and validate end-user workflows in preparation for User Acceptance Testing (UAT).

II **Rollout Plan and Future Outlook**

a) Pilot Stabilization Period: April 2025 – March 2026

b) UAT Completion & Optimization: Targeted within FY 2025–26

c) Full-Scale Rollout Across MMDs: Starting April 1, 2026

d) Project Duration: Three years (2025–2028), covering phased infrastructure deployment and system adoption across India.

ERP Solution for Seafarers Provident Fund Society (SPFO)

4.5 ERP Solution for Seafarers Provident Fund Society (SPFO)

A. About the Project

The Seamen's Provident Fund Organization (SPFO), established under the Seamen's Provident Fund Act, 1966 (Act No. 4 of 1966), is entrusted with the administration, implementation, and monitoring of the Seamen's Provident Fund Scheme, which has been operational retrospectively since July 1, 1964. The scheme is designed to provide retirement security and social protection to Indian seafarers, along with essential financial support to their families in the event of the seafarer's demise.

The SPFO allows seafarers to avail non-refundable and final withdrawals based on eligibility, and in FY 2022–23, it processed over 1,849 claims amounting to ₹86.43 crores, reflecting its vital role in the financial well-being of maritime workers. The governance structure of SPFO ensures balanced representation from the Government, Employers, and Employees on its Board, reinforcing its mandate to protect the rights and entitlements of all stakeholders in the seafaring community.

In addition to provident fund contributions, SPFO also receives ex-gratia and annuity payments from shipping companies, which are credited to individual seafarer accounts and invested once they cross predefined thresholds. Investment operations are carried out in accordance with regulatory guidelines, with surplus balances—beyond a set liquidity threshold—transferred to registered investment advisors, while a portion is retained to ensure timely settlement of withdrawal claims. This liquidity management mechanism enables the SPFO to maintain operational continuity, ensure timely payments, and fulfil its fiduciary responsibilities.

The Seamen's Provident Fund Organization (SPFO), under the administrative control of the Ministry of Ports, Shipping and Waterways (MoPSW), has embarked on a flagship digital initiative to modernize and automate its operations through the development of a comprehensive Enterprise Resource Planning (ERP) system.

The ERP initiative aims to create an end-to-end digital platform that integrates and streamlines all core functional areas of SPFO to ensure efficient, transparent, and user-centric service delivery to both seafarers and employers. The envisioned system will include modules for Provident Fund (PF) Management, Financial Accounting, Scheme Application Processing, Investment and Levy Tracking, GST and Tax Compliance, Payroll, Budgeting, and Technical Support Management. A user-friendly web portal will serve as the central access point, enabling seamless processes such as registration, contribution tracking, automated eligibility checks, withdrawal processing, real-time compliance monitoring, and approvals. The new system should work seamlessly without any dependencies on the existing applications such as the legacy PF management software and Tally software for account maintenance.

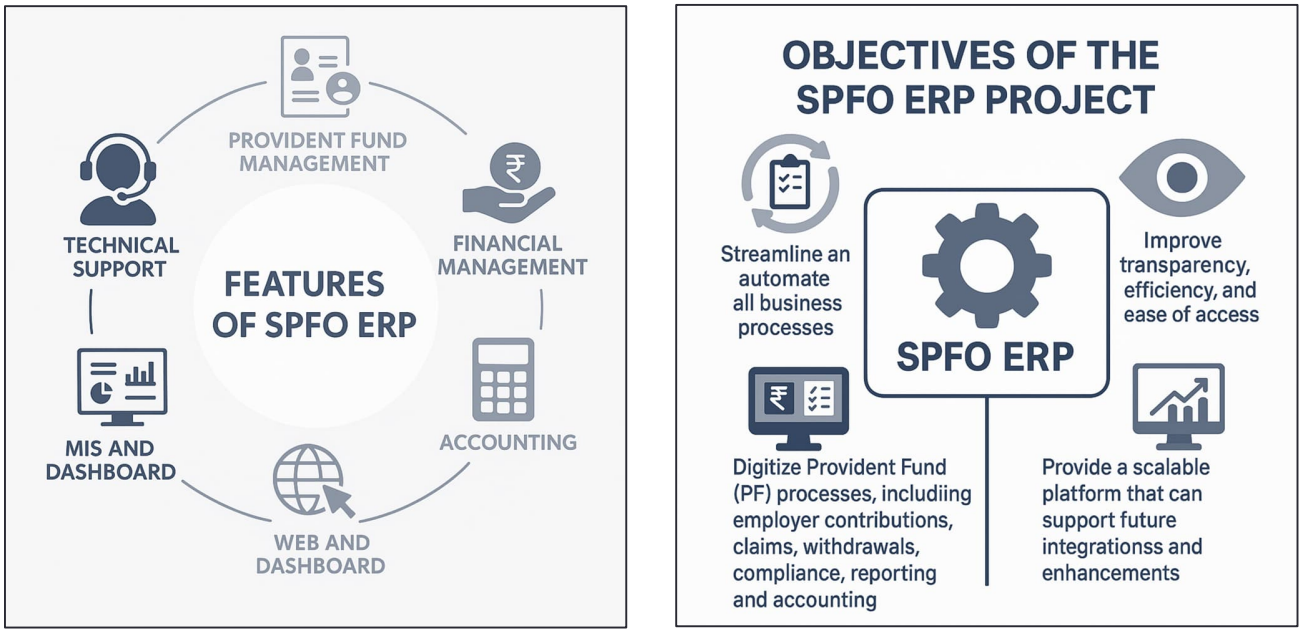


Figure 14 Features for the ERP

In essence, the SPFO ERP project marks a pivotal step in India's maritime digital transformation journey, aimed at elevating the governance, accessibility, and operational efficiency of seafarer welfare and provident fund services. The project is administered and driven by the Crew branch of Directorate general of Shipping with the support of the IT and E governance Branch for technical support.

B. Objectives

The primary objective of the SPFO ERP Project is to streamline and automate the end-to-end business operations of the Seamen's Provident Fund Organization (SPFO) by implementing a robust, scalable, and integrated ERP system. This digital transformation initiative aims to replace manual and semi-automated processes with a unified digital infrastructure that ensures accuracy, efficiency, and traceability across all functional areas.

I **Streamline and Automate All Business Processes**

The ERP system will integrate SPFO's diverse functions into a single platform to eliminate silos, reduce duplication of effort, and establish standardized workflows. By automating routine tasks such as employer registration, contribution processing, fund allocation, claim disbursements, and report generation, the system will significantly reduce manual intervention, thus minimizing errors, delays, and operational bottlenecks. This transformation will also include dynamic dashboards, alerts, and workflows that allow for real-time tracking and status updates.

II **Enhance Transparency, Efficiency, and Accessibility**

One of the core goals is to foster **greater transparency and trust** among stakeholders, particularly seafarers and employers. With ERP-led automation, seafarers will be able to track their provident fund balances, claims, and applications in real time through a self-service portal. Employers will have clear visibility into their compliance status, outstanding dues, and contribution schedules. The system will generate audit trails and reports to ensure accountability at every level and reduce dependency on physical interactions and paper-based processes.

III **Digitize Provident Fund (PF) Lifecycle**

The ERP solution will comprehensively digitize the entire PF management cycle, including:

a) Employer Contributions: Online uploading, validation, and reconciliation of monthly PF contributions.

b) PF Remittances: Digital interfaces for banks and treasury for real-time fund transfers and receipts.

c) Claims and Withdrawals: Seamless claim initiation, verification, approval, and disbursement workflows—supporting both final and non-refundable withdrawals.

d) Regulatory Compliance: Automated generation of statutory reports and certificates, tracking of defaults, and penalty calculations.

e) Accounting & Reporting: Real-time ledger updates, account reconciliations, financial analytics, and audit readiness.

f) This digitization will ensure compliance with regulatory mandates and help SPFO fulfill its fiduciary responsibilities more efficiently

IV **Provide a Scalable and Future-Ready Platform**

The ERP system will be designed to be **modular and scalable**, enabling SPFO to incorporate future functional enhancements, integrations with external agencies (e.g., banks, Ministry dashboards, Aadhaar, PAN verification services), and advanced capabilities such as analytics and AI-driven compliance checks. The platform will adhere to open standards and interoperability frameworks, ensuring it can evolve with changing policy needs, technology upgrades, and expanding stakeholder expectations.

Moreover, the cloud-based architecture will facilitate flexibility, high availability, disaster recovery, and cost-effective maintenance, enabling SPFO to meet peak load demands without compromising performance.

C. Strategic Alignment

01

Strategic Digital Transformation for Maritime Welfare

The ERP initiative by SPFO is a reform-oriented digital transformation aligned with India's maritime, governance, and citizen-service priorities, It modernizes financial administration and stakeholder engagement, contributing to Maritime India Vision 2030 and Amrit Kaal Vision 2047 by enabling efficient, inclusive, and scalable welfare systems.

02

Enhancing Ease of Doing Business

The ERP replaces manual workflows with fully digital processes for contributions, compliance, and claims. Real-time dashboards, digital approvals, and grievance resolution reduce turnaround time. increase transparency, and simplity employer interactions, aligning with national ease of doing business reforms.

03

Empowering Seafarers through Digital Access

Designed with seafarers in mind, the ERP ensures timely Provident Fund settlements and transparent service delivery. Its mobile access, self-service features, and user-centric interface allow seafarers to manage their accounts independently-enhancing convenience, dignity, and financial empowerment.

04

Robust Governance, Security, and Capacity Building

Built on MeitY and CERT-In standards, the ERP incorporates encryption, audit trails, and secure access controls to ensure data integrity and compliance. It also includes structured training and phased implementation to build a digitally empowered workforce and ensure smooth transition across stakeholders.

D. Key Features of the Project

From a technical standpoint, the SPFO ERP solution is designed as a modular, secure, and cloud-native platform, hosted on a robust Data Centre and Disaster Recovery (DC-DR) architecture. Developed on a compliant technology stack, the system will adhere to stringent cybersecurity guidelines prescribed by the Ministry of Electronics and Information Technology (MeitY) and CERT-In. The solution includes essential digital capabilities such as secure multi-factor authentication, role-based access controls, document digitization, workflow automation, and an integrated MIS and dashboard layer that facilitates real-time analytics, monitoring, and reporting. The architecture ensures high availability, data redundancy, and business continuity, with proactive disaster recovery mechanisms in place.

The system is envisioned to seamlessly integrate with third-party services such as PAN/Aadhaar verification, banking systems, and e-signature platforms, offering a fully digitized experience for all stakeholders. Functionally, the ERP will automate all critical operational processes of SPFO, including employer registration, contribution submissions, claim processing (for both final and non-refundable withdrawals), fund remittances, compliance monitoring, regulatory reporting, and grievance resolution. Additionally, modules for financial accounting, investment portfolio tracking, GST/tax compliance, payroll integration, and audit trail generation will ensure comprehensive financial governance and administrative efficiency. User-friendly, role-based portals for both employers and seafarers will enable self-service, allowing real-time access to contribution status, withdrawal tracking, and compliance information without the need for physical visits.

Key stakeholders in this initiative include seafarers (the beneficiaries), maritime employers, SPFO administrators, the Directorate General of Shipping, and the Ministry of Ports, Shipping and Waterways. Supporting entities include banks, auditors, IT vendors, and cybersecurity agencies who play a vital role in implementation and compliance assurance.

The overall impact of the SPFO ERP initiative is transformative. For seafarers, it ensures transparent, timely, and hassle-free access to benefits, promoting digital dignity and self-reliance. For employers, it simplifies statutory compliance, enhances visibility over fund contributions, and reduces administrative overhead. For the government, it facilitates effective policy execution, enhances financial oversight, and enables data-driven decision-making. In doing so, the ERP fosters institutional accountability, supports maritime digital inclusion, and aligns India's maritime welfare administration with global best practices.

In essence, the SPFO ERP is not only a technology project—it is a strategic enabler that bridges the gap between legacy systems and modern expectations. It strengthens the digital infrastructure for provident fund management, reinforces India's leadership in maritime governance, and demonstrates a commitment to delivering excellence in public service through innovation.

Table 6 Different Modules of the SPFO ERP

#	Module / Feature	Brief Description
1	Employer Registration Module	Online registration and approval of maritime employers with unique employer IDs.
2	Seafarer Profile Management	Centralized management of seafarer PF accounts, KYC verification, and updates.
3	Contribution Management	Monthly submission and validation of PF contributions with automated ledger updates.
4	Claim Processing (Final / Non-Refundable Withdrawals)	End-to-end claim lifecycle: initiation, validation, approval, and disbursement.
5	Remittance & Fund Transfer	Integration with banking/treasury systems for secure fund movements and receipts.
6	Compliance Monitoring & Penalty Management	Tracks employer compliance, calculating penalties, and issues alerts or notices.
7	Seafarer and Employer Dashboards	Real-time access to account status, transactions, compliance, and claim history.
8	Online Grievance Redressal	Ticketing system with escalation matrix and resolution tracking for all stakeholders.
9	Financial Accounting & Reporting	Automated bookkeeping, budgeting, reconciliation, GST, tax, and audit-ready reports.
10	Investment Management	Manages PF investment portfolios, returns, and rebalancing in compliance with norms.
11	Regulatory Reporting & Audit Trails	Auto-generation of compliance reports and traceable audit logs.
12	MIS & Analytics Dashboard	Visual dashboards with KPIs, insights, and downloadable MIS for management use.
13	Web Portal and Content Management	Public-facing portal for notices, forms, news, and communication tools.
14	User Access & Role-Based Security	Secure login, two-factor authentication, and access based on role hierarchy.
15	Document Management System (DMS)	Indexed digital repository for uploaded documents with versioning and retrieval.

#	Module / Feature	Brief Description
16	Helpdesk & Technical Support	Integrated support system with knowledge base, ticket management, and feedback loop.
17	Cloud Hosting and DR Integration	Hosted on government-approved cloud with disaster recovery and business continuity.

This figure illustrates the **interaction ecosystem** of the **Seafarers Provident Fund Organization (SPFO)'s Digital Platform** through a simplified yet effective visual flow.

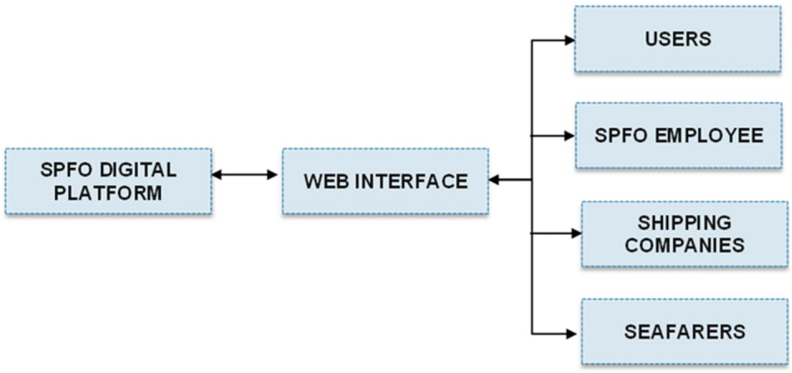


Figure 15 Ecosystem of SPFO digital platform

E. Project Timelines and costing

The Estimated project cost for the project is INR 12.93 Cr. The timelines for this are as follows:

Table 7 Project Implementation Timeline

#	Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Year 1	Year 2	Year 3	Year 4	Year 5
1	Design & Development																	
2	UAT																	
3	Pilot Testing																	
4	Go-Live																	
5	STQC & CERT-In Audit																	
6	System Stabilization																	
7	Change Management																	
8	Warranty Period																	
9	O & M																	

F. Project Status

The SPFO ERP project is currently in the **public procurement stage**, as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the **Quality and Cost-Based Selection (QCBS)** method

ERP Solution for Seafarers' Welfare Fund Society (SWFS)

4.6 ERP Solution for Seafarers' Welfare Fund Society (SWFS)

A. About the Project

The Seafarers' Welfare Fund Society (SWFS) was established following the recommendations of a Special Sub-Committee set up by the National Welfare Board for Seafarers, as per the provisions of the Merchant Shipping (M.S.) Act, 1958. The primary objective of SWFS is to provide welfare facilities for seafarers and undertake initiatives that contribute to their well-being, including support for aged, invalid, distressed, or destitute seafarers and their families.

The general management and control of the Society's affairs are vested in the Committee of Management (CoM), with all members nominated or appointed by the Ministry of Ports, Shipping, and Waterways (MoPSW). The Director General of Shipping serves as the ex-officio Chairman of the Society. As per data from the last ten years, the number of eligible seafarer beneficiaries for various funds is as follows:

Table 8 Different schemes and Seafarers' Beneficiaries'

Welfare Fund	Eligible seafarer beneficiaries are around 3900 from last 10 years data.
Gratuity Fund	Eligible seafarer beneficiaries are around 6500 from the last 10 years data.
Admin Fund	for salaries and office related expenses.

I **SWFS Existing Schemes**

a) Welfare Schemes:

b) Survival Benefit Scheme: For nominees of deceased Indian seafarers who died during the off-article period.

c) Invalidity Benefit Scheme: For Indian Seafarers suffering from permanent disability.

d) Maternity Benefit Scheme: For Indian female Seafarers.

e) Old Age Benefit Welfare Scheme: For Indian seafarers.

f) Family Benefit Welfare Scheme: For Indian seafarers.

g) Ex-Gratia Assistance on Death.

h) Welfare Scheme under 'Azadi Ka Amrit Mahotsav':

   i. One-time financial assistance to spouses of deceased seafarers.

   ii. Support for super senior Indian seafarers (aged 75 years and above).

i) Grant-in-Aid: Provided to Seamen's Clubs under the control of the Principal Officer, Mercantile Marine Department (PO-MMD).

Currently, seafarers must manually submit applications for these welfare schemes. Forms are downloaded from the website and submitted to the SWFS office via post, courier, or in person. The eligibility of applicants is then manually verified against an approved checklist before benefits are processed.

II **Gratuity Scheme –** Under a bi-partite agreement between the Indian National Shipowners' Association (INSA) and Seafarers' Unions, arrangements for seafarers' gratuity deposits have been made. Indian shipping companies and their manning agents deposit the gratuity amount for rating seafarers with SWFS on a voyage-to-voyage basis. The SWFS serves as the custodian of these funds.

III The deposited gratuity amount is recorded under each seafarer's individual account in the 'Gratuity System Software.' Upon retirement, voluntary retirement, or cancellation of the Continuous Discharge Certificate (CDC) book, the seafarer can submit a claim for gratuity withdrawal. The accumulated amount, along with interest, is then disbursed accordingly. Seamen's Gratuity Fund is invested as per the Ministry of Finance's investment guidelines. Five percent of the income earned on gratuity fund investments is transferred to the Administration Fund for managing seafarers' gratuity accounts. The remaining interest income is credited to individual seafarers' accounts based on the interest rate approved by the Committee of Management.

IV The project encompasses end-to-end automation of welfare scheme applications, gratuity processing, fund accounting, document management, compliance monitoring, and real-time dashboards—augmented by a public-facing portal and mobile app for enhanced accessibility. The ERP platform is designed not only to simplify and expedite routine administrative tasks but also to build a secure, scalable, and resilient digital ecosystem that ensures integrity, auditability, and responsiveness in all SWFS operations. It will empower seafarers with real-time access to information, reduce administrative delays, and uphold their rights to welfare and social protection in a transparent, technology-enabled manner. The new system should work seamlessly without any dependencies on the existing applications such as the legacy gratuity management software and Tally software for account maintenance.

V By reimagining workflows through intelligent automation and cloud-based integration, this project is a strategic enabler of good governance, data-driven decision-making, and citizen-centric service delivery in India's maritime domain.

B. Objectives

The primary objective of the SWFS ERP project is to **design, develop, and deploy a modern, secure, and scalable digital platform** that automates and streamlines all core functions of the Seafarers' Welfare Fund Society (SWFS). This initiative aims to enhance service delivery, ensure timely disbursement of welfare and gratuity benefits, improve operational efficiency, and uphold transparency, accountability, and ease of access for all stakeholders, particularly Indian seafarers.

I **End-to-End Digitization and Automation**

a) Transform existing manual and semi-digital processes into fully automated workflows.

b) Enable online submission, tracking, and processing of applications for welfare and gratuity schemes.

c) Eliminate delays caused by physical paperwork, manual verification, and fragmented systems.

II **Unified Welfare and Gratuity Platform**

a) Develop a centralized ERP system that integrates all welfare schemes, gratuity processing, fund management, and administrative functions.

b) Consolidate data across schemes and functions to avoid duplication, inconsistencies, and manual reconciliation.

III **Enhance Beneficiary Access and Empowerment**

a) Provide a web-based portal and mobile application for seafarers to apply for benefits, upload documents, and track their application status in real time.

b) Ensure digital inclusion by offering multilingual and user-friendly interfaces.

IV **Transparency and Governance**

a) Incorporate role-based dashboards, audit trails, and MIS reporting to provide real-time insights to SWFS management and MoPSW.

b) Build accountability into the system through time-stamped actions and approval workflows.

V **Strengthening Financial Control and Fund Management**

a) Implement automated fund accounting, budget monitoring, interest tracking, and investment management aligned with Ministry of Finance guidelines.

b) Facilitate accurate, auditable, and timely disbursement of funds through a secure payment gateway.

VI **Integration and Interoperability**

a) Enable secure API-based integrations with existing systems of DG Shipping, Government Shipping Offices, and authorized shipping companies.

b) Avoid dependencies on legacy gratuity software and standalone financial tools like Tally.

VII **Cybersecurity and Data Privacy**

a) Enforce a Zero Trust Security Model with strong encryption, MFA, and audit logging.

b) Comply with CERT-In, ISO 27001, GIGW, and GDPR standards to ensure data integrity, confidentiality, and availability.

VIII **Resilience and Continuity**

a) Ensure Meity empaneled cloud-native deployment with multi-cloud support and geo-redundant disaster recovery (DR) capabilities.

b) Maintain business continuity through scalable infrastructure and auto-failover mechanisms.

C. Strategic Alignment

The **Enterprise Resource Planning (ERP) System for the Seafarers' Welfare Fund Society (SWFS)** is not merely a technology upgrade—it is a strategically aligned national initiative that directly supports the Government of India's long-term maritime, digital governance, and ease of doing business goals. The project reinforces SWFS's commitment to ensuring timely, transparent, and technology-driven delivery of welfare services to Indian seafarers.

Alignment with Maritime India Vision (MIV) 2030

a) Supports MIV's focus on digitizing maritime administration, including welfare institutions.

b) Promotes modernization of citizen-facing services for seafarers and their families.

c) Improves quality of life and welfare assurance for maritime human resources—a key MIV objective.

02

Alignment with Maritime Amrit Kaal Vision (MAKV) 2047

a) Reinforces MAKV's emphasis on high-performance digital infrastructure.
b) Empowers maritime workforce with rights-based, technology-enabled welfare access.
c) Enables paperless, contactless, and faceless administration in line with MAKV's future-ready governance goals.

03

Contributing to Ease of Doing Business (EoDB)

a) Streamlines interactions between SWFS, shipping companies, and manning agents.
b) Removes bottlenecks caused by physical application processes and paperwork.
c) Introduces self-service portals and automated fund workflows to reduce transaction time and administrative delays.

04

Advancing Data Governance and Digital Security

a) Enforces robust role-based access, audit logging, and compliance with national data protection guidelines.
b) Fulfills obligations under CERT-In, ISO 27001, NIST, and GIGW frameworks.
c) Ensures secure integration with other government platforms via encrypted APIs, enhancing trust and interoperability.

05

Promoting Seafarers' Rights and Social Security

a) Empowers seafarers to access welfare benefits, track their applications, and raise grievances transparently.
b) Upholds the constitutional right to dignity and timely entitlement delivery.
c) Brings SWFS in line with international obligations (e.g., MLC 2006) around maritime social security.

06

Digital India and Good Governance Alignment

a) Supports the Digital India programme by delivering last-mile digital services to mobile-first users.
b) Promotes e-Governance and accountability in fund management through intelligent dashboards and automated workflows.
c) Reduces administrative overhead, enhances audit readiness, and strengthens institutional governance.

D. Key Features of the Project

The proposed ERP system for the **Seafarers' Welfare Fund Society (SWFS)** is designed to digitally enable and streamline all critical operations across welfare schemes, gratuity processing, fund management, and administrative governance. The key modules and their core functionalities are outlined below:

Table 9 Key Features and Core functionalities of the ERP

For Welfare Schemes – The system shall have provision for	
Online Application by Seafarer	All the application forms should be digitally available on this interface to the beneficiaries, along with provision to submit the necessary proof documents digitally as applicable to the respective welfare scheme being applied.
Eligibility assessment by responsible officers	a) After the online registration of applicant, Eligibility assessment of the submitted application and document verification shall be completed through the ERP portal by the Welfare section of SWFS. The SWFS staff shall be able to update the status of the application as per the checklist for the applied welfare scheme. b) The officer/ assistant can resend/ reject the application in case of any shortcomings in the documents submitted by the applicant.
Storage for Maintenance of Records	The ERP system shall be capable to store the records of successful applications and beneficiaries per welfare scheme.
Application Status check for Seafarers	The applicant/ beneficiary should have the access to check or track the status of their application
For Gratuity Schemes – The system shall have provision for	
Collection of Gratuity from Shipping Companies	
Online Application by Beneficiary in need	All the application forms should be digitally available along with provision to accept the necessary proof documents digitally as applicable to the Gratuity scheme being applied.
Application Status check	The applicant/ beneficiary should have the access to check or track the status of their application
Claim of Gratuity Dues (for seafarer)	

Online Application by Beneficiary in need	All the application forms should be digitally available along with provision to accept the necessary proof documents digitally as applicable to the Gratuity scheme being applied.
Application Status check	The applicant/ beneficiary should have access to check or track the status of their application
Claim of Gratuity Dues (in death cases)	
Online Application by Beneficiary	All the application forms should be digitally available along with provision to accept the necessary proof documents digitally as applicable to the Gratuity scheme being applied.
Application Status check	The applicant/ beneficiary should have access to check or track the status of their application
Accounting Section	
Software for accounting and fund management	a) Currently, Tally ERP software is being used, it is imperative that in the proposed ERP software a dedicated software for account maintenance and for process verification for transfer of funds from SWFS bank. b) An automated system can be developed for finance management having the following functionalities: c) Records, monitors & maintain accounting and financial information of SWFS. d) Automate Periodic Postings. e) Track income & expenses of Gratuity fund, welfare fund & Administration fund. f) Manage GST return filings. g) Facilitate preparation of yearly budget h) Facility for budget revisions and reappropriation. i) Manage Administrative expenses budget
Dedicated Payment Gateway for SWFS	A dedicated payment gateway for transfer of funds after due process approval for various welfare schemes, gratuity payment to seafarers and administrative expenses payment from designated bank account of SWFS to bank account of applicant/ beneficiary.
Automation of Fund Management	a) Facility for shipping companies to pay the gratuity contributions and welfare scheme contributions. b) Capture and record contributions from shipping companies towards gratuity and welfare schemes. c) Support direct deposit by shipping companies into the society's bank accounts. d) Facilitate shipping companies to share statements with remittance information. e) Automatic reconciliation of contributions. f) Facility for government shipping company to transfer the levy fees. g) Manage Gratuity and Welfare fund accounts separately. h) Track collections from shipping companies and levy fees. i) Implement investment management based on Ministry of Finance guidelines. j) Provide a secure mechanism to transfer funds between different accounts, such as from the main account to the Fund Management account.

	k) Monitor fund utilization against schemes. l) Automatically calculate and transfer 5% of interest income from the Gratuity investment to the administrative fund. m) Transfer excess funds to Fund Management Account for investments. n) Record and track capital procurements made by society. o) Finance Management p) Administration Fund Management
Administration Section	
MIS Dashboard	Provision SWFS staff to check the status of application for all welfare and gratuity schemes and other administrative activities of the SWFS
LMS	Leave Management System for SWFS staff
SMS Gateway	SMS Gateway to alert beneficiaries/applicants about the status updates of their application for all welfare and gratuity schemes.
Networking Infrastructure	The scope for Network Infrastructure encompasses the establishment of a robust networking infrastructure within SWFS. Network infrastructure must be cloud-based with virtual networking (SD-WAN, VPN, and cloud-native firewalls). The System Integrator shall undertake the planning, deployment, and maintenance of the networking solution to meet the specific requirements of the SWFS.

E. Project Timelines and costing

The Estimated project cost for the project is INR 9 Cr. The timelines for this are as follows –

#	Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Year 1	Year 2	Year 3
1	Design & Development															
2	UAT															
3	Pilot Testing															
4	Go-Live															
5	STQC & CERT-In Audit															
6	System Stabilization															
7	Change Management															
8	Warranty Period															
9	O & M															

F. Project Status

The SWFS ERP project is currently in the **public procurement stage**, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the **Quality and Cost-Based Selection (QCBS)** method.


DIRECTORATE GENERAL OF SHIPPING
MUMBAI
INDIA
सागराः सुपन्थानः सन्तु
Digital Record Room

4.7 Digital Record Room

A. About the Project

The **Digital Record Room initiative** of the **Directorate General of Shipping (DGS)** is a strategic digital transformation program aimed at modernizing the management, accessibility, and preservation of critical maritime records. In line with the Government of India's Digital India vision and Maritime India Vision 2030, this initiative seeks to replace traditional, paper-based documentation systems with a structured, secure, and interoperable digital ecosystem.

Over the decades, the Directorate has accumulated vast volumes of essential records relating to seafarer certification, maritime training institutions (MTIs), recruitment and placement agencies (RPSLs), ship registration and licensing, marine incident reports, legal correspondence, international conventions, and administrative decisions. These records are vital not only for regulatory enforcement and policy formulation but also for legal validation, audits, grievance redressal, and transparency.

However, the traditional handling of these documents presents serious challenges such as:

I Physical degradation of paper records due to age and handling

II Inefficient manual retrieval processes causing administrative delays

III Limited traceability for compliance, audits, and court proceedings

IV Inadequate storage infrastructure and security risks

To address these gaps, the DGS has conceptualized a **Digital Record Room** that encompasses:

I End-to-end digitization of all physical records using high-speed scanning, Optical Character Recognition (OCR), and image enhancement tools.

II Systematic indexing and metadata tagging to enable seamless search, retrieval, and cross-referencing of documents.

III Development and deployment of a secure Document Management System (DMS) with role-based access, audit trails, version control, and integration capabilities.

IV Integration with existing DGS e-Governance platforms, including INDOS, e-Samudra, MTI portals, RPSL records, and internal regulatory systems.

V Preservation of physical documents using barcode-based tracking, archival protocols, and climate-controlled storage systems.

VI Robust data security, backup, and disaster recovery mechanisms, aligned with ISO 27001, DPDP Act, and government IT guidelines.

The initiative will be implemented through a capable technology partner responsible for digitization, software development, metadata creation, and post-deployment support. Training, change management, and ongoing handholding will be core components to ensure smooth adoption by DGS staff.

By implementing this Digital Record Room, DGS aims to not only modernize its recordkeeping infrastructure but also to lay a strong foundation for paperless governance, enhanced regulatory efficiency, legal defensibility, and stakeholder service delivery. It is envisioned as a pivotal initiative in India's maritime digital transformation journey under the broader frameworks of Maritime India Vision 2030 and Amrit Kaal Vision 2047.

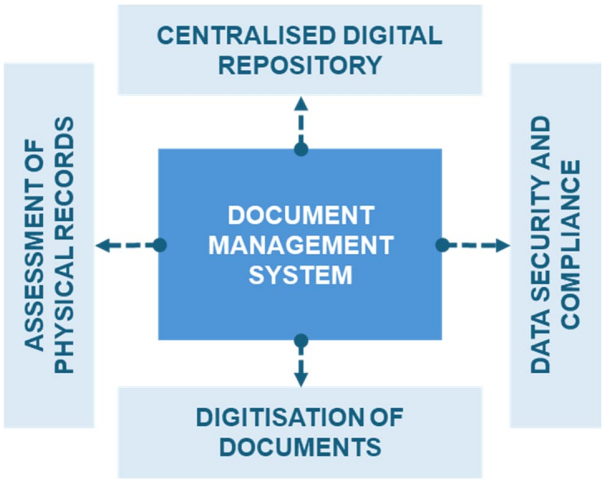


Figure 16 Overview of the Digital Record Room Project

B. Objectives

The Digital Record Room initiative is designed with the overarching goal of transforming the Directorate General of Shipping's legacy physical record system into a secure, structured, and digitally accessible repository. This transformation supports effective governance, regulatory transparency, operational efficiency, and long-term archival preservation. The key objectives are outlined as follows:

I **Streamline Document Management Processes**

a) Replace disorganized, manual, and paper-based record-keeping practices with a centralized digital platform.

b) Standardize the cataloguing, indexing, and classification of documents for consistency and efficient retrieval.

II **Enhance Accessibility and Operational Efficiency**

a) Enable authorized users to securely access records on demand from any location via a web-based interface.

b) Reduce response time for inter-departmental queries, RTI requests, audits, and stakeholder services.

III **Preserve Critical Maritime Records**

a) Digitize and archive documents of historical, regulatory, and operational value to prevent degradation and data loss.

b) Ensure long-term availability of key documents for statutory, policy, and legal reference.

IV **Ensure Data Security and Confidentiality**

a) Enforce robust access controls, encryption, and audit trails to protect sensitive information.

b) Comply with data protection regulations such as ISO 27001, DPDP Act 2023, and MeitY security guidelines.

V **Establish a Centralized Digital Repository**

a) Create a scalable and searchable document management platform with metadata tagging and OCR capabilities.

b) Support disaster recovery and business continuity through secured digital storage and backups.

VI **Integrate with Existing and Future e-Governance Systems**

a) Seamlessly connect the DMS with key systems such as e-Samudra, INDOS, MTI, RPSL, and others through APIs.

b) Ensure readiness for integration with future IT modules and stakeholder databases.

VII **Improve Transparency and Auditability**

a) Maintain a tamper-proof digital audit trail of all document interactions, modifications, and access.

b) Enable regulatory reporting and audit compliance with tools for version control and access logs.

VIII **Align with Digital India and Maritime India Vision 2030**

a) Support national goals for digital governance, paperless administration, and efficient maritime services.

b) Contribute to the broader objectives of Amrit Kaal Vision 2047 through digitization and sustainability.

IX **Optimize Resource Utilization and Reduce Costs**

a) Free up physical storage space and minimize resource costs for document retrieval and maintenance.

b) Reduce the administrative burden on staff involved in manual tracking, filing, and archiving documents.

X **Empower Stakeholders and Improve Service Delivery**

a) Enhance the experience of internal users, auditors, legal authorities, and external stakeholders.

b) Enable faster and more reliable delivery of services related to documentation, certification, and compliance.

C. Strategic Alignment

The Digital Record Room initiative undertaken by the Directorate General of Shipping (DGS) is a forward-looking endeavour designed to reinforce national priorities in digital transformation, maritime sector reform, and administrative modernization. The initiative serves as a pivotal enabler of broader government visions such as Maritime India Vision 2030 and Amrit Kaal Vision 2047, while also supporting operational goals such as ease of doing business, data governance, cybersecurity, and environmental sustainability. Each of these strategic alignments is detailed below:

01

Alignment with MIV 2030 and MAKV 2047

The Digital Record Room supports MIV 2030 and MAKV 2047 by modernizing archival systems and enabling data-driven governance. It preserves maritime data with strategic value and enhances institutional memory through digitization, contributing to a scalable, technologically empowered maritime administration.

02

Contributing to Ease of Doing Business
By digitizing maritime records, the initiative improves access for stakeholders like shipping companies, MTis, and seafarers. It reduces turnaround times, enables online verification, and cuts bureaucratic delays enhancing service efficiency and contributing to India's Ease of Doing Business ranking.

03

Data Governance & Cybersecurity
A secure Document Management System ensures compliance with national and global data protection standards. With access controls, audit trails, and encryption, the system protects sensitive records and aligns with India's goals for data sovereignty and secure digital governance.

04

Environmental Sustainability
The shift from paper to digital records reduces printing, storage needs, and carbon emissions. It supports sustainable resource use and office efficiency, aligning with Indias climate goals and the Government's Green Governance agenda.

In essence, the Digital Record Room initiative is not merely a technological upgrade—it is a strategic reform aligned with the country's maritime ambitions and sustainable development vision. By embedding digital governance, security, efficiency, and ecological responsibility into its core design, the initiative positions the Directorate General of Shipping as a model for digital transformation.

D. Key Features of the Project

The **Digital Record Room initiative** of the Directorate General of Shipping (DGS), Ministry of Ports, Shipping and Waterways, Government of India, is a flagship undertaking to digitize, modernize, and secure the vast repository of physical records currently maintained by the Directorate. With a dual focus on archival preservation and enhanced administrative efficiency, this initiative seeks to transform the way maritime records are managed, accessed, and integrated into policy and operational workflows.

Over several decades, the Directorate has accumulated a significant volume of documents relating to seafarer certifications, maritime training institutions (MTIs), recruitment and placement agencies (RPSLs), shipping licenses, statutory compliance, international communications, marine accidents, court cases, and administrative correspondences. These records are critical to India's maritime regulatory framework and form the foundation for various decisions, audits, legal proceedings, and historical references. However, the traditional manual handling of these records has led to challenges in accessibility, risk of physical degradation, and delays in stakeholder services.

To address these challenges, DGS has envisioned the creation of a Digital Record Room encompassing scanning, cataloguing, metadata tagging, quality control, secure digital storage, and the implementation of a robust Document Management System (DMS). The initiative will follow a structured approach that begins with assessing the physical condition and categorization of existing documents. The digitization process will include high-resolution scanning, Optical Character Recognition (OCR), classification, indexing, and tagging of documents with appropriate metadata to ensure efficient retrieval and cross-referencing.

The DMS platform will serve as a centralized digital repository and will be accessible to authorized users based on defined access roles. It will feature version control, audit trails, document classification, search filters, user authentication, and integration with other e-Governance systems such as INDOS, e-Samudra, and internal regulatory portals. This integration will ensure continuity of operations and enable seamless digital interaction between DGS and stakeholders.

The stakeholders involved in this initiative include various internal divisions of DGS (Crew Branch, Nautical, Engineering, Naval Architecture, International Cooperation, Training, and Administration), external regulatory bodies, seafarers, MTIs, RPSLs, shipping companies, legal authorities, and government audit agencies. Additionally, the service provider will be responsible for executing the digitization, developing the DMS platform, providing support, training, and ensuring compliance with standards such as ISO 27001 for information security.

The overall impact of this initiative is multi-dimensional. It will enhance operational efficiency by reducing manual record retrieval time, improving traceability, and automating workflows. It will ensure data integrity and security through encryption, access controls, and regular audits. The system will support transparency, accountability, and legal defensibility in regulatory processes. Furthermore, the reduction in paper usage and physical storage will align DGS with India’s environmental sustainability goals.

#	Feature / Module	Brief Description
1	Record Assessment	Evaluation of volume, type, and condition of physical records; categorization based on retention policy.
2	Scanning & Digitization	High-speed scanning with OCR; supports various formats (A4 to A0, typed/handwritten).
3	Metadata Tagging & Indexing	Tagging documents with metadata fields like type, date, subject; enables accurate and quick search.
4	Document Preparation & Quality Control	Pre-scanning activities (e.g., sorting, repairs); post-scanning checks for image clarity and completeness.
5	Centralized Digital Repository	Secure, scalable repository with logical structure for storage and retrieval of digitized documents.
6	Document Management System (DMS)	Provides versioning, role-based access, audit trails, annotation tools, and full-text/metadata search.
7	System Integration	Integrates with e-Samudra, INDOS, MTI, RPSL modules and other internal systems via API.

#	Feature / Module	Brief Description
8	Physical Record Storage & Retrieval	Barcode-based tracking and organized secure storage of original documents post-digitization.
9	Disaster Recovery & Data Backup	Real-time replication to DR site; scheduled backups with retention compliance.
10	Audit & Compliance Management	Logs all actions; enables audit-ready reporting for RTI/legal/statutory reviews.
11	Training & Capacity Building	Training sessions, manuals, and helpdesk support for DGS officials and stakeholders.
12	Environmental & Operational Efficiency	Reduces paper usage, frees up office space, lowers operating costs; supports paperless governance.

E. Functional Architecture

The architecture of the **Digital Record Room** as depicted in the visual, is a **modular, secure, and interoperable framework** designed to digitize, manage, and provide seamless access to critical maritime records. The architecture is structured across multiple integrated layers, each focusing on a key functional and technological aspect.

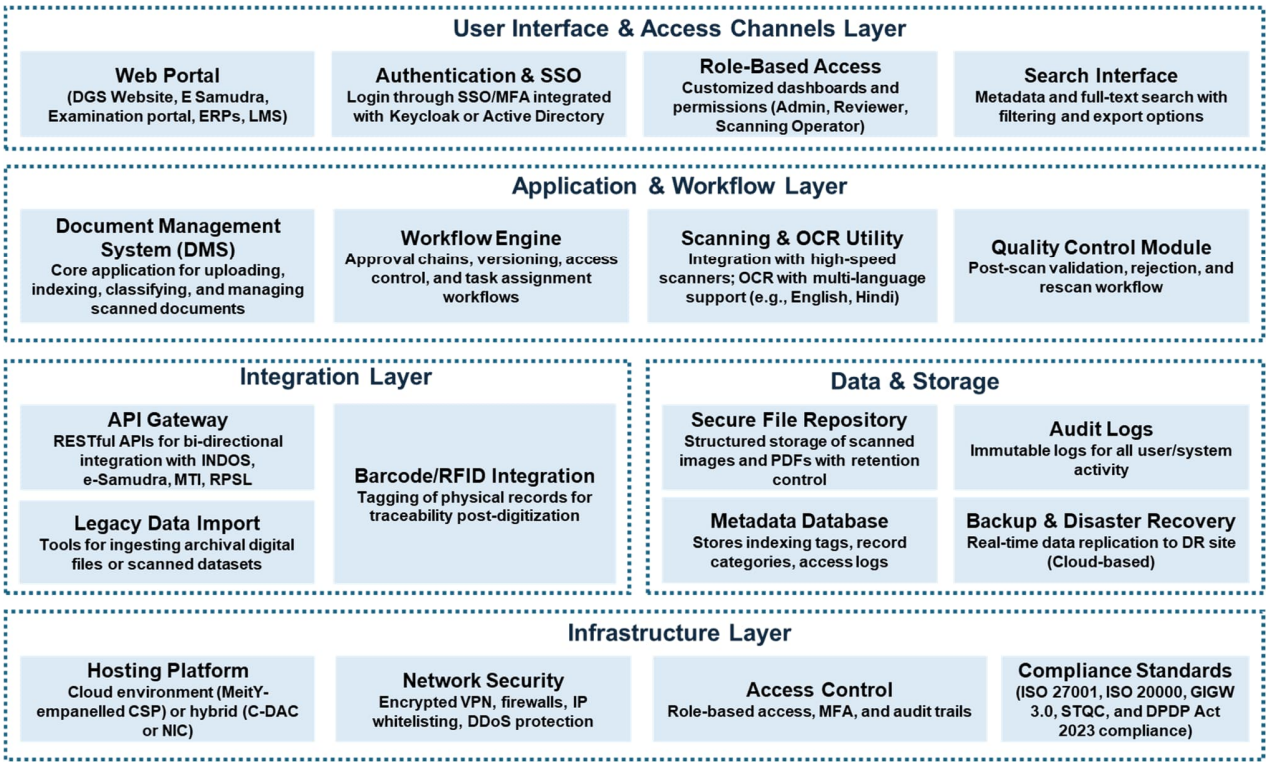


Figure 17 Functional Architecture of the Digital Record Room

F. Project Timelines

The timelines for this are as follows –

Table 10 Timeline proposed for Scanning and Digitization

#	Activity	Revised Timeline	Remarks
1	Agreement Signing and Issuance of Work Order	T	Day 0
2	Requirement Gathering, Project Plan Submission	T + 1 week	Overlaps with initial mobilization
3	Transportation of Documents to Facility	T + 1.5 weeks	Begin transport in batches to expedite
4	Categorization of Documents by DGS	T + 2.5 weeks	Must start immediately after transport; parallel to infra setup
5	Setup of Scanning & Digitization Infrastructure	T1 = T + 2.5 weeks	Parallel to categorization
6	Scanning and Digitization of 50% of the Documents	T1 + 4 weeks (≈ T + 7 weeks)	Aggressive scanning with parallel QA
7	Scanning and Digitization of 100% of the Documents	T1 + 8 weeks (≈ T + 11 weeks)	Completion targets to allow final integration
8	Final Submission of Digitized Files & Metadata	T + 12 weeks	Closeout with document-wise audit and sign-off

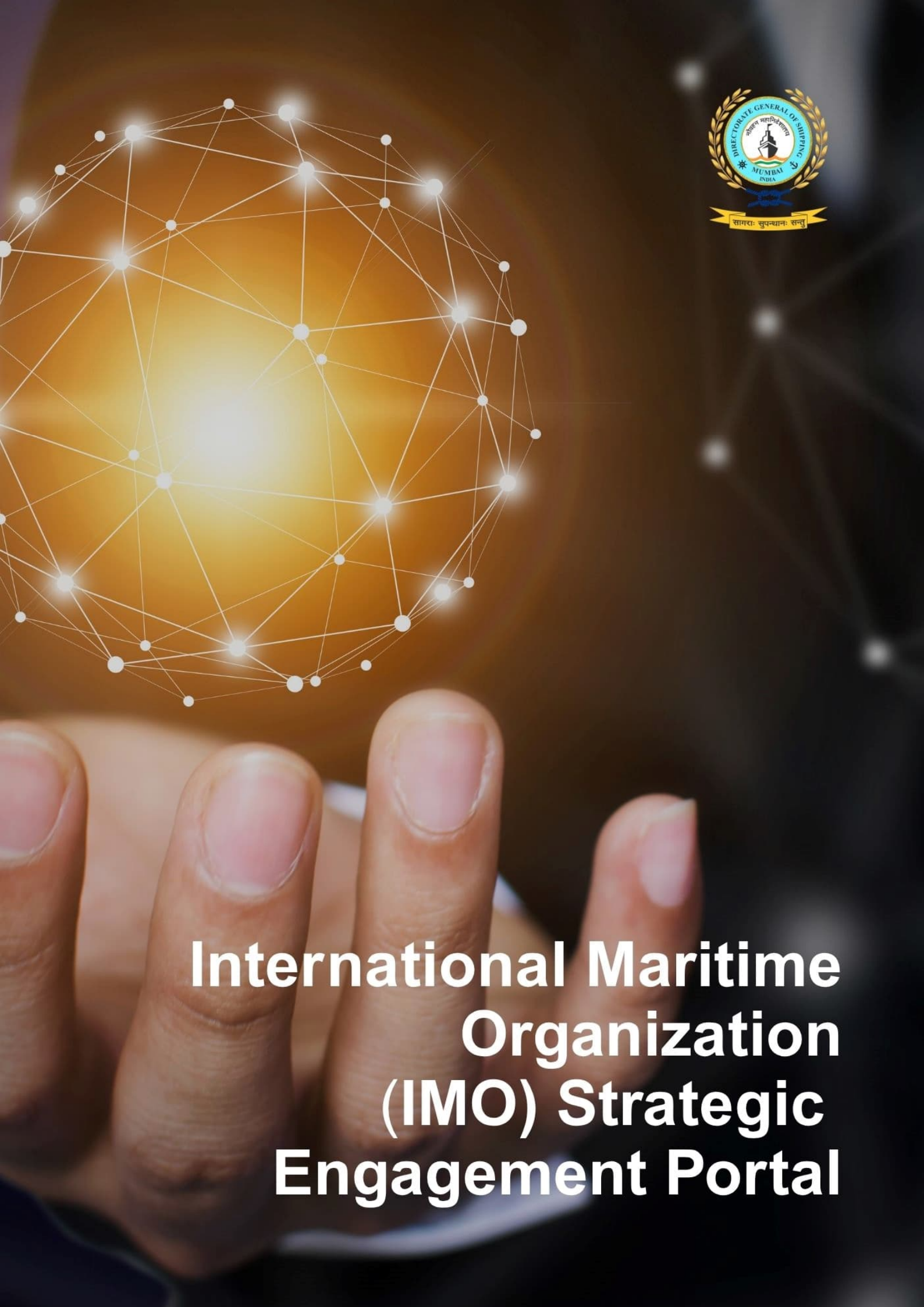
Table 11 Timeline proposed for Document Management System

#	Activity	Responsibility	Revised Timeline	Remarks
1	Agreement Signing and Issuance of Work Order	DG Shipping	T	Project initiation
2	Requirement Gathering, Functional Study & Project Plan Submission	Bidder	T to T + 1 week	Parallel kick-off & planning
3	Deployment of DMS at Primary Data Centre (DC) – Core Setup	Bidder	T + 1 to 2 weeks	Fast-tracked infra readiness assumed
4	Metadata, Folder Structure, User Roles, and Workflow Configuration	Bidder	T + 2 to 3 weeks	Parallel with DC setup
5	DR Site Hardware Provisioning (Infra Readiness)	DG Shipping	T to T + 2 weeks	Must be initiated immediately
6	DR Site Software Setup & Replication Configuration	Bidder	T + 3 to 4 weeks	Contingent on DR infra readiness
7	Categorization of Documents by DGS	DG Shipping	T + 2 weeks	To run in parallel with configuration
8	Integration of DMS with Digitization Output Pipeline	Bidder	T + 3 to 4 weeks	After initial config + digitization start
9	Document Ingestion Begins (Phase 1 - 50% Scanning Complete)	Bidder	T + 6 weeks	Concurrent with scanning process

#	Activity	Responsibility	Revised Timeline	Remarks
10	Document Ingestion Complete (100% Scanning) & DMS Stabilization	Bidder	T + 10 weeks	Must run parallel to ingestion
11	DR Drill Execution as per DG Shipping's BCP Plan	Bidder	T + 11 weeks	Post-stabilization verification
12	Final Acceptance Testing, User Training, and Handover	Bidder + DG Shipping	T + 12 weeks (End of Month 3)	Final UAT, documentation, and go-live

G. Project Status

The project is currently in the **public procurement stage**, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the **Quality and Cost-Based Selection (QCBS)** method.



International Maritime Organization (IMO) Strategic Engagement Portal

4.8 IMO Strategic Engagement Platform

A. About the Project

The **IMO Shadow Committee Portal** is a secure, web-based collaboration platform developed by the Indian Register of Shipping (IRS) under the guidance of the Directorate General of Shipping (DGS). The platform is designed to streamline and digitize India's internal coordination process for international maritime engagements, particularly those under the International Maritime Organization (IMO), the International Labour Organization (ILO), and the International Maritime Satellite Organization (IMSO).

Built to support India's growing influence in global maritime governance, the portal enables seamless collaboration between technical experts, administrative officials, policy makers, and delegation leaders. It provides a structured, role-based environment for reviewing agenda documents, assigning tasks, compiling feedback, and preparing formal interventions.

The platform ensures that India's national maritime positions are:

a) Well-informed through collective expert inputs
b) Timely in submission to international bodies
c) Digitally traceable with audit-ready workflows
d) Collaboratively developed with real-time task management and document control

This platform positions DGS and India's maritime stakeholders for greater preparedness, participation, and policy shaping at international forums. It eliminates dependency on fragmented offline coordination and enables institutional memory by preserving all feedback, versions, and approvals in a structured digital archive.

Whether preparing for an IMO committee meeting, drafting amendments to the Maritime Labour Convention (MLC), or participating in a bilateral maritime dialogue, the **IMO Shadow Committee Portal** serves as a unified portal for India's global maritime diplomacy.

The **International Maritime Organization (IMO)** is a specialized agency of the United Nations responsible for regulating shipping across the globe. Its primary objective is to develop and maintain a comprehensive regulatory framework for international shipping, covering safety, environmental concerns, legal matters, technical cooperation, and maritime security.

To carry out its wide-ranging mandate, the IMO is supported by a robust **governance and technical structure**, comprising an **Assembly**, a **Council**, and five principal **technical committees**, further assisted by specialized **sub-committees**.

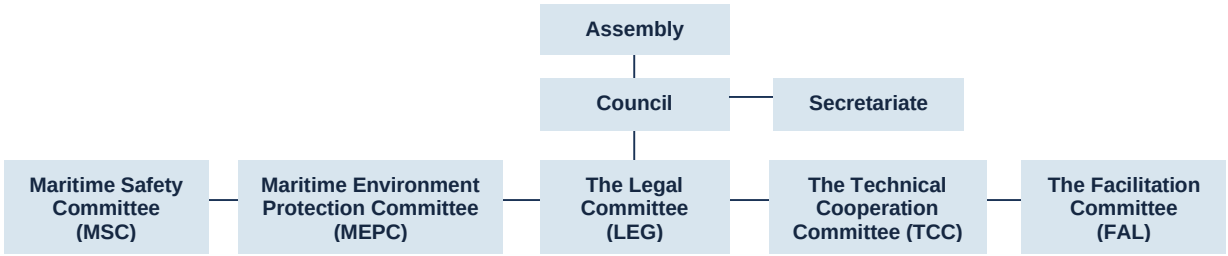


Figure 18 Structure of the International Maritime organization (IMO)

The technical work of the International Maritime Organization is carried out by five principal Committees. These include:

a) The Maritime Safety Committee (MSC)
b) The Marine Environment Protection Committee (MEPC)

c) The Legal Committee
d) The Technical Cooperation Committee, for capacity building
e) The Facilitation Committee, to simplify the documentation and formalities required in international shipping. The Committees meet once or twice a year attended by Member States and NGOs

The **MSC and MEPC** are assisted in their work by several sub-committees which are open to all Member States. The committees are:

a) Sub-Committee on Human Element, Training and Watchkeeping (HTW)
b) Sub-Committee on Implementation of IMO Instruments (III)
c) Sub-Committee on Navigation, Communications and Search and Rescue (NCSR)
d) Sub-Committee on Pollution Prevention and Response (PPR)
e) Sub-Committee on Ship Design and Construction (SDC)
f) Sub-Committee on Ship Systems and Equipment (SSE)
g) Sub-Committee on Carriage of Cargoes and Containers (CCC)

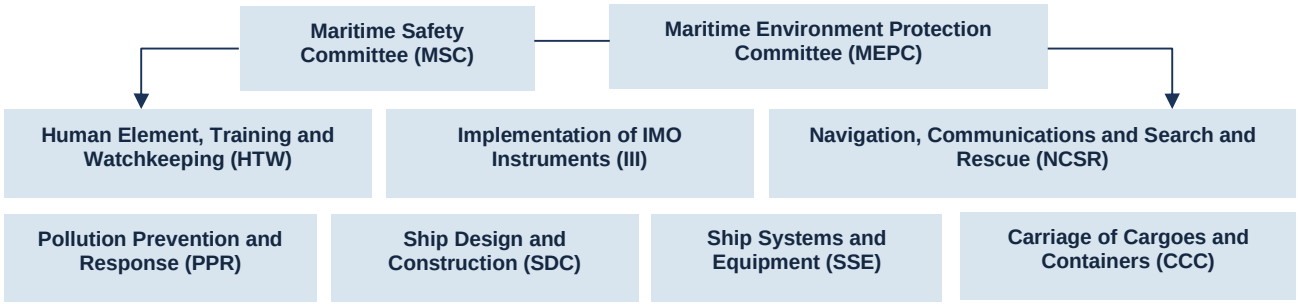


Figure 19 Different Committees and Sub Committees

B. Objectives

The IMO Shadow Committee Portal has been conceived as a digital platform to institutionalize, streamline, and enhance India's participation in international maritime regulatory processes. The primary goal is to facilitate structured coordination, efficient feedback management, and informed decision-making across diverse national stakeholders involved in maritime governance. The detailed objectives are outlined below:

I **Institutionalize India's Engagement in Global Maritime Forums**

a) To establish a permanent digital mechanism for India's proactive and consistent participation in the work of international maritime organizations such as the International Maritime Organization (IMO), International Labour Organization (ILO), and International Mobile Satellite Organization (IMSO).
b) To ensure that India's national position is developed through a transparent, inclusive, and consultative process with relevant stakeholders.

II **Enable Structured and Role-Based Stakeholder Collaboration**

a) To digitally manage the participation of various maritime stakeholders including government officials, shipping associations, classification societies, legal experts, seafarer unions, training institutes, and academic bodies.
b) To define and assign roles (e.g., Member, Coordinator, Leader, Administrator) to ensure clarity, accountability, and role-specific access.

III **Streamline the Review and Feedback Lifecycle**

a) To create an organized system for reviewing IMO/ILO/IMSO documents, including draft amendments, circulars, meeting agendas, and working papers.

b) To facilitate collaborative review and consolidation of comments through an end-to-end feedback pipeline — from individual members to group leaders, to the final delegation leader submission.

IV **Support Task Assignment and Progress Tracking**

a) To assign agenda items and related tasks to specific working groups or individuals based on domain expertise.

b) To track the status of assigned tasks, manage deadlines, and ensure timely completion of preparatory work for international meetings.

V **Manage Version-Controlled Document Workflows**

a) To upload, edit, review, and version control all official documents, position papers, and feedback statements.

b) To maintain a secure and auditable record of India's inputs, decisions, and final submissions, with the ability to trace evolution of thought and policy.

VI **Facilitate High-Level Approval Workflows**

a) To support digital workflows for review and approval of papers through designated hierarchies including Coordinators, Delegation Leaders, Chief Surveyors (CS), Nautical Advisors (NA), and the Directorate General (DG), culminating with approval by the Ministry of Ports, Shipping and Waterways (MoPSW).

VII **Enhance Transparency and Accountability**

a) To provide visibility into individual and group contributions, attendance, submissions, and performance.

b) To enable automated performance reports and preparation status dashboards for administrators and senior leadership.

VIII **Integrate with National Maritime Governance Goals**

a) To align with India's strategic goals under Maritime India Vision 2030, Ease of Doing Business, and Digital India Mission.

b) To promote maritime regulatory preparedness, capacity building, and knowledge sharing across institutions.

IX **Expand Beyond IMO to Other Global Maritime Engagements**

a) To provide structured modules for tracking participation in ILO meetings (e.g., MLC, STC, JMC) and IMSO activities (e.g., LRIT oversight, GMDSS audits).

b) To accommodate bilateral and multilateral working groups such as India–Norway Joint Working Groups and other intergovernmental maritime collaborations.

X **Enable Data-Driven Decision-Making and Digital Diplomacy**

a) To generate real-time reports, consolidated views, meeting minutes, and issue-based summaries for quick reference by decision-makers.

b) To strengthen India's maritime diplomacy through timely, well-prepared, and technically sound international interventions.

C. Strategic Alignment

The **IMO Shadow Committee Portal**, developed under the Directorate General of Shipping (DGS), is a transformative digital initiative aligned with India's broader maritime, diplomatic, and digital governance strategies. It not only addresses operational needs for managing international maritime engagements but also contributes to long-term strategic goals. The following sections explain its alignment with key national and international priorities.

01

Alignment with Maritime India Vision 2030

The portal aligns directly with the goals outlined in the Maritime India Vision 2030 (MIV 2030), which emphasizes global regulatory participation, policy-led maritime growth, and a digital transformation of maritime governance. By providing a structured digital system to review international agenda items, coordinate expert feedback, and finalize India's positions in global maritime forums, the portal ensures India is not only a passive recipient of global regulations but a proactive and informed contributor

02

Support for India's Aspiration for IMO Council Category-A Membership

India aspires to secure a permanent seat in Category-A of the IMO Council, which includes the most influential maritime nations. To support this, the country must demonstrate high-quality, consistent engagement in IMO's technical, legal, and environmental discussions. The Shadow Committee Portal institutionalizes internal consultations and tracks the quality, timing, and substance of India's interventions.

03

Institutionalizing Maritime Regulatory Preparedness

International maritime conventions and regulatory proposals evolve continuously across domains such as safety (SOLAS), environmental protection (MARPOL), seafarer training (STCW), and labour standards (MLC). The portal plays a pivotal role in enabling early-stage tracking of such developments and orchestrating nationwide consultations. Through structured reviews and feedback collection, the platform ensures India is always well-prepared to analyse regulatory implications.

04

Enabling Inter-Ministerial and Industry Collaboration

Maritime policy in India involves a wide range of actors, from the MoPSW and DGS to private shipping lines, classification societies, training institutes, and labour unions. The portal acts as a digital convergence point, enabling role-based collaboration between these stakeholders. It ensures that India's international positions are developed through inclusive, expert-backed, and institutionally coordinated processes. This multi-stakeholder collaboration helps build the legitimacy of India's global maritime stances.

05

Alignment with Digital India and Ease of Doing Business

As part of the Digital India Mission, the Shadow Committee Portal contributes to creating a paperless, responsive, and efficient e-governance ecosystem in the maritime sector. It digitizes all stages of India's participation in IMO/ILO/IMSO activities—from agenda dissemination to document review and policy feedback—thus eliminating manual processes and improving decision speed.

06

Enhancing Maritime Diplomacy and India's Global Presence

India's growing role in the global maritime order requires not only presence but influence in international maritime bodies. The portal strengthens India's maritime diplomacy by ensuring that the country's positions at IMO, ILO, and IMSO are backed by rigorous domestic consultation and technical evaluation. Well-prepared and timely interventions improve India's credibility, enhance bilateral cooperation, and provide leverage during negotiations and elections at international forums.

07

Contribution to Capacity Building and Knowledge Management

One of the long-term benefits of the portal is its ability to function as a living knowledge repository of India's maritime regulatory engagements. It stores past feedback, interventions, drafts, and policy decisions in a structured, accessible format. This supports onboarding and training of new officers, researchers, and stakeholders, while reducing dependency on individual memory or institutional silos.

D. Key Features of the Project

The platform provides robust functionalities to manage meeting documents, track feedback, facilitate collaboration, and streamline decision-making workflows. The following are its key features:

Table 12 Key Functionalities of the Platform

#	Feature	Detailed Description
1	Role-Based Access Control	a) The portal enforces a strict role-based hierarchy to ensure secure and structured collaboration. Users are categorized as **Members, Coordinators, Delegation Leaders, or Administrators**. b) Each role is granted specific permissions; for example, only Delegation Leaders can finalize feedback, and only Administrators can create shadow committees or manage users. This ensures confidentiality, prevents unauthorized access, and streamlines task responsibilities.
2	Committee and Agenda Management	a) The platform allows the creation of multiple Shadow Committees corresponding to IMO, ILO, IMSO, or other international forums. b) Each committee is populated with structured agenda items, member lists, and associated documents. c) Members can view the committees they are part of, track specific agenda topics, and access relevant updates. This ensures focused discussions and issue-specific task distribution.
3	Document Review and Version Control	a) Agenda documents such as draft conventions, circulars, or meeting notes can be uploaded to the system. Users can review, annotate, and submit feedback directly within the portal. b) A version control mechanism ensures that edits and suggestions are tracked. Final documents can be locked by the Delegation Leader to preserve integrity. Historical versions are archived for transparency and reference.
4	Task Assignment and Tracking	a) Coordinators and Group Leaders can assign specific agenda items or review tasks to selected members or subgroups. b) Tasks include due dates, document links, and description fields. Members can view and update their task status. c) This feature ensures accountability, equitable workload distribution, and structured tracking of all contributions ahead of international meetings.
5	Feedback Compilation Workflow	a) Individual members submit feedback using a built-in text editor. Group Leaders compile these inputs into subgroup summaries, which are further consolidated at the committee level by Delegation Leaders. b) This ensures a coherent, well-reviewed, and nationally approved position is submitted to international bodies, reflecting all stakeholder views.
6	User-Specific Dashboards	a) The system provides customized dashboards depending on user roles. Members see assigned tasks and relevant documents; Coordinators manage subgroup work; Delegation Leaders monitor overall committee preparation; and Administrators track system-wide performance. b) Dashboards are categorized into IMO, ILO/JWG, and other folders, and meetings are listed in chronological order.

#	Feature	Detailed Description
7	Real-Time Collaboration and In-Meeting Editing	a) During live meetings or reviews, the platform enables real-time discussions and co-editing of documents. Users can collaborate on feedback using track changes, discussion boards, and shared editing tools. b) This helps finalize positions during fast-paced deliberations and ensures team coordination under time constraints.
8	Secure Authentication and Communication	a) Users authenticate via registered email IDs, with enforced password resets on first login. The system uses encrypted data transmission, and role-based restrictions prevent unauthorized access. b) Email invitations are sent for new account registration, ensuring a secure and traceable onboarding process.
9	Reports and Feedback Documentation	a) Users can generate structured reports on preparation status, task progress, meeting summaries, and feedback compilations in XML or Excel formats. b) These reports help track inputs across committees, enable documentation for ministry briefings, and serve as compliance records for audits or future references.
10	Administrative Control and Superuser Access	a) Administrators have access to all platform functions including committee creation, user management, agenda setup, and document uploads. b) A designated Superuser (e.g., DDG–International Cooperation) can oversee system-wide activity, intervene when needed, and assign administrator rights to consultants or support teams.
11	Calendar-Based Meeting Visualization	a) A sidebar calendar allows administrators and users to visualize upcoming international meetings. Hovering over a date reveals the committee's name, agenda, and participant list. b) Clicking a date displays associated documents, assigned tasks, and feedback summaries, making scheduling and planning more intuitive.
12	Structured Paper Drafting and Approval Workflow	a) The portal enables structured drafting of position papers and responses. Papers move through a defined approval hierarchy: **Member → Group Leader → Delegation Leader → Chief Surveyor/Nautical Advisor → DG → MoPSW.** b) Each step is time-stamped, and the final version is locked to preserve document sanctity.
13	Performance Monitoring and Evaluation	a) The platform includes tools to evaluate member contributions. Metrics include meeting attendance, agenda participation, task completion, and review submissions. b) This data supports internal assessments, ensures accountability, and helps identify active contributors and areas requiring support or improvement.
14	Expanded Modules for ILO, IMSO, and JWGs	a) In addition to IMO, the portal supports similar structures for ILO (e.g., MLC, STC, JMC), IMSO (e.g., LRIT audits), and bilateral/multilateral engagements such as India–Norway Joint Working Groups. b) These modules include ToRs, agreements, meeting minutes, and issue trackers, enabling comprehensive international maritime engagement.
15	One-Click Summary Downloads and Archives	a) Users can download consolidated summaries of all committee activities, meeting minutes, and document feedback trails.

#	Feature	Detailed Description
		b) These archives support reporting to senior officials, preparing parliamentary responses, and retaining institutional memory of India's maritime policy engagements over time.

E. Technical Stack and Architecture

The architecture of the IMO Shadow Committee Platform is designed as a layered and modular system, with clear separation of concerns between user interaction, functional workflows, backend services, and infrastructure. It provides a comprehensive, secure, and scalable environment for managing India's participation in international maritime deliberations through structured shadow committee processes.

At the top is the **User Interface Layer**, which delivers a role-sensitive and intuitive web-based experience. This layer consists of a web portal that serves as the primary interface for all users, including Members, Coordinators, Delegation Leaders, and Administrators. The platform is developed with responsive design principles to ensure compatibility across devices—desktops, tablets, and smartphones—while also incorporating a rich-text editor to allow users to draft detailed feedback and comments. Dashboards are dynamically rendered based on the user's role, offering relevant views and functions, such as task assignments for members or consolidated feedback panels for leaders. A document viewer with embedded version control and edit tracking enables collaborative document management, allowing users to see past versions, track changes, and ensure document integrity during review cycles.

Beneath the interface lies the **Application Functional Modules Layer**, which handles the core logic and user workflows. This layer supports essential operations such as user authentication and role-based authorization, ensuring that access is tightly controlled and aligned with the user's responsibilities. Shadow committees and their meetings are managed through dedicated tools that allow the creation, editing, and tracking of meeting-specific documents and agendas. Functional modules also handle the assignment of tasks to groups, the management of agenda-specific working groups, and the development of formal papers through collaborative workflows. Users can participate in the drafting process, while group leaders and delegation heads consolidate and approve final submissions. Additionally, the platform enables robust mechanisms for compiling individual feedback into group responses, supporting multi-stage review processes.

The **Application Services and API Layer** acts as the connective tissue between frontend interfaces and backend systems. This layer facilitates all CRUD (Create, Read, Update, Delete) operations via secure APIs for managing documents, user data, feedback, and tasks. Database interactions are executed using safe, parameterized queries to ensure integrity and performance. The calendar integration module allows users to schedule meetings and receive reminders, thus aligning operational planning with international maritime meeting calendars. Export services are also provided at this layer, enabling the generation of detailed reports in XML or Excel format for archival or official submission purposes. The system supports integration with external Document Management Systems (DMS), ensuring interoperability with existing government platforms for final paper submission and long-term document storage.

The foundation of the system is the **Cloud Infrastructure and Security Layer**, which ensures the platform's high availability, data protection, and compliance with national IT governance policies. The platform is hosted in a MeitY-empanelled cloud environment such as AWS, Azure, C-DAC, or NIC, depending on deployment preferences. It includes strong network-level security through Secure Socket Layer (SSL) encryption, Web Application Firewalls (WAF), and endpoint protection measures to guard against intrusion and data breaches. The data is stored in managed relational or document-based databases like PostgreSQL or MongoDB, which offer reliability, backup management, and horizontal

scalability. Automated backup systems are configured with disaster recovery protocols to ensure system continuity in the event of outages, corruption, or cyber incidents.

This integrated architectural framework empowers the IMO Shadow Committee platform to operate as a reliable, secure, and collaborative digital governance tool. It enables seamless coordination among diverse stakeholders, structured documentation processes, and real-time responsiveness to international maritime engagements, while complying with India's e-Governance standards.

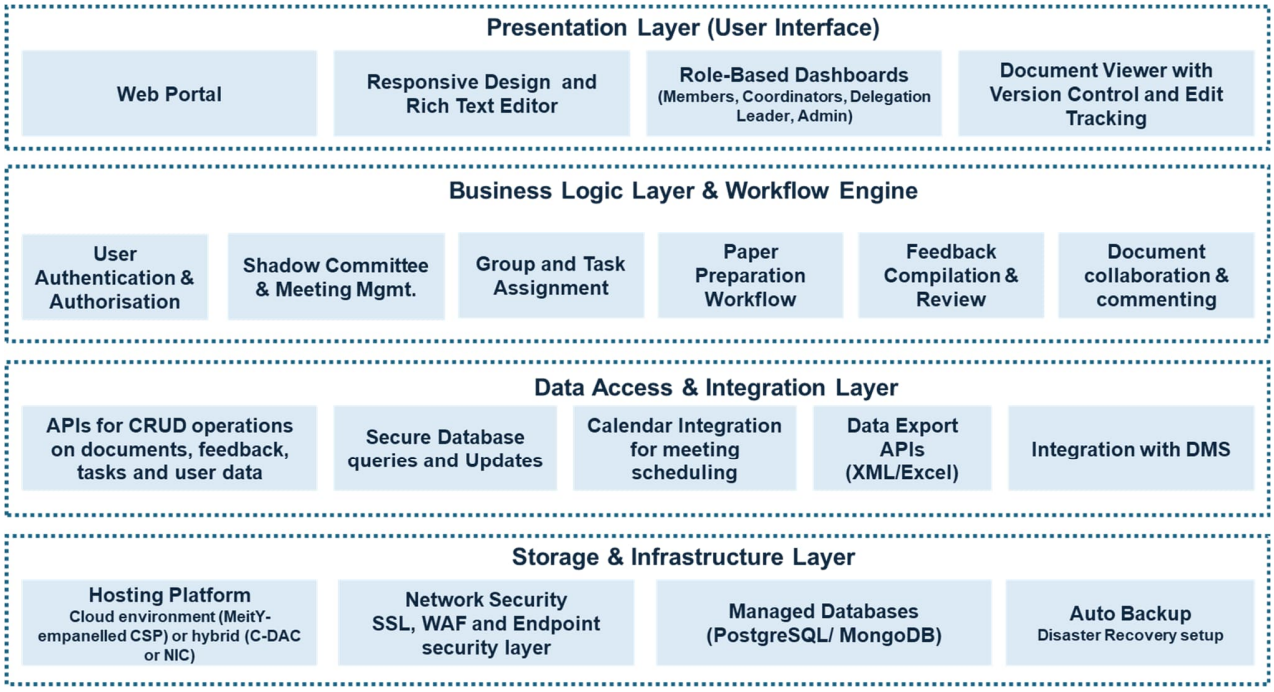


Figure 20 Functional Architecture of the Platform

F. Project Timelines

Project Duration: 12 Months Implementation + 3 Years Operation & Maintenance (O&M)

Table 13 Project Implementation Timeline

#	Activity / Month	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Year 1	Year 2	Year 3
1	Project Kick-off & FRS Finalization															
2	Architecture & Design															
3	Core Development Phase I															
4	Core Development Phase II															
5	Integration, Testing, Security Audit															
6	Go-Live															
7	Training & Change management															
8	O&M (support, audit, DR)															

Learning Management System(LMS)

4.9 Learning Management System (LMS)

A. About the Project

The Learning Management System (LMS) project, initiated by the Directorate General of Shipping (DGS), Ministry of Ports, Shipping and Waterways, is a transformative step toward modernizing maritime education and certification in India. This pioneering digital platform is designed to provide a unified, accessible, and globally compliant learning ecosystem for seafarers and maritime professionals.

The LMS aims to revolutionize the delivery of training by digitizing key educational components of maritime courses, integrating simulation-based learning, and automating assessments and certifications. It is a strategic response to the growing need for technology-enabled, standardized maritime training aligned with international conventions such as the STCW Convention, while also supporting India's national development priorities under Digital India, Maritime India Vision 2030 (MIV 2030), and Amrit Kaal Vision 2047 (MAKV 2047).

This project is led by the IT & e-Governance Division of DGS in close collaboration with the Training Branch, ensuring both technical and academic excellence. It brings together cutting-edge technology, regulatory compliance, and global standards to build a robust digital learning infrastructure that will enhance the competence, employability, and global standing of Indian seafarers.

Through the LMS, DGS seeks to:

a) **Democratize access to maritime education** by reaching trainees across geographies.
b) **Ensure consistency and quality** in training delivery, course content, and certification processes.
c) **Modernize examinations and assessments** through AI-based supervision and real-time progress tracking.
d) **Foster continuous skill development**, lifelong learning, and alignment with industry trends and emerging technologies.

The LMS project represents a foundational pillar in India's ambition to become a global leader in maritime human resource development and serves as a benchmark for digital innovation in the maritime training ecosystem.

B. Objectives

The primary objective of the LMS initiative is to transform India's maritime education and certification ecosystem through a unified, digital-first platform that promotes accessibility, quality, and global compliance. The LMS is envisioned to foster continuous learning and professional excellence among seafarers and maritime professionals.

I **Unified Digital Platform-** To develop a single, centralized platform for delivering maritime education and training that provides standardized learning pathways across foundational, preparatory, and career advancement courses.

II **International Compliance-** To align all training content and assessments with globally recognized standards, particularly the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), ensuring international recognition and acceptance of Indian maritime certifications.

III **Flexible and Inclusive Learning-** To facilitate a blended learning model that allows seafarers from remote and diverse geographic locations to access high-quality training with minimal dependence on physical infrastructure.

IV **Interactive and Immersive Training Experience-** To integrate advanced digital tools such as virtual simulations, multimedia content, smart classroom technologies, and real-time tracking to deliver an engaging and immersive educational experience.

V **Robust Assessments and Certification-** To incorporate secure, transparent, and automated mechanisms for assessments, including AI-based invigilation, digital grading, e-certifications, and analytics-based performance feedback.

VI **Lifelong Learning and Career Progression-** To support continuous professional development by providing updated knowledge on industry regulations, safety protocols, sustainable maritime practices, and emerging technologies.

VII **Data-Driven Monitoring and Governance-** To enable centralized monitoring, recordkeeping, and audit capabilities to ensure compliance, transparency, and accountability in training delivery and certification processes.

VIII **Promote Gender Sensitivity and Inclusivity-** To incorporate feedback and grievance redressal mechanisms with special provisions for female seafarers and underrepresented groups, ensuring an inclusive learning environment.

C. Strategic Alignment of the Project

The **Learning Management System (LMS)** initiative aligns seamlessly with the Government of India's national digital priorities and international maritime obligations. It is envisioned as a cornerstone of a modern, efficient, and globally benchmarked maritime education ecosystem. The initiative reflects the Directorate General of Shipping's (DGS) commitment to leveraging technology for capacity building, regulatory compliance, and international competitiveness in the maritime domain.

01

Alignment with Maritime India Vision 2030

a) Uniformity in standards across Maritime Training Institutes (MTIs).
b) Transparency in certification and evaluation processes.
c) Accessibility to training for seafarers across the country and abroad.
d) Reduction in administrative overhead for regulatory authorities.

02

Alignment with Amrit Kaal Vision (MAKV) 2047

The LMS contributes by:

a) Enabling technology-driven instructional methods such as simulations and adaptive learning.
b) Ensuring standardized curriculum delivery and access across urban and rural areas.
c) Promoting continuous skill development to meet future industry needs, such as automation, decarbonization, and digitalization in shipping.

Compliance with STCW Convention (IMO)

a) Delivery of STCW-compliant modules through a unified digital interface.
b) Enabling trackable learning outcomes and audit-ready assessment records.
c) Ensuring secure digital certification and evaluation, minimizing risk of fraud and manual error.
d) Promoting maritime safety, environmental compliance, and international mobility for Indian seafarers.

D. Key Features of the Project

The LMS is a state-of-the-art digital platform designed to enhance accessibility, flexibility, and quality in maritime training. It will provide a unified learning environment for a wide range of programs, including STCW Modular Courses, CoC Preparatory Courses, and Career Advancement Courses. By leveraging interactive features such as virtual simulations, progress tracking, and blended learning methodologies, the LMS aims to deliver an engaging and dynamic educational experience for seafarers and maritime professionals.

This initiative reflects DGS's vision of creating a continuous, technology-driven learning ecosystem that meets evolving industry needs, promotes global best practices, and ensures the readiness of India's maritime workforce to meet modern challenges. The key features of the project are as follows:

Table 14 Key Functionalities of DG Shipping's Learning Management System

Category	Feature	Description
Course Coverage	STCW, CoC, Career Courses	LMS will host STCW Modular Courses, CoC Preparatory Courses, and Career Advancement Courses aligned with IMO
User Experience	Multilingual, Intuitive UI	Easy navigation, multilingual support, real-time progress tracking, and interactive tutorials.
Cloud-Based Architecture	Scalable & Secure Hosting	Hosted on a robust cloud infrastructure ensuring high availability, global access, and data integrity.
Cybersecurity	Advanced Protection	Secure login, role-based access, encryption, and regular vulnerability audits.
Regulatory Compliance	STCW & DGS Alignment	Full compliance with STCW Convention, DGS standards, and international maritime training norms.
Integration	API & Platform Interoperability	Seamless integration with DGS systems, training institute portals, and certification databases.
Pilot Testing	Controlled Rollout	Initial testing with select users to validate system functionality before phased implementation.
Blended Learning Model	Online + Offline	Flexibility to support synchronous/asynchronous sessions, recorded lectures, and live classes.

Category	Feature	Description
Instructor Enablement	Training & Certification	Faculty workshops, peer-reviewed practice sessions, and digital training materials.
Technical Support	24x7 Helpdesk	Continuous support with ticketing system for issue resolution and user queries.
Performance Monitoring	Analytics & Logs	System metrics, usage tracking, feedback collection, and audit-ready recordkeeping.
Digital Assessments	Secure Online Exams	AI-based proctoring, ID verification, session recordings, and auto-evaluation features.
Smart Classrooms	Virtual Teaching Tools	Integration of digital whiteboards, breakout rooms, and instructor control features.
Simulation Integration	Virtual Labs	High-fidelity simulations replicating real-life maritime scenarios for decision-making and training.
Adaptive Learning	Personalized Pathways	Custom learning tracks based on trainee progress, performance, and career goals.
Attendance Management	Centralized Tracking	Biometric/photo/video-based attendance with archival for up to 5 years.
Feedback Mechanism	Course & System Feedback	Built-in forms for instructor and student feedback with analytics dashboard.
Grievance Redressal	Inclusive Resolution System	Digitally managed grievance portal with special provisions for women and vulnerable groups.
Post-Implementation Support	AMC & Warranty	1-year warranty + 2 years of operations & maintenance with continuous optimization.
Compliance Auditing	Record Preservation	Secure archival of course records, assessments, and system logs for audit purposes.
Alignment with National Goals	MIV 2030, MAKV 2047	Strategically aligned with Digital India, Maritime India Vision 2030, and Amrit Kaal Vision 2047.
Digital Public Goods (DPG)	Open Source / Vendor-Neutral	Options for Moodle, Zoho LMS, or custom platforms compliant with Digital Public Infrastructure (DPI).

E. Project Timelines

The Estimated project cost for the project is INR 9.00 Cr. The timelines for this are as follows:

Table 15 Implementation Timeline of the Learning management system

#	Activity / Month	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Year 1	Year 2	Year 3
1	Project Kick-off & FRS Finalization										
2	System Design & Development										
3	Digital/Cloud Infrastructure Setup										
4	Final Version Development and Compliance Audit (STCW and DGS Standards)										
5	End-User Training and Pilot Phase										
6	Go-Live										
7	Warranty Period										
8	O & M										

F. Project Status

The project is currently in the **public procurement stage**, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the **Quality and Cost-Based Selection (QCBS)** method.

Simulator Based Maritime Training

4.10 Simulator Based Maritime Training

A. Simulators in The Maritime Industry

Simulators are sophisticated training devices or software systems that replicate real-world environments and processes, allowing users to practice, learn, and master various tasks without actual exposure to risks or operational costs. In maritime training, simulators recreate shipboard scenarios, navigation, machinery operations, and emergency situations, providing a safe and controlled environment for seafarers to develop skills and competencies.

Figure 21 360-degree Full Mission Bridge Simulator

B. Importance of Simulators in Maritime Training

Simulators play a critical role in maritime education and training for the following reasons:

a) **Safety:** Training in a simulation environment allows seafarers to practice handling emergencies, dangerous situations, and complex manoeuvres without risk to life, vessel, or environment.

b) **Realism:** Modern simulators use advanced graphics, physics, and hardware controls to closely mimic the conditions found aboard ships, bridges, or engine rooms.

c) **Cost-effectiveness:** They reduce the need for real ship time, thus saving operational costs and resources while maximizing learning opportunities.

d) **Competency-building:** Simulators help in developing technical, operational, and decision-making skills in compliance with international standards (e.g., STCW, DNV).

e) **Assessment & Certification:** They provide objective assessment tools and documentation necessary for regulatory and certification purposes.

Table 16 Types of Maritime Simulator Based Training

Type of Simulator	Description	Primary Training Focus
Bridge Simulator	Simulates ship's bridge with controls, navigation systems (radar, ECDIS), and visual environment.	Navigation, ship handling, bridge team management, emergency response.
Engine Room Simulator	Replicates engine room machinery and control systems.	Engine operations, machinery control, troubleshooting, maintenance.
Liquid Cargo Handling Simulator	Models' cargo control systems on oil, chemical, LPG, and LNG carriers.	Cargo operations, loading/unloading, emergency procedures related to cargo.
Tug Handling Simulator	Specialized for tugboat operations and towage manoeuvres.	Tug manoeuvring, towage, port support operations.
ECDIS Simulator	Desktop-based simulator focused on electronic navigation charts and systems.	Training in electronic navigation, compliance with navigation regulations.
Radio Communication Simulator	Simulates ship-to-shore and ship-to-ship radio communications.	Communication protocols, GMDSS training.
Dynamic Positioning (DP) Simulator	Simulates dynamic positioning systems on specialized vessels.	DP operations for offshore support vessels and drill ships.
Safety and Security Simulator	Focuses on safety drills, search and rescue (SAR), firefighting, piracy and security scenarios.	Emergency preparedness, safety procedures, security training.
Vessel Traffic Service (VTS) Simulator	Models traffic management systems used in ports and busy waterways.	Vessel traffic coordination and management training.
Ice Navigation Simulator	Designed for training navigation and handling in polar/ice conditions.	Ice navigation and manoeuvring in harsh sea environments.
Fishing Simulator	Simulates operations and navigation specific to fishing vessels.	Fishing vessel operations and navigation.
Survival Craft Simulator	Practice of lifeboat and survival craft deployment and handling.	Emergency evacuation and survival drills.
Oil Spill Response Simulator	Models oil spill accidents and recovery operations.	Environmental protection and oil spill mitigation training.

C. Web Based Simulation

The **Web-Based/ Cloud- Based Simulation platform** is a pioneering digital initiative by the Directorate General of Shipping (DGS), designed to transform the way seafarers in India are trained and assessed. This innovative project addresses the limitations of traditional simulator-based training—such as high infrastructure costs, limited accessibility, and physical dependency—by offering a fully cloud-native, browser-accessible simulation environment. Trainees can now undergo realistic simulation-based exercises for deck and engine operations from any location, using only a standard computing device with internet access.

Aligned with international maritime standards, including the STCW Convention and its Manila Amendments, this platform supports scenario-based training, real-time instructor-led assessments, and

compliance-ready evaluation processes. It integrates seamlessly with a Learning and Virtual Simulation Framework (LVSF), offering structured learning modules, performance tracking, and post-session analysis for both candidates and faculty. The system is equipped with a robust set of features such as customizable assessment rubrics, audit logs, and pre-training technology checks to ensure readiness and transparency.

By removing the need for physical simulators and central training locations, the platform democratizes access to high-quality maritime training—especially for candidates in remote or underserved regions. It significantly enhances the efficiency, scalability, and consistency of training delivery across the country. Moreover, the initiative supports India's broader maritime vision under MIV 2030 and MAKV 2047, promoting sustainability, digital transformation, and global competitiveness in seafarer development. This strategic leap in maritime education ensures that Indian seafarers remain globally competent, digitally equipped, and aligned with evolving regulatory and industry standards.

This project is led by the Training Branch of DGS in close collaboration with the IT and E governance Branch, ensuring both technical and academic excellence.

Figure 22 Overview of the Web Based Simulation

D. Objectives

The primary objectives of Web based simulators are:

I **Enhance Oral Examination for Certificate of Competency (CoC):** Integrate immersive simulation-based scenarios into the oral assessment process to evaluate practical decision-making, situational awareness, and problem-solving skills of candidates in real-world maritime contexts.

II **Replicate Realistic Deck and Engine Operations:** Provide a virtual, yet highly realistic training and assessment environment simulating deck-side operations (e.g., navigation, cargo handling,

bridge watchkeeping) and engine-side operations (e.g., machinery management, troubleshooting, engine room watchkeeping).

III **Ensure Global Regulatory Compliance: Align** simulation content and examination structure with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), DGS rules, and other applicable IMO guidelines.

IV **Enable Anytime, Anywhere Access through Web Deployment:** Leverage cloud-based and browser-accessible architecture to eliminate dependency on physical infrastructure, thereby enabling remote access for examiners and candidates across India.

V **Improve Training Outcomes with Real-Time Feedback:** Incorporate instant feedback and evaluation tools within the simulation to help candidates and trainers understand strengths, weaknesses, and areas for improvement.

VI **Foster Uniformity and Transparency in Assessments:** Standardize examination processes and minimize human bias through digitally recorded, auto-evaluated simulation assessments.

VII **Promote Continuous Learning and Readiness:** Support self-paced learning, formative assessments, and preparatory exercises for seafarers aiming to enhance competencies beyond exam requirements.

VIII **Support Integration with DGS Digital Platforms:** Ensure seamless data exchange and interoperability with existing DGS portals (e.g., e-Samudra, LMS) for end-to-end management of training, certification, and performance records.

IX **Future-Proof and Scalable System Design:** Build a modular, extensible architecture that can accommodate future training needs, additional modules (e.g., GMDSS, ship handling), AI-driven evaluations, and multiple user roles.

X **Facilitate Evidence-Based Governance:** Provide dashboards and analytics tools for DGS to monitor simulator usage, performance trends, and compliance metrics.

E. Strategic Alignment

The Web-Based Maritime Simulation Platform is a transformative step in the Directorate General of Shipping's digital reform journey and is strategically aligned with India's national maritime policies as well as international regulatory frameworks.

Alignment with Maritime India Vision 2030

The web-based simulation platform supports MIV 2030 by modernizing maritime training through cloud-based, STCW-compliant simulations. It extends quality training access to remote areas, enhances employability, and promotes a digitally skilled maritime workforce aligned with global standards.

02

Alignment with Amrit Kaal Vision (MAKV) 2047
Aligned with MAKV 2047, the platform promotes innovation and sustainability by reducing reliance on physical simulators and travel. Through cloud integration, it supports continuous learning, green digital education, and positions India as a leader in maritime talent for the future.

03

Alignment with the STCW Convention
Compliant with STCW Regulations 1/6 and 1/12, the platform offers structured, quality assured training using instructor-led simulations and real tas assessments. It ensures candidate authentication, traceabiliti end audit-ready documentation-meeting global competency and evaluation standards.

04

Alignment with IMO Strategic Directions
The platform advances IMO's goals of digital transformation and regulatory compliance by integrating simulation tech into training. It boosts accessibility, consistency, and global alignment, showcasing India's leadership in adopting smart, scalable maritime education solutions.

F. Key Features of the Project

The Web-Based Maritime Simulation Platform is a pioneering initiative by the Directorate General of Shipping to revolutionize maritime training and assessments through immersive, accessible, and digitally secure simulation technologies. Built in alignment with STCW standards and leveraging cloud infrastructure, the platform provides seafarers and Maritime Training Institutes (MTIs) with a scalable, compliant, and performance-driven solution. With AI-enabled assessments, secure proctoring, and national-level integration capabilities, the platform positions India at the forefront of digital maritime capacity building.

Table 17 Key Features of the Project

#	Feature	Description
1	Cloud-Based Accessibility	Fully web-based simulator accessible from any device via a secure browser interface—no need for physical infrastructure.
2	STCW-Compliant Modules	Simulation exercises designed as per STCW Convention standards for Deck and Engine operations, safety, and emergency drills.
3	AI-Powered Assessments	Intelligent performance analytics for real-time evaluation, scoring, and feedback generation during simulations and oral exams.
4	Oral Examination Integration	Enables structured, remotely monitored oral assessments for Certificate of Competency (CoC) with scenario-based evaluation.
5	Role-Based Dashboards	Separate dashboards for candidates, instructors, and regulators to track progress, review assessments, and manage content.
6	Secure Digital Proctoring	Advanced monitoring features including live video supervision, screen tracking, and behaviour alerts to ensure examination integrity.
7	Dynamic Scenario Library	Continuously updated bank of simulation cases covering navigation, machinery operations, environmental protocols, etc.
8	Multi-Stakeholder Access	Controlled access for seafarers, MTIs, assessors, and DGS officials through secure login and permissions-based workflows.
9	Regulatory Analytics	Centralized analytics engine providing insights to DGS on institutional performance, candidate trends, and policy gaps.
10	Integration with DGS Ecosystem	Seamlessly links with existing DGS platforms including Seafarer MIS, e-Governance systems, and certification modules.

G. Technical Requirements for Conducting simulator-based courses

The Live Virtual Simulation Framework (LVSF) is a cloud-based training environment designed to deliver simulation-based maritime courses remotely, in compliance with STCW and DGS requirements. Below is a summarized representation of the technical requirements that must be adhered to by Maritime Training Institutes (MTIs) for effective and compliant delivery of such courses.

Table 18 Technical Requirements for the Cloud based/ Web Based simulators

Components	Description
SIMULATION ENVIRONMENT AND INFRASTRUCTURE REQUIREMENTS	
System Applicability and Structure	a) LVSF Usage: Applicable for theory, practical, demonstrations, and assessments of simulation-based modular courses. b) System Components: i. **Live Cloud Simulation Sessions (LCSS)** – Cloud-based simulators for live practical and assessments. ii. **Virtual Classes/Live Video Sessions (VC/LVS)** – For lectures and instructor-led demos. c) Mandatory Approvals: LVSF systems must be approved by DGS or a recognized body (IACS or Authorized Organization).

Components	Description
Device Compatibility	a) **Requirements:** i. RAM: 8 GB+, i7 processor, SSD storage, webcam (2 MP), and mic. ii. Device: Windows/Mac laptop/desktop with recommended screen size (15" +). b) **Trial Runs:** Mandatory system test before official session participation.
Internet Bandwidth	Minimum 10 Mbps bandwidth recommended per concurrent user to ensure smooth delivery of simulation and real-time communication.
Video & Audio Support	Integrated HD video conferencing, screen sharing, chat and voice communication with monitoring tools for instructors.
Network Security	End-to-end encryption (AES 256-bit), compliance with ISO/IEC 27001 standards, and secure user authentication via OTP, role-based access control (RBAC), and audit trails.
Data Storage & Recording	Secure cloud storage for training and assessment logs, student submissions, and session recordings with backup and retrieval features for a minimum of 5 years.
SIMULATION FIDELITY & STANDARDS COMPLIANCE	
Simulator Realism	The simulator must demonstrate physical and behavioural realism, replicating shipboard equipment and scenarios, including errors and limitations.
Standards Compliance	Simulators must comply with STCW A-I/12 for training and assessment, and be audited periodically for calibration, version control, and performance validation.
Scenario Design	Capable of generating normal and emergency conditions; scenarios should include environmental variables (weather, sea state, system failure).
Instructor Control Panel	Instructors must have tools to control, monitor, intervene, and debrief simulation sessions in real-time with comprehensive analytics.
TRAINING, FAMILIARIZATION, AND TRIAL PROTOCOLS	
Faculty Training	MTIs must organize structured training sessions for faculty on LVSF usage, netiquette, pedagogy, and digital tools. At least one peer-reviewed practice session is mandatory and must be digitally documented.
Faculty Certification	Faculty must undergo training and certification as per DGS-issued guidelines for the specific course/module.
Pre-Course Trials	A 15-minute trial session is to be arranged to verify student device compatibility and internet quality.
Simulator Familiarization	Students must perform simple exercises and interact with individual equipment components to replicate on-site training practices. Familiarization records are to be digitally stored.
TRAINING & DEBRIEFING PROCEDURES	

Components	Description
Pre-Exercise Briefing	Clear briefing on exercise objectives, tasks, and expected outcomes.
Monitoring	Live monitoring by instructors with support for audio-visual tracking, screen control, and chat monitoring.
Debriefing & Feedback	Post-exercise evaluations with instructor and peer feedback. Digital records of debriefing should be maintained.
Exercise Design	Exercises must be designed to match training objectives, including progressive levels of difficulty.
ASSESSMENT PROCEDURES FOR LVSF-BASED COMPETENCY EVALUATION	
Performance Criteria	Clearly defined, valid, and transparent to the candidate.
Briefing of Candidates	Detailed briefing about assessment tasks and evaluation methods.
Simulation Scenarios	Must allow demonstration of individual decision-making, interaction with virtual crew/equipment, and safe operations.
Assessor Tools	Capability for assessors to observe, control, and evaluate performance using structured rubrics and recorded sessions.
Assessment Validation	Grading methods and rubrics must be validated and minimize subjectivity.
PERFORMANCE STANDARDS AS PER STCW A-I/12	
Training Simulators	Suitable to training tasks; simulate shipboard operations with realism; produce varied operational conditions; include instructor control, monitoring, and debrief capabilities.
Assessment Simulators	Match assessment objectives; high physical and behavioural realism; support diverse assessment conditions (e.g., emergencies); enable monitoring and performance evaluation by assessors.

H. Project Timelines and Costing

The estimated cost of the project is INR 2.5 Crore which will be the CAPEX. Further there will be year-on-year subscription charges on per user per hour basis. The project will be implemented in seven months with go live at the fifth month. Further there will be five years of Operation and Maintenance which includes the one-year warranty period.

Table 19 Project Implementation Timeline

Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Year 1	Year 2	Year 3	Year 4	Year 5
Design and Development												
UAT												
Go - live												

Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Year 1	Year 2	Year 3	Year 4	Year 5
Training and Capacity Building												
STQC & CERT IN Audit												
Stabilization												
Warranty Period												
Operation and Maintenance												

I. Project Status

The project is currently in the **public procurement stage**, following due process as per the Government of India's procurement guidelines. There are only limited players for this in the marketplace. This procurement approach ensures a competitive yet quality-driven evaluation process under the **Quality and Cost-Based Selection (QCBS)** method.

Indian Global Maritime Safety Platform

4.11 Indian Global Maritime Safety Platform

A. About the Project

The maritime industry is the backbone of global trade, and its safety is critical to the economy, environment, and human life. Drawing from the success of the European Marine Casualty Information Platform (EMCIP) and other leading maritime safety platforms worldwide such as MAIB (Marine Accident Investigation Branch), NTSB (National Transportation Safety Board), TSB (Transportation Safety Board), BSU (Federal Bureau of Maritime Casualty Investigation), DMAIB (Danish Maritime Accident Investigation Board etc., the creation of an Indian Global Maritime Safety Platform (IGMSP) is proposed.

Figure 23 Indian Global Maritime Safety Platform (IGMSP)

The Indian Global Maritime Safety Platform (IGMSP) will serve as a centralized hub for maritime casualty analysis, safety learnings, and the dissemination of best practices, aiming to significantly enhance maritime safety and align with the Maritime Amrit Kal Vision, Suraksha Sarvapratham Initiatives and IMO regulations.

Also, IGMSP will follow the vision of the "Suraksha Pratham - Hamesha" campaign which will establish a maritime industry where safety is the foremost priority, significantly reducing accidents and risks aboard ships by fostering a culture of safety and vigilance.

B. Objectives

The project aims to establish a robust and globally accessible **Global Maritime Safety Platform** through the following key objectives:

Develop and implement dynamic, user-personalized dashboards for the Global Maritime Safety Platform that display **real-time safety metrics, trends, and insights using advanced analytics tools**. These dashboards ensure cross-device compatibility, intuitive user interfaces, comprehensive user training, and stringent data security in line with international cybersecurity standards.

Build a **multilingual, structured knowledge repository** within the platform to provide seamless access to:

a) Global and national maritime **safety circulars and advisories**,

b) Specialized guidance on operational safety areas (e.g., pilot ladder usage, confined space entry, ballast operations, berthing operations),

c) IMO guidelines and regulatory updates, ensuring timely dissemination of safety-critical information and promoting adherence to global maritime safety standards.

Integrate a web-based Learning Management System (LMS) within the platform to:

a) **Host** a curated collection of **30–40 animated maritime safety training videos** to be rolled out over three years,

b) Provide open and free access to standardized safety training and risk certification programs,

c) Reinforce awareness and protocol adherence among seafarers through engaging and accessible digital content.
Note: Content development will be executed independently and is not part of this platform's development scope.

Design a secure, AI-enabled integrated database for maritime incident management, facilitating:

a) Standardized reporting and classification of incidents,

b) Pattern and root cause analysis using tools like Power BI and Tableau,

c) Controlled user access for confidentiality and compliance, thus supporting data-driven decision-making and regulatory enforcement.

Advance the vision of **"Zero Incidents, Injuries, and Environmental Harm"** in maritime operations by:

a) Promoting a safety-first culture,

b) Ensuring compliance with international safety standards,

c) Leveraging real-time monitoring and advanced analytics,

d) Delivering comprehensive safety training, and

e) Implementing proactive incident response and management systems to uphold operational excellence.

Establish and maintain a **centralized safety knowledge hub** that consolidates:

a) **Annual reports and statistics** on marine casualties and incidents,

b) **Infographics and root-cause summaries** from accident investigations,

c) Documented **preventive measures** and **safety recommendations**,

d) Case studies on accidents affecting both personnel and vessels, with the objective of facilitating continuous learning and risk reduction across the global maritime sector.

C. Strategic Alignment

The **Indian Global Maritime Safety Platform (IGMSP)** is closely aligned with India's national vision documents and international maritime objectives. The initiative reinforces the Government of India's commitment to safe, secure, sustainable, and technology-driven maritime governance through the following strategic frameworks:

01

Alignment with Maritime India Vision 2030

IGMSP directly contributes to the core pillars of Maritime India Vision 2030 by promoting:

a) End-to-end digitalization of maritime safety governance,
b) Advanced analytics for real-time incident tracking,
c) Technology-enabled training platforms, and improved compliance and risk management systems. It also supports MIV's goal of enhancing India's global maritime safety record and fostering data-driven policymaking.

02

Alignment with Amrit Kaal Vision (MAKV) 2047

In alignment with the long-term vision for Amrit Kaal, IGMSP embodies the national aspiration of building a zero-incident safety culture across all maritime operations. The platform enhances:

a) Operational resilience of the maritime sector,
b) Environmental stewardship through safe practices, and
c) A sustainable, future-ready safety ecosystem, anchoring India's leadership in the maritime domain by 2047.

03

Suraksha Sarvapratham & Suraksha Pratham Hamesha Campaign

The IGMSP is rooted in the ethos of these national safety campaigns by:

a) Institutionalizing a culture of continuous safety awareness and vigilance,
b) Promoting multilingual e-learning and training modules for seafarers and maritime professionals,
c) Deploying proactive tools for accident prevention and safety monitoring.

04

Digital India Initiative

The platform exemplifies the objectives of the Digital India mission through:

a) Unified digital interfaces for safety services,
b) A centralized data-driven platform for maritime safety governance,
c) Deployment of e-learning tools, dashboards, compliance tracking systems, and
d) Seamless integration of safety-related workflows and training records.

05

SAGAR (Security and Growth for All in the Region)

IGMSP will act as a regional catalyst by:

a) Supporting international cooperation and safety knowledge-sharing,
b) Aligning with IMO standards and best practices, and
c) Reinforcing India's commitment to secure and responsible maritime leadership in the Indian Ocean Region (IOR).

06

Blue Economy Initiatives

By embedding safety in operations and promoting environmentally responsible practices, the platform:

a) Helps mitigate marine accidents,
b) Supports ecological conservation,
c) Promotes clean, sustainable shipping, and
d) Protects the economic integrity of India's coastal and marine sectors, making it a key enabler of India's Blue Economy strategy.

D. Key Features of the Project

The purpose of this initiative is to provide a unified source of maritime safety information, enabling the industry to learn from past incidents, apply best practices, and prevent future casualties, thereby promoting safer maritime operations on a global scale and also to enhance the safety of seafarers by promoting risk-free professional practices, ensuring a safer working environment at sea and in ports, and aligning with the objectives of the Global Maritime Safety Platform.

Figure 24 Dynamic Dashboards and Safety Repository

I **Dynamic Safety Dashboard Initiative**

a) Develop and implement customizable dashboards that provide real-time safety metrics and analytical insights.

b) Ensure the dashboards are accessible on various devices such as smartphones, laptops, and tablets.

c) Offer comprehensive training programs for users to effectively utilize the dashboard.

d) Apply robust data security measures to protect sensitive information within the dashboard.

II **Multilingual Safety Documentation Repository Initiative**

a) Construct a repository that houses a comprehensive collection of safety circulars, advisories, and guidelines.

b) Include key documents such as SOLAS regulations and IMO guidelines, as well as operational materials on pilot ladder usage, confined space entry, ballast operations, and birthing operations.

c) Ensure the repository supports multiple languages to cater to a diverse user base.

d) Keep the repository current with the latest safety information and international maritime safety standards.

Figure 25 Animated Safety Videos and Database for Incidents

Figure 26 Zero Incidents and Knowledge hub

III **Maritime Safety Animation Video Series Initiative**

a) Host a series of 200 AI-based innovative safety videos to engage and educate seafarers on a dedicated streaming platform that is part of the Global Maritime Safety Platform.

b) Implementing a web-based learning management system for delivering safety training.

c) Categorize the videos to cover a wide range of safety topics and best practices.

IV **Integrated Maritime Incident Database Initiative**

a) Create a secure database for standardized incident reporting and management.

b) Integrate AI and analytical tools such as Power BI and Tableau for advanced data analysis and pattern recognition.

c) Control access to the database to ensure data integrity and support safety and regulatory compliance.

V **Zero Incidents Culture Initiative**

a) Reinforce a safety-first culture across all maritime operations with the aim of achieving zero incidents, injuries, and environmental harm.

b) Ensure strict adherence to international maritime safety standards.

c) Provide extensive safety training and utilize advanced technologies for monitoring and data analysis.

d) Develop and maintain effective incident response and management systems to enhance safety and efficiency.

VI **Safety Knowledge Repository Initiative**

a) Establish a centralized knowledge hub for safety-related publications and resources.

b) Aggregate content such as annual marine casualty overviews, navigation accident analyses, and accident investigation infographics.

c) Include comprehensive information on preventive measures, causes of accidents, incident summaries, and safety recommendations.

d) Continuously update the repository to contribute to maritime safety.

E. Project Timelines

The system integrator is expected to adhere to these timelines with precision to ensure the timely delivery of high-quality software solutions that align with the project's objectives and milestones.

Table 20 Project Implementation Timeline

SN	Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Year 1	Year 2	Year 3
1	Design & Development													
2	UAT													
3	Pilot Testing													
4	STQC & CERT-In Audit													
5	Go-Live													
6	Warranty Period													
7	O & M													

F. Project Status

The Indian Global Maritime Safety Platform project is currently in the public procurement stage, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the Quality and Cost-Based Selection (QCBS) method.

Upgradation of DG COMM Centre

4.12 Upgradation of DG Comm

A. About the Project

The **DG Communication Centre** was established on 1st July 2004 to ensure 24x7 maritime communication support, particularly for **compliance with SOLAS Regulation XI-2/6** regarding maritime security. Operated initially with support from shipping companies and ports, the Centre has evolved into a critical node for incident reporting, crisis response, and multi-agency coordination involving Indian and foreign vessels, seafarers, port authorities, and security forces.

The DG COMM Centre acts as a central maritime communication hub, responsible for:

Figure 27 DG COMM Centre, Mumbai

a) Monitoring and managing Ship Security Alert System (SSAS) activations
b) Coordinating **ISPS Code drills**
c) Facilitating search and rescue **(SAR) operations**
d) **Supporting pollution response** coordination
e) **Exchanging security alerts** with MRCCs and ports
f) **Issuing tsunami and cyclone warnings**
g) **Handling incidents** involving hijackings, piracy, stowaways, and maritime terrorism

Given the rising number of seafarers and shipping activity—along with the increasing volume of reported maritime incidents—the Centre is being modernized and expanded.

B. Objectives

I **Establish a secure, real-time communication framework** among ships, ports, MRCCs, Indian Navy, and Coast Guard.
II Act as a central node for **monitoring crisis during disasters and security threats**.
III **Enable standardized reporting and documentation** of incidents for transparency and learning.
IV **Ensure compliance** with SOLAS, ISPS Code, and national maritime security mandates.
V **Disseminate security-related alerts and safety advisories** across maritime stakeholders.

C. Key features of Upgradation of DG COMM

I **Development of a Comprehensive Online Incident Reporting Module**
  a) For reporting marine casualties, pollution events, and security incidents.

b) Features: Real-time reporting, automated categorization, dashboards, and auto-generated reports.

II **Annual & Periodic Incident Reports**

DG COM will generate quarterly, six-monthly, and annual summaries of reported maritime incidents, including analysis and action taken.

a) **Multilingual Safety Training Videos**

Based on actual reported incidents to enhance seafarer awareness and onboard safety culture, in coordination with the Crew Branch.

b) **Historical Incident Analysis (2015–2022)**

Analyze trends in maritime casualties to derive actionable insights and improve risk mitigation.

c) **Monthly Coordination Meetings with the Indian Coast Guard (ICG)**

For aligned response strategies and reviewing maritime security incidents.

d) **Recruitment of Data Analyst & Facility Management Services**

To support data-driven decision-making and operational upkeep of the Centre.

e) **Collaboration with Indian Register of Shipping (IRS)**

For effective recovery of stakeholder dues and financial sustainability of operations.

Upgradation of Long Range Identification and Tracking System (LRIT)

4.13 Upgradation of LRIT

A. About the Project

The **Long-Range Identification and Tracking (LRIT) system** is an international maritime security and safety framework established under Regulation V/19-1 of the 1974 SOLAS Convention. Its primary function is to provide **global tracking and identification of ships** to support maritime safety, environmental protection, security, and search and rescue (SAR) coordination. The Indian LRIT National Data Centre (NDC), operated under DGS, not only fulfils India's own compliance obligations but also extends LRIT services to neighbouring countries like Sri Lanka and Maldives.

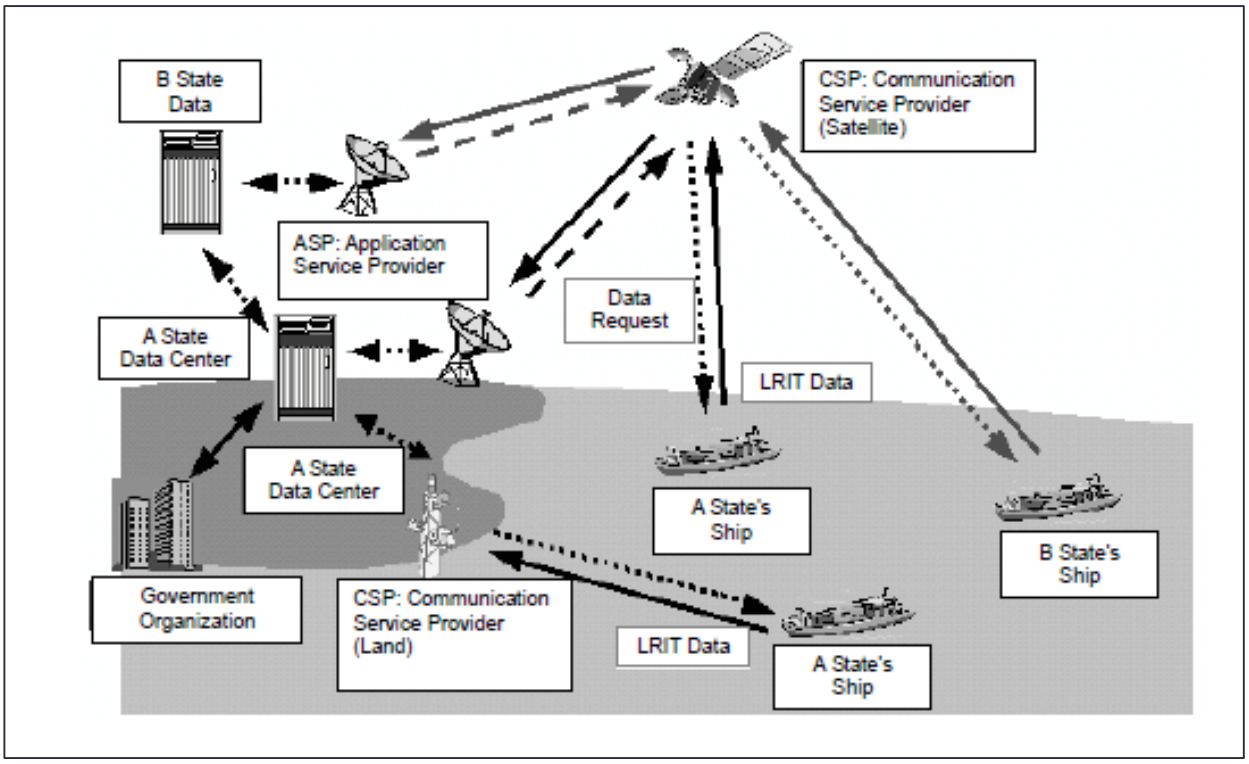


Figure 28 Components of LRIT System

The system comprises several components:

a) Shipborne LRIT transmitters
b) Communication Service Providers (CSP)
c) Application Service Providers (ASP)
d) The LRIT Data Centre (DC)
e) The Data Distribution Plan (DDP)
f) The International Data Exchange (IDE)

Together, these elements enable the automatic transmission of vessel position, identity, and timestamp information at six-hour intervals, or more frequently if required. The data is used by flag States, coastal States, port States, and SAR services to ensure compliance, enhance security, and coordinate emergency responses.

B. Objectives

I **Improve Search and Rescue (SAR) Operation**

By providing real-time vessel positioning, LRIT enables rapid and coordinated responses to distress signals.

II **Ensure Regulatory Compliance**

Supports enforcement of IMO regulations by ensuring vessels transmit mandated information to authorities.

III **Monitor Vessel Movements**

Allow continuous tracking of ships across international waters to detect illegal activities and support national security.

IV **Enhance Maritime Domain Awareness (MDA)**

Supports holistic understanding of maritime traffic, useful for both strategic planning and environmental protection.

V **Support Operational Efficiency**

Facilitates better voyage planning, logistics coordination, and emergency readiness for shipowners and regulators.

C. Key features of LRIT

I **Search and Rescue Coordination**

The LRIT system plays a vital role in locating vessels in distress, particularly in remote or international waters. It provides accurate real-time vessel positioning, enabling Search and Rescue (SAR) authorities to coordinate responses more effectively and reach distressed vessels quickly. This enhances safety outcomes and reduces rescue response times.

II **Position Reporting**

All LRIT-equipped vessels are required to automatically transmit their position data (latitude, longitude, speed, and heading) at 6-hour intervals, or at shorter intervals when requested. These reports are shared with the flag state, port state, or coastal state based on jurisdiction and request, supporting real-time tracking and strategic planning.

III **Environmental Monitoring**

LRIT data is used to track vessel activity in ecologically sensitive areas, such as marine protected zones or coastal ecosystems. By observing traffic patterns, regulators can enforce environmental controls, detect potential risks like oil discharges, and support marine conservation efforts in line with IMO environmental conventions.

IV **Continuous Tracking and Monitoring**

One of the core features of LRIT is its ability to track ships globally—even in deep sea or outside territorial waters. This helps authorities monitor vessel behavior, detect anomalies, and identify suspicious or unauthorized maritime activity such as illegal fishing or smuggling.

V **Vessel Identification**

LRIT enables identification of vessels through essential transmitted data, including:

a) Vessel name
b) Call sign
c) IMO number
d) Flag state

This identification supports compliance verification, port clearance, and law enforcement activities.

VI **Safety and Security Enhancement**

By integrating vessel tracking and data exchange with coastal, port, and defense agencies, LRIT strengthens maritime safety and national security. It enables the monitoring of high-risk zones, detection of unsafe navigation patterns, and real-time responses to potential threats like piracy or collisions.

VII **Regulatory Compliance**

The LRIT system ensures that vessels meet SOLAS Regulation V/19-1 and IMO mandates. Flag states and coastal states can monitor whether vessels are transmitted as required, helping enforce global standards for safety, security, and environmental responsibility.

VIII **Operational Efficiency Support**

The availability of accurate positional data helps shipowners, operators, and authorities to:

a) Plan optimal routes
b) Reduce fuel consumption
c) Improve scheduling and logistics coordination

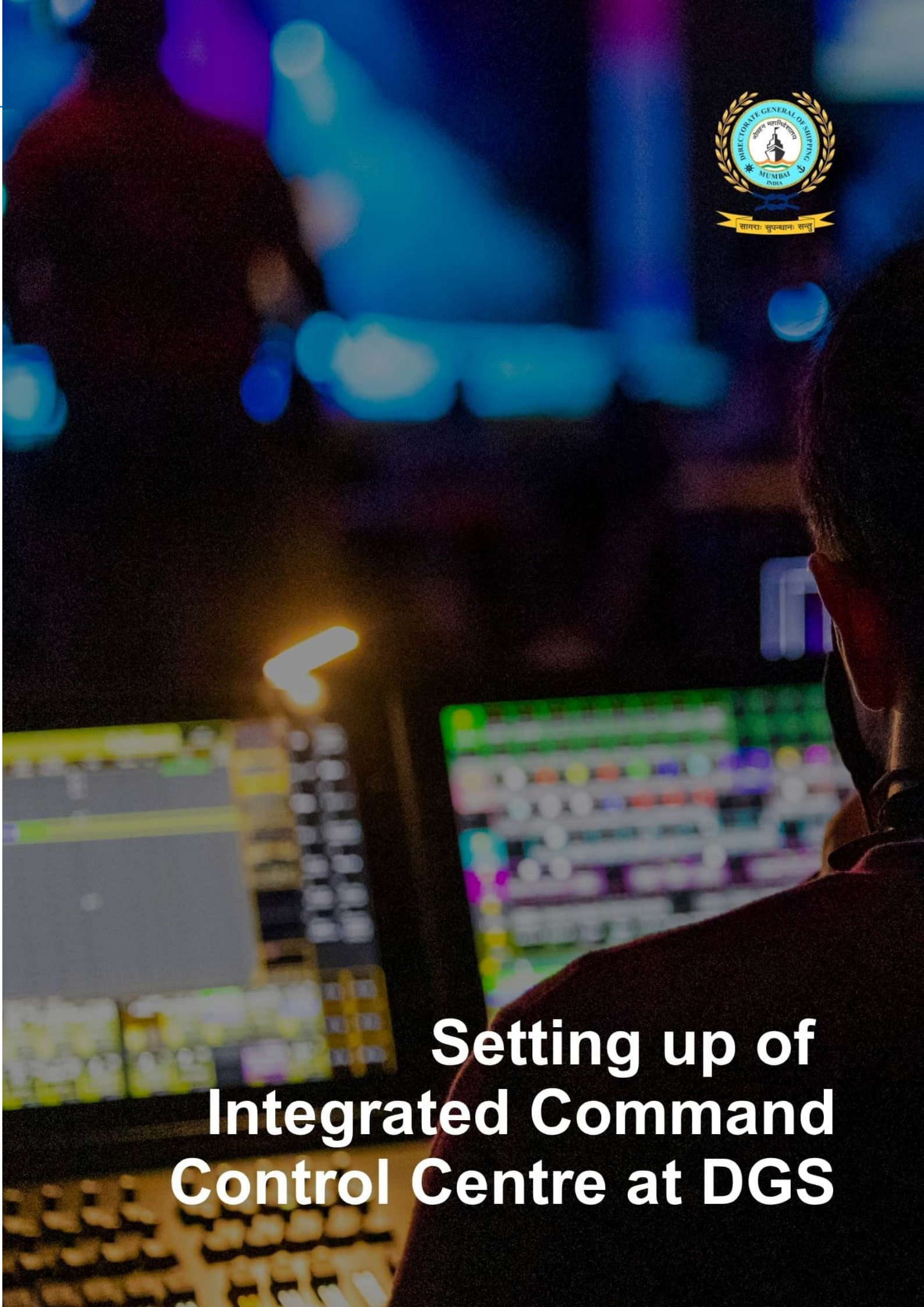
This contributes to cost savings and better supply chain management across the maritime sector.

IX **Data Distribution & Interconnectivity**

Through the LRIT Data Centre, position reports are routed using:

a) Communication Service Providers (CSPs)
b) Application Service Providers (ASPs)
c) International LRIT Data Exchange (IDE)

This architecture ensures that data flows securely and efficiently to the correct requesting authority (flag, port, or coastal state) as per the Data Distribution Plan (DDP).



Setting up of Integrated Command Control Centre at DGS

4.14 Setting up of Integrated Command Control Centre at DGS

A. About the Initiative

This initiative is a strategic step towards realizing the Directorate General of Shipping's (DGS) vision of embracing cutting-edge technologies to transform India's maritime governance. It underscores the Directorate's commitment to **fostering transparency, operational efficiency, and environmental sustainability through digital innovation**. By adopting a holistic and phased implementation model, the initiative aims to lay a solid foundation for smart maritime oversight and data-driven decision-making. Participating system integrators and technology partners will play a pivotal role in reshaping maritime operations by contributing technical expertise, domain understanding, and scalable IT solutions. Their involvement is not just limited to infrastructure deployment but extends to building capabilities for continuous analytics, monitoring, and policy support, thereby **creating a robust Command & Control ecosystem.**

The initiative will be implemented in two comprehensive phases:

I **Phase I: Deployment of Command Control Centre Infrastructure**

This phase focuses on establishing the physical and technological backbone required for centralized maritime monitoring and control.

a) Installation of a state-of-the-art Video Wall capable of displaying real-time feeds, geospatial data, surveillance footage, and operational dashboards in high resolution (minimum 4K UHD).

b) Deployment of high-performance computing hardware including workstations and servers to process and analyze maritime data efficiently.

c) Setup of secure network connectivity with disaster recovery mechanisms, ensuring high availability and data protection.

d) Provision of end-user training and technical support to DGS personnel for system operation, troubleshooting, and maintenance.

II **Phase II: Business Intelligence (BI) and Analytics System**

Building on the foundational infrastructure, this phase introduces a powerful Business Intelligence system designed to empower DGS with actionable insights.

a) Design, development, and deployment of BI tools tailored to the needs of DGS departments and maritime stakeholders.

b) Implementation of real-time dashboards and data analytics platforms capable of generating KPIs, alerts, and performance metrics across various maritime domains such as vessel traffic, inspections, compliance, and port operations.

c) Integration of AI/ML and GIS features to support predictive analytics, spatial analysis, and dynamic data visualization.

d) Enablement of secure data sharing, role-based access, and cross-platform accessibility for improved coordination and transparency.

Figure 29 Depiction of the Integrated Command & Control Centre (ICCC) proposed for DGS

Together, these two phases will establish a comprehensive digital Command & Control ecosystem, transforming how DGS monitors, analyses, and responds to maritime activities across the Indian coastline and beyond.

B. Objective

The primary objective of this initiative is to establish a state-of-the-art **Command & Control Centre (CCC)** integrated with a robust Business Intelligence (BI) and Analytics System at the Directorate General of Shipping (DGS). This dual-layered digital infrastructure aims to transform maritime monitoring capabilities, enable real-time, data-driven decision-making, and significantly improve the operational efficiency, safety oversight, and responsiveness of India's maritime governance framework.

- **Challenges in the Current Maritime Ecosystem**

  Despite rapid advancements in maritime technology, key systemic challenges persist:

  a) **Fragmented Surveillance Mechanisms**

  i. Limited real-time visibility across India’s extensive coastline and maritime routes.

  ii. Inconsistent monitoring due to disjointed systems deployed by different agencies.

  b) **Siloed and Non-Integrated Data Systems**

  i. Disparate platforms such as AIS, VTS, port logistics, and compliance databases operate independently.

  ii. Hinders interoperability, unified situational awareness, and regulatory enforcement.

  c) **Absence of Centralized Analytical Capability**

  i. Maritime data is underutilized due to lack of centralized tools for analysis.

  ii. Delays in detecting compliance lapses, risk scenarios, and emerging bottlenecks.

II **Proposed Solution Framework**

The proposed initiative envisions a Unified Command & Control Environment that integrates:

a) Live feeds from surveillance systems, vessel tracking mechanisms (e.g., AIS, LRIT), and port operations.
b) Inspection, compliance, and licensing data from e-Samudra and allied platforms.
c) Alert systems and incident management workflows for immediate response and escalation.

This centralized setup will enable:

a) Real-time situational awareness,
b) Multi-agency coordination, and
c) Timely response to incidents or deviations from regulatory norms.

III **Business Intelligence & Advanced Analytics Capabilities**

The BI and Analytics platform will be designed to empower maritime administrators with:

a) **Interactive Dashboards**
   i. Real-time KPIs across vessel traffic, licensing, training, safety incidents, etc.
   ii. Role-based access for different stakeholders (HQ, MMDs, Training Institutes, etc.).
b) **AI/ML-Driven Predictive Analytics**
   i. Early identification of risks such as vessel delays, non-compliance, or accident-prone zones.
   ii. Scenario modelling to support regulatory planning and resource optimization.
c) **GIS-Based Visualization Tools**
   i. Layered maritime maps with tracking of vessel movement, maritime zones, and risk overlays.
   ii. Useful for policy formulation, surveillance planning, and emergency response.
d) **Drill-Down & Custom Reporting Capabilities**
   i. Custom reports for compliance, training, crew certification, and fleet profiles.
   ii. Exportable intelligence for inter-ministerial collaboration and policy briefing.

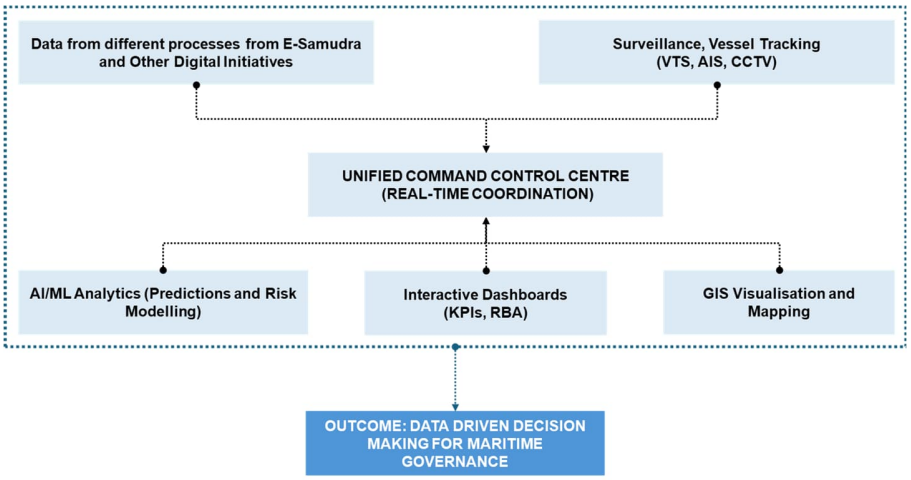


Figure 30 Interface of the proposed Command Control Centre

C. Strategic Alignment

The establishment of the Command & Control Centre (CCC) and Business Intelligence (BI) & Analytics Platform at the Directorate General of Shipping (DGS) is a transformative initiative that aligns with India's national vision documents and global maritime obligations. It serves as a digital backbone for modernizing maritime governance, improving safety oversight, and enhancing India's global maritime standing. The strategic alignment spans across the following policy pillars:

01

Maritime India Vision (MIV) 2030 & Amrit Kaal Vision 2047

a) Advances the creation of a digitally empowered maritime governance framework.
b) Supports the transition from reactive to predictive and preventive safety mechanisms.
c) Enables real-time decision-making, port performance analytics, and coordinated incident response through integrated systems.

02

Digital India Mission

a) Embodies Digital India's pillars of automation, integration, and transparency.
b) Centralizes maritime data processing, compliance monitoring, and surveillance operations under a single digital infrastructure.
c) Facilitates paperless workflows, smart monitoring, and streamlined regulatory services.

03

Ease of Doing Business

a) Streamlines interactions with DGS by digitizing compliance monitoring, inspections, and service delivery.
b) Reduces bureaucratic delays and improves predictability for stakeholders including seafarers, shipping companies, and training institutes.
c) Supports a user-centric governance model aligned with national EoDB reforms.

04

Maritime Safety & Surveillance

a) Strengthens maritime domain awareness (MDA) by integrating AIS, VTS, CCTV, and weather systems into a unified command interface.
b) Enhances navigational risk detection, incident alerting, and emergency preparedness.
c) Enables continuous surveillance and regulatory enforcement through real-time data.

05

Suraksha Sarvapratham & Suraksha Pratham Hamesha Campaign

a) Reinforces India's "safety-first" maritime governance by embedding digital vigilance and proactive monitoring.
b) Supports live tracking and automated alerts to prevent accidents and ensure swift compliance intervention.

06

SAGAR (Security and Growth for All in the Region)

a) Promotes regional safety coordination and maritime intelligence in the Indian Ocean Region (IOR).
b) Enhances interoperability and knowledge-sharing with allied maritime nations.
c) Positions India as a responsible and technologically advanced maritime partner.

07

International Maritime Organization (IMO) Alignment

a) Fulfils India's obligations under global maritime standards including STCW, SOLAS, and MDA frameworks.
b) Enables structured incident reporting, compliance dashboards, and support for IMO audits and flag state duties.

08

Seafarer Welfare & Capacity Building

a) Enables real-time monitoring of seafarer deployment, grievances, safety conditions, and compliance timelines.
b) Includes structured training for DGS personnel to manage the platform and analyse insights, fostering continuous skill development and digital capacity enhancement.

D. Key Features of Integrated Command Control Centre

I Phase I: Command & Control Centre Infrastructure

The Command & Control Centre (CCC) serves as the operational nucleus of DG Shipping's real-time maritime governance and situational monitoring. Designed as a high-availability, mission-critical environment, it ensures continuous surveillance, rapid decision-making, and system-wide data integration for India's maritime ecosystem.

Table 21 Key Components of the ICCC project (Phase 1)

Component	Detailed Feature Description
High-Resolution Active-LED / LCD Video Wall (4K UHD)	A seamless, ultra-high-definition display with 24x7 operation support for concurrent visualization of vessel movements, surveillance feeds, real-time alerts, dashboards, and weather overlays.
Centralized Video Wall Controller (4/8/12 Input Support)	Advanced controller with software-enabled multi-source integration; enables centralized management of feeds from AIS, VTS, CCTV, dashboards, and geospatial systems.
Integration with AIS, VTS, CCTV, Weather & Satellite Feeds	Consolidates maritime situational awareness by merging real-time data from vessel tracking (AIS), port movement (VTS), surveillance systems, meteorological data, and satellite inputs.
High-Performance Computing Workstations (Intel i9, 32GB RAM, GPU)	Dedicated workstations optimized for live data processing, analytics rendering, dashboard interaction, and multi-screen visualization tasks.
Enterprise-Grade Server Infrastructure (Dual Xeon CPUs, 10TB RAID Storage)	Scalable, redundant backend with RAID-based storage, supporting analytics engines, data warehousing, and secure multi-user access.
VPN-Secured Remote Access & Fibre-Optic Backbone	Enables secure, low-latency access to the CCC environment from remote DGS offices and field units through a high-speed fibre network.
Disaster Recovery (DR) Setup with Redundant Backup	Full disaster recovery architecture with scheduled data backups, failover servers, and mirrored storage to ensure zero data loss and operational continuity.

Component	Detailed Feature Description
Onsite & Remote Technical Support (Minimum 3 Years)	Vendor-backed comprehensive support including system maintenance, software updates, and troubleshooting with structured technical training for DGS officials.

II Phase II: Business Intelligence (BI) & Analytics System

This phase introduces an intelligent data and analytics layer atop the CCC infrastructure, enabling DG Shipping to derive actionable insights, improve risk anticipation, ensure compliance, and enhance policy decision-making.

Table 22 Key Components of the ICCC Project (Phase II)

Component	Detailed Feature Description
Role-Based Dashboards with Drill-Down Analytics	Personalized dashboards tailored to user roles (e.g., Port Officer, Compliance Cell, Safety Head) with drill-down capabilities by location, time, vessel type, and operational metric.
KPI-Driven Insights & Color-Coded Alerts	Real-time display of performance metrics using intuitive visual indicators (Green-Yellow-Red) for instant recognition of delays, deviations, and non-compliance.
GIS Spatial Mapping with Heatmaps & Zoom	Interactive geo-visualization tools to monitor vessel locations, traffic congestion, high-risk zones, and incident clusters using map overlays and heatmaps.
AI/ML Capabilities for Predictive Analytics	Embedded machine learning models forecast safety risks, detect anomalies, and identify compliance trends using historical and real-time data.
Real-Time & Historical Data Toggle	Allows users to compare current maritime scenarios with historical data patterns to identify trends, perform root cause analysis, and support policy formulation.
RESTful API Integration with External Systems	Ensures seamless and secure connectivity with port systems, DGTL platforms, environmental sensors, and global maritime compliance databases.
Multi-Format Report Export (PDF, Excel, CSV, JSON)	Enables flexible data output and sharing for audits, stakeholder communication, public dashboards, and inter-agency reporting.
High-Availability Architecture (99.9% Uptime Target)	Redundant infrastructure with failover capability ensuring uninterrupted BI operations during peak demand or maintenance windows.
Cross-Platform Compatibility (Web & Mobile)	Fully responsive interface accessible across desktops, laptops, tablets, and mobile devices, ensuring operational continuity from field to HQ.
User Training, Manuals & Documentation	Structured onboarding for officials, including instructor-led sessions, user manuals, quick-reference guides, SOPs, and handholding for power users and administrators.

E. Functional Architecture

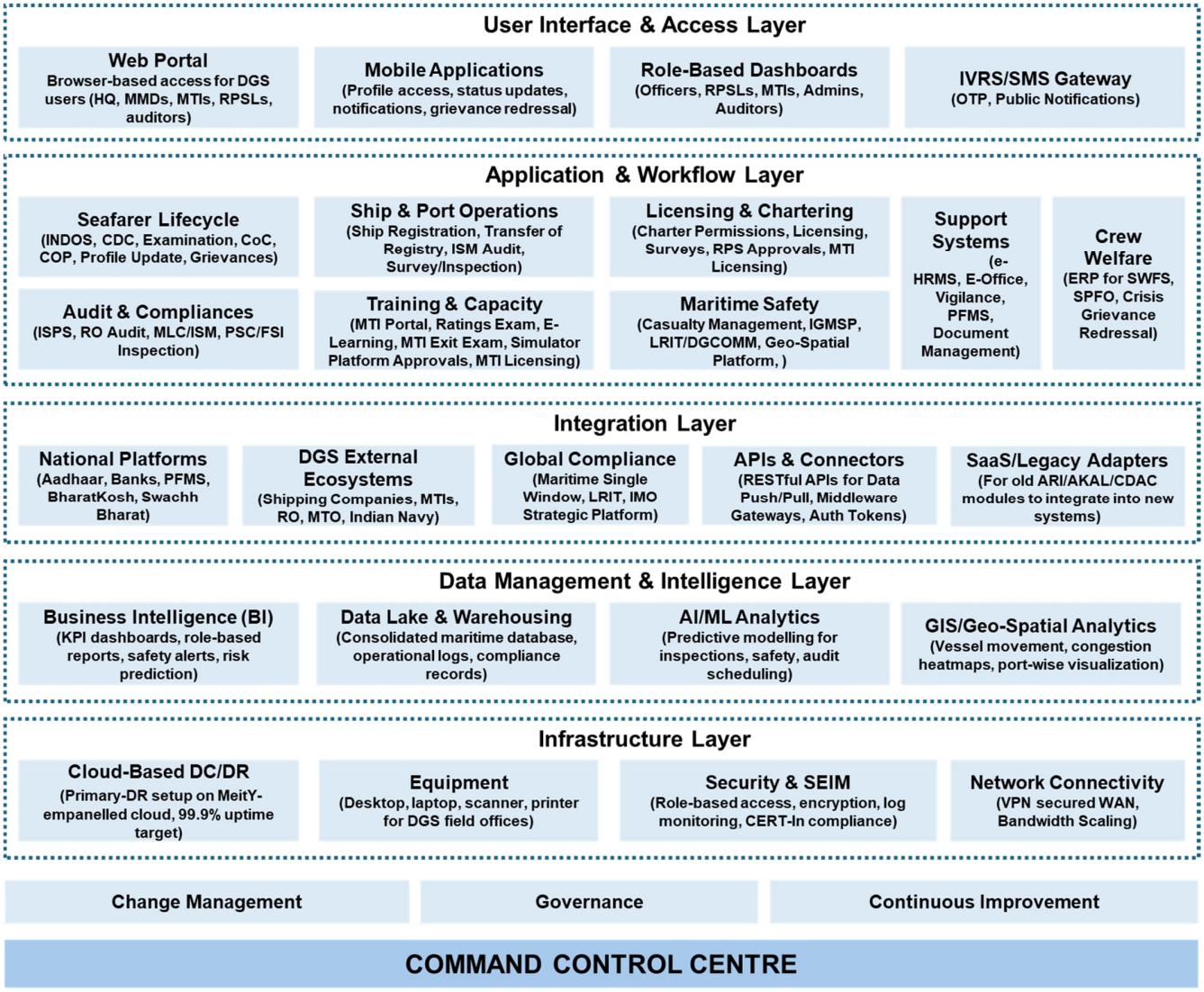


Figure 31 Functional Architecture of the Command Control Centre

The architecture presents a layered digital ecosystem unified under the Command & Control Centre (CCC), designed to centralize maritime governance, enhance operational efficiency, and ensure real-time decision-making across India's maritime infrastructure.

F. Project Timelines

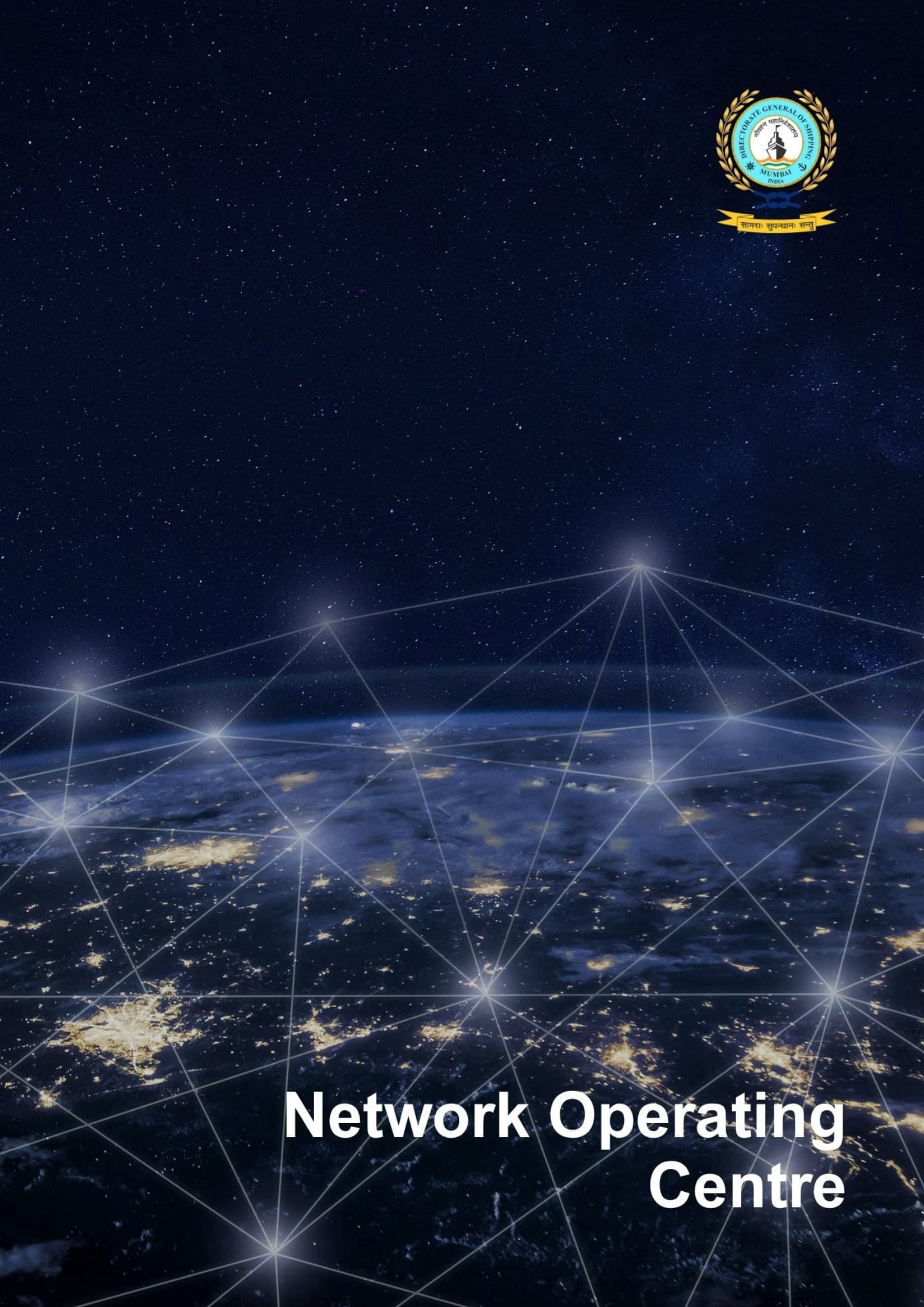
Below is a proposed parallel implementation timeline for Phase 1 (Command & Control Infrastructure) and Phase 2 (BI & Analytics Platform) of the DG Shipping Command & Control Centre.

Table 23 Project Implementation Timelines

Components	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Year 1	Year 2	Year 3	Year 4
Video Wall Procurement & Installation												
Deployment of Computing Hardware												
BI & Analytics Tool Development												
System Integration & Testing												
Warranty Period												
Maintenance & Support												

G. Project Status

The Integrated Command Control Centre project is currently in the public procurement stage, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the Quality and Cost-Based Selection (QCBS) method.



Network Operating Centre

4.15 Network Operation Centre

A. About the Initiative

The **Network Operation Centre (NOC)** initiative at the Directorate General of Shipping (DGS), Ministry of Ports, Shipping and Waterways, is a flagship step toward creating a resilient, centralized IT command facility that enables real-time oversight, performance management, and operational continuity of India's maritime digital infrastructure. As the maritime sector increasingly adopts digital services, it is imperative to establish a robust monitoring mechanism that ensures uninterrupted availability, cybersecurity, and high service quality.

The NOC will act as a mission-critical control hub, operating 24x7x365 to monitor all core digital platforms, including:

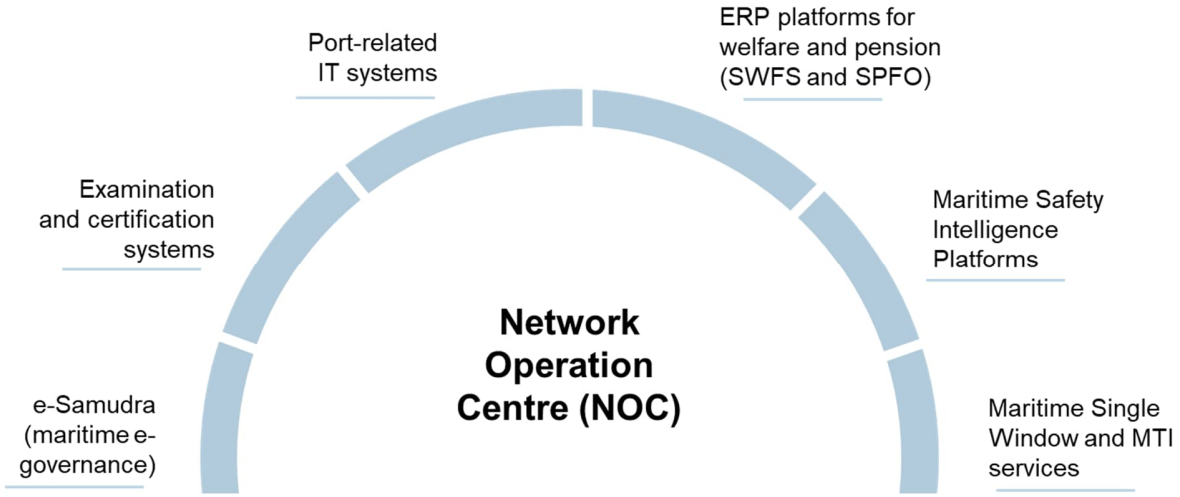


Figure 32 Role of the Network Operation Centre – Monitoring the Core Digital Platforms

This initiative will be further enhanced by the deployment of an integrated **Network Management System (NMS)**, which automates the tracking of IT asset health, bandwidth consumption, user traffic patterns, threat detection, and fault diagnostics across a vast network of on-premises and cloud-hosted services.

The system architecture will allow DGS to proactively detect performance bottlenecks, anomalies, and potential threats well before they escalate into full-scale outages. With deep integration into ticketing systems, SIEM tools, and third-party cloud platforms, the NOC will provide DGS with a **"single pane of glass"** view of its entire digital operations.

Moreover, the NOC will support **predictive monitoring**, enabling the Directorate to analyze trends, anticipate network failures, and plan IT infrastructure upgrades in alignment with future demand. This positions DGS to deliver high-quality, secure, and scalable digital services to stakeholders such as seafarers, training institutes, shipping companies, port operators, and international regulators.

In doing so, the NOC becomes more than just a technical facility—it becomes the **nerve Centre of maritime digital governance**, enabling India to meet the highest standards of maritime safety, transparency, and efficiency in the global arena.

B. Objective

The establishment of the **Network Operation Centre (NOC)** with an integrated **Network Management System (NMS)** at the Directorate General of Shipping (DGS) is aimed at strengthening the digital governance backbone of India's maritime administration.

The initiative is designed to fulfil the following strategic and operational objectives:

I **Establish a Centralized Monitoring Facility:** To create a 24x7x365 Network Operation Centre that acts as the central hub for monitoring all IT systems, infrastructure, and applications operated by the Directorate General of Shipping.

II **Ensure High Availability and Performance of Digital Services:** To maintain consistent uptime and optimal performance of critical maritime digital platforms such as e-Samudra, ERP systems (SPFO/SWFS), examination portals, and safety systems.

III **Implement a Robust Network Management System (NMS): To** deploy an integrated NMS that provides real-time visibility into the health of network devices, bandwidth utilization, application status, and incident alerts.

IV **Enable Proactive Issue Detection and Resolution:** To reduce service downtime through intelligent alerting, automatic fault detection, root cause identification, and escalation mechanisms.

V **Strengthen Cybersecurity and Compliance:** To integrate with Security Information and Event Management (SIEM) tools, log analyzers, and alert systems for continuous cyber threat monitoring and regulatory compliance with MeitY and CERT-In guidelines.

VI **Provide Role-Based Dashboards and SLA Tracking:** To deliver performance insights and operational dashboards to DGS leadership, enabling SLA monitoring, vendor evaluation, and governance oversight.

VII **Support Business Continuity and Disaster Recovery:** To ensure operational resilience with redundant systems, cloud-based backup infrastructure, and disaster recovery protocols for mission-critical services.

VIII **Facilitate Future-Ready Maritime IT Infrastructure:** To build a scalable and modular foundation capable of supporting future digital expansion, advanced analytics, AI/ML tools, and next-generation maritime platforms.

C. Strategic Alignment

The Network Operation Centre (NOC) and its integrated Network Management System (NMS) initiative is strategically aligned with India's national maritime vision, digital transformation policies, and global regulatory standards. It acts as a critical enabler of performance, security, and resilience across the maritime digital ecosystem. Key areas of alignment include:

01

Maritime India Vision (MIV) 2030

a) Providing real-time, centralized visibility into maritime IT infrastructure.
b) Ensuring the reliability of core platforms like e-Samudra, ERP systems, and port connectivity tools.
c) Enhancing transparency and responsiveness in maritime governance through intelligent monitoring and automated control systems.

02

Ease of Doing Business

a) Minimizing downtimes and accelerating system recovery.
b) Ensuring high uptime for platforms like e-Pariksha, e-Office, and DG Shipping portals.
c) Providing a unified helpdesk and early issue resolution through proactive alerts.
d) By reducing technical delays and enhancing service reliability, the NOC directly contributes to a business-friendly maritime regulatory environment.

03

Maritime Safety and Surveillance

a) Supporting platforms that facilitate vessel tracking, incident logging, and regulatory compliance.
b) Ensuring uninterrupted transmission of surveillance data through resilient, monitored network pathways.
c) Providing integration capability for future AI-based risk analytics, IOT maritime devices, and emergency response systems. It reinforces India's readiness to meet international safety obligations and respond swiftly to incidents at sea.

04

Data Governance and Cybersecurity

a) Implementing ISO 27001, ISO 20000, and DPDP Act 2023 compliance.
b) Enforcing Role-Based Access Control (RBAC), VPN encryption, and SSO/MFA (e.g., using Keycloak).
c) Integrating with SIEM tools, log monitoring systems, and cyber threat intelligence platforms.

D. Key Features and Network Landscape

Table 24 Key Components of the Network Operation Centre

Category	Feature Description
Centralized NOC Facility	Establishment of a unified NOC at DGS HQ with infrastructure including racks, video walls (LED TVs), civil/electrical works, and ergonomic interior setup.
Network Management System	Unified console for real-time monitoring of routers, firewalls, switches, APs with ITSM integration (incident, change, asset, knowledge, and SLA management).
Network Monitoring Tools	Flow-based traffic analysis (NetFlow, sFlow, jFlow, IPFIX), SNMP traps, packet loss tracking, application-wise bandwidth monitoring, alarm/event suppression.
Authentication & Access	AAA Authentication Controller with Role-Based Access Control (RBAC), Single Sign-On (SSO), and Multi-Factor Authentication (MFA).
Structured Cabling	CAT6 UTP cable (11,700 m), OFC (600 m), patch cords, LIUs, and rack-mounted termination; fluke-tested installation, labelling, and documentation with CAD diagrams.
Hardware Deployment	Core and distribution switches, racks (42U & 6U), patch panels, SFP modules, network controllers, and access points—all enterprise-grade and centrally managed.
Log Management & SIEM	Integration of log data from all devices; support for security analytics, audit trails, alerts, forensic analysis, and policy violation detection.
Application Performance	Monitors eParikshа, eOffice, BSID, Exit Exam and cloud systems with SLA-based reporting and predictive analytics dashboards.
Helpdesk Integration	NMS integration with Helpdesk for issue ticketing, escalation, and SLA tracking; user-friendly web GUI with multi-session access.
SLA Monitoring	Quarterly SLA enforcement with >99% uptime requirement; automated alerts, reports, and penalties for non-compliance.
Risk Dashboards	Custom dashboards for network health, alerts, bandwidth usage, high-risk elements, and historical performance analysis.
NOC Civil Infrastructure	Workstations, HVAC, CCTV, power backup (UPS), access control, anti-static flooring, partitions, and signage within NOC zone.
Redundancy & Availability	High-availability switches, UPS power, structured cabling redundancy; centralized monitoring to detect link/device failures in real time.
Certification Compliance	ISO/IEC 20000 readiness, including documentation, ticketing, and reporting formats required for service quality certification of the NOC.
Reporting & Analytics	Predefined/custom reports on uptime, ticket resolution, network usage, device performance, alerts, and compliance; drill-down visualizations and export options.
Multi-Tenancy & Segregation	Supports separate views and administration per location/division; secure, role-based isolation of network data and components.
Integration with Cloud	Seamless connectivity and monitoring for C-DAC cloud-hosted services; DR-aware monitoring and uptime analysis of external dependencies.
End-User Support	Centralized helpdesk, network administration support, and field technician response with defined SLAs for issue resolution.
Visual Topology	Auto-generated and editable network maps showing physical and logical device interconnectivity for quick diagnosis and planning.

I Existing Network Landscape

a) Hosting Infrastructure

Core business applications such as eParikshа, eOffice, Exit Exam, and BSID are hosted on the C-DAC Data Centre in Noida. In addition, a Disaster Recovery (DR) setup is provisioned on the C-DAC Cloud, ensuring continuity and data resilience.

b) Internet Connectivity

DGS uses a 100 Mbps MTNL Leased Line for internet connectivity. This link serves dual purposes:

i. Providing access to hosted applications on the C-DAC platform
ii. Supporting general internal internet usage across DGS offices

c) Local Area Network (LAN)

The current LAN setup is based on a Flat Switched Network topology using unmanaged switches. This design lacks segmentation and redundancy, limiting scalability and fault tolerance. The backbone uses CAT6 cabling, and wireless connectivity is enabled through multiple access points, all managed via a central wireless controller.

d) LAN Equipment

The deployed equipment includes a mix of PoE and non-PoE unmanaged switches, sourced from vendors such as D-Link and TP-Link. A TP-Link Omada wireless controller manages 13 wireless access points, providing wireless coverage across key office areas.

e) Firewall and Security

Network perimeter security is managed using two Sophos firewall appliances—models XG135 and XGS2100. These firewalls enforce localized security policies, but integration with a broader SIEM or centralized log management solution is currently missing.

f) Network Racks & Cabling

The physical infrastructure includes three 42U racks and one 6U rack, which house the networking hardware. Approximately 264 CAT6 cable nodes (I/O points) have been terminated for user connectivity. However, cable routing and infrastructure monitoring are done manually, without centralized oversight or automation.

g) Observations & Gaps

The current network faces several operational limitations:

i. Use of unmanaged switches restricts visibility, centralized control, and troubleshooting capability
ii. There is no integrated Network Management System (NMS) or Security Information and Event Management (SIEM) platform.
iii. Redundancy is minimal, making the network vulnerable to downtime
iv. No SLA-based alerting or real-time dashboards exist to proactively monitor network health or performance issues

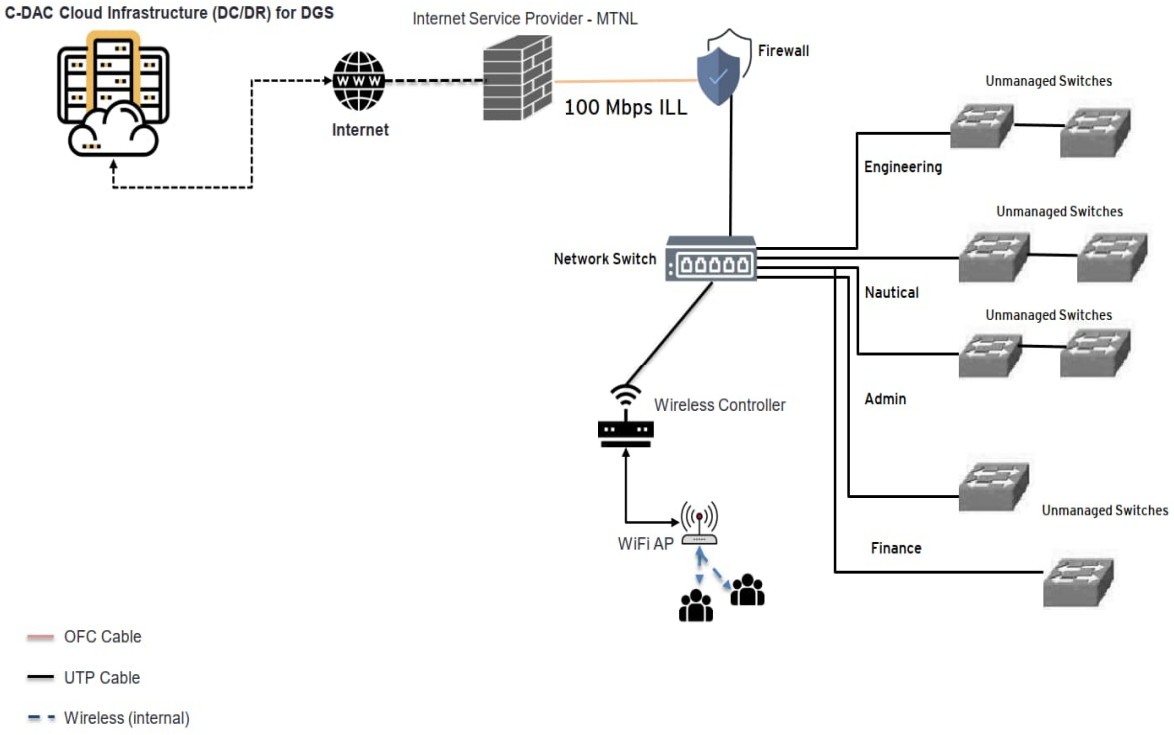


Figure 33 Existing Network Landscape of DG shipping

a) **High Availability and Redundancy**

The proposed design ensures network resilience with High Availability (HA) for core components. Redundant core switches, distribution switches with SFP uplinks, and dual internet paths are to be deployed. The network backbone will support loop-free topology and automatic failover mechanisms to maintain uptime.

b) **Structured and Scalable LAN Design**

The new LAN will follow a hierarchical, segmented architecture instead of the existing flat topology. It will consist of Core, Distribution, and Access layers using managed Layer 2/3 switches, allowing for traffic segregation, VLANs, QoS, and better bandwidth control.

c) **CAT6 and Optical Fiber Backbone Cabling**

The structured cabling setup includes:

i. CAT6 UTP cabling for access nodes (with ~11,700 meters proposed)
ii. 6-core armored single-mode OFC (600 meters) for high-speed backbone connections
iii. All cabling will follow industry standards for bend radius, labelling, patching, and tray-mounted routing

d) **Advanced Network Equipment and Racks**

The setup includes:

i. 2 Core Switches (24-port, OFC/SFP capable)
ii. 6 Distribution Switches (48-port) and 1 Distribution Switch (24-port)
iii. SFP modules (1G and 10G) for uplinks

iv. Proper housing through 42U and 6U Racks with accessories, ensuring organized, scalable infrastructure

e) **NMS and Network Operations Centre (NOC)**

A unified Network Management Solution (NMS) with ITSM capabilities will be deployed and integrated with the Network Operations Centre (NOC). Key features include:

i. Real-time monitoring of flow, logs, device status
ii. Dashboards, SLA alerts, trap/alarm processing
iii. Configuration and performance management (FCAPS compliant)
iv. Support for IPv4/IPv6, SNMP, syslog, and customized reporting
v. Integrated Helpdesk system and ITIL processes (incident, problem, change, asset, etc.)

f) **Application Flow Monitoring**

Tools will be deployed to analyze traffic via NetFlow, sFlow, jFlow, and IPFIX, offering visibility into application-level bandwidth usage, anomalies, and threats. This enables deep packet inspection, traffic pattern analysis, and early threat detection.

g) **Log Management and SIEM Integration**

The system will support collection, consolidation, indexing, and analysis of machine-generated data (structured/unstructured logs). Features include:

i. Security forensic analytics
ii. Policy violation alerts
iii. Unified data modeling and drill-down analytics
iv. Integration with SIEM for proactive threat monitoring

h) **Cybersecurity and Access Controls**

The proposed solution includes:

i. AAA Authentication Controllers for secure network access
ii. Enforcement of SSO/MFA through tools like Keycloak
iii. Firewalls integrated with NMS
iv. Role-based access, encrypted tunnels, and audit trails as per ISO 27001, DPDP Act 2023, and CERT-IN guidelines

i) **NOC Setup and Site Preparation**

The NOC will include:

i. Civil, electrical, furniture, HVAC, CCTV, access control, anti-static flooring, ergonomic layout
ii. 50” LED video walls for real-time event dashboards
iii. Certification of the NOC with ISO/IEC 20000 for IT service management
iv. Dedicated workspace and hardware deployment supported by detailed architectural and electrical drawings

j) **Annual Maintenance and SLA Compliance**

The network will be covered under a 3-year comprehensive AMC post-warranty. SLAs include:

i. >99% uptime requirement

ii. Quarterly monitoring, preventive maintenance schedules
iii. Spare replacement, technical support, and reporting
iv. Network availability monitoring 24x7x365
v. Compliance with planned fibre optic system maintenance, routing integrity, and documentation (AutoCAD-based route maps, loss measurement reports)

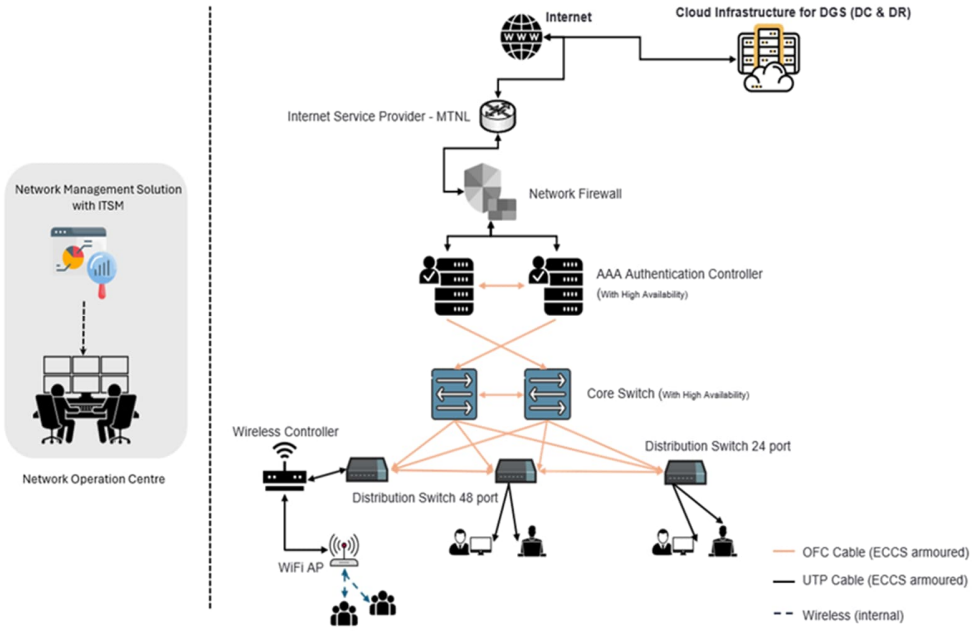


Figure 34 Future state of Network Landscape of DG shipping

E. Technical Specifications

Table 25 Key Technical specifications proposed

Technology Domain	Tools / Technologies / Standards	Purpose / Function
Network Infrastructure	- Managed Core & Distribution Switches (L2/L3) - SFP Modules (1G/10G) - CAT6 & OFC Cables	Structured, redundant, and scalable network backbone with high-speed data transmission
Authentication & Access	- AAA Authentication Controller - Keycloak or equivalent (SSO/MFA) - Role-based Access Control (RBAC)	Secure user identity management and access control for wired/wireless and admin interfaces
Network Monitoring	- NMS with ITSM (e.g., SolarWinds, ManageEngine, Nagios XI, Zabbix) - Flow Monitoring (NetFlow/sFlow/jFlow/IPFIX)	Real-time monitoring of traffic, logs, performance, availability, and configuration
Security & Compliance	- Sophos XG135 / XGS2100 UTM/Firewall - Log Management System with SIEM	Cyber threat detection, firewall management, intrusion prevention, audit trails, secure communication

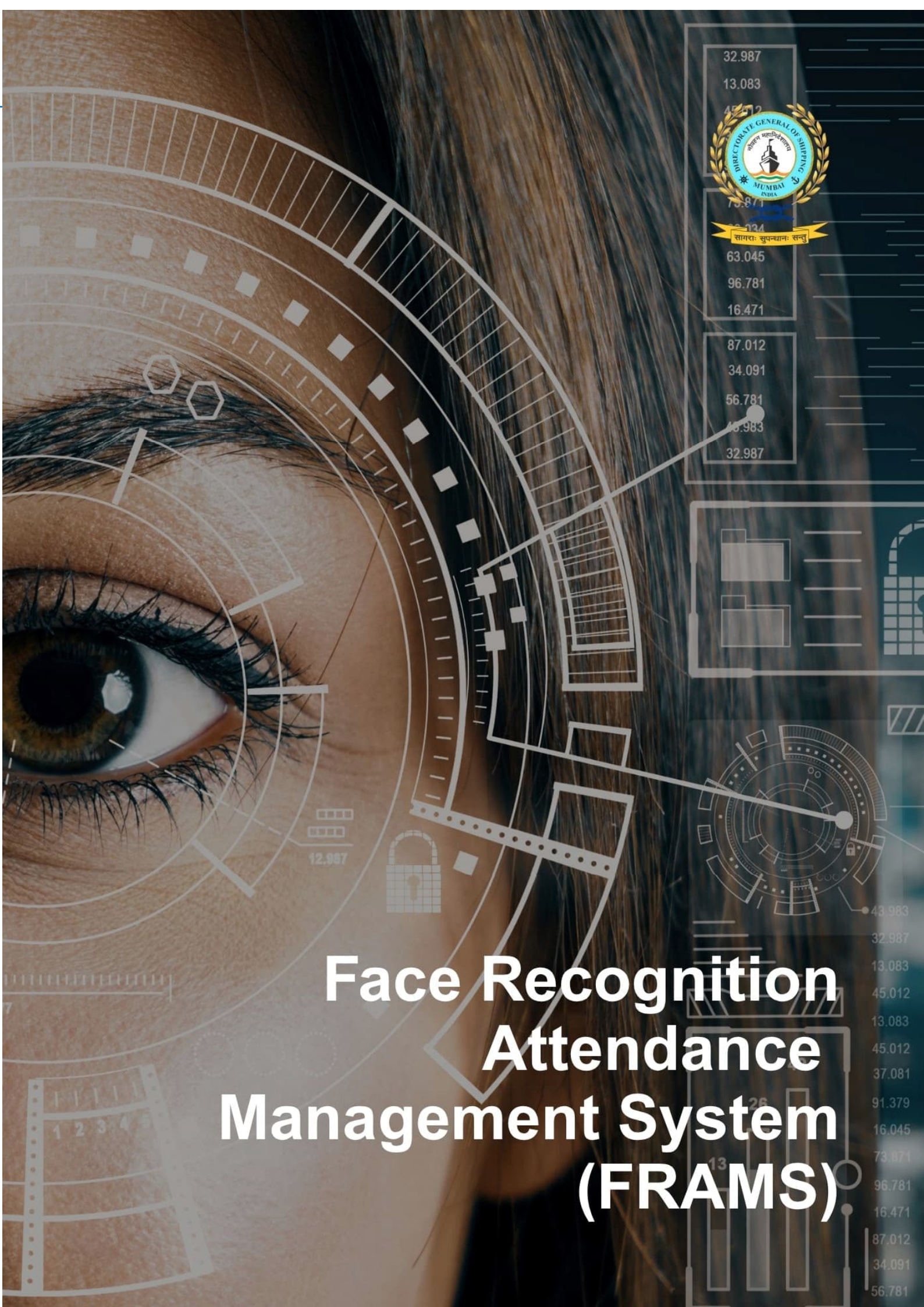
Technology Domain	Tools / Technologies / Standards	Purpose / Function
	integration - Encrypted VPN	
Infrastructure Software	- Web-based GUI dashboard - SNMP v2/v3 support - Syslog servers - IPv4/IPv6 support	Device-level management and network protocol support
ITSM & Helpdesk	- ITIL-compliant modules (Incident, Change, Asset, Problem Management) - Centralized Helpdesk Interface	Service management aligned with ISO/IEC 20000 standards
Physical Infrastructure	- Racks (42U/6U) - Patch Panels, LIUs - Video Walls (LED 50") - Anti-static flooring, CCTV, biometric access	Physical setup of NOC with structured layout and physical access security
Visualization & Reporting	- Topology Map Generator - Risk Visibility Dashboards - Real-time Alerts (Email/SMS) - Custom SLA Reports	Simplified network health, traffic analysis, and alerting mechanism
Compliance Standards	- ISO 27001 (Information Security) - ISO/IEC 20000 (Service Management) - DPDP Act 2023 - CERT-IN Guidelines	Ensuring regulatory compliance and data privacy for maritime and government infrastructure
Cable Testing Tools	- Fluke Network Tester for UTP - Light Loss Power Meter for OFC	Performance validation and certification of network cables

F. Project Timelines and Costing

The Estimated project cost for the project is INR 2.25 Cr. The implementation of the Network Operation Centre (NOC) and upgraded network infrastructure at DG Shipping is expected to be completed over a period of approximately 6 months, followed by one year of warranty support and three years of comprehensive Annual Maintenance Contract (AMC).

G. Project Status

The Network Operation Centre project is currently in the public procurement stage, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the Quality and Cost-Based Selection (QCBS) method.



Face Recognition Attendance Management System (FRAMS)

4.16 Face Recognition Attendance Management System (FRAMS)

A. About The Initiative

The Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways, is initiating the implementation of a **Face Recognition Attendance Management System (FRAMS)** to digitally transform and automate its employee attendance tracking process. This advanced solution is a strategic step towards improving operational transparency, accountability, and efficiency across DGS offices. The initiative leverages state-of-the-art IP camera infrastructure, enabling non-intrusive, real-time facial recognition without requiring employees to manually interact with biometric devices or terminals. By doing so, it significantly reduces congestion at entry points, eliminates the need for physical contact, and enhances user experience. FRAMS is designed to be seamlessly integrated with DGS's existing IT ecosystem, including HR, ERP, and mobile platforms, ensuring smooth data synchronization and comprehensive reporting capabilities. The system will be implemented in strict compliance with national data security and privacy regulations, including secure data storage, encrypted transmission, and stringent access controls. Beyond automating attendance, the FRAMS initiative reflects DGS's commitment to modernizing internal processes using intelligent digital tools that support efficiency, scalability, and future-readiness. Once deployed, the system will serve as a centralized platform for attendance management, with potential to expand across multiple DGS locations nationwide.

B. Objective

The **Directorate General of Shipping (DGS)** currently relies on conventional attendance systems that are either manual or dependent on touch-based biometric devices.

These legacy methods present a range of challenges:

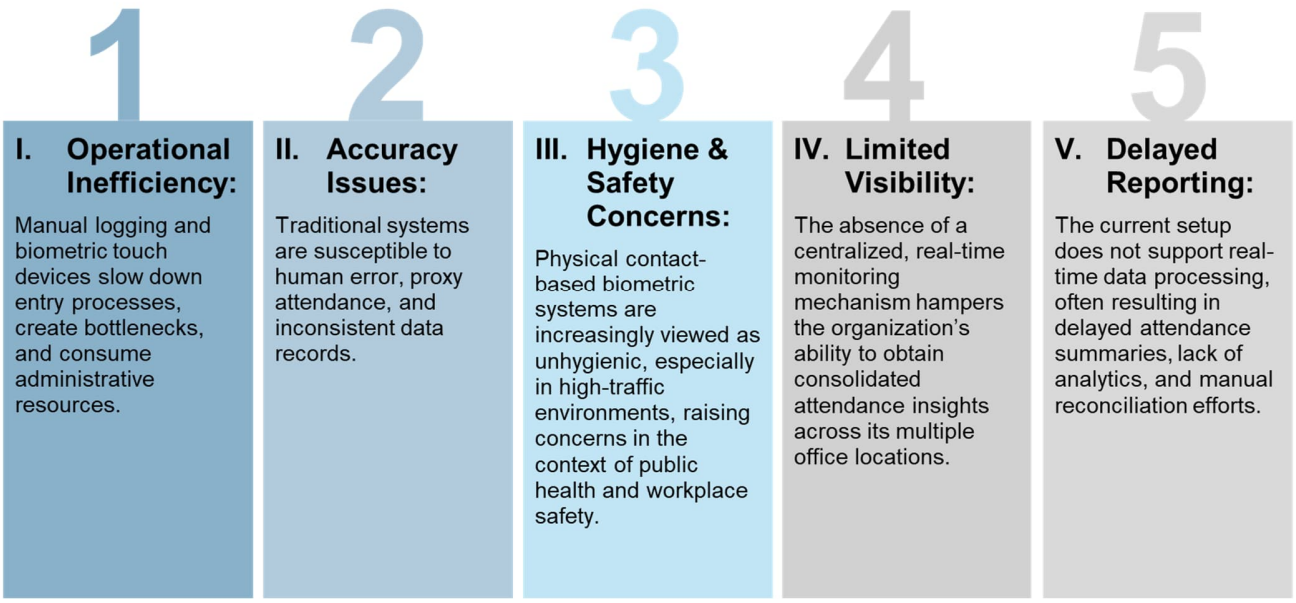


Figure 35 Challenges of the Existing Attendance System

To address these gaps and modernize its workforce management practices, DGS is launching the **Face Recognition Attendance Management System (FRAMS)**. This automated, camera-enabled solution will utilize advanced facial recognition technology to mark attendance in a **non-intrusive, contactless** manner as employees naturally enter office premises, eliminating the need to pause, touch, or interact with any device.

The FRAMS initiative is designed to deliver the following strategic advantages:

I Real-Time Attendance Tracking: Immediate visibility into workforce presence across locations through centralized dashboards.

II Scalability Across Locations: Support for multi-location deployment ensures consistent attendance management across all DGS offices.

III Enhanced Data Governance and Cybersecurity: Compliant with national data protection norms, including STQC standards, encrypted communication protocols, and localized data storage within India.

IV System Integration Capabilities: Seamless API-based integration with existing HR, payroll, and ERP systems to automate downstream processes.

V Reduced Administrative Overhead: Elimination of manual processes reduces staff workload, improves accuracy, and supports audit-readiness.

This initiative is a critical component of DGS's broader digital transformation roadmap, enhancing transparency, accountability, and operational efficiency. By bridging longstanding gaps in attendance tracking with an intelligent and secure solution, FRAMS aligns with the goals of e-Governance, capacity building, and data-driven decision-making in the maritime administration sector.

C. Strategic Alignment

The **Face Recognition Attendance Management System (FRAMS)** initiative aligns with several key national and organizational priorities, contributing to the Directorate General of Shipping's commitment to modernization, digital governance, and service excellence. The initiative specifically supports the following focus areas:

01

Ease of Doing Business

By automating the attendance process and eliminating manual or hardware-dependent workflows, the system enhances administrative efficiency and reduces operational friction. Real-time tracking and seamless integration with existing HR and ERP systems streamline internal processes, enabling faster decision-making and improved service delivery. This contributes to a more agile and responsive maritime administration ecosystem, supporting the broader "Ease of Doing Business" mandate in the maritime sector.

02

Attendance Management System

A modern and transparent attendance management system ensures accurate time tracking for maritime staff and administrative personnel, which directly impacts leave management, payroll accuracy, and service record integrity. This promotes trust and fairness in employee management, ultimately contributing to the welfare and satisfaction of seafarers and support staff—who are at the core of the shipping ecosystem.

03

Data Governance & Cybersecurity

The initiative is designed with strict adherence to Government of India's data protection policies and standards. By leveraging encrypted transmission, secure cloud/on-premises storage, and STQC-certified software, the system ensures that biometric and facial recognition data is safeguarded at all stages. Compliance with national cybersecurity frameworks ensures the confidentiality, integrity, and availability of sensitive data, protecting the organization against data breaches and unauthorized access.

04

Capacity Building

The implementation of FRAMS includes comprehensive training and documentation for administrative and technical staff, enabling smooth adoption of the new system. It fosters digital literacy within the organization and enhances the capacity of personnel to operate and maintain advanced technology platforms. This not only supports sustainability of the system but also contributes to long-term institutional capacity building and digital readiness within DGS.

D. Key Features of the Project

The Face Recognition Attendance Management System (FRAMS) incorporates several advanced features designed to automate, secure, and streamline employee attendance tracking at the Directorate General of Shipping (DGS). The following are the key functional modules:

I **IP Camera-Based Facial Recognition for Attendance**

High-resolution IP cameras equipped with facial recognition technology are used to automatically capture attendance as employees enter designated areas. The system ensures accurate identification without the need for any physical contact or manual intervention.

II **Non-Intrusive Tracking with Passive Detection**

The solution is designed to be completely non-invasive, allowing employees to walk naturally past the cameras without needing to stop, touch, or face a device. This ensures minimal disruption to daily routines while enhancing user experience and compliance.

III **Real-Time Dashboard and Historical Attendance Analytics**

A centralized, web-based dashboard provides real-time visibility into attendance data across multiple office locations. It also enables administrators to access historical reports, trend analysis, and custom analytics for workforce management and operational insights.

IV **Mobile App for Attendance Visibility**

A dedicated mobile application will allow employees to view their individual attendance records, receive alerts, and access summaries. Managers can also monitor departmental attendance and receive notifications on anomalies or exceptions.

V **API Integration with HRMS/ERP System**

The system includes secure and robust APIs that facilitate seamless integration with existing HR Management Systems (HRMS), Enterprise Resource Planning (ERP) systems, and mobile platforms. This ensures that attendance data automatically synchronizes with payroll, leave, and administrative modules.

VI **Secure, Encrypted Data Transmission and Storage**

The solution adheres to government data security standards, including STQC compliance. All facial recognition data and attendance records are encrypted both at rest and in transit, ensuring confidentiality and integrity. The hybrid storage model combines cloud and on-premises servers for redundancy and scalability.

VII **24/7 Vendor Support and Proactive Monitoring**

The vendor will provide round-the-clock technical support, proactive monitoring of system health, and timely resolution of any issues. This includes preventive maintenance, vandalism or tampering alerts, and software updates to ensure continuous uptime and optimal performance.

E. Project Timelines

The implementation of the Face Recognition Attendance Management System (FRAMS) has been structured with clearly defined milestones to ensure timely delivery and smooth deployment. The project is designed to be completed within a 45-day period from the date of contract signing, with the following phased approach:

I **Kick-off Meeting (Within 7 Days of Contract Signing)**

An initial project kick-off meeting will be conducted with all stakeholders, including the Directorate General of Shipping (DGS), the selected vendor, IT/EDP division, and the procurement team. The session will outline the scope of work, finalize implementation schedules, establish communication protocols, and assign responsibilities.

II **Installation & Configuration (Within 30 Days of Contract Signing)**

During this phase, the selected vendor will carry out on-site installation and configuration of all necessary hardware and software components. This includes mounting IP cameras at designated entry points, setting up server and hybrid cloud infrastructure, deploying the face recognition engine, and integrating the system with DGS's existing IT ecosystem.

III **Testing & Training (Within 15 Days Post-Installation)**

After installation, the system will undergo thorough testing to ensure facial recognition accuracy, real-time data processing, and seamless integration with HRMS/ERP systems. Concurrently, training sessions will be conducted for administrative users, IT staff, and employees to familiarize them with the mobile app, dashboard, and reporting tools. User feedback collected during this phase will be incorporated into final configurations.

IV **Go-Live (Within 45 Days of Contract Signing)**

Upon successful completion of testing and training, the system will be fully rolled out for live operations. Go-Live marks the transition from project implementation to operational use, where real-time attendance tracking begins, and ongoing support and monitoring take effect.

This timeline-driven approach ensures that the FRAMS is deployed efficiently and is fully functional within the defined project duration, while minimizing disruption to daily operations.

F. Project Status

The Face Recognition Attendance Management System (FRAMS) project is currently at the Request for Proposal (RFP) Stage.

Cellular Network Augmentation

4.17 Cellular Network Augmentation

A. About the Initiative

The Cellular Network Augmentation initiative at the Directorate General of Shipping (DGS) Headquarters, Mumbai is a mission-critical project aimed at transforming the office's communication infrastructure to support uninterrupted, high-quality voice and data services across all cellular networks. Recognizing the growing reliance on mobile connectivity for internal coordination, stakeholder engagement, remote collaboration, and emergency communication, DGS is addressing existing connectivity gaps within its premises that hinder productivity and service delivery. Located at the heart of India's maritime regulatory ecosystem, the DGS headquarters houses over 300 officials and technical personnel involved in policy implementation, maritime education oversight, seafarer certification, and coordination with global agencies such as the International Maritime Organization (IMO). However, inadequate cellular coverage has posed persistent operational challenges—leading to call drops, poor data speeds, and difficulty in accessing mobile-based digital tools. To overcome these challenges, this project involves the planning, deployment, and maintenance of a modern Cellular Network Augmentation System. It includes deploying a Distributed Antenna System (DAS), cellular signal boosters, and small cell technology across the office premises to ensure blanket coverage and signal strength consistency across all major mobile operators (2G, 3G, 4G, and 5G). The solution will be tailored based on site survey analysis and will incorporate Quality of Service (QoS) mechanisms, DoT/TRAI-compliant designs, and future-ready scalability to accommodate evolving communication needs and user densities. A significant component of this initiative is the Knowledge Transfer Program, designed to empower DGS personnel with fundamental skills in managing and troubleshooting mobile network issues. Beyond technical enhancements, this initiative supports broader strategic objectives such as improving administrative efficiency, enabling seamless stakeholder communication, and aligning with national programs like Digital India, Maritime India Vision 2030, and Ease of Doing Business. Once completed, the enhanced network infrastructure will not only resolve current connectivity issues but will also enable DGS to function more effectively as a digitally empowered maritime regulator, setting a benchmark for modern, responsive, and resilient government operations.

B. Objective

The Cellular Network Augmentation initiative at the Directorate General of Shipping (DGS) Headquarters in Mumbai is a targeted intervention to resolve long-standing issues of poor indoor cellular connectivity that have been affecting the day-to-day efficiency and operational effectiveness of the organization. Despite being the nerve center of India's maritime administration, the DGS office premises have experienced significant signal blackouts and weak mobile reception in several indoor zones. These connectivity gaps have impacted the quality of both voice communication and mobile data services, posing challenges for over 300 staff members who rely on mobile networks for mission-critical coordination, digital documentation, video conferencing, and emergency communication. Employees often struggle with dropped calls, low data speeds, and unreliable mobile access, which hampers productivity, delays decision-making, and creates friction in internal and external stakeholder interactions. This becomes especially problematic during remote collaboration, where mobile connectivity serves as a critical fallback for internet-based communication tools. To resolve this, the initiative proposes the design and deployment of a state-of-the-art indoor cellular augmentation system that delivers uniform, high-quality coverage across all major mobile networks—including 2G, 3G, 4G, and 5G bands. This solution will utilize a combination of Distributed Antenna Systems (DAS), small cells, and signal boosters, tailored to the building layout and user density, to ensure reliable mobile access in all office zones, including basements, meeting rooms, cabins, and common areas. In addition to eliminating signal dead zones, the project is designed to offer future scalability to accommodate growing user demands, changes in building occupancy, or technology upgrades. It ensures that the solution is robust enough not just for current usage but also adaptable to evolving requirements such as IoT-based maritime systems, hybrid work models, or digital governance platforms that require stable mobile data connectivity. Ultimately, the

initiative supports DGS's broader goals of modernizing its IT and communication infrastructure, enhancing employee productivity, and ensuring that the directorate functions as a responsive and digitally capable maritime authority.

C. Key Features of the Project

I **End-to-End Design and Implementation of Distributed Antenna System (DAS):**

A customized Distributed Antenna System (DAS) will be designed and deployed to ensure uniform signal distribution throughout the DGS Mumbai office. The DAS will comprise strategically placed indoor antennas connected via coaxial or optical cables to a central signal source, ensuring seamless and consistent cellular coverage across all floors and zones, including basements, meeting rooms, and cabins.

II **Cellular Signal Boosters and Small Cells for 2G/3G/4G/5G:**

To enhance indoor signal strength and capacity, the solution will include multi-band cellular boosters and small cells that support all generations of mobile technology—2G, 3G, 4G, and 5G. These devices will amplify and rebroadcast carrier signals from external sources, enabling high-speed data transfer and reliable voice services from multiple telecom providers simultaneously.

III **Compliance with DoT/TRAI and Safety Standards:**

The system will be fully compliant with the Department of Telecommunications (DoT) and Telecom Regulatory Authority of India (TRAI) guidelines. This includes adherence to radiation norms, equipment safety certifications, and wireless signal transmission limits. All installations will meet the prescribed fire safety, structural integrity, and EMF exposure norms as per Indian regulations.

IV **Quality of Service (QoS) Management and Network Scalability:**

The network design will incorporate QoS mechanisms to ensure prioritization of critical communication, even during peak loads or emergencies. The infrastructure will be scalable, supporting future user growth, changing coverage requirements, and integration with newer cellular technologies without requiring major overhauls.

V **24/7 System Monitoring and Support (with Defined SLA Response Times):**

A centralized monitoring system will be implemented to ensure real-time oversight of signal performance, outages, and faults. Support services will include a 24x7 helpdesk, proactive issue detection, and SLA-driven response and resolution timelines assuring that any faults are addressed quickly and service disruptions are minimized.

VI **Preventive and Corrective Maintenance:**

Regular preventive maintenance schedules will be implemented to identify and resolve potential issues before they cause downtime. Corrective maintenance protocols will ensure timely resolution of technical problems, whether remote or through on-site intervention. Maintenance will be documented through detailed logs and performance reports.

VII **User Acceptance Testing (UAT)-Based Commissioning and Performance Testing:**

Upon installation, the system will undergo rigorous User Acceptance Testing (UAT) involving DGS staff to validate signal strength, call quality, and data performance. Only after successful validation against defined benchmarks and operational readiness will the system be formally commissioned and marked "Go-Live."

a) **Comprehensive Knowledge Transfer & Exit Management Plan:**

The vendor will deliver a well-defined knowledge transfer framework that prepares DGS staff to manage and operate the system independently post-handover. This includes the transfer of all

documentation, training materials, system configuration details, and exit protocols to ensure operational continuity and self-sufficiency.

b) **Training Modules and Operational SOPs for DGS Staff:**

To build internal capacity, a suite of training modules will be provided, covering topics such as basic cellular networking concepts, troubleshooting techniques, and optimization strategies. In addition, Standard Operating Procedures (SOPs) will be supplied for routine tasks, emergency responses, and escalation protocols—empowering staff to confidently handle first-level support issues.

D. Project Status

The project is currently in the public procurement stage, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the Quality and Cost-Based Selection (QCBS) method.

Maritime Knowledge Cluster (MKC)

4.18 Maritime Knowledge Cluster (MKC)

A. About the Initiative

The Maritime Knowledge Cluster (MKC) is an ambitious, future-ready initiative launched under the aegis of the Directorate General of Shipping (DGS), Ministry of Ports, Shipping and Waterways (MoPSW), Government of India. It is envisioned as a centralized, digital knowledge and services platform that aims to unify and empower India's maritime ecosystem. Recognizing the growing importance of the maritime domain in the national and global economy, the MKC is designed as a strategic response to the fragmented, siloed, and under-optimized flow of maritime knowledge and services across the country.

The MKC serves as a multi-dimensional e-platform that brings together a wide array of maritime stakeholders—government authorities, regulatory bodies, shipping companies, seafarers, maritime educational and training institutions, port authorities, legal and insurance firms, classification societies, surveyors, shipbuilders, environmental experts, start-ups, researchers, and investors—under a single digital umbrella. It is not merely an information repository but a collaborative, interactive, and service-oriented digital cluster, tailored to meet the diverse and evolving needs of the maritime sector.

The initiative is structured around 15 well-defined thematic verticals covering all core and allied domains such as Shipping Development, Ports, Shipbuilding, Ship Recycling, Maritime Safety & Security, Sustainability & Maritime Decarbonization, Maritime Services, Seafarers' Corner, Research & Innovation, and Policy Consultation, among others. Each vertical is equipped with specialized sub-verticals and service modules, making the platform both comprehensive and navigable.

The MKC also acts as a catalyst for innovation and industry-academia collaboration, working closely with premier institutions like the National Technology Centre for Ports, Waterways, and Coasts (NTCPWC), Centre for Inland and Coastal Maritime Technology (CICMT), Indian Maritime University (IMU), and National Institute of Oceanography (NIO). Through these partnerships, MKC facilitates advanced research, new policy ideas, skill development, and sustainable technological solutions.

B. Objective

The maritime sector in India, despite its critical importance—handling nearly 95% of trade by volume and 70% by value—has long faced systemic challenges that have constrained its growth and efficiency. These include fragmented information dissemination, weak stakeholder integration, inadequate digital infrastructure, and poor access to services and expertise.

The Maritime Knowledge Cluster is conceptualized to solve these core challenges and address several interlinked objectives:

a) **Centralization of Maritime Knowledge and Data:**

Maritime knowledge in India is currently scattered across various agencies and platforms. MKC solves this by offering a single, unified platform that aggregates sector-specific information, compliance data, research outputs, service directories, training opportunities, and market insights.

b) **Enhancing Stakeholder Collaboration:**

The maritime sector consists of multiple stakeholder groups that often work in silos. MKC aims to facilitate seamless interaction between shipowners, port operators, educators, policymakers, and entrepreneurs, fostering greater synergy and reducing duplication of effort.

c) **Promoting Sustainability and Green Shipping Practices:**

MKC supports India's maritime decarbonization goals by disseminating information on IMO GHG norms, alternative fuels, green technologies, and best practices in environmental compliance. It also promotes market-based measures and green audits through onboarded consultants.

d) **Empowering Seafarers and Maritime Professionals:**

The Seafarers' Corner within MKC is dedicated to improving the lives and careers of Indian seafarers. It offers resources on welfare schemes, training, job opportunities, mental health, and community engagement, thus ensuring a human-centric maritime ecosystem.

e) **Driving Innovation and Research Integration:**

MKC actively connects research institutions and think tanks with industry needs, promoting problem-solving research and innovation in areas like coastal shipping, port logistics, ship design, digitalization, and sustainability.

f) **Ensuring Regulatory Compliance:**

By maintaining an up-to-date repository of national and international maritime regulations, MKC simplifies compliance for stakeholders and reduces risks associated with regulatory violations.

g) **Hosting Maritime Events, Seminars, and Networking Forums:**

Through digital forums, event calendars, and webinar tools, MKC enables stakeholders to engage, network, and stay informed about industry developments, upcoming policies, and new business opportunities.

h) **Supporting Maritime Education and Capacity Building:**

The MKC integrates maritime education databases, training programs, certification resources, and MOOCs, aimed at building a competent workforce ready to meet the challenges of modern maritime operations.

i) **Promoting India as a Global Maritime Hub:**

By showcasing India's maritime strengths—its port infrastructure, shipping fleet, human resources, and policy frameworks—MKC contributes to building the nation's global maritime reputation.

j) **Acting as a Service Bridge:**

MKC functions as a matchmaking platform, connecting service seekers (e.g., shipowners, exporters) with providers (e.g., legal experts, classification societies, surveyors), thereby unlocking business potential and reducing transaction friction.

C. Strategic Alignment

Maritime Knowledge Cluster (MKC) – A Brief Overview through the Lens of Maritime India Vision 2030 (MIV 2030) and Maritime Amrit Kaal Vision (MAKV) 2047.

The Maritime Knowledge Cluster (MKC), as envisioned under the broader Maritime India Vision 2030 (MIV 2030) and Maritime Amrit Kaal Vision 2047, is a strategic initiative by the Ministry of Ports, Shipping and Waterways (MoPSW), Government of India, aimed at transforming India's maritime sector into a globally competitive and knowledge-driven domain. It is not an isolated program but an integrated knowledge ecosystem that underpins MIV 2030 and MAKV 2047's transformative objectives across ports, shipping, inland waterways, and coastal communities.

MIV 2030 and MAKV 2047, such as infrastructure development, policy and institutional reforms, technology adoption, shipbuilding and recycling, cruise tourism, inland waterways, green ports, and human capital development. The MKC aligns itself with these strategic themes by serving as a centralized, digital-first platform designed to provide maritime stakeholders—ranging from government authorities and private players to academia and seafarers—with easy access to credible, updated, and sector-specific information and services.

At its core, the MKC facilitates the dissemination and exchange of maritime knowledge in a structured, user-friendly format. It encompasses verticals like ports and logistics, shipbuilding and recycling, maritime safety and security, coastal and EXIM trade, policy consultation, sustainability and decarbonization, and maritime education and training. Each vertical is designed to provide stakeholders with information such

as best practices, industry standards, geospatial data, regulatory updates, stakeholder directories, event calendars, and collaboration opportunities.

Functionally, the MKC is positioned to support MIV 2030 and MAKV 2047's goals in multiple ways:

01

Operational Efficiency and Port-led Growth
By curating data on port infrastructure, capacity, connectivity, and technology upgrades, the MKC aids in benchmarking Indian ports against global standards and promotes operational excellence-key pillars of MIV 2030.

02

Human Capital Development
As MIV 2030 targets making India a top seafaring nation, MKC supports this by housing information on training institutions, courses, certifications, and career pathways in maritime education.

03

Green Maritime Future
MKC plays a pivotal role in advancing MIV's sustainability objectives by centralizing research, policy updates, and innovation on maritime decarbonization and green fuels.

04

Policy Support and Stakeholder Engagement

One of MIV 2030's themes is institutional strengthening. MKC supports this by acting as a bridge for public-private academic dialogue, providing policy consultations, feedback mechanisms, and a repository of laws and regulations.

India needs to drive collaboration across National Technology Centre for Ports, Waterways and Coasts (NTCPWC), Centre for Inland and Coastal Maritime Technology (CICMT), National Institute of Oceanography (NIO), and Indian Maritime Universities (IMUs) for strategic maritime research.

Indian maritime knowledge cluster to focus on:

a) Enhancing research and development (R& D) capacities at IMUs/M TIs
b) Focused research across strategic topics
c) Onboarding 10+ industry players across 5 research thrusts of ports, shipbuilding, dredging and logistics industries
d) Creating a taskforce under Indian Maritime Center to drive collaboration across domestic/international network (Exhibit 10.2) Additionally, steps to promote and partner with all public/ private shipyards, ports and logistics service providers (LSPs) to offer customized skill development courses for becoming the best highend training / upskilling partner for marine / Port sector workers should also be evaluated.

The platform is also aligned with India's aspiration to achieve Aatmanirbhar Bharat (self-reliant India), as it encourages domestic innovation, supports indigenous maritime businesses, and increases digital governance within the sector. The MKC is expected to enhance maritime data transparency, empower evidence-based policymaking, reduce duplication of efforts across ministries and institutions, and enable real-time coordination for strategic maritime decisions.

By institutionalizing the Maritime Knowledge Cluster as a permanent, evolving infrastructure under the vision of MIV 2030 and MAKV 2047, India positions itself not just as a global maritime trade hub, but also as a leader in maritime thought, innovation, and sustainable development. The MKC, thus, becomes an enabler and catalyst for India's ambition to emerge as a maritime superpower.

D. Key Features of the Project

Module/Feature	Description
Thematic Vertical Structure	a) Covers 15 specialized verticals: Maritime Services, Ports, Seafarers' Corner, Sustainability, Ship Recycling, Research & Innovation, etc. b) Each vertical includes targeted information, services, and stakeholder directories.

Module/Feature	Description
Centralized Knowledge Repository	a) Unified platform for regulations, guidelines, research papers, market data, and technical resources. b) Downloadable content includes circulars, manuals, SOPs, and best practices.
Interactive Service Directories	Role-based access to verified maritime service providers such as: a) Insurance companies b) Legal and arbitration experts c) Marine surveyors and classification societies d) Training institutes and consultants Includes a service seeker–provider matchmaking module.
Data-Driven Decision Support Tools	a) Real-time dashboards, port data, trade analytics, and trend visualizations. b) Includes modules for fleet statistics, vessel tracking, port congestion, and policy updates.
Seafarers' Corner	a) Welfare and support services for seafarers. b) Access to training programs, job listings, grievance redressal, and mental health support.
Training & Certification Hub	a) Listings of courses, institutions, and certification programs. b) Covers refresher training, advanced skill-building, and MOOC integration.
Collaboration & Innovation Modules	a) Tools for research institutions and startups to collaborate, share ideas, and showcase innovations. b) Access to funding directories, grant opportunities, and mentorship programs.
Maritime Events & Networking Calendar	a) Central listing of industry events, conferences, webinars, and exhibitions. b) Enables stakeholders to upload event details and connect with peers.
Compliance & Regulatory Modules	a) Centralized access to IMO guidelines, Indian maritime laws, MS Act, STCW, and other standards. b) Includes templates, checklists, and SOPs to ease regulatory compliance.

Module/Feature	Description
Subscription & Membership Management	a) Tiered access model: Free, Member, and Paid (Premium) Services. b) Customizable access levels for individuals, institutions, and corporates.
User Experience & Interface	a) Intuitive, multilingual UI with role-specific dashboards. b) Mobile responsive and accessible for wider reach.
Secure & Scalable Architecture	a) Hosted on Government Community Cloud (GCC). b) Built-in cybersecurity, data backup, and disaster recovery features.

Geospatial Platform

4.19 Geospatial Platform

A. About the Initiative

In today's rapidly evolving maritime landscape, efficient management of port areas is key to sustaining global trade and economic growth. Port authorities and government agencies are increasingly turning to geospatial intelligence to enhance the planning, operation, and sustainability of these complex hubs. Traditionally, data on port infrastructure, land use, environmental conditions, and security has been scattered across various systems, leading to delays, redundancies, and incomplete insights.

A **centralized Geospatial Platform dedicated to Port Areas** offers a transformative solution by consolidating diverse spatial datasets from Geographical boundary, Port and harbor asset inventories and infrastructure blueprints to environmental and sensors data into one unified repository. It will empower users with powerful visualization tools to analyze spatial patterns, visualize infrastructure and asset management, and track environmental impacts. This comprehensive approach not only streamlines port operations but also enables proactive decision-making, regulatory compliance and ensures that ports remain safe, efficient, and sustainable in the face of growing global demands. A pilot project for the geospatial platform has been proposed for four EXIM ports: JNPA, Kandla, Paradip, and Vizhinjam. POC has been conducted for all 4 ports.

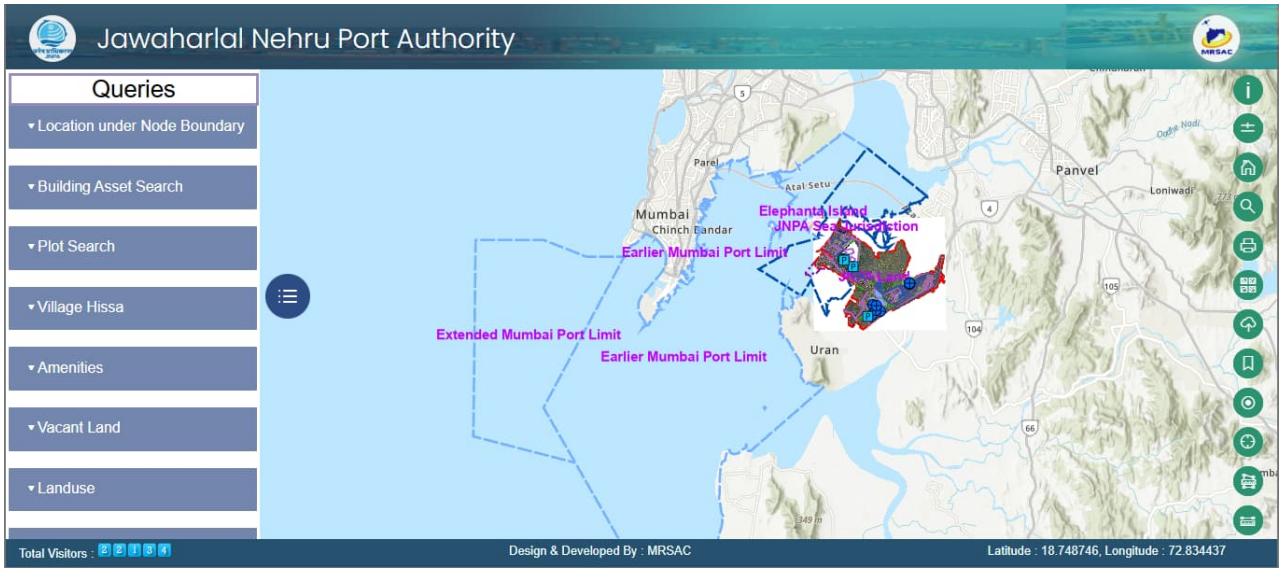


Figure 36 Geospatial data representation of the Jawaharlal Nehru Port Authority

B. Objective

The Geospatial Development Initiative aims to solve the critical problem of fragmented, outdated, and unstandardized spatial data management across Indian ports, which hampers operational efficiency, regulatory compliance, and security oversight.

Currently, port authorities and related agencies face significant challenges due to:

a) Dispersed and non-integrated datasets on infrastructure, land use, environmental zones, and navigational limits.

b) Absence of a centralized platform for visualizing, managing, and analyzing port-specific spatial data.

c) Inability to monitor and validate compliance with key frameworks such as the International Ship and Port Facility Security (ISPS) Code and Navigational Safety at Port Committee (NSPC).

d) Lack of decision-support tools for real-time assessment of port assets, encroachments, emergency response zones, and development planning.

The initiative addresses these gaps by:

a) Creating a centralized geospatial system that consolidates all spatial and attribute data into a single, secure, and accessible platform.

b) Enabling precise mapping and visual tracking of port infrastructure, ISPS-restricted zones, and NSPC-compliant Safety perimeters.

c) Supporting regulatory authorities with automated reporting and visualization tools for monitoring port safety, land use compliance, and environmental management.

d) Enhancing data-driven decision-making for operational planning, berth management, and strategic port development.

Figure 37 Proposed Geospatial Platform Components

C. Strategic Alignment

01

Maritime India Vision 2030

a) Establishes smart infrastructure with real-time visibility of assets and layouts
b) Enables predictive maintenance and intelligent port operations
c) Supports "Smart Ports" vision with integrated, data-driven tools

02

Amrit Kaal Vision 2047

a) Provides scalable digital architecture to support growth of greenfield and brownfield ports
b) Aids in sustainable development planning by integrating environmental and spatial intelligence
c) Strengthens data sovereignty and national spatial intelligence capabilities

03

Ease of Doing Business

a) Provides a centralized digital platform that consolidates land, infrastructure, navigational, and environmental data—reducing time taken for approvals, land allocation, and operational planning.
b) Facilitates faster layout clearance and streamlined compliance through spatial visualization and automated reporting.

04

Maritime Safety & Surveillance

a) Digitally maps critical safety zones including ISPS Code-restricted areas, Navigational Safety perimeters, and emergency response zones, enhancing situational awareness.
b) Enables live spatial monitoring of safety compliance, vessel movement within harbor limits, and incident tracking using real-time data.
c) Supports coordinated surveillance and incident response between stakeholders such as the Indian Navy, Coast Guard, CISF, and PHOs.

05

Data Governance & Cybersecurity

a) Establishes a standardized geo-database framework across ports to ensure consistent data structure, accuracy, and interoperability.
b) Provides role-based access controls, encryption, and audit logs to protect sensitive port and security data from unauthorized use.
c) Aligns with national digital governance and cybersecurity protocols to ensure data sovereignty and resilience against cyber threats.

06

Capacity Building

a) Drives skill development in modern GIS tools, spatial analysis, and digital governance among port officials, planners, and regulators.
b) Facilitates training programs, SOPs, and user manuals to build institutional knowledge and operational readiness for adopting geospatial tools.
c) Encourages inter-agency collaboration and learning through shared geospatial dashboards and analytics platforms.

D. Key Features for Geospatial Development

The Geospatial system is a Web enabled system with the following application features.

Table 26 Key Features of the Platform

Module/Feature	Description
Client Server Architecture	Separation of the server-side components from the client-side components resulting in efficient code execution and implement application load balancing. Multitier application enhances the execution efficiency and software code maintenance.
User Interface	The user interface was ergonomically designed with menu driven application component access, selection of appropriate colour, controls, application messages, context sensitive help to facilitate easy application access and long hours of operation.
Application Security	The application embedded with multiple security layers with appropriate security logic to restrict unauthorized access to the system components. The Land Management System was developed as an integrated application with multiple functional components loosely coupled with a common data repository. The functional components are governed by the application security rules and are accessible by the users with appropriate combination of application and object level privileges.
Standard Geo-database	Implementation of standardized Geo database definition shall facilitate data compatibility and interoperability.

E. Technology Stack / Platform

I **System Architecture:**

The architecture of the Web GIS system developed largely using open architecture. The system comprises composite three-tier architecture. The client nodes talk to the database server through the application server. Due to large volume of spatial data and its massive usage, the spatial dataset and data attached to these entities were maintained separately in Relational Database Management System (RDBMS) (MS SQL). Using spatial database engine, the spatial data were stored in the RDBMS. The entire application software resides on application server to coordinate various activities between the client nodes and the database server. This application server also enables the remote users to access the information through web browser.

The following are the different servers:

a) **Web Server:** The web server is installed with Apache Tomcat to host the PPTs Web GIS application. Nginx is configured as a reverse proxy and load balancer to distribute client requests

across multiple Tomcat instances. It manages SSL termination, handles static content delivery, and ensures efficient request routing based on server health and load. This setup improves application availability, scalability, and performance.

b) **Application Server (Geo Server):** Geo-Server is used to serve GIS data and maps through OGC-compliant services such as WMS, WFS, and WCS. It publishes spatial datasets from various sources, enabling dynamic access and integration with client applications like Leaflet for visualization and analysis.

c) **Database Servers:** The database server has all the necessary Geodatabase needed for the PPTs Web application and desktop users. GIS clients use direct connection to access the Geodatabase. All the process were executed as batch job and this batch job also helps to compress the data in Enterprise Geodatabase.

d) **Software/Hardware Configuration:**

The software and hardware were designed to cater the need of more than 25 concurrent users accessing the system. The following are the software and hardware technical specifications:

Table 27 Technical Specifications of the proposed platform

Software	
Client Technology	a) HTML5/JavaScript b) Leaflet JS c) QGIS
Web Server	a) NGINX, Tomcat JAVA Customized application
Application Server	a) Open Geospatial architecture, Geo-server
Database	a) MS SQL Server Standard 2012
Hardware	
Web Server	a) CPU: 4 Core CPU b) RAM: 16 GB c) STORAGE: 512 GB
Application Server	a) CPU: 4 Core CPU b) RAM: 64 GB c) STORAGE: 512 GB
Database Server	a) CPU: 4 Core CPU b) RAM: 32 GB c) STORAGE: 2 TB

F. Project Timelines and costing

Timeline: Once the Pilot project is successfully completed for all 4 ports, the rollout will be expanded to other ports.

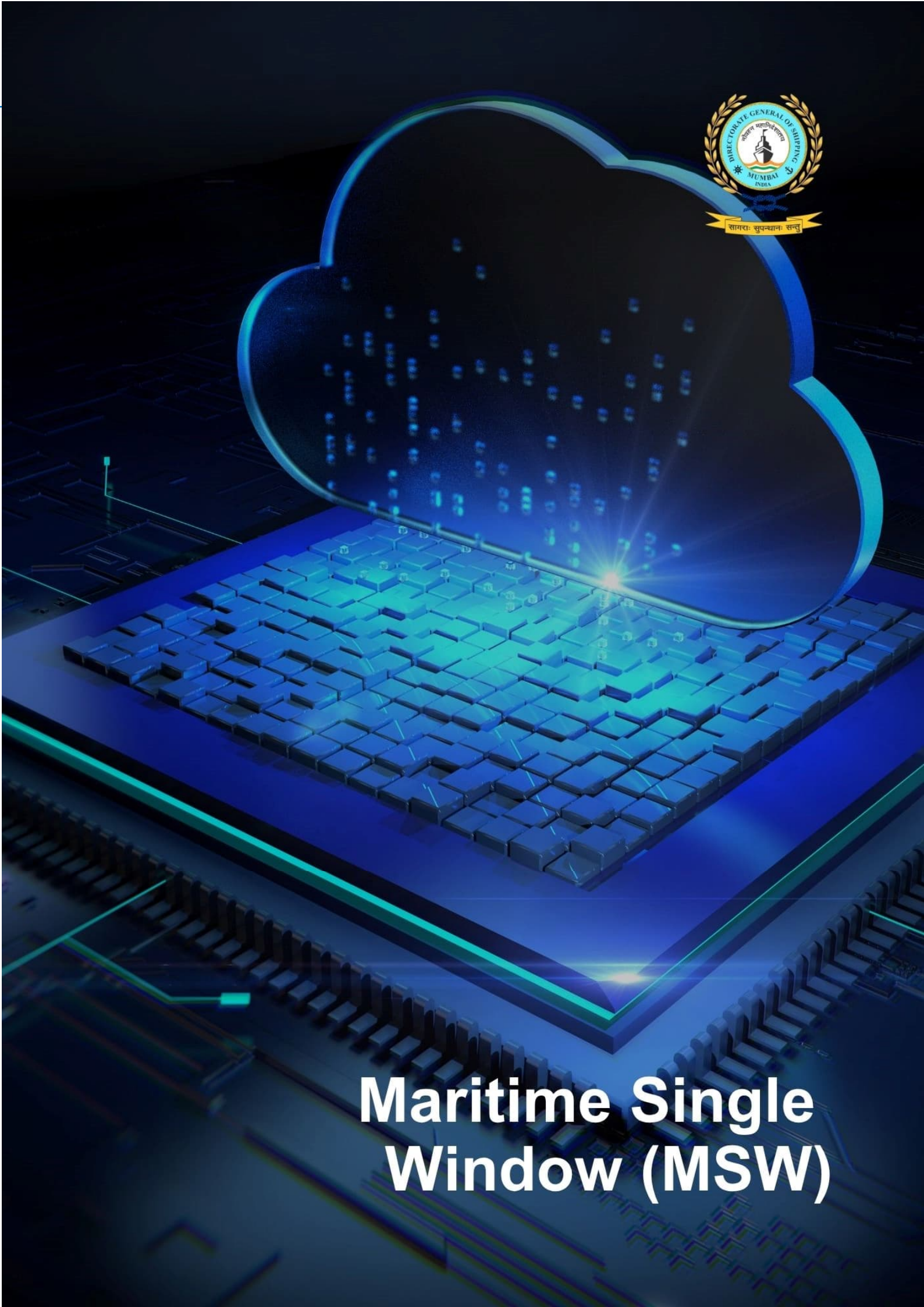
Project Costing: The cost of developing the geospatial system will be borne by the respective port authorities. The Directorate General of Shipping (DG Shipping) will be responsible for publishing the standardized framework and guidelines for geospatial data structure and implementation.

G. Project Status

The project is currently in the public procurement stage, following due process as per the Government of India's procurement guidelines. This procurement approach ensures a competitive yet quality-driven evaluation process under the Quality and Cost-Based Selection (QCBS) method.

Table 28 Current Status of the Geospatial Platform Project

Components	Status
Pilot Project	JNPA, Kandla, Paradip, Vizhinjam ports
Proof of Concept (POC)	Completed for all 4 ports
Initial Data Layer Submission	a) JNPA Port b) Paradip Port Authority c) Vizhinjam Port d) Kandla Port (under process)
Kandla Pilot Processing	Started post vendor finalization
Procurement Progress	EOI & Procurement Note published
POC Submission	a) JNPA b) Paradip



Maritime Single Window (MSW)

4.20 Maritime Single Window (MSW)

A. About the Initiative

The Maritime Single Window (MSW) in India aims to revolutionize the reporting and regulatory processes within the maritime sector by integrating various stakeholders, such as port authorities, shipping companies, customs, and other regulatory bodies, into a unified platform. The objective is to enhance efficiency, reduce administrative burdens, and facilitate smoother operations.

The Maritime Single Window (MSW) is a flagship digital transformation initiative undertaken by the Directorate General of Shipping (DGS), Ministry of Ports, Shipping & Waterways, to modernize and simplify regulatory reporting procedures across India's maritime sector.

Operational since 1st January 2024, the MSW serves as a one-stop electronic service environment for the unified submission, validation, and processing of information required by various maritime authorities during a ship's arrival, stay, and departure from port.

By integrating stakeholders such as port authorities, shipping companies, customs, immigration, health authorities, and security agencies, the MSW reduces operational redundancies, enhances transparency, and improves turnaround time at ports — thereby contributing to sustainable and efficient maritime logistics in India.

MSW is applicable to Vessels under Cruise, Containerized, Bulk, Break-bulk, Liquid etc.

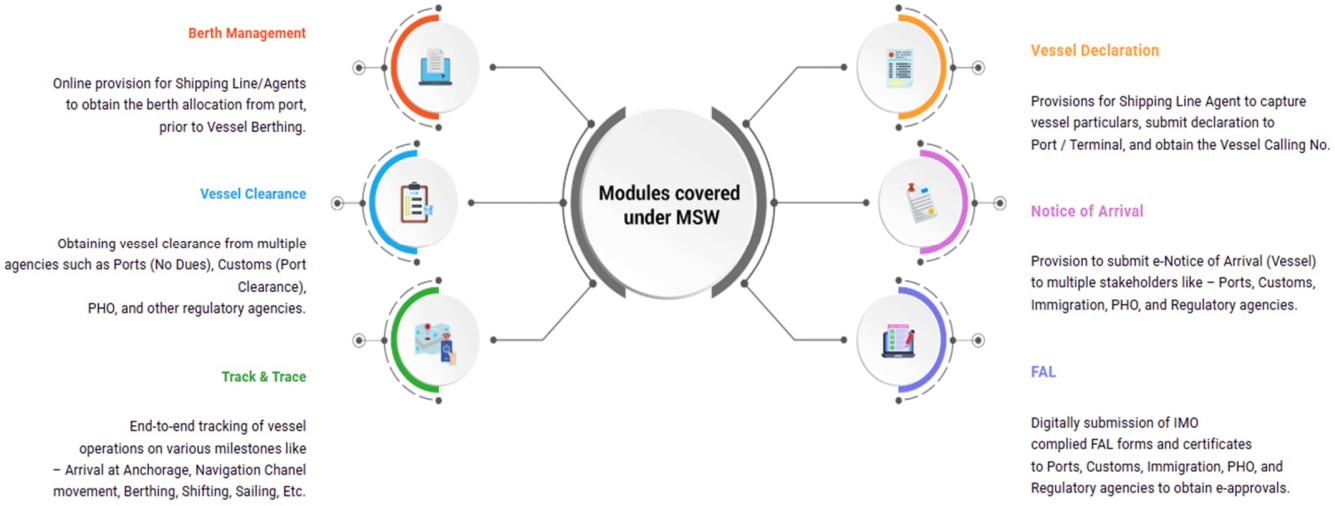


Figure 38 Maritime Single Window – Key Modules

B. Objective

The Maritime Single Window (MSW) aims to eliminate redundancy, delays, and inefficiencies in vessel clearance processes by providing a single, unified digital platform for the submission of all mandatory declarations required under both international and domestic maritime regulations. This initiative is pivotal in enhancing transparency, operational efficiency, and regulatory compliance across Indian ports.

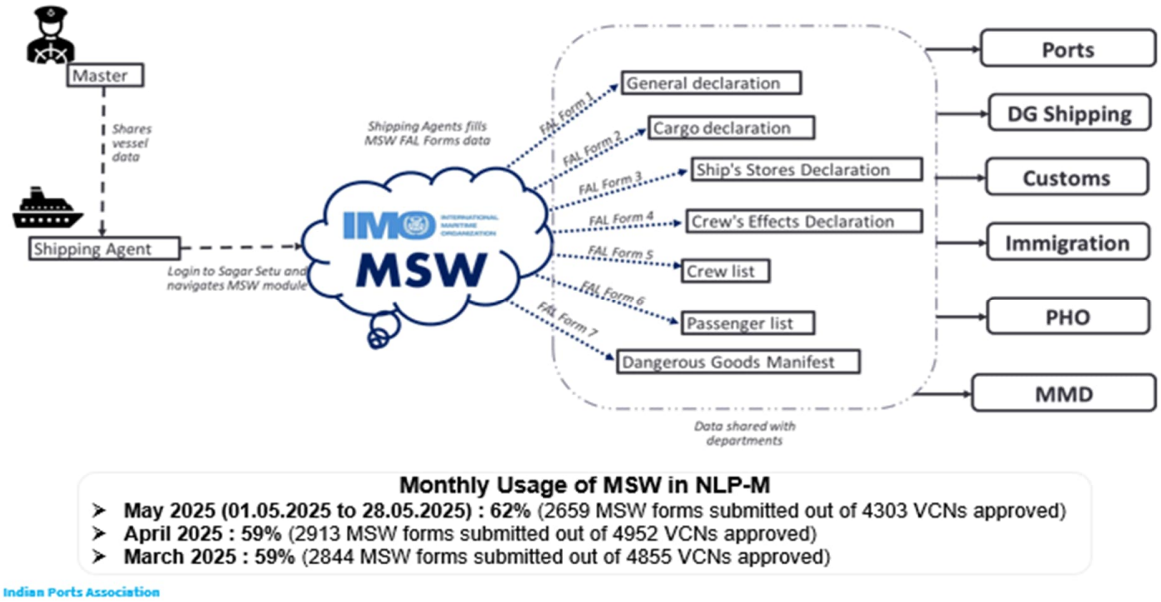


Figure 39 MSW Platform – Current Flow in Sagar Setu

The MSW specifically addresses the following:

I **Streamlining ship arrival and departure formalities**

Enables vessels to electronically submit all required data in one go, minimizing repetitive submissions to multiple agencies.

II **Reducing the administrative burden on shipping agents and government authorities**

Simplifies document handling and coordination by replacing paper-based processes with automated workflows.

III **Enhancing compliance with international obligations (IMO FAL Convention – Standard 1.3)**

Supports India's commitment to the Facilitation Convention by mandating electronic transmission of FAL forms 1 to 7.

IV **Improving data accuracy, processing speed, and inter-agency coordination**

Reduces errors through validation mechanisms and allows seamless communication among ports, customs, immigration, and health bodies.

V **Facilitating ease of doing business in the maritime sector**

Shortens vessel turnaround time, enhances trade facilitation, and contributes to India's logistics competitiveness.

VI **Supporting environmental sustainability goals**

Reducing idle times at port helps in cutting emissions and energy consumption by vessels.

VII **Enhancing national maritime security and surveillance**

By ensuring timely and accurate exchange of ship-related information, the system contributes to better maritime domain awareness.

C. Strategic Alignment

The MSW is strategically aligned with key national and international frameworks:

01

Maritime India Vision 2030 and Amrit Kaal Vision 2047
Supports long-term modernization and digitization goals of India's maritime ecosystem through smart port governance and optimized logistics.

02

Ease of Doing Business (EoDB)
Reduces transaction time and documentation burden, significantly easing procedural bottlenecks for maritime operators and shipping lines.

03

IMO FAL Convention Compliance
Fully aligned with Standard 1.3 of the Facilitation of International Maritime Traffic (FAL) Convention, promoting paperless processing and international best practices.

04

Data Governance & Cybersecurity
Incorporates robust data security frameworks including encryption, role-based access, and adherence to GIGW 3.0 and NIC guidelines.

05

Maritime Safety & Surveillance
Facilitates timely and accurate exchange of port clearance data, strengthening India's maritime domain awareness and safety operations.

06

Environmental Sustainability
By reducing turnaround and idle times for vessels, the MSW indirectly contributes to emission reduction and green port operations.

D. Key Features of Maritime Single Window (MSW)

The Maritime Single Window (MSW) is a centralized platform enabling the digital submission and processing of all documentation required for port entry and exit. Developed by the Directorate General of Shipping, it integrates inputs from shipping agents, port authorities, customs, immigration, health, and security agencies. The platform ensures real-time data exchange and reduces turnaround time by eliminating repetitive documentation.

Stakeholders include shipping companies, port authorities, government regulatory agencies, customs, health inspection bodies, and IT infrastructure partners. The MSW fosters transparency, compliance, and alignment with IMO's Facilitation (FAL) Convention. It supports automated validation, status tracking, and alerting for various maritime declarations (FAL Forms 1 to 7). MSW is part of India's commitment towards digitization, facilitating ease of doing business, and reducing port congestion.

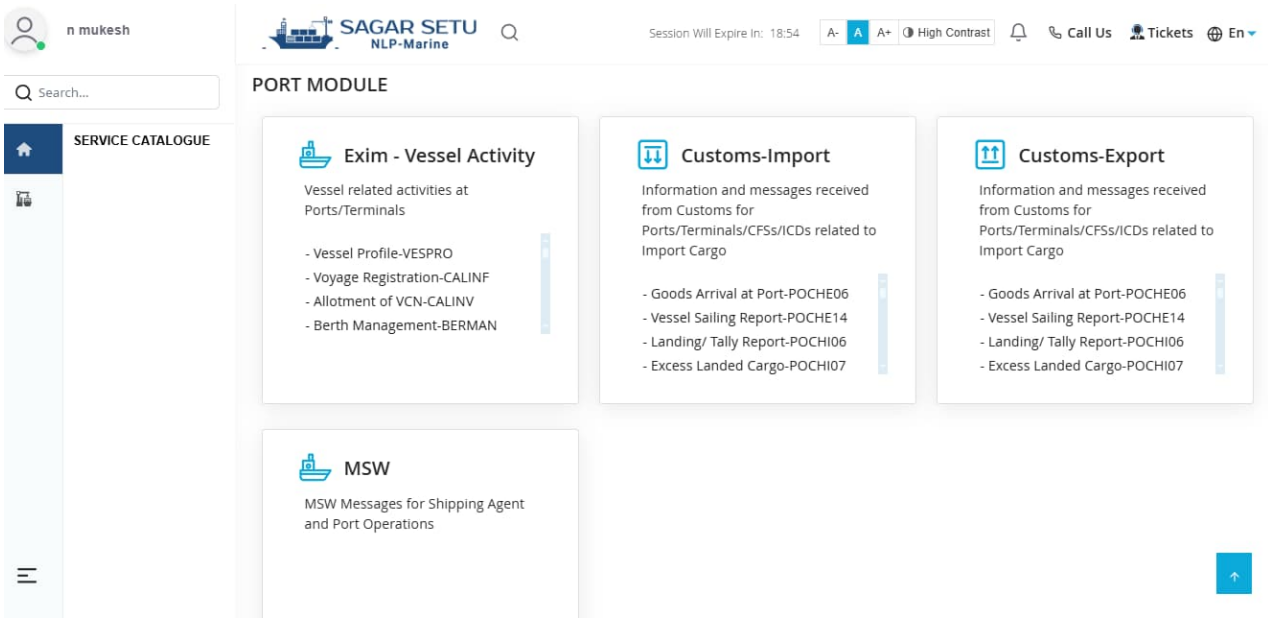


Figure 40 Port Modules on Sagar Setu NLP-Marine

Table 29 Key Features of the Platform

Strategic Priority	Description
Centralized FAL Submission	Single portal for FAL Forms 1–7 and other FAL additional forms
Role-Based Access Control (RBAC)	Secure, role-specific access, ensures data privacy and accountability
Automated Validation & Tracking	Auto-checks for form accuracy; real-time submission status updates
Real-Time G2G Integration	Live data sharing with Customs, PHO, Immigration, and other government systems
Dashboards & Analytics	Visual insights for port authorities; aids operational and compliance decisions
Alerts & Compliance Reminders	Timely notifications for pending actions, document expiry, or follow-ups
External System Integration	Linked with PCS, ICEGATE, and Port MIS for seamless workflow

E. Technology Stack / Platform

The technology stacks for the Maritime Single Window (MSW) are as follows:

Table 30 Technology Stacks

Component	Specification
Front-End	AngularJS
Backend / Middleware	IBM APIs
Database	MS SQL
Security	NIC-approved data encryption & role-based access
Certification	STQC, GIGW 3.0 Compliant
Integration	PCS, ICEGATE, Port Operating Systems

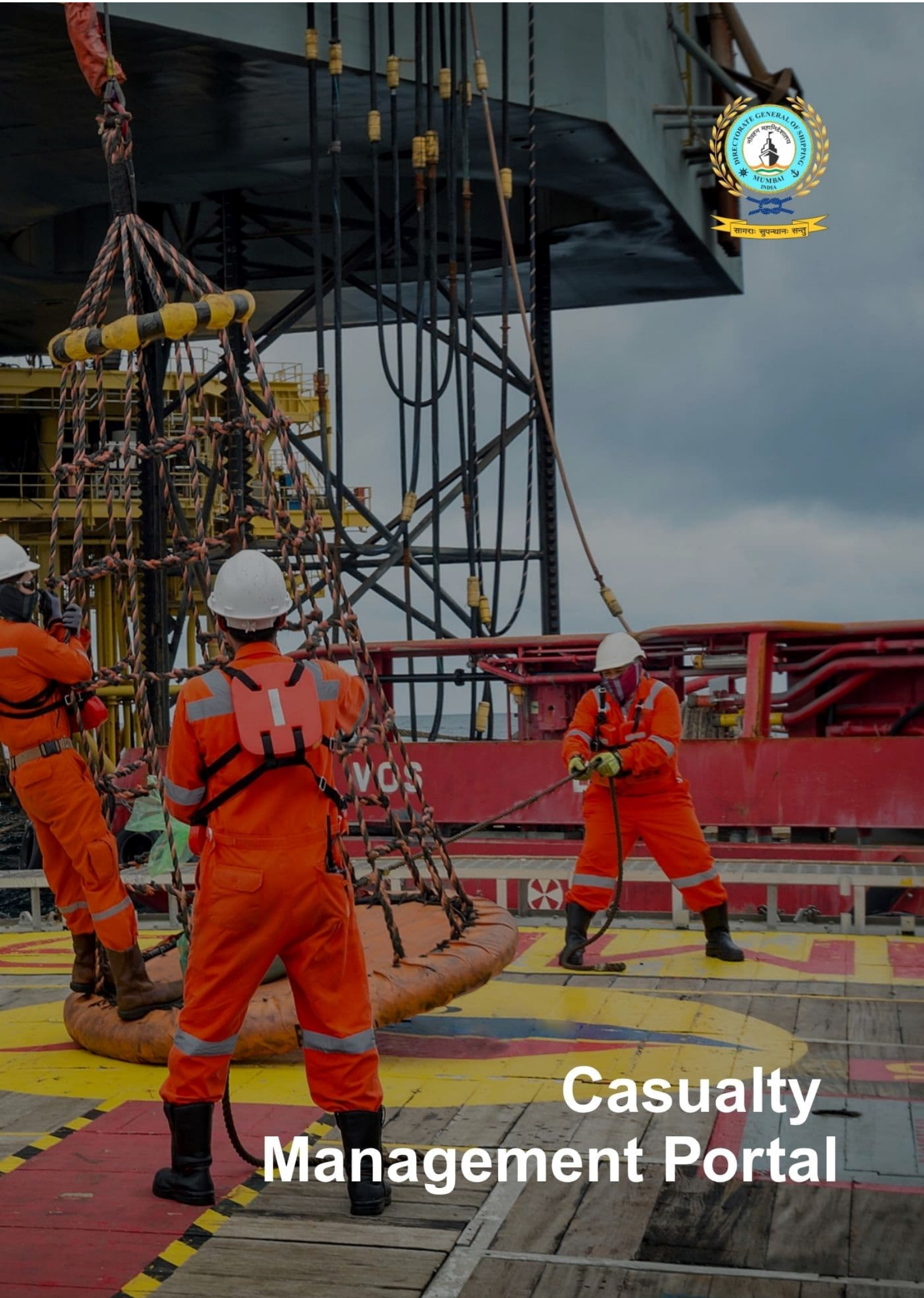
F. Project Status

The Maritime Single Window (MSW) has been developed and implemented through a phased approach, ensuring comprehensive system integration, user acceptance, and long-term sustainability. The platform is designed to be dynamic and scalable, with ongoing upgrades based on feedback, regulatory changes, and technological advancements.

Continuous system monitoring, user support, and feature enhancements - 2024-25.

Table 31 Current Status of the Maritime single Window

Component	Status
National Rollout	☑ Completed
Operational Ports	☑ All Major Ports Integrated
System Functionality	☑ Fully Active
Stakeholder Training	☑ Conducted via DGS and other Agencies
Feedback & Upgradation Loop	☑ Ongoing



Casualty Management Portal

4.21 Casualty Management Portal

A. About the initiative

India's maritime sector, governed by the Merchant Shipping Act, 1958, faces various incidents such as shipwrecks, collisions, groundings, onboard accidents, and loss of life. While these incidents are investigated under legal frameworks (Sections 359 and 389 of the Act), the reporting and management process was largely manual, fragmented, and lacked transparency or real-time tracking.

To overcome these limitations and ensure compliance with national and international maritime safety standards, DGS initiated the development of a centralized digital system for casualty reporting and management.

The Casualty Management Portal will be developed under the Directorate General of Shipping (DGS), Government of India. The goal of the portal is to digitize and streamline the reporting, inquiry, and investigation of maritime casualties involving Indian and foreign ships operating in Indian waters. The Portal is a web-based module, aimed at digitizing the complete life cycle of maritime casualty handling — from reporting to final investigation closure. It will serve as a unified platform for:

a) Reporting of maritime casualties
b) Assigning Inquiry Officers (IOs)
c) Conducting preliminary inquiries or investigations
d) Collecting and storing evidence
e) Issuing legal notices and summons
f) Generating and submitting structured reports
g) Tracking legal proceedings
h) Providing real-time updates to all stakeholders

It is designed to be compliant with IMO (International Maritime Organization) guidelines and ensure procedural transparency and accountability.

B. Objectives

The objectives of the casualty management portal are stated below:

I Efficient Reporting: Enable online submission of casualty reports by stakeholders (ship owners, seafarers, ports, etc.).
II Automated Assignment: Assign Inquiry Officers (IOs) based on the jurisdiction automatically.
III Timely Action: Generate alerts and reminders for timely report submission and inquiry milestones.
IV Evidence Management: Provide secure storage for evidence like logbooks, documents, photos, and statements.
V Legal Tracking: Track legal cases if complaints are filed in local courts or police stations.
VI Structured Documentation: Auto-generate notices, summons, and structured reports in DGS format.
VII Real-time Monitoring: Display live status updates of inquiry progress and deadlines through a dashboard.

C. Strategic Alignment

01

Maritime India Vision 2030 and Amrit Kaal Vision 2047
Supports digital transformation and modernization of maritime safety governance, aligns with India's vision for a globally compliant and transparent maritime ecosystem.

02

Ease of Doing Business (EoDB)
Streamlines the casualty reporting and investigation process through automation, real-time tracking, and digitized workflows — reducing procedural delays and improving efficiency.

03

Seafarer Welfare
Protects lives at sea by ensuring accountability and root cause analysis of casualties. Also helps deter negligence by enforcing timely legal action, which indirectly improves safety and working conditions for seafarers.

04

Maritime Safety & Surveillance
Central goal of the system — enables real-time reporting, inquiry tracking, site inspections, and structured root cause analysis to prevent future incidents.

05

Data Governance & Cybersecurity
Compliant with IT Act 2000 and MeitY guidelines; employs AES-256 encryption, role-based access control, secure cloud deployment, and disaster recovery architecture.

06

Environmental Sustainability
While the focus is on casualty investigations, the portal contributes indirectly by enabling rapid response to environmental accidents like oil spills, ship groundings, and pollution events.

07

International Maritime Organization (IMO) Alignment
Incorporates investigation standards per IMO Casualty Investigation Code; aligns processes with Section 359 & 389 of the Merchant Shipping Act and global reporting norms.

08

Capacity Building
Builds institutional capacity by digitizing workflows, enabling evidence-based decision-making, and training officers in using tech-driven inquiry tools.

D. Key Features of Casualty Management Portal

I **Casualty Reporting System**

a) A dedicated web page for reporting casualties.
b) Accepts reports of ship loss, damage, stranding, abandonment, or loss of life.
c) Accessible to various stakeholders including DGS, MMD, ship owners, etc.

II **Inquiry and Investigation Management**

a) Inquiry Officers can be assigned automatically or manually.
b) Inquiry is conducted per IMO guidelines.
c) Tools for IOs to collect evidence, inspect vessels, and interview stakeholders.
d) Auto-generated legal notices and summons based on provided templates.

III **Report Generation**

a) Support for Initial (3 days), Interim (30 days), and Final Reports (90 days).
b) Includes sections like incident background, root cause analysis, recommendations, and annexures.

IV **Document & Evidence Repository**

a) Centralized, secure storage for uploaded data (logs, declarations, photos, etc.).
b) Upload functionality for field personnel and inquiry officers.

V **Legal Case Management**

a) Tracks court proceedings and links them to the related inquiry records.

VI **Dashboard and Alerts**

a) Real-time status dashboard for DGS, IOs, and stakeholders.
b) Notification system for upcoming deadlines, overdue actions, and important milestones.

VII **Security and Compliance**

a) Compliance with the IT Act 2000 and MeitY guidelines.
b) AES-256 encryption, TLS for data transmission, and role-based access.

VIII **Cloud-Based Deployment**

a) Hosted in the existing e-Samudra cloud environment.
b) Designed for scalability with future growth in user base and data.

E. Project Timelines

The system integrator is expected to adhere to these timelines with precision to ensure the timely delivery of high-quality software solutions that align with the project's objectives and milestones.

Table 32 Project Implementation Timeline

SN	Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Year 1	Year 2	Year 3
1	Design & Development													
2	UAT													

SN	Particulars	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Year 1	Year 2	Year 3
3	Pilot Testing													
4	STQC & CERT-In Audit													
5	Go-Live													
6	Warranty Period													
7	O & M													

F. Project Status

The Indian Global Maritime Safety Platform project is currently in the public procurement stage, following due process as per the Government of India's procurement guidelines.

Comprehensive Shipbuilding and Ship Repair Portal

4.22 Comprehensive Shipbuilding & Ship Repair Portal

A. About the Initiative

The Comprehensive Shipbuilding & Ship Repair Portal is a strategic initiative led by the Directorate General of Shipping (DGS) under the Ministry of Ports, Shipping & Waterways (Mops), Government of India. The project aims to digitally transform the Indian shipbuilding and ship repair industry, improving visibility, collaboration, and overall efficiency. By bringing together shipyards, ancillary industries, regulators, financial institutions, design agencies, investors and other industry stakeholders onto a unified digital platform, the portal will drive data-driven decision-making, promote industry collaboration, and enhance India's global competitiveness in the maritime sector.

B. Objective

I Enhance industry visibility – Provide a comprehensive digital repository of Indian shipbuilding and repair capabilities including the allied sectors, enhancing the industry competitiveness and global positioning.

II Capability showcase - Provide real-time industry intelligence and performance insights through dashboards, analytics, and dynamic capability assessment frameworks

III Facilitate stakeholder collaboration – Establish a centralized digital platform to connect all key stakeholders of the Indian shipbuilding and repair ecosystem.

IV Promote financial & investment opportunities – Offer structured information on financial assistance schemes, government incentives, and investment opportunities to catalyze sectoral growth.

V Support workforce development – Enable access to available training and certification programs for shipbuilding industry professionals.

VI Encourage innovation, sustainability & R&D – Encourage innovation, sustainability, and adoption of green technologies through collaboration and information sharing.

VII Ensure regulatory compliance – Provide centralized access to maritime regulations, classification standards, and policy updates.

C. Strategic Alignment

Maritime India Vision 2030 and Amrit Kaal Vision 2047

a) The initiative directly supports India's long-term maritime strategy to become a global shipbuilding hub.
b) Enhances India's positioning by:
   i. Showcasing shipyard and allied sector capabilities.
   ii. Facilitating international competitiveness.
   iii. Encouraging adoption of green, innovative, and sustainable shipbuilding practices.

02

Ease of Doing Business (EoDB)

a) The portal simplifies and streamlines:
   i. Stakeholder collaboration via a centralized digital platform.
   ii. Access to compliance data, financial schemes, insurance support, and technical resources.

b) By consolidating regulatory information, project financing details, and industry directories, it significantly reduces information asymmetry and procedural delays.

D. Key Features of Comprehensive Shipbuilding & Ship Repair Portal

The portal will be structured into multiple functional modules, each designed to address specific industry needs:

Table 33 Key Features of the Ship Building Portal

Key Features	Description
Capability Insights module	Showcases shipyard profiles, past projects, and capability assessment framework
Collaboration Hub module	Provides a discussion platform for industry networking, project-based collaboration, and expert Q&A forums.
Training & Certification module	Lists training programs and certification courses for skill development.
Finance & Insurance module	Features information on government financial schemes, financing options, and investment incentives.
Innovation Centre module	Facilitates R&D collaborations, technology adoption, and sustainability initiatives.
Technical Library module	Serves as a knowledge repository for technical documents, design specifications, and industry guidelines.
Regulatory & Compliance module	Offers structured information on regulatory frameworks and classification requirements.
Industry Directory module	Provides a comprehensive database of stakeholders in the Indian shipbuilding and repair industry


DIRECTORATE GENERAL OF SHIPPING
MUMBAI
INDIA
सागराः सुपन्थानः सन्तु
Ship Recycling Portal

4.23 Ship Recycling Portal

A. About the Initiative

The Ship Recycling vertical within the Maritime Knowledge Cluster (MKC) has been envisioned as a comprehensive resource hub focused on advancing safe and sustainable ship recycling. Ship recycling is a vital component of the maritime industry, providing a means to responsibly decommission vessels, recycle valuable materials, and minimize environmental impacts. The process, involves complex regulatory, environmental, and labour challenges, highlighting the need for greater awareness, collaboration, and innovation in this domain. The inclusion of the Ship Recycling vertical within MKC thus aims to centralize essential information and resources, supporting the industry's shift towards compliance with global standards like the Hong Kong International Convention with an emphasis on the welfare of workers and environmental sustainability.

The vertical aims to cater to ship recycling companies, ship recycling yards, environmental organizations, regulatory bodies, and ship recycling workers engaged in ship dismantling and recycling activities. Its goal is to enhance industry-wide knowledge sharing, regulatory compliance, and the welfare of ship recycling workers.

B. Objective

I **Promote Safe and Environmentally Sound Recycling**

a) Encourage adherence to international standards such as the Hong Kong International Convention (HKC).

b) Minimize environmental damage during ship dismantling.

c) Ensure safe working conditions for recycling yard workers.

II **Centralize Knowledge and Regulatory Resources**

a) Create a comprehensive resource hub for stakeholders in ship recycling.

b) Disseminate information on ship recycling policies and legal frameworks, facility compliance (HKC-certified and non-compliant yards) and incentives, schemes, and international conventions (e.g., Basel Convention, EU SRR).

III **Enable Training and Skill Development**

a) Promote training programs, certification, and career pathways in ship recycling.

b) Support local-language education to improve accessibility.

c) Provide details of recognized training institutes and internship/apprenticeship opportunities.

IV **Foster Collaboration & Networking**

a) Establish a virtual matchmaking platform for ship owners, cash buyers, recycling yards, steel companies and technical/consulting agencies

b) Facilitate partnerships and business opportunities across the ecosystem.

V **Encourage Innovation and Research**

a) Create an Innovation Corner for solving industry challenges (e.g., waste management, green ship recycling), academia-industry collaboration and access to grants and expert consultation.

VI **Promote Stakeholder Engagement in Policy**

a) Host a Policy Consultation hub to enable participation in DGS-led consultations, share updates on new or revised ship recycling policies and collect stakeholder feedback and promote transparency.

VII **Disseminate Reports, Market Insights, and Data**

a) Maintain a repository of audit and compliance reports, market trends and forecasts, environmental and economic impact assessments and publications by cash buyers and international bodies.

C. Strategic alignment

01

Maritime India Vision 2030 and Amrit Kaal Vision 2047

a) Supports sustainable maritime development.
b) Aims for green, globally compliant ship recycling — a stated goal of India's maritime ambitions.
c) Contributes to job creation, exports of recycled steel, and cleaner recycling practices.

02

Ease of Doing Business (EoDB)

a) Builds a virtual matchmaking platform to connect ship owners, cash buyers, yards, and steel recyclers.
b) Streamlines access to compliance information, contacts, and procedures.
c) Provides data on vessel end-of-life status and preferred yard locations for planning.

03

Capacity Building

Modules dedicated to career guidance, training programs, apprenticeships and certified trainers and training institutes connects academia, industry, and government through the Innovation Corner and Research & Academia Connect.

04

Seafarer Welfare

a) Promotes worker safety, training, and upskilling at ship recycling facilities.
b) Provides career pathways and training modules focused on health, safety, and welfare.
c) Emphasis on local language training, certified trainers, and safe dismantling protocols.

05

IMO Convention Alignment

a) Integrates Hong Kong International Convention (HKC) compliance status for yards.
b) Educates stakeholders on international frameworks like Basel Convention.
c) Builds mechanisms to align national practices with IMO standards for ship dismantling and safety.

06

Environmental Sustainability

a) Promotes safe and environmentally sound ship recycling practices.
b) Encourages compliance with HKC, Basel Convention, and EU Ship Recycling Regulation.
c) Modules on green ship recycling, waste management, and environmental impact reporting.
d) Focus on minimizing pollution, hazardous waste, and improving yard infrastructure.

D. Key Features of the Project

The Key modules of the portal are as follows:

Table 34 Key features of the Project

Key Features	Description
Information & Insights Module	
Database of Ship Recycling Facilities	Lists of HKC-compliant and non-compliant yards with certifications, locations, capacity.
Ship Recycling Policies & Regulations	National (e.g., Recycling of Ships Act, 2019) and international (e.g., HKC, Basel Convention, EU SRR) regulations.

Key Features	Description
Incentives and Schemes	Details on tax benefits, technology grants, and green ship recycling incentives.
Register of National & Competent Authorities	Contact details and responsibilities of designated national and authorized bodies.
Ship Owner & Fleet Information	Owners' fleet details, decommissioning plans, and vessel availability for recycling.
Reports & Publications Module	
Audit Report Analysis	Findings from Competent Authorities submitted to the National Authority.
Cash Buyer Market Reports	Insights from GMS, Braemar, Intercargo, etc.
Annual Recycling Data Reports	Number and type of ships recycled, environmental impacts, and economic contributions.
Industry Trends & Forecasts	Market outlooks, scenario planning, and technology impact analysis.
Research Papers & Global Reports	National/international studies from IMO, NGT, IRS, Greenpeace, UNCTAD, etc.
Collaboration & Networking Platform	
Virtual Marketplace	A matchmaking platform connecting stakeholders like ship owners, cash buyers, recycling yards, steel companies and consulting & technical firms
Stakeholder Profiles & Communication Tools	Chat, video conferencing, messaging for partnership building.
Policy Consultation Interface	
Consultation Notices	DGS-led initiatives on Green Ship Recycling, alternative methods, etc.
Submission Portal	Interface for submitting feedback, policy suggestions, or documents.
Consultation Events	Workshops, webinars, roundtables with registration and participation tracking.
Outcomes & Policy Updates	Archival of past consultations and resultant policy changes.
Events & Conferences	
Event Listings	Webinars, national/international conferences, workshops.
Event Management Tools	Registration, schedules, notifications (email/SMS).
Archived Content	Webinars, summaries, downloadable presentations, and recordings.
Research & Innovation Corner	
Problem Statements and Calls for Solutions	Focus on green recycling, waste management, safety tech, etc.
Academia Connect	Joint research, internships, thesis collaboration with universities.

Key Features	Description
Research Grants Information	Database of available grants for innovation in ship recycling.
Expert Connect Directory	One-on-one consultation bookings with domain experts.
Careers & Training	
Career Pathways	Roles, qualifications, and certifications required in the sector.
Training & Certification Programs	Basic, value-added, and compliance-specific training.
Training Institute Directory	Recognized institutes like GMU, Alang Training Institute, IISR, etc.
Internship/Apprenticeship Listings	Structured hands-on programs for learners and early professionals.
Job Listings & Portals	Real-time job postings with filters for roles, location, and skill.
Register of Certified Trainers	Accredited trainers with their courses and credentials.

Ship Security Alert System (SSAS) Integration with Information Fusion Centre- Indian Ocean Region (IFC-IOR)

4.24 SSAS Integration with IFC-IOR

A. About the Initiative

The Directorate General of Shipping (DGS) has undertaken the strategic initiative to integrate its Ship Security Alert System (SSAS) with the Indian Navy's Information Fusion Centre - Indian Ocean Region (IFC-IOR). This integration enhances India's maritime security, real-time situational awareness, and national maritime domain collaboration. The initiative is implemented by Centre for Development of Advanced Computing (C-DAC) under an approved work order.

The SSAS Integration with IFC-IOR addresses a critical national security requirement by ensuring instantaneous, secured alert transmission from commercial ships to India's security apparatus in real-time. It enables:

I Seamless relay of ship security alerts to IFC-IOR.
II Secure integration using role-based access, AES-256 encryption, SHA-256 data validation.
III Automated workflows replacing manual reporting delays.
IV Full auditability, data retention, and legal accountability.
V High availability, disaster recovery, and security compliance.
VI Controlled access for NMDA, INDSAR, and Indian Navy coordination units.
VII Comprehensive operational support through dedicated helpdesk, ticketing, incident management, and quarterly SLA monitoring.

B. Objective

The primary objective of this initiative is to:

I Enable real-time, secure data exchange of SSAS alerts with IFC-IOR.
II Automate maritime incident reporting and alert transmission, minimizing response times.
III Improve coordination between DG Shipping, Indian Navy, NMDA, and allied agencies.
IV Build a standards-compliant secured interface using API-based communication channels.
V Strengthen cybersecurity, encryption, and data governance mechanisms.
VI Comply with national security mandates under CERT-IN, STQC, NCIIPC, and MeitY guidelines.
VII Establish robust SLAs, audit mechanisms, exit management, and governance structures.

C. Strategic Alignment

Maritime Safety & Surveillance

This initiative directly enhances maritime safety and surveillance by enabling real-time transmission of ship security alerts from commercial vessels to India's security agencies, particularly the Indian Navy and IFC-IOR. It improves incident response times, enhances situational awareness, and contributes to national maritime domain awareness and operational readiness — all critical components of maritime security infrastructure.

02

Data Governance & Cybersecurity

The project incorporates stringent cybersecurity measures such as AES-256 encryption, SHA-256 data validation, MFA, RBAC, and full compliance with CERT-IN, STQC, MeitY, and NCIIPC guidelines. Additionally, it includes audit trails, security certifications, and a governance structure that ensures data integrity, confidentiality, and role-based access — making it a model for data governance in critical maritime systems.

03

IMO Convention Alignment

The Ship Security Alert System (SSAS) is a mandatory requirement under the SOLAS Convention (Chapter XI-2, Regulation 6), which is governed by the International Maritime Organization (IMO). This integration reinforces compliance with global maritime security standards, contributing to India's commitment to IMO obligations and international best practices.

04

Capacity Building

The initiative includes the establishment of SLAs, audit mechanisms, helpdesk operations, and training modules for stakeholders. These efforts contribute to building institutional capacity within DGS, Indian Navy, and other allied agencies by enabling them to use modern digital infrastructure for maritime threat response and coordination.

D. Key Features of SSAS integration with IFC-IOR

I **Real-time SSAS Alert Monitoring Dashboards**

This module provides a live, centralized interface for tracking and monitoring SSAS alerts raised by ships. It enables real-time situational awareness and ensures that alert data is visible to authorized stakeholders, including the Indian Navy and IFC-IOR, allowing for rapid threat detection and response.

II **Encrypted Web Services & API Integration with IFC-IOR**

The system uses RESTful APIs with robust encryption standards to securely transmit SSAS data between DG Shipping and the IFC-IOR. This integration ensures secure, standardized, and automated communication, eliminating manual delays and enhancing reliability.

III **Incident Ticketing & Escalation System**

Each SSAS alert automatically generates an incident ticket, which is tracked through a structured workflow. The module supports defined escalation mechanisms, ensuring that unresolved issues are promptly addressed at appropriate authority levels.

IV **Security Audit Integration**

This feature ensures that the system is regularly assessed for vulnerabilities and is compliant with national cybersecurity frameworks such as CERT-IN and STQC. Periodic audits and certifications help maintain a strong security posture.

V **SLA Monitoring System (linked to PMIS)**

To ensure accountability, this module monitors service level agreements (SLAs) for incident resolution, system uptime, and response times. Integrated with the Project Monitoring Information System (PMIS), it enables transparent tracking of system performance and timely interventions.

VI **Helpdesk Operations (24x7)**

A dedicated helpdesk supports stakeholders round-the-clock, offering technical assistance, incident logging, issue resolution, and user guidance. This ensures smooth functioning and minimal downtime of the alert system.

VII **Data Encryption and Validation**

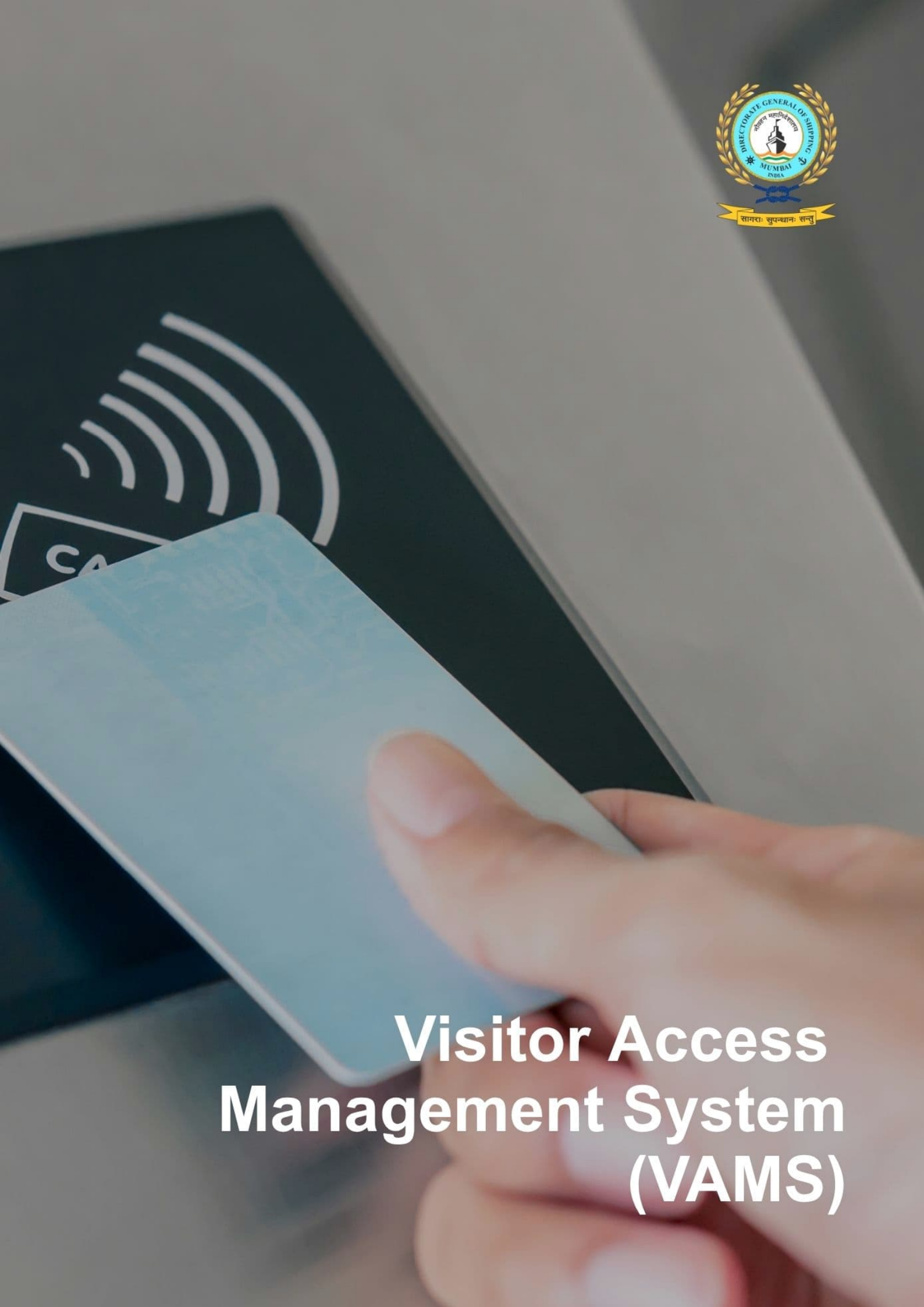
All SSAS data is encrypted using AES-256 encryption, and data integrity is validated through SHA-256. These mechanisms ensure data confidentiality, authenticity, and protection from tampering.

VIII **Role-Based Access Control (RBAC) and Multi-Factor Authentication (MFA)**

Access to the system is controlled through RBAC, ensuring that users only access data and features relevant to their roles. MFA adds an additional layer of security to prevent unauthorized access.

IX **Change Control & Contract Governance**

A structured framework is in place to manage software updates, configuration changes, and enhancements. All changes are logged, reviewed, and approved with full traceability, ensuring governance and compliance.



Visitor Access Management System (VAMS)

4.25 Visitor Access Management System (VAMS)

A. About the Initiative

The **Visitor Access Management System (VAMS)** is a digital initiative by the Directorate General of Shipping (DGS), Government of India, designed to streamline, secure, and modernize the visitor entry process across its offices. Implemented by CMS Computers India Pvt. Ltd., the VAMS aims to manage the registration, approval, and validation of visitors—ranging from seafarers and ministry officials to consultants and stakeholders—through a centralized digital platform.

This **web and mobile application-based system** replaces manual entry procedures with a secure, automated, and role-based workflow. The platform enables **visitors to pre-register** their details—such as name, department to visit, purpose, date/time, and relevant documentation—through a user-friendly interface. Once submitted, the application is routed to the respective department head for approval. Notifications are automatically sent to the visitor via SMS regarding their approval status, along with a QR code-based entry pass if approved.

A **QR-based access mechanism** ensures secure and contactless gate validation, reducing queue time and enhancing the visitor experience. The admin dashboard allows authorized officials to monitor visitor flow in real-time, configure approval workflows, and manage roles and permissions across departments. Additionally, the system supports comprehensive reporting and analytics, offering insights into visitor trends, department-specific data, and daily/monthly logs.

By introducing this system, DGS not only enhances institutional security and operational efficiency, but also improves transparency, visitor convenience, and departmental coordination, aligning with broader digital governance goals of the Indian maritime sector.

B. Objective

I Digitize the visitor registration and approval workflow for seamless entry management across DGS offices.

II Enhance security and traceability through controlled access and QR code-based gate validation.

III Improve visitor experience by reducing wait times and eliminating manual gate-pass processes.

IV Enable centralized monitoring and reporting via an admin dashboard with real-time insights.

V Facilitate departmental coordination by enabling role-based approval flows and automated notifications.

VI Support long-term scalability and compliance with cloud hosting and modular expansion capability.

C. Key features of Visitor Management System (VAMS)

I **Visitor Registration Module**

This module provides a user-friendly web and mobile interface where visitors (including seafarers, ministry officials, or vendors) can apply for an entry pass. The application form captures essential information such as name, mobile number, purpose of visit, department and officer to be visited, date and time of visit, and allows for uploading a photo and supporting documents. This digital pre-registration simplifies the onboarding process and eliminates the need for paper-based gate passes.

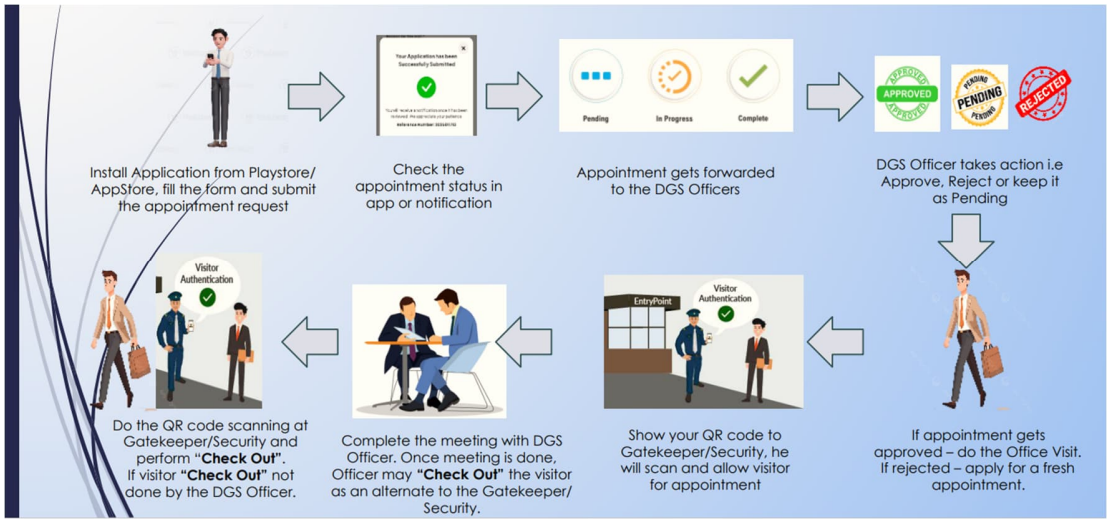


Figure 42 VAMS System Flow – End User

Figure 41 VAMS System Flow – End User and Gatekeeper

II Approval Workflow Module

Once the visitor submits the registration request, this module routes it automatically to the relevant department head or officer for review. The approving authority receives email/SMS notifications and can accept or reject the request digitally. This module reduces manual follow-ups and enforces a structured approval hierarchy, thereby improving administrative efficiency.

III Notification System Module

This component sends real-time SMS alerts to visitors at each key stage:

a) Acknowledgment of submission

b) Approval or rejection status

c) A secure link to generate a QR code for approved visits

This ensures clear communication, enhances the visitor experience, and prevents miscommunication or delays at the entry gate.

IV **QR Code-Based Entry System**

Once a visitor is approved, a unique QR code is generated. This code is scanned at the gate by security personnel to verify the visitor's credentials and appointment in real-time. It acts as a digital gate pass, enabling contactless, secure, and fast entry validation.

V **Admin Dashboard Module**

The centralized dashboard gives administrators and designated users a real-time overview of visitor flow, pending approvals, and system usage. The dashboard is configurable, allowing different user roles and department-specific views. This module provides operational control and transparency over the entire visitor management lifecycle.

VI **Reporting & Analytics Module**

This module enables generation of daily, weekly, and monthly reports on visitor data, trends, and department-specific statistics. It supports advanced filtering and analysis to understand visitor frequency, types of visitors, and peak entry times, aiding better planning and security oversight.

VII **Technical Infrastructure & Integration**

While not a user-facing feature, this module ensures smooth functioning by integrating:

a) SMS gateways for communication,

b) QR code generators for secure identification,

c) Cloud hosting infrastructure provided by DGS,

d) Secure backend built on .NET Core and MySQL, with mobile frontend using Flutter.

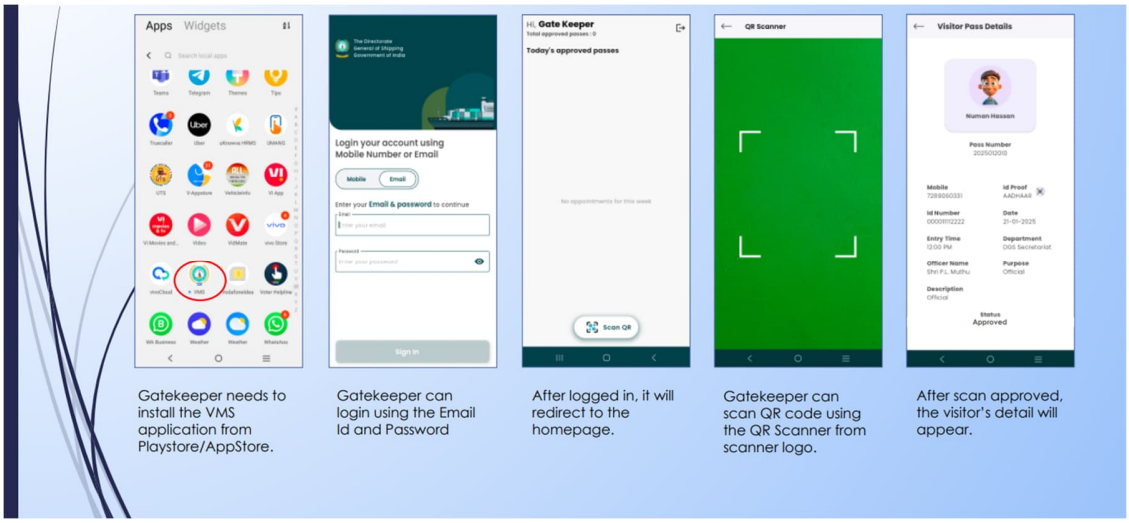


Figure 43 Visitor Appointment Check-In Steps - Gatekeeper Login

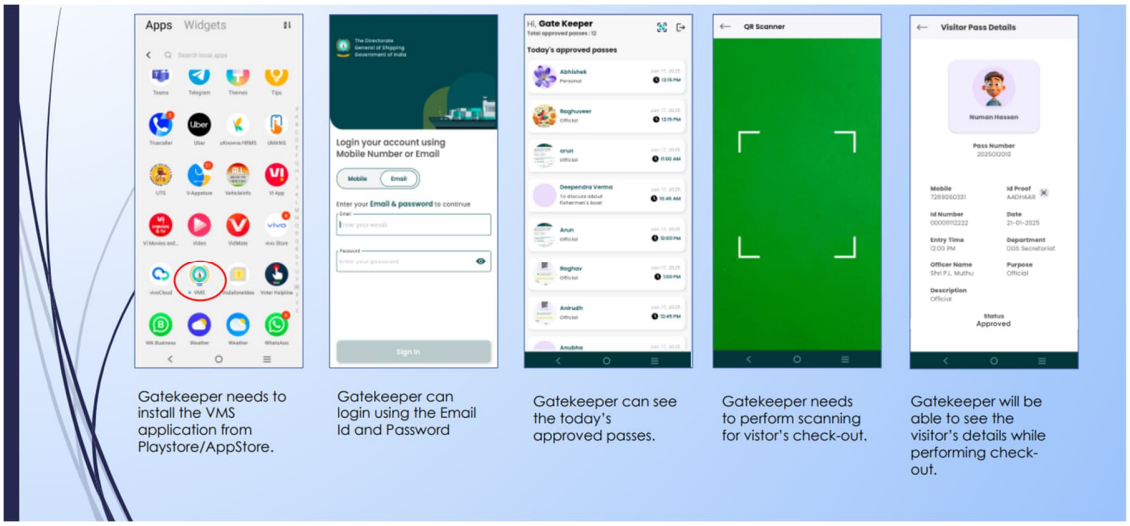


Figure 44 Visitor Appointment Check-Out Steps - Gatekeeper Login

D. Technology stack/ Platform

I Frontend Technologies

a) Mobile App:

Developed using Flutter, which is a cross-platform UI toolkit by Google. It enables building a single codebase that runs on both Android and iOS devices, ensuring consistent user experience across platforms.

II Backend Technologies

a) Application Framework:

Built using .NET Core, a robust, high-performance, cross-platform backend development framework provided by Microsoft. It offers scalability and security for enterprise applications.

b) Database:
The system uses MySQL, a popular open-source relational database management system, to store and manage all visitor data, logs, approvals, and Audit trails.

III Integration & Services

a) SMS Gateway Integration:

Used for sending real-time alerts to visitors for submission acknowledgements, approvals, and QR code links.

b) QR Code Generator:

Integrated into the backend system to generate unique, secure QR codes for each approved visitor.

IV Hosting Infrastructure

a) Cloud Hosting:

The application is hosted on cloud infrastructure provided by DGS, with deployment in both Data Centre (DC) and Disaster Recovery (DR) environments as required.

b) Operating System & Database Setup:

To be provided by DGS for hosting the application servers.

c) SSL Certificate & App Store Deployments:

SSL certificates (for HTTPS), Google Play Store, and Apple App Store registrations are managed by DGS to ensure secure deployment and distribution of the mobile application.

V **Security & Compliance** While the document doesn't specify encryption standards, hosting in a controlled cloud environment with QR code authentication and structured access suggests a basic security posture with room for enhancement (e.g., role-based access control and HTTPS).

Swachh Sagar Portal

4.26 Swachh Sagar Portal

A. About the initiative

The Swachh Sagar portal, developed by the Directorate General of Shipping (DGS), Government of India, is a comprehensive digital initiative aimed at enhancing marine environmental protection and promoting sustainable practices across Indian maritime operations. This digital platform supports India's efforts to comply with IMO conventions and national maritime environmental regulations while offering transparency, traceability, and data-driven decision-making tools.

Recognizing the critical role of technology in environmental compliance, the portal consolidates several modules that enable efficient management and reporting on key areas such as bunker delivery (e-BDN), ballast water management, port reception facilities, single-use plastic usage, fuel consumption, and port adequacy assessments. It is designed not only for Indian-flagged vessels but also for all foreign ships calling Indian ports, thus contributing to global maritime sustainability.

The Swachh Sagar portal provides a centralized mechanism for ships, ports, suppliers, and authorities to interact and maintain regulatory compliance. It ensures accurate data collection, reduces administrative burden, facilitates vendor coordination, and supports India's commitment to reducing marine pollution and advancing environmentally sound maritime practices. Notably, it aligns with various IMO guidelines and has been presented to the IMO's Marine Environment Protection Committee (MEPC) as a model for global adoption.

Figure 45 Swachh Sagar Portal Homepage- Various modules developed under the portal

B. Objective

I Digitally enable compliance with IMO and national marine environment protection regulations.

II Facilitate electronic recordkeeping and verification (e.g., e-BDNs, port audits, ballast waterlogs).

III Enhance transparency and traceability in bunker supply chains, waste management, and port facilities.

IV Improve coordination between shipowners, ports, suppliers, and regulators through real-time digital interaction.

V Reduce the use of single-use plastics onboard ships and promote sustainable alternatives.

VI Support data-driven policy making by enabling structured data collection and environmental reporting.

VII Ensure effective monitoring and audit mechanisms for port reception facilities and ship-generated waste.

VIII Contribute to global sustainability goals by offering a replicable model for green maritime digital transformation.

C. Strategic Alignment

01

Environmental Sustainability

It directly supports environmentally responsible maritime operations through modules for:

- Electronic Bunker Delivery Notes (e-BDN)
- Waste management and port reception facilities (PRF)
- Ballast water management
- Single-use plastic reporting
- Fuel consumption monitoring

These modules aim to minimize pollution, promote green shipping, and enforce sustainable port and vessel practices.

02

IMO Convention Alignment –

The portal facilitates compliance with several IMO conventions and resolutions, including:

- MARPOL Annex VI (e-BDN, fuel reporting)
- Ballast Water Management Convention
- MARPOL Annex V (port reception facilities)
- IMO circulars (e.g., MEPC.1/Circ.795/Rev.8, MEPC.362(79))

By digitizing data capture and reporting, the platform helps ships and ports meet their obligations under international maritime environmental regulations.

03

Data Governance & Cybersecurity –

The Swachh Sagar portal acts as a centralized data platform for bunker delivery, waste disposal, ballast water, and emissions:

- Structured, verifiable data collection and archival
- Transparent reporting

Use of digital tools for compliance and audits While the document doesn't detail specific cybersecurity standards, the platform's emphasis on traceability, authentication (e.g., watermark, unique BDN numbers), and data retention shows alignment with data governance principles.

04

Capacity Building

The platform builds institutional and operational capacity by:

- Standardizing digital reporting across stakeholders
- Training ports, shipowners, and suppliers to use the modules
- Enabling port authorities to assess infrastructure adequacy and compliance
- Providing tools for regulatory audits and third-party assessments It also promotes digital readiness in Indian maritime agencies and skills upgradation for sustainability management.

D. Key Modules of Swachh Sagar Portal

The Swachh Sagar Portal has five functional modules.

I **Port reception facilities**

The use and provision of port reception facilities (PRFs) is fundamental to the overall success of implementing the MARPOL Convention in the objective of reducing and ultimately eliminating intentional pollution of the marine environment by ships.

The port reception facility application serves as a strategic instrument for managing ship-generated waste inventory upon arrival at Indian ports. It requires ship captains, owners, managers or agents to input essential information, independent of their requirement of port reception facilities.

II **Bunker supplier information and electronic BDN**

Recognizing that the establishment and sustenance of a reliable 'bunker supply chain' are crucial to ensure the delivery of quality bunker to the ships in Indian ports, India introduced a regime for the approval of local bunker suppliers that meet certain set standards and has been maintaining and publishing a register of such approved bunker suppliers for the public awareness and the benefit of end users.

III **Ballast water reporting**

As part of experience building phase and comprehensive review program of the Ballast Water Convention, in order to have a database of the technical issues associated with operation of Ballast Water Management System (BWMS) installed onboard, a data collection module has been developed within the Swachh Sagar portal.

All Indian ships are required to access the Swachh Sagar portal digitally and complete the data related to ballast water and its management on each arrival and departure from any port worldwide including Indian ports. All ships other than those flagged with India are required to complete the same at each arrival and departure from Indian ports.

IV **Single-use plastic reporting**

The Indian Administration has issued Flag Circulars namely DGS Order No.05 of 2019 and Addendum No.1 to DGS Order No.05 of 2019 which has imposed a ban on single-use plastic on all Indian ships in a phased manner.

The online module on Single-Use Plastic Reporting on the Swachh Sagar portal facilitates ships to prepare the Ship Execution Plan (SEP), list and identify single-use plastic items onboard and availability of sustainable equivalent products at various ports. Ships are mandated to account for every single-use plastic category used and disposed of during their voyages.

E. Project Status

The Portal has been developed by Indian Register of Shipping. All the modules are functional.

Revamping of Four Modules (MTI, RPSL, Crisis Management, Grievance Redressal)

4.27 Revamping of Four Modules (MTI, RPSL, Crisis Management, Grievance Redressal)

A. About the Initiative

Development of these four modules is pivotal initiative that will significantly enhance the Directorate General of Shipping's capabilities in ensuring safety, efficiency, and service excellence. Our focus is on the development of specialized modules for Grievance Redressal, Crisis Management, Maritime Training Institutes (MTI), and Recruitment and Placement Services License (RPSL). These modules represent a strategic advancement in our commitment to streamlining operations, improving stakeholder engagement, and ensuring the highest standards of maritime safety and training.

I **Grievance Redressal Module:**

The first module, dedicated to Grievance Redressal, is designed to provide a robust, transparent, and efficient platform for addressing the concerns of our stakeholders. Whether they are seafarers, shipping companies, or other related parties, this module will facilitate the swift resolution of grievances. By automating the process, we ensure that every complaint is logged, tracked, and resolved within stipulated timelines. This not only enhances accountability but also builds trust and confidence in DG Shipping as a responsive and responsible regulator. Our goal is to create a seamless experience where stakeholders feel heard and valued, and their issues are resolved efficiently.

II **Crisis Management Module:**

The second module is for Crisis Management, a critical tool in our arsenal to handle emergencies with precision and speed. In the maritime sector, crises can range from natural disasters to accidents at sea, and our ability to respond quickly can mean the difference between safety and catastrophe. This module will allow authorized officials to register and manage crises in real time, ensuring coordinated efforts across all relevant agencies. By integrating with other key systems, we will be able to assess situations promptly, deploy resources effectively, and communicate clearly with all stakeholders. This capability will significantly enhance our readiness and response, minimizing risks and ensuring the safety of lives and assets.

III **Maritime Training Institutes (MTI) Module:**

The third module focuses on Maritime Training Institutes (MTIs), which play a crucial role in developing the skills and knowledge of our seafarers. This module will streamline the processes related to the approval of MTIs, the generation of seafarer profiles, and the updating of training and certification details. By centralizing and automating these functions, we ensure that training standards are consistently upheld and that all institutes are compliant with the latest regulations. This module will also facilitate better coordination with MTIs, ensuring that they are aligned with the needs of the industry and that our seafarers are equipped with the best possible training.

IV **Recruitment and Placement Services License (RPSL) Module:**

Finally, the Recruitment and Placement Services License (RPSL) module will oversee the licensing and regulation of agencies involved in recruiting and placing seafarers. This module will streamline the application and renewal process for licenses, ensuring that only qualified and compliant agencies are allowed to operate. It will also provide a platform for monitoring and enforcing compliance, reducing the risk of malpractice in the recruitment and placement of seafarers. By doing so, we protect the interests of seafarers and ensure that they are employed by trustworthy agencies.

B. Objectives of the Revamped Four Modules

The Directorate General of Shipping (DGS) has undertaken the development and revamp of four critical modules—**MTI**, **RPSL**, **Crisis Management**, and **Grievance Redressal**—to establish a unified, efficient, and responsive digital ecosystem for maritime governance. The collective objectives of these modules are:

I **Strengthening Maritime Governance and Regulatory Oversight**

a) Enable real-time monitoring of training institutes and recruitment agencies through digital dashboards and compliance alerts.

b) Institutionalize CIP scoring, audit trails, and inspection workflows to ensure regulatory accountability.

c) Provide accurate, up-to-date information for decision-making and policy enforcement.

II **Enhance Transparency, Accountability, and Seafarer Welfare**

a) Ensure timely and verifiable redressal of grievances and crisis situations affecting Indian seafarers.

b) Empower seafarers with access to their training, placement, and complaint status through secure, user-friendly digital interfaces.

c) Eliminate dependence on intermediaries and reduce bureaucratic delays by automating workflows.

III **Enable Data-Driven, Standardized, and Secure Operations**

a) Build interoperable systems integrated with INDoS, DGCOMM, Aadhaar, and other core databases.

b) Implement role-based access, data validation, and encryption protocols across all modules to ensure data integrity and cybersecurity.

c) Adopt metadata tagging, classification, and audit logs for traceability and reporting.

IV **Promote 24x7 Service Delivery and Multi-Channel Access**

a) Allow grievance and crisis submissions through the web, mobile, WhatsApp, helpline, and social media.

b) Offer round-the-clock tracking and automated notifications to concerned authorities for time-bound resolution.

c) Improve turnaround time (TAT) and ensure SLA-based responses.

C. Strategic Alignment

The development and deployment of the MTI, RPSL, Crisis Management, and Grievance Redressal modules reflect the Directorate General of Shipping's commitment to driving maritime digital transformation in alignment with key national priorities, policy mandates, and international obligations. These modules together serve as strategic enablers of a responsive, transparent, and resilient maritime governance framework.

01

Maritime India Vision 2030 & Amrit Kaal Vision 2047

a) Modernizing the regulatory ecosystem for maritime training and recruitment.

b) Establishing a digitized response mechanism for seafarer welfare and crisis situations.

c) Creating scalable and citizen-centric platforms that support future maritime reforms.

02

Ease of Doing Business in the Maritime Sector

a) Automation of MTI and RPSL approvals, batch scheduling, and inspection workflows significantly reduces processing time.

b) Seamless grievance and crisis registration through multi-channel access empowers stakeholders and removes procedural bottlenecks.

c) Transparent dashboards, digital certificates, and workflow-based approvals promote trust and service reliability.

03

Seafarer Welfare and Protection

These modules place seafarers at the center of service delivery by enabling:

a) Real-time grievance tracking and timely redressal.

b) Transparent crisis response mechanisms with inter-agency coordination.

c) Centralized access to training certifications and placement verification.

04

Digital India and Data Governance

a) The modules are built on secure, cloud-hosted infrastructures with robust access controls, encryption, audit trails, and interoperability with systems such as INDoS, DGCOMM, and Aadhaar validation.

b) They comply with MeitY and CERT-In guidelines on data privacy and cybersecurity, promoting data integrity, reliability, and digital sovereignty.

05

Institutional Capacity Building and Stakeholder Collaboration

- Capacity building and change management embedded in the implementation plan empower maritime officials, MTIs, RPSLs, and support staff to adapt to digital governance tools.
- Integration across departments and coordination with MEA and MoPSW ensures a unified government response in times of crisis or escalation.

D. Key Features of the Project

#	Functionality	Description
MTI Module: Functionality Description		
1	Profile Approval	Facilitates submission and approval of new MTI profiles through multi-level verification and inspection workflows.
2	Existing Profile Approval	Allows MTIs to update existing profile details, subject to validation by DGS before being incorporated.
3	Seafarer INDoS Generation	Enables submission and verification of seafarer applications for generating INDoS numbers, with credential issuance.
4	Update Batch Details	Allows manual input of batch information, including course dates, INDoS numbers, and faculty, with validations.
5	Update Certification Details	Manages certificate issuance by validating course completion and authorized signatory requirements.
6	View Placement Details	Tracks placement outcomes by course and batch, aiding performance monitoring and employability analysis.
7	Notify RO for CIP	Enables MTIs to notify Recognized Organizations for inspection scheduling via automated alerts.
8	Upload Monthly Timetable	Mandates uploading of course timetables before each months start, preventing batch uploads if not done.
9	Change of Premises	Allows online application and approval workflow for MTIs seeking to change training premises.
10	Background Processes	Automates notifications, validations, and status updates to reduce manual intervention.
11	Courses Approval	Manages application, inspection, and final approval of new courses and intake enhancements.
12	Annual Fee Payment	Calculates and collects 1% annual fee from tuition revenue, including secure payment and transaction logging.
13	Change in Batch	Facilitates changes in batch data like start date or faculty assignment with DGS approval.

#	Functionality	Description
14	In-Principal Approval for Opening New MTI	Supports initial approval workflow for new MTIs including inspection and presentation.
15	STCW Compliance Workflow	Ensures review and consent of inspection reports by STCW Board with secure, traceable processes.
16	Faculty Identification Number (FIN)	Processes faculty applications and issues FINs after verification for tracking and compliance.
17	Faculty Contact & Performance Information	Captures faculty contact, workload, and multi-institute deployment details.
18	Centralized Admission Portal	Unified portal for seafarer admissions, integrated with INDoS and validation workflows.
19	CIP Rating Integration	Links CIP ratings with MTI profiles to control batch permissions and inspection frequency.
20	CIP Grading and Compliance Tracking	Tracks MTI compliance actions based on CIP grades and inspection outcomes.
21	Mobile App for CIP	Enables inspectors to capture photos/videos with geo-tags and sync to central system.
22	Course In-Charge Eligibility Verification	Verifies eligibility of assigned faculty based on qualifications and FIN.
23	Automated Certificate Generation & Digital Signature	Generates digitally signed certificates post course completion with system validations.
24	eLearning Module Tracking	Tracks seafarer progress in eLearning components required for course completion.
25	Exit Exam Results Upload	Manages upload of exam results and link them with seafarer profiles and certification.
26	Candidate Withdrawal & Batch Corrections	Allows MTIs to withdraw candidates and request batch data corrections with approval workflow.
27	Backdated Permission for Batch Upload	Facilitates request and approval for uploading missed batch data retroactively.
28	Logging of MTI Profile Modifications	Maintains audit logs of all profile changes including user, timestamp, and nature of update.
29	Annual Fees Late Penalty Calculation	Automatically apply penalties for late fee payments and notify MTIs of outstanding dues.
30	Monitoring Dashboards & Analytics	Provides real-time insights into batch performance, inspections, and compliance metrics.
31	MIS Reports (Fees, Placement, Corrections, etc.)	Generates downloadable reports on fees, corrections, placements, and other KPIs.
32	Correction in INDoS Personal Details	Handles fee-based requests for INDoS data correction post-verification by MTT.
33	Eligibility Verification of Courses	Validates course status in MTI profiles and flags unauthorized or expired approvals.

#	Functionality	Description
34	Media File Metadata and Audit Trail (CIP)	Captures metadata for CIP media files and maintains audit logs for authenticity.
35	Geospatial Mapping	Maps MTIs regionally for inspection planning and capacity analysis.
RPSL Module		
1	RPS Profile Approval	Enables new Recruitment and Placement Service (RPS) companies to submit applications for registration. The module manages inspection, documentation, compliance checks, and final approval by DG Shipping.
2	Existing Profile Update	Allow registered RPS companies to update profile details including contact information, management, or staffing. All changes go through a verification and approval process.
3	Crew Seafarer Registration	Facilitates registration of seafarers under an RPS company, linking them with the INDoS database and enabling tracking across the employment lifecycle.
4	Upload of Seafarer Employment Contract (SEC)	RPS companies can upload digitally signed SECs, which are validated against seafarer and employer profiles. This ensures authenticity and contractual compliance.
5	Joining and Sign-off Details Upload	Captures details of seafarer embarkation and disembarkation, ensuring complete voyage tracking and linking with vessel and contract data.
6	Vessel Details Entry	Allows entry and management of vessel details including IMO number, ownership, and flag. Ensures that crew deployment is aligned with approved vessels.
7	Complaint Management Interface	RPS companies can track and respond to seafarer grievances. Integrated workflows ensure timely redressal and visibility to DG Shipping.
8	RPS Monitoring Dashboard	Provides real-time analytics and performance metrics for each RPS company, covering contract compliance, crew deployment, and grievance trends.
9	Annual Return Submission	RPS companies are required to file annual returns with financial and operational data. The module validates submissions and triggers penalties for delays.
10	Blacklisting and Suspension Workflow	Enables DG Shipping to initiate and manage the blacklisting or suspension of RPS companies based on verified non-compliance or legal breaches.
11	Search and Reporting Tools	Advanced filters allow DGS and RPS users to search records, generate reports, and extract data related to crew, vessels, contracts, and compliance.
12	Communication Module	Facilitates secure messaging and document exchange between RPS companies and DG Shipping for clarifications, approvals, and alerts.
13	Provisional Registration for RPS	Allow new companies to receive provisional registration subject to initial compliance, enabling them to begin limited operations before final approval.
14	Risk Scoring Mechanism for RPS Companies	Calculates risk scores based on factors like grievance frequency, contract violations, and inspection outcomes. Helps prioritize monitoring and inspection.

#	Functionality	Description
15	Real-time Communication and Alert Engine	Sends automated alerts to RPS companies for compliance deadlines, missing documents, or irregular crew activity to ensure timely action.
16	Comprehensive Grievance Integration	Integrates grievance redressal system with the RPS platform, enabling seamless issue registration, tracking, and reporting by all stakeholders.
17	Mobile App for CIP	A dedicated mobile app allows inspectors to capture data, images, and geolocation during RPS inspections. Ensures transparency and real-time upload.
18	Inspection Scheduling and Mobile Inspection App	Manages scheduling of inspections and enables field inspectors to complete inspection checklists via mobile devices.
19	License Renewal Workflow	RPS companies can apply for license renewal with pre-filled data, document revalidation, and payment of applicable fees through the portal.
20	Data Correction Request Workflow	Supports structured submission of correction requests for crew, contract, or vessel data. Includes DGS approval and audit trail.
21	Emigration Clearance Integration	Links with the emigration system to ensure required clearances are secured before deploying seafarers to international assignments.
22	Digital Signing & Validation of SEC	Ensure all employment contracts are digitally signed and validated using secure tokens. Validity checks are performed before contract registration.
23	Auto-flagging of Non-compliant RPS Companies	The system auto-detects rule violations or delayed actions and flags RPS profiles for further scrutiny or inspection.
24	Smart Contracts	Implements blockchain-enabled contracts for seafarer employment, ensuring immutability, transparency, and automatic enforcement of terms.
25	Authentic Job Portal	A government-backed job portal enables verified seafarer placement through registered RPS companies only. Prevents fraudulent employment offers.
26	Master Checker Integration	Allows verification of SECs, crew, and RPS details through a public-facing interface, improving transparency for stakeholders.
27	Seafarer Sign-on Monitoring with Alerts	Tracks sign-on events and sends alerts if patterns suggest overbooking, duplicate employment, or irregular assignments.
28	Advanced Reports & Dashboards with Filters	Provides customizable dashboards for users to view metrics by date, company, vessel, or seafarer. Supports decision-making and compliance monitoring.
Crisis Management Module		
1	Incident Logging	Allows users (registered or unregistered) to log maritime incidents with supporting details like location, vessel, and time. Generates a unique incident ID.
2	Incident Validation Workflow	Enables DDG Crew to review submitted incidents and validate them as a crisis or redirect to the Grievance Redressal Module.
3	Incident Categorization	Classifies incidents into predefined types (e.g., Oil Spill, Collision, Fire) and allows custom types.

4	Real-time Status Tracking	Tracks status of each crisis through stages like Reported, Under Investigation, In Progress, Resolved, Closed.
5	Crisis Escalation Matrix	Automatically escalates unresolved cases through defined levels with timelines, as per MS Notices, Circulars, and Citizen Charters.
6	Dual-Factor Authentication	Enforces secure access for internal and external users, including MoPSW and MEA, using OTP-based authentication.
7	Unified Landing Page	A single interface for reporting both grievances and crises with appropriate workflow routing after validation.
8	Action Plan Generation	Allows generation of crisis-specific action plans with task assignments, deadlines, and coordination tools.
9	Resource Mobilization Dashboard	Coordinates deployment of resources through MRCCs, ports, and other agencies with real-time tracking.
10	SITREP Generation	Auto-generates situation reports using incident data, status, and resource information, with review and approval workflow.
11	Comprehensive Notification Engine	Sends automated alerts via email, SMS, and in-app notifications based on incident lifecycle events or escalation.
12	Contact Management System	Maintains and updates categorized contacts (emergency responders, officials) integrated with alert mechanisms.
13	User Role Management	Role-based access control for different types of users (DDG, SMO, Po, MoPSW, MEA, Support Units, Navy/Coast Guard).
14	Automated Audit Trails	Captures every activity related to the incident with timestamp, user ID, changes, and logs for transparency.
15	Document Repository	Centralized storage of documents related to crisis (photos, investigation reports, closure reports) with version control.
16	Historical Data & Analytics	Enables search and trend analysis across past incidents based on type, timeline, and response metrics.
17	Dashboard with Visual Analytics	Customizable dashboards with maps, timelines, and comparative metrics to monitor crisis performance and resolution time.
18	Discussion Boards	Structured collaboration among officials for each incident with file-sharing and threaded discussions.
19	Mobile Accessibility	Forms and tools are accessible via mobile devices to enable incident reporting and tracking in the field.
20	Integration with Grievance & Casualty Modules	Real-time workflow, data sync, and joint status tracking across crisis, casualty, and grievance modules.
21	Query Response Mechanism	Allows complainants to respond to DGS queries within a fixed time, post which the incident is closed.
22	System Integration with MoES & MHA	(Phase 2) Real-time data exchange with MoES (satellite/weather) and MHA (security inputs) with alerting and analysis.
23	Incident Closure Workflow	Final review, action summary, and report generation before formal closure and archival of the crisis.

24	Crisis Phones & Devices	Dedicated smartphones and laptops for DDG, Crisis & Casualty Units with WhatsApp/SMS alerts for real-time coordination.
25	Support Group Manpower	Two dedicated contractual officials, each for Crisis and Casualty Management Support Groups for platform use and coordination.
26	Data Security & Validation	Full compliance with access control, data encryption, and tamper-proof storage for all users and incident data.
27	Master Timeline Tracker	Visual display of incident chronology showing actions, updates, escalations, and approvals with filters.
28	Periodic Reporting	Daily, weekly, monthly summary reports sent to authorized officials for performance review and MIS purposes.
Grievance Redressal Module		
1	Grievance Registration	Allows complainants, call center users, unions, and others to submit grievances through portal, email, phone, SMS, letters, or social media.
2	Role-Based Registration	Allow different user types (e.g., Call Centre, DG COMM, Unions) to register and track grievances with defined access.
3	Unified Landing Page	Shared entry point with Crisis Module; DDG routes the case to grievance or crisis based on content.
4	Grievance Categorization & Routing	Categorizes grievances into predefined heads/subheads and routes them to relevant departments automatically.
5	Grievance Tracking System	Tracks grievance status with clear states – Open, Under Process, Require More Info, Closed, Rejected.
6	Escalation Matrix & Auto Routing	Configurable escalation timelines and levels, auto-forwarding unresolved grievances to the next authority.
7	OTP-based Dual Authentication	Ensures secure login and complaint submission with mobile/email OTP verification.
8	Feedback Collection	Stakeholders (e.g., call center, department staff) can collect structured feedback from complainants' post-closure.
9	Investigation Workflow	Department officers conduct reviews, seek queries, involve stakeholders (RPSL/MTIs/companies), and update status.
10	Resolution & Closure Workflow	Final resolution is shared via SMS/email; system captures verification and stores closure documentation.
11	Document Upload & Version Control	Complainants can upload supporting files; the system manages versions, access, and retention policy.
12	Helpdesk Integration (24x7)	Integrates with ticketing systems; operates round the clock with call logging, query resolution, and escalation.
13	DG COMM Integration	DG COMM can register, forward, and monitor grievances and coordinate with DDG Crew.
14	Dashboards & Analytics	Customizable dashboards for internal/external users showing grievance stats, aging, closures, and performance.

15	Social Media Grievance Capture	Allows DG COMM/social media teams to capture potential grievances from posts and respond via standardized messaging.
16	WhatsApp Motivational Support	Sends automated/manual motivational content to seafarers after grievance-related calls, especially via DG COMM.
17	Document Repository	Central repository of grievance-related files organized by categories with access control and search features.
18	Training & SOP Access	Role-based training modules, induction programs, SOPs, and knowledge base available for staff.
19	Audit Trails & Logging	Full traceability of all user actions, escalations, and updates for transparency and accountability.
20	Grievance Status via URL	Users can check grievance status online using ticket number and captcha without login.
21	Reporting & MIS	Generates daily, weekly, monthly reports on grievances (received, in progress, resolved) with export options.
22	Geo-Spatial Reporting	Visual mapping of grievances by location (port/city/country) for trend analysis and hotspot monitoring.
23	Trend & Root Cause Analysis	Tracks frequent issues by type, evaluates average resolution time, and supports process improvements.
24	AI-Based Prioritization (Phase 2)	Planned for future: AI-based grievance triaging, auto-tagging, and risk scoring for efficient handling.
25	IMO/ILO/ITF Integration (Phase 2)	Future scope includes integration with international grievance bodies and systems.
26	Public FAQs & External Links	Provides department-wise FAQs, external resources, and process clarifications for public users.
27	Multi-Channel Communication	Supports communication via portal, email, phone, WhatsApp, and social platforms with unified interface.
28	User Profile & History	Logged-in users can view, update their profile, and access full grievance history with timestamps and attachments.

Shipbuilding Financial Assistance Portal

4.28 Shipbuilding Financial Assistance Portal

A. About the initiative

The Shipbuilding Financial Assistance portal is a pivotal initiative by the government aimed at bolstering the domestic shipbuilding industry. By providing a streamlined platform for shipyards to request In-Principal Approval from the Directorate General of Shipping (DG Shipping) and seeking financial assistance post-vessel delivery, this portal significantly enhances the operational efficiency of shipbuilding enterprises. The goal of overarching is to promote local ship construction, reduce dependency on imports, and elevate the global competitiveness of domestic shipyards.

Designed with user accessibility in mind, the portal adheres to GIGW 3.0 guidelines, MeitY standards, and cybersecurity requirements, ensuring a secure and user-friendly experience for all stakeholders. Key functionalities include shipyard registration, application for approvals and financial assistance, an internal audit module, and the generation of business intelligence reports. Additionally, the portal facilitates seamless data interoperability between various modules, ensuring that users can efficiently track the status of their applications and financial releases.

The portal also incorporates a robust notification system that keeps users informed about task assignments and pending actions. Shipyards will receive timely reminders regarding queries from DG Shipping, while section officers and committee members will be prompted to act on applications within specified timelines. This proactive approach not only enhances accountability but also ensures that the financial assistance process is expedited, ultimately benefiting the shipbuilding industry and contributing to the nation's economic growth.

B. Objective

I Streamline Application Processes: Facilitate a user-friendly interface for shipyards to apply for In-Principal Approval and Financial Assistance, reducing administrative burdens and enhancing efficiency.

II Enhance Data Interoperability: Ensure seamless integration between various modules of the portal, including Shipyard Registration, In-Principal Approval, and Financial Assistance, to provide real-time updates and status tracking.

III Promote Accessibility and Compliance: Adhere to GIGW 3.0 guidelines and MeitY standards to ensure the portal is accessible to all users, including those with disabilities, thereby promoting inclusivity in the shipbuilding sector.

IV Implement Robust Notification System: Establish an automated notification system to keep stakeholders informed about application statuses, pending actions, and reminders, ensuring timely responses and accountability.

a) Generate Comprehensive Reports: Enable the generation of various business intelligence reports and dashboards to provide insights into financial assistance distribution and shipyard performance, aiding in informed decision-making.

b) Facilitate Financial Transparency: Integrate the portal with the PFMS portal for real-time tracking of financial assistance releases, ensuring transparency and accountability in the disbursement of funds to shipyards.

C. Strategic Alignment

01

Maritime India Vision (MIV) 2030 and Amrit Kaal Vision 2047

a) Supports sustainable maritime development by promoting local ship construction.
b) Aims to elevate the global competitiveness of domestic shipyards, reducing dependency on imports.
c) Contributes to job creation and economic growth within the maritime sector.

02

Ease of Doing Business

a) Streamlines application processes for shipyards to apply for In-Principle Approval and Financial Assistance.
b) Enhances user accessibility by providing a user-friendly interface, reducing administrative burdens.
c) Facilitates real-time updates and status tracking for applications, improving transparency

03

Environmental Sustainability

a) Promotes local ship construction, which can lead to reduced carbon emissions associated with shipping.
b) Encourages compliance with environmental standards in shipbuilding practices.
c) Focuses on minimizing pollution and improving the overall sustainability of the maritime industry.

04

Capacity Building

The initiative's emphasis on generating comprehensive reports and insights into shipyard performance supports capacity building by enabling informed decision-making and fostering growth within the domestic shipbuilding industry.

D. Key features of Ship Building Financial Assistance Portal

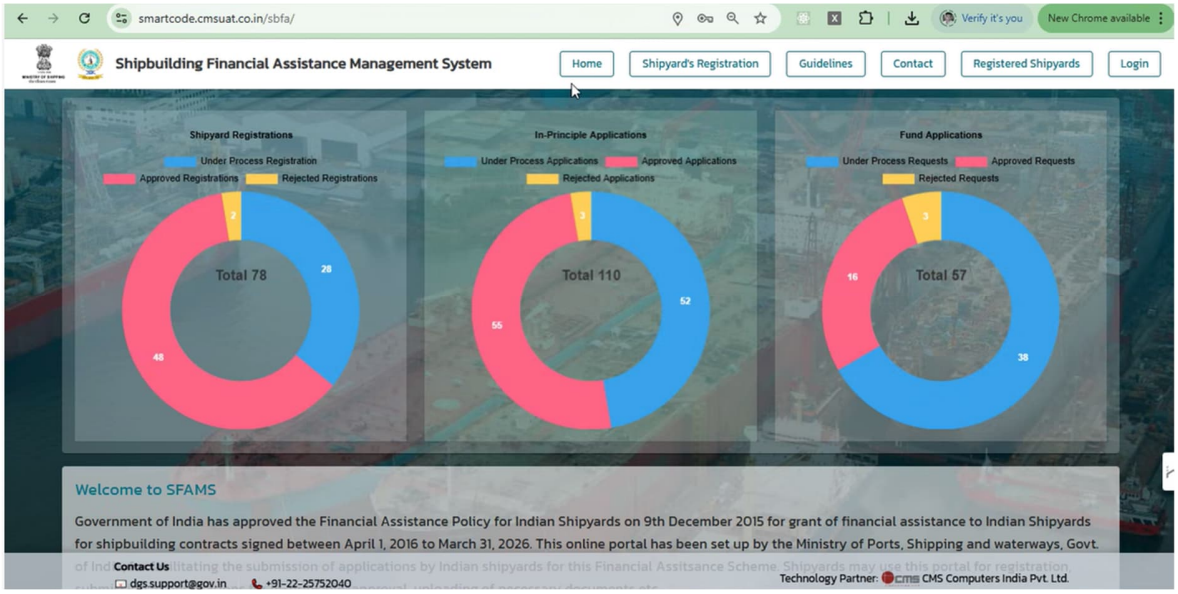


Figure 46: Homepage of Shipbuilding Financial Assistance Portal

The Shipbuilding Financial Assistance Portal has eight functionalities.

I **Shipyard Registration:**

The Ship Building Financial Assistance (SBFA) portal is a critical initiative designed to streamline the registration and financial assistance processes for shipyards in India. This document outlines the functional flow of the SBFA portal, detailing key features and functionalities that enhance user experience and operational efficiency.

a) **User Journey Overview**

The user journey for shipyards begins with accessing the SBFA portal, where they can register and apply for financial assistance. The process is designed to be intuitive, ensuring that shipyards can easily navigate through the registration module, verify their mobile numbers, and submit necessary documentation.

b) **Shipyard Registration Process**

i. Initial Form Submission: Shipyards initiate the registration by filling out an initial form, including essential details such as the name and address of the shipyard, contact information, and the name of the decision-maker.

ii. Mobile Verification: After submitting the form, shipyards receive an OTP on their registered mobile number for verification. If the OTP is not received, they can request a new one.

iii. Confirmation Notification: Upon successful registration, shipyards receive a confirmation email and SMS containing their login credentials.

c) **Login and Profile Management**

i. Login to SBFA Portal: Shipyards can log in using the credentials received via email. Upon first login, they are prompted to change their system-generated password for security purposes.

ii. Profile Completion: After logging in, shipyards must complete their profiles by uploading required documents, including PAN cards, bank certifications, and project details.

d) **Change Information Feature**

i. Updating Account Information: Shipyards can submit requests to modify specific data fields, such as contact information and director details. This feature ensures that the portal maintains up-to-date information.

ii. Approval Workflow: Change requests undergo a three-level approval process involving the Registration & Finance Section Officer, the Chairman of the SBFA Committee, and the Directorate General of Shipping (DGS).

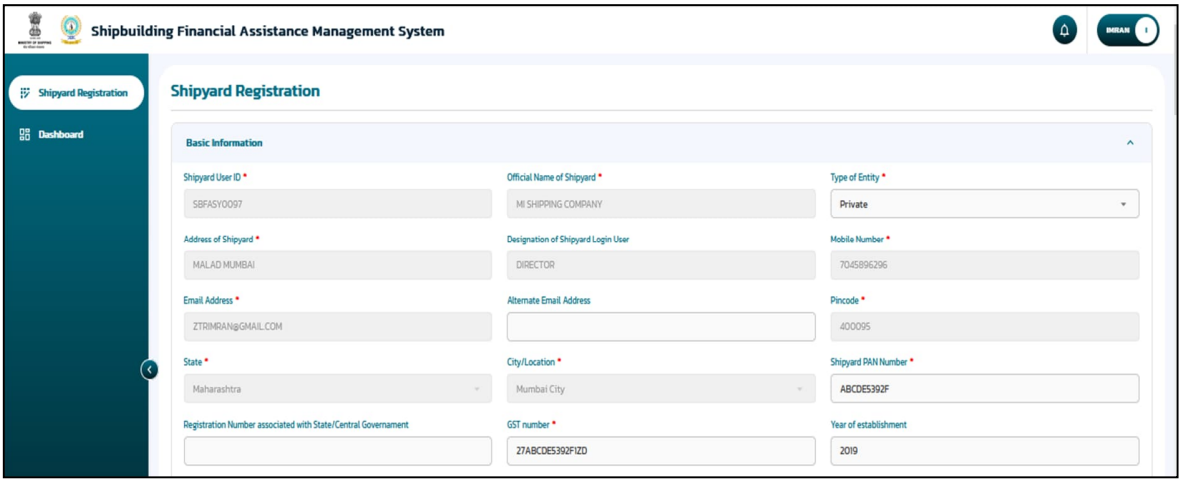


Figure 47 Shipyard Registration page

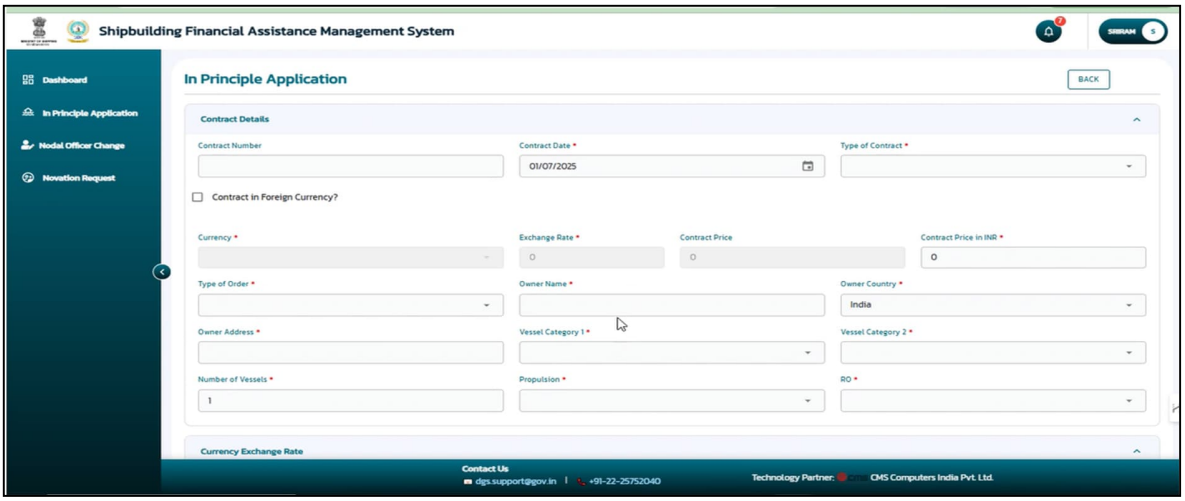


Figure 48 In principle Approval application Page

II In-Principal Approval

The In-Principle Approval functionality within the SBFA portal is designed to facilitate shipyards in applying for financial assistance after the completion of their registration. This document outlines the user journey, key features, and functional flow associated with the In-Principle Approval process.

III Novation Request

The Novation Request feature within the SBFA portal allows shipyards to apply for changes in vessel ownership multiple times if necessary. This functionality is crucial for maintaining accurate records and ensuring compliance with ownership changes in the shipbuilding process.

IV Budgeting Module

This module allows DG Shipping to forecast the budgeted amount based on approved In-Principal applications. The approved amounts will be added to the budget for any financial year based on the delivery year specified by the shipyard during the approval of their In-Principal application. Additionally, a view will be created to see the In-Principle applications queued for any given financial year.

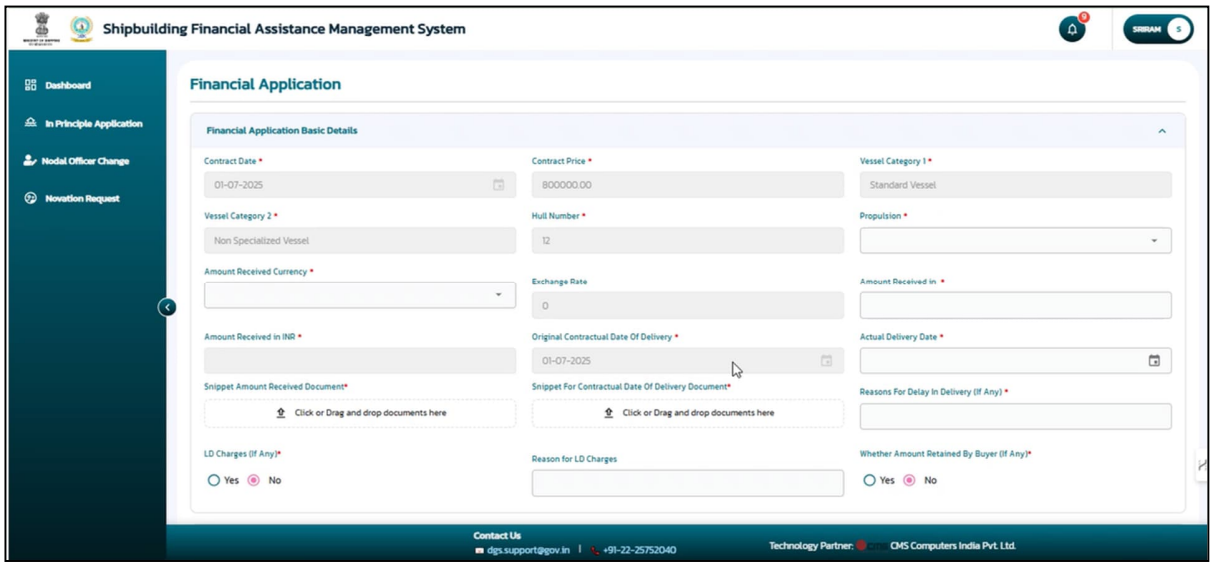


Figure 49: Financial Assistance I Application page.

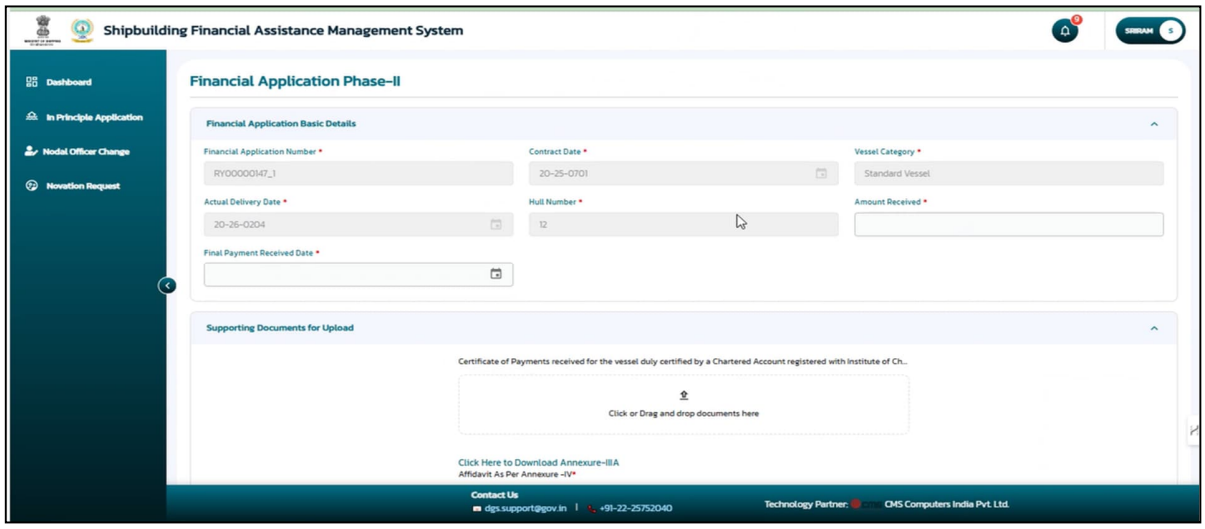


Figure 50: Financial Assistance II Application Page

V Financial Assistance Phase I:

To release 90% of the fund the Financial Assistance Request feature within the SBFA portal allows shipyards to apply for financial support after delivering a vessel to the client. This

document outlines the purpose, scope, user journey, and approval process associated with this functionality.

VI **Financial Assistance Phase I - 10% Disbursement (After Internal Audit)**

The Financial Assistance Phase 1 functionality within the SBFA portal is designed to facilitate the disbursement of the remaining 10% of financial assistance to shipyards after the completion of an internal audit.

VII **Financial Assistance Phase II**

The Financial Assistance II functionality within the SBFA portal allows shipyards to create additional requests for financial assistance when they have claimed less than the approved In-Principle amount.

The Ship Building Financial Assistance (SBFA) portal serves as a comprehensive platform designed to streamline the processes associated with shipyard registration, financial assistance requests, and the management of funds. Through its various functionalities, the portal enhances operational efficiency, transparency, and accountability within the shipbuilding industry.

The Financial Assistance Request feature allows shipyards to seek financial support post-delivery of vessels, ensuring that all necessary documentation is submitted and reviewed through a structured approval process. The Financial Assistance II functionality further enables shipyards to claim additional funds when the initial assistance received is less than the approved In-Principle amount, accommodating the dynamic financial needs of shipyards.

The Financial Assistance Phase I functionality ensures that the remaining 10% of funds are disbursed after thorough internal audits, reinforcing the importance of compliance and financial oversight. Additionally, the Budgeting Module provides a framework for forecasting and managing financial allocations based on approved applications, ensuring that resources are effectively utilized.

The enhanced dashboard and report generation module facilitate real-time monitoring and analysis of key metrics, empowering stakeholders to make informed decisions based on accurate and timely data. The integration of user-friendly features, such as dynamic data visualization and automated notifications, significantly improves the user experience for shipyards and DGS officials alike.

Overall, the SBFA portal is a pivotal tool in promoting the growth and sustainability of the shipbuilding sector in India.

5. Development of Data Standards and Cyber Securities

5. Development of Data Standards and Comprehensive Cyber Security Development Plan

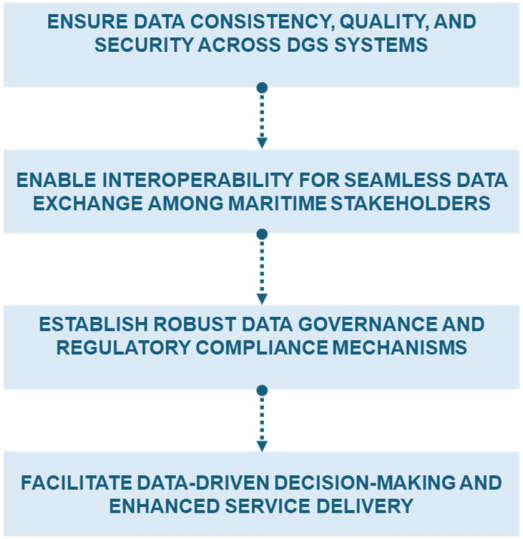
5.1 Development of Data Standards Document

A. About the Initiative

In line with the overarching goals of Digital India, Maritime India Vision 2030, and Amrit Kaal Vision 2047, the Directorate General of Shipping (DGS) has undertaken a strategic initiative to develop a comprehensive Data Standards and Cybersecurity Framework. This initiative is aimed at establishing a resilient, secure, and future-ready maritime governance ecosystem by ensuring consistency, quality, interoperability, and security across all digital systems and services.

B. Objective & Vision

The development of the Data Standards Framework was driven by the need:



C. Key Highlights of the Data Standards

I Modular and Reusable Framework: Comprises reusable components for data formatting, naming conventions, and access standards to ensure flexibility across use cases.

II Metadata Management: Centralized metadata catalog covering data lineage, update frequencies, and KPI definitions, with replication across Data Centre (DC) and Disaster Recovery (DR) sites.

III Interoperability and APIs: Use of standardized APIs (e.g., for vessel registration, port traffic) and data exchange formats like JSON/XML for seamless system integration.

IV Security and Compliance Alignment: Aligned with MeitY, NeGD, DPDP Act, and NCIIPC frameworks for privacy, encryption, threat mitigation, and access control.

V Integrated into Application Lifecycle: Data standards embedded into the Functional and Software Requirement Specification (FRS/SRS), HLD/LLD design phases, and testing plans.

D. Cybersecurity Controls & Architecture

To safeguard the digital ecosystem of the Directorate General of Shipping (DGS), the Data Standards and Cybersecurity Framework incorporates a multi-layered cybersecurity architecture. This architecture ensures confidentiality, integrity, availability, and regulatory compliance across all applications and services. The core components of this cybersecurity strategy are outlined below:

I **Chief Information Security Officer (CISO) Mandate:**

CISO plays a central leadership role in defining and implementing the cybersecurity posture for DGS. The key responsibilities include:

a) **Policy Formulation:** Drafting and updating cybersecurity policies and guidelines in alignment with national and international standards.

b) **Risk Assessment:** Leading periodic risk assessments to identify threats, vulnerabilities, and control gaps across critical systems.

c) **Malware Defence & Threat Protection:** Overseeing the deployment of anti-malware, endpoint detection and response (EDR), intrusion detection systems (IDS), and threat intelligence tools.

d) **Cyber Resilience Planning:** Preparing Business Continuity and Disaster Recovery plans, including simulations and response drills to enhance DG Shipping's readiness.

II **Dedicated Cybersecurity & Data Protection Cell:**

A specialized cell has been established under the CISO to institutionalize operational cybersecurity functions. This includes:

a) Network Operations Centre (NOC): A 24x7 centralized monitoring hub that oversees system availability, network traffic, and security anomalies.

b) STQC & VAPT Audits: Facilitating Standardization Testing and Quality Certification (STQC) and Vulnerability Assessment and Penetration Testing (VAPT) through CERT-IN empanelled auditors.

c) Incident Response Management: Coordinating the identification, containment, eradication, and recovery from cyber incidents, along with post-incident analysis and reporting.

III **Access Control & Identity Management:**

Robust access control mechanisms are implemented to prevent unauthorized access and ensure secure user authentication:

a) Role-Based Access Control (RBAC): Access rights are granted based on job functions and need-to-know principles, ensuring least privilege.

b) Session Management: Session tracking and auto-timeout policies are enforced to reduce risks of session hijacking or unauthorized persistence.

c) Biometric and Multi-Factor Authentication (MFA): Integration of biometric authentication and MFA (via OTPs, tokens, or mobile apps) to strengthen identity verification.

IV **Regulatory Compliance:**

All cybersecurity practices are designed to adhere to the prevailing national and international regulatory requirements, ensuring legal defensibility and operational accountability:

a) DPDP Act 2023: Compliance with data processing, consent management, breach notification, and privacy-by-design obligations under the Digital Personal Data Protection Act.

b) ISO/IEC 27001: Implementation of an Information Security Management System (ISMS) framework covering asset management, access control, operations security, and business continuity.

c) NIST Cybersecurity Framework (CSF): Alignment with NIST 800-53 controls for risk-based security practices, incident response, and system recovery.

d) NCIIPC Guidelines: Protection of Critical Information Infrastructure through segmentation, redundancy, encryption, and continuous monitoring as per the National Critical Information Infrastructure Protection Centre

Table 35 Institutional Framework for Cyber Security Oversight

DDG (IT & e-Gov.)	Oversight of compliance and integration of standards into IT systems
CISO	Formulation and enforcement of cybersecurity policies and audits
Cybersecurity Cell	VAPT, STQC audits, incident management, NOC operations
System Integrators (SIs)	Implementation of STQC-compliant applications and fulfilment of SLA metrics
Cloud Service Providers	Ensuring encryption, backup, and data recovery per cybersecurity policy
Application Developers	Embedding standards in FRS/SRS, design, testing, and deployment
DGS Functional Wings	Ownership of business data standards and reporting protocols
Technical Auditors/STQC	Independent validation of compliance, security posture and risk mitigation

E. Strategic Benefits

The implementation of the Data Standards and Cybersecurity Framework by the Directorate General of Shipping (DGS) delivers transformative benefits that extend beyond mere compliance. It is a cornerstone of DGS's broader digital transformation strategy, enabling a resilient, interoperable, and secure maritime digital ecosystem. The strategic benefits include:

I **Improved Data Quality & Trustworthiness**

a) Establishes standardized formats, definitions, and structures across applications, reducing inconsistencies and duplication.

b) Enables reliable, accurate, and timely data for operations, compliance, and reporting.

c) Builds confidence among internal and external stakeholders in the integrity of DGS-managed data.

II **Seamless Interoperability and System Integration**

a) Adoption of standardized APIs (RESTful, JSON/XML formats) ensures seamless data exchange across diverse systems and agencies.

b) Enables real-time interfacing with allied institutions such as MTIs, RPSLs, ports, and international maritime bodies.

c) Reduces the cost and complexity of integrating new applications or third-party platforms into the DGS ecosystem

III **Enhanced Regulatory Compliance and Risk Management**

a) Embeds compliance requirements from MeitY, NeGD, DPDP Act 2023, and NCIIPC directly into application lifecycles (FRS/SRS, HLD/LLD).

b) Enables continuous audit readiness through STQC, VAPT, and role-based access controls.

c) Reduces legal and operational exposure to cybersecurity threats and data privacy violations

IV **Data-Driven Decision-Making and Analytics Enablement**

a) Standardized, structured data enables advanced analytics, forecasting, and evidence-based policymaking.

b) Supports dashboard-based performance monitoring, service delivery optimization, and regulatory oversight.

c) Lays the foundation for emerging technologies such as AI/ML-based maritime intelligence and predictive compliance tools.

V **Cost Efficiency and Operational Streamlining**

a) Reduces redundant data capture and reconciliation efforts across DGS departments and services.

b) Promotes reuse of components (e.g., metadata definitions, access control templates), reducing development and maintenance overheads.

c) Facilitates automation and workflow optimization through clean, structured data.

VI **Strengthened Cybersecurity Posture**

a) Establishes robust controls for identity management, threat detection, encryption, incident response, and disaster recovery.

b) Enhances resilience of mission-critical maritime systems such as vessel tracking, port clearance, and seafarer certification.

c) Improves visibility into vulnerabilities and enables proactive mitigation through an integrated security framework.

VII **Strategic Alignment with National Priorities**

a) Supports the goals of Digital India, Maritime India Vision 2030, and Amrit Kaal Vision 2047 by building a secure and interoperable maritime governance architecture.

b) Enables India to comply with international maritime cybersecurity mandates and demonstrate global leadership in maritime data governance.

5.2 Comprehensive Cybersecurity Program Development

A. About the Initiative

Recognizing the criticality of adopting digital transformation and the increasing threat actors' engagement towards maritime assets, digital assets, and infrastructure, this initiative encompasses a comprehensive Cybersecurity Gap Assessment and the development of a tailored Cybersecurity Framework. With the growing sophistication of cyber threats, especially those targeting government and critical infrastructure sectors, DGS is proactively addressing these challenges and working towards future-proofing its systems.

The DGS infrastructure comprises applications such as the Long-Range Identification and Tracking (LRIT) platform, classified as a Critical Information Infrastructure (CII), alongside other mission-critical systems that handle the training, certification, and examination of Indian seafarers. These platforms ensure seamless maritime governance, and their uninterrupted availability, integrity, and confidentiality are crucial.

The Directorate has embarked on a strategic journey to benchmark its digital infrastructure against leading global frameworks, including the NIST 800-53, ISO/IEC 27001:2022, and the NIST Cybersecurity Framework (CSF). The initiative also incorporates regulatory compliance with Indian frameworks, such as CERT-In advisories, NCIIPC Guidelines, and the Information Technology Act, 2000.

This endeavour is not just technical—it reflects DGS's organizational commitment to establishing a robust cybersecurity governance model, fostering internal awareness, strengthening resilience, and creating a secure digital environment that aligns with national maritime security goals.

B. Cybersecurity Trends in Maritime Security in 2025

The maritime industry has long been a cornerstone of global commerce, as evidenced by discussions in the International Maritime Forum, which transports nearly 90% of the world's trade by volume. With the rapid digitization of ship systems and port infrastructure, cyber threats have become a fast and dangerous reality.

Maritime operations are now heavily reliant on interconnected IT (Information Technology) and OT (Operational Technology) systems that, if breached, could result in catastrophic consequences—from economic disruption and data theft to threats to human life.

As cyber threats evolve in strength and efficiency, particularly in the form of planned-out cyberattacks, the need for comprehensive maritime cyber risk management measures is more pressing than ever.

C. What Is Maritime Security?

Maritime cybersecurity refers to the protection of shipboard and shoreside computer and digital systems from cybersecurity challenges and cyber threats that can compromise the confidentiality, integrity, or availability of digital data and processes. These critical systems include navigation systems, communication networks, propulsion controls, cargo management, and crew welfare platforms.

The International Maritime Organization (IMO) defines maritime cyber risk as a measure of the extent to which a technology asset could be threatened by a potential circumstance or event, highlighting the importance of effective cyber risk management.

D. Why Is Safeguarding Maritime Cybersecurity Important?

Safeguarding cybersecurity in maritime operations is crucial due to the high stakes involved, particularly in the face of targeted attacks. A breach could lead to:

I **Shipping delays** are impacting global supply chains

II **Rerouted or hijacked vessels** due to manipulated navigation systems

III **Compromised cargo manifests**, risking loss or theft of goods

IV **Exposure of sensitive crew and passenger data**

V **Downtime in port operations** is causing massive economic losses

The maritime industry is not isolated and is increasingly targeted by cyber criminals. It interacts with global logistics, oil and gas, defence, and even tourism. Weaknesses in maritime cybersecurity can thus reverberate far beyond the sector itself, impacting overall maritime security and causing severe consequences to critical infrastructure and national economies.

E. Common Cyber Threats to Maritime Cybersecurity

Several types of cyber threats affect the maritime industry, especially those targeting complex networks:

I **Ransomware**: Encrypting systems and demanding ransom for release

II **Malware**: Corrupting or stealing data from shipboard systems

III **Denial-of-Service (DoS) Attacks**: Overloading systems to cause operational failure

IV **Phishing and Spear Phishing**: Targeting crew members to gain unauthorised access

V **Insider Threats**: Malicious or negligent crew actions that lead to vulnerabilities

VI **GPS Spoofing**: Misleading navigation systems about location and course

F. The Rising Cyber Attacks in 2024

According to the 2024 Maritime Cybersecurity Report by MarPoint and Darktrace, cyber incidents in the maritime sector have surged dramatically, impacting the global economy:

I Over 1,800 vessels targeted in just the first half of 2024

II 23,400 malware detections

III 178 ransomware attacks

IV Over 50 billion firewall events

Emerging cyber threats include artificial intelligence-powered malware, botnets that exploit IoT devices, and hybrid threats that combine physical and cyber tactics. These attacks are more targeted and evasive, exploiting existing cyber vulnerabilities and bypassing traditional security protocols.

G. Common Concerns in Maritime Cybersecurity

I **Legacy Systems**: Many vessels still use outdated industrial control systems lacking modern security features

II **IT/OT Convergence**: Breaches in IT can now impact OT systems like engine controls and navigation

III **Shadow Connectivity**: Unregulated remote access by vendors and OEMs can create hidden vulnerabilities

IV **Regulatory Gaps**: While IMO guidelines exist, enforcement remains inconsistent across jurisdictions

V **Shortage of Skilled Personnel**: Limited cybersecurity expertise among crew members can lead to human error

H. Cybersecurity Guidelines

The International Maritime Organization (IMO) recommends that cyber risks be **appropriately addressed** in existing safety management systems. These are based on five functional elements:

I **Identify**: Threats, vulnerabilities, and impacted systems

II **Protect**: Control access, update software, and implement best practices
III **Detect**: Monitor for unusual activity and early threat indicators
IV **Respond**: Establish incident response protocols
V **Recover**: Plan for data restoration and system functionality

The International Association of Classification Societies (IACS) has introduced two Unified Requirements (URs):

I **UR E26**: Operational aspects of cybersecurity, including lifecycle plans
II **UR E27**: Technical specifications for systems to ensure cyber resilience

I. Objective

The primary objective of the Cybersecurity Gap Assessment and Framework Development initiative is to enhance the security, resilience, and compliance capabilities of the Directorate General of Shipping. In an increasingly digital and interconnected maritime environment, the initiative aims to protect the integrity, confidentiality, and availability of information systems that support national maritime operations.

The initiative seeks to accomplish the following core objectives:

I **Strategic Governance:** To establish governance bodies such as the Information Security Steering Committee (ISSC) and assign clear responsibilities for cybersecurity oversight at all organizational levels.
II **Cybersecurity Gap Identification:** To identify existing vulnerabilities, process gaps, and control deficiencies across DGS's IT and application landscape.
III **Risk Management:** To establish a formal IT Security Risk Assessment Framework that incorporates risk identification, classification, and prioritization using asset-based and process-based approaches. The framework will factor in both technical and non-technical threats, including insider threats, third-party risks, and advanced persistent threats.
IV **Development of Policy & Procedure:** To institutionalize a suite of cybersecurity policies, standards, and operating procedures that guide secure operations, data protection, user access, system maintenance, and incident response across the organization.
V **Alignment to Standards, Framework and regulatory guidelines:** To align DGS systems and operations with national mandates, such as the IT Act, 2000, CERT-In Guidelines, NCIIPC advisories, and relevant international cybersecurity frameworks such as NIST 800-53, NIST Cyber Security Framework (CSF), ISO 27001:2025, ISO 22301, ENISA and etc.
VI **Business Continuity & Resilience:** To enhance the organization's capacity to detect, respond to, and recover from cybersecurity incidents, thereby minimizing the impact of potential disruptions.
VII **Awareness and Training:** To implement structured cybersecurity awareness and training programs for DGS staff, third-party contractors, and stakeholders to foster a culture of security-first behaviour.

By achieving these objectives, DGS will ensure the long-term sustainability of its digital operations, align with national digital transformation goals, and uphold its role as a leader in secure maritime administration.

J. Strategic Alignment

As DGS is a custodian of Critical Information Infrastructure (CII), its digital strategy must reflect the priorities of national cyber defence, international maritime protocols, and public service efficiency.

One of the primary strategic anchors for this initiative is the **Maritime India Vision 2030**, which emphasizes the adoption of digital technologies for seamless maritime governance. Cybersecurity, in this context, becomes a foundational pillar for achieving transparency, reliability, and operational continuity across all DGS systems.

Furthermore, DGS is committed to implementing cybersecurity best practices as outlined in the CERT-In guidelines, the National Critical Information Infrastructure Protection Centre (NCIIPC) directives, ISO 22301, ISO 31000, and the **Information Technology (IT) Act, 2000**. These frameworks establish the legal and regulatory backbone for ensuring that public sector digital infrastructure remains secure, accountable, and resilient against modern cyber threats.

On the international front, the initiative resonates with guidelines by the **International Maritime Organization (IMO)** regarding cybersecurity in maritime operations. The implementation of NIST 800-53 and NIST CSF, as well as ENISA, ensures that DGS not only meets Indian compliance standards but also keeps pace with international norms.

This cybersecurity program also supports India's adoption of the **Zero Trust Architecture** model, advocated by the Government of India in its cybersecurity strategies. This approach eliminates implicit trust and continuously validates all access at every stage.

By ensuring strategic alignment at national and international levels, DGS guarantees that its cybersecurity investments are not only reactive but also proactive and future ready.

K. Scope under the Initiative

The scope of the cybersecurity initiative at DGS is comprehensive, covering both strategic and operational layers. The work is structured to ensure the coverage of all components—process, people, and technology—and extends across governance, risk management, control implementation, training, and awareness. The scope includes the following key components:

I **Risk Assessment Methodology:** Development of a formal methodology to conduct periodic asset-based and threat-centric IT security risk assessments. This includes mapping risks to business-critical applications and functions.

II **Access Control and Administrative Framework:** Defining principles and mechanisms for administrative privilege management, RBAC (Role-Based Access Control), least privilege enforcement, and access authorization.

III **Malware and Threat Defence:** Designing an anti-malware framework, deploying endpoint protection tools, and implementing zero-day and ransomware response mechanisms.

IV **Policy and Configuration Management:** Drafting and scheduling periodic review of cybersecurity policies. Implementation of patch and vulnerability management schedules.

V **Cyber Resilience:** Building mechanisms for continuous operations even during cyberattacks. This includes system redundancies and automated failover strategies.

VI **Disaster Recovery and Incident Management:** Developing ICT disaster recovery plans, business continuity strategies, and security incident response processes.

VII **Standard Operating Procedures (SOPs):** Creating SOPs for cyber hygiene, vendor risk evaluation, network scanning, audit compliance, and training.

VIII **Regulatory and Audit Compliance:** Ensuring alignment with ISO 27001, 22301, CERT-In, and NCIIPC regulations. Preparing for sector-specific audits.

IX **Security Awareness and Training:** Defining awareness goals, training methods, simulated phishing exercises, and scheduling plans.

X **Best Practices and Assurance:** Identifying, documenting, and validating cybersecurity best practices and assurance levels across applications.

XI **Cyber Crisis Management Plan:** Creating a plan to guide DGS in case of major cyber incidents. Includes crisis detection, response, mitigation, and communication protocols.

This integrated scope ensures DGS's preparedness across the entire cybersecurity lifecycle—from prevention and detection to response and recovery.

L. Key Features of Assessment

This initiative is marked by several standout features that reflect both the depth of engagement and the focus on outcome-driven cybersecurity transformation:

I **Framework-Based Approach:** The use of globally recognized frameworks such as NIST 800-53, ISO/IEC 27001, and NIST CSF ensures a robust, scalable, and auditable security posture.

II **Tailored Risk Methodology:** A customized asset-based risk methodology has been developed to identify specific vulnerabilities associated with DGS's LRIT system, internal portals, training platforms, and seafarer certification applications.

III **Integrated Policy Suite:** A suite of 20+ cybersecurity policies and standards is being developed and adopted, covering access control, media protection, data classification, acceptable usage, and system maintenance.

IV **Vendor Security Management:** A risk-based third-party risk management program is being formulated with periodic reassessment protocols.

V **SOP Development:** Development of SOPs for areas like network traffic scanning, security incident response, data backup and restoration, and forensic investigation handling.

VI **Cybersecurity Governance:** Establishment of a formal Information Security Steering Committee (ISSC) chaired by the CISO and involving heads of relevant DGS divisions to ensure oversight and accountability.

VII **Simulated Exercises and Awareness Campaigns:** Use of simulated attacks (like phishing exercises) and training programs tailored to IT staff, administrators, and general employees.

M. Key Policies and Standard Operating Procedures

As part of the comprehensive cybersecurity initiative at the Directorate General of Shipping (DGS), several key policy documents and Standard Operating Procedures (SOPs) have been developed and institutionalized. These are aligned with NIST 800-53 control families and ISO standards such as ISO 27001, 22301, and 31000. Below are highlights of major deliverables:

I **Cyber Crisis Management Plan (CCMP)**

The Cyber Crisis Management Plan serves as a detailed blueprint for DGS to identify, respond to, and recover from major cyber incidents. It is structured around:

a) Crisis recognition triggers

b) Activation of crisis response teams

c) Communication protocols (internal and external)

d) Escalation paths and stakeholder coordination

e) Post-incident analysis and continuous improvement. The CCMP ensures DGS is well-prepared for high-impact disruptions, including threats to critical infrastructure, such as LRIT.

II **Business Continuity Plan (BCP)**

The Business Continuity Plan outlines how essential DGS functions and services will continue during and after a cyber disruption. The BCP includes:

a) Defined recovery strategies by business unit
b) Alternative operating procedures and manual workarounds
c) Interdependency analysis across applications and departments
d) RPO (Recovery Point Objective) and RTO (Recovery Time Objective) targets
e) Periodic testing and tabletop exercises. The BCP is integrated with ISO 22301 and aligned with NIST contingency planning (CP) controls.

III **Business Impact Analysis (BIA)**

BIA identifies critical functions, quantifies the impact of disruptions, and determines recovery priorities. Conducted across all DGS departments, the BIA informs both the CCMP and BCP by:

a) Cataloguing mission-critical processes and applications
b) Estimating financial and operational impact from system downtime
c) Identifying acceptable thresholds for data loss and recovery timelines
d) Prioritizing resources based on criticality
e) Enabling informed decision-making during crisis scenarios

These foundational deliverables ensure that DGS's cybersecurity program not only protects against cyber threats but also guarantees operational resilience and continuity in the face of disruptions.

Additional key policies and SOPs include:

i. Access Control Policy
ii. Information Security Policy
iii. Incident Response Plan
iv. Secure Software Development Lifecycle (SDLC) Guidelines
v. Network and Infrastructure Security SOPs
vi. Vendor Risk Management and Onboarding SOPs
vii. Cybersecurity Training and Awareness Plan

Together, these documents form the backbone of a resilient and policy-driven cybersecurity ecosystem tailored to the needs of a critical maritime regulator like DGS.

N. Technology Stack/Platform Coverage

The success of a cybersecurity program lies in the strategic integration of proven tools, platforms, and technologies. The DGS cybersecurity initiative employs a multi-layered technology stack that ensures defence-in-depth and operational continuity. These include:

I SIEM (Security Information and Event Management): Centralized log collection and threat detection through correlation engines and alerts.

II Endpoint Detection & Response (EDR): Advanced monitoring tools to detect ransomware, rootkits, and anomalous behavior at the endpoint level.

III Firewall and IDS/IPS: Next-Generation Firewalls (NGFW), Intrusion Detection Systems (IDS), and Intrusion Prevention Systems (IPS) configured to monitor and block malicious traffic.

IV Network Access Control (NAC): Tools to enforce security policy on devices accessing the DGS infrastructure.

V Vulnerability Management: Platforms for regular scanning and patch tracking of all systems and applications.

VI Secure Configuration Baselines: Enforced through automated compliance tools, ensuring CIS/NIST baselines.

VII Backup and Recovery Tools: For secure data replication, off-site backup, and rapid recovery.

VIII Privileged Access Management (PAM): Role-based, time-bound, monitored access to sensitive systems.

IX Email Security Gateway: Spam filtering, malware scanning, and phishing protection.

X Identity and Access Management (IAM): Authentication protocols, RBAC enforcement, and audit logs.

All systems are deployed within secure enclaves, with role-based permissions and enforced multi-factor authentication (MFA) for added security. The technology stack aligns with the zero-trust principle and is tested periodically for resiliency and compliance.

O. Project Timelines

To ensure long-term cybersecurity maturity, the following roadmap is recommended:

I Finalize and approve all policies by September 2025

II Launch full implementation of NIST-based control mapping by Q4 FY25

III Initiate formal STQC assessment of LRIT application

IV Integrate real-time threat intelligence feeds by Q1 FY26

V Expand Red Team/Blue Team testing programs

VI Build a security operations centre (SOC) or leverage a managed SOC

VII Schedule recurring awareness training sessions every quarter

VIII Plan reassessment every 12 months post-implementation

The roadmap will help sustain cyber hygiene, address evolving threats, and align with GIGW 3.0 and MeitY guidelines.

P. Project Status

As of June 2025, the cybersecurity initiative has achieved the following milestones:

I Completion of risk-based gap assessment across applications, infrastructure, and endpoints.

II Drafting and review of 20+ cybersecurity policies and control standards.

III Establishment of the Information Security Steering Committee (ISSC).

IV Submission of final drafts of Cybersecurity Risk Assessment Framework and Cyber Crisis Management Plan.

V Initiation of vulnerability scanning, malware defence rollout, and security awareness campaigns.

VI Mapping of ISO 27001, ISO 22301, ISO 31000, and NIST 800-53 controls to existing systems.

VII Engagement of third-party STQC and CERT-In vendors identified for assessment phases.

6. Road Map Ahead

6. RoadMap ahead - Strengthening Digital Infrastructure for Maritime Governance

6.1 Charting a Transformational Digital Horizon

The Directorate General of Shipping (DGS) stands at the cusp of a profound digital transformation that redefines India's maritime governance ecosystem. Guided by national visions—Amrit Kaal, Maritime India Vision (MIV) 2030, and Maritime Amrit Kaal Vision (MAKV) 2047—DGS is committed to leveraging advanced digital technologies, fostering innovation, and building collaborative partnerships. This transformation is not limited to technology implementation; it is about creating a resilient, secure, transparent, and agile maritime governance framework that empowers seafarers, enhances operational efficiency, and positions India as a global maritime digital leader.

A future-proof digital infrastructure will underpin regulatory excellence, stakeholder engagement, and international competitiveness. By integrating emerging technologies with strategic capacity building and governance reforms, DGS will set new benchmarks in maritime administration.

6.2 Strategic Vision for 2030 and 2047

The Maritime India Vision for 2030 and 2047 envisions a transformative journey that will establish India as a global leader in maritime digital governance and sustainable maritime development. By 2030, the complete digitization of maritime services and AI-powered risk management will streamline operations, enhance safety, and promote transparency, while seamless integration with international maritime systems will facilitate efficient global trade and compliance. The creation of a robust Maritime Knowledge Cluster will foster innovation and develop a skilled workforce, ensuring continuous progress. Looking ahead to 2047, India aims to pioneer indigenous digital platforms utilizing blockchain, AI, and autonomous technologies, alongside establishing green digital corridors that advance environmental stewardship and carbon compliance in shipping. Quantum-resilient cybersecurity frameworks will safeguard these advancements against evolving threats, while integrated research and development labs will drive ongoing innovation in vessel technology, autonomous navigation, and ecological sustainability.

A. Vision 2030: Digital Foundation and Integration

The 2030 vision focuses on establishing a solid and comprehensive digital foundation within India's maritime governance. This phase is crucial for digitizing core services, enhancing operational efficiency, and achieving interoperability with global maritime systems.

I **Complete Digital Enablement**: Fully digitizing maritime services such as certifications, licensing, examinations, inspections, and compliance reporting to eliminate paper-based workflows, reduce processing time, and improve transparency.

II **AI-Enabled Risk Mitigation:** Deploying AI-powered predictive analytics for proactive safety surveillance, compliance enforcement, and incident prevention.

III **Global System Interoperability:** Ensuring seamless integration with International Maritime Organization (IMO) digital platforms and Single Window systems globally to simplify cross-border trade and regulatory exchanges.

IV **Knowledge Cluster Establishment:** Creating a central Maritime Knowledge Cluster by integrating Indian Maritime University (IMU), Maritime Training Institutes (MTIs), National Technology Centres (NTCPWC), along with global R&D partners to foster collaborative innovation and skilled workforce development.

B. Vision 2047: Maritime India as a Global Digital Powerhouse

By 2047, the vision is for India to become a world leader in maritime digital governance, sustainable maritime ecosystem management, and technological innovation.

I Indigenous Digital Platforms: Leading global maritime governance with fully indigenous AI and blockchain-enabled platforms for certifications, compliance, smart shipping operations, and autonomous vessel monitoring.
II Sustainable Maritime Ecosystems: Developing Green Digital Corridors enabled by real-time emission monitoring and carbon compliance tools to support India's climate commitments and sustainable shipping goals.
III Quantum-Resilient Cybersecurity: Future-proofing digital infrastructure with quantum computing–resistant cryptographic systems and advanced cyber defence mechanisms.
IV Integrated R&D Labs: Establishing innovation labs driving continuous improvements in vessel technology, environmental impact mitigation, autonomous navigation, and maritime safety.

Together, these strategic milestones empower the Directorate General of Shipping to future-proof India's maritime governance, enhance operational efficiency, ensure global interoperability, and champion a resilient, secure, and environmentally responsible maritime ecosystem that positions India as a beacon of technological excellence and green leadership on the international stage.

6.3 Key Strategic Pillars and Recommendations

A. Strengthening Digital Infrastructure

DGS must build a foundational maritime digital infrastructure that is secure, resilient, and scalable. Moving to cloud-native architecture will enable dynamic resource allocation, reduce downtime, and facilitate rapid adoption of new technologies.

Strategic Recommendations

I Establish a state-of-the-art, ISO 27001-certified cloud infrastructure with multi-region redundancy for disaster recovery and business continuity.
II Develop a Network Operations Centre (NOC) with 24/7 real-time monitoring, incident detection, and rapid response capabilities to minimize service disruptions and cyber threats.
III Create an integrated Maritime Data Lake powered by AI/ML technologies for comprehensive data aggregation, analytics, and decision-support insights across maritime operations.
IV Invest in blockchain infrastructure trials to ensure scalability, interoperability, and regulatory acceptance before full deployment.

B. Implementing Best Practices in E-Governance

Adopting internationally recognized frameworks and stringent cybersecurity standards will enhance service reliability and stakeholder confidence in digital maritime governance.

Strategic Recommendations:

I Mandate compliance with MeitY guidelines, ISO 27001 information security standards, and IMO data exchange protocols.
II Institutionalize regular cybersecurity audits including Vulnerability Assessment and Penetration Testing (VAPT) to pre-emptively mitigate vulnerabilities.
III Adopt Zero Trust Architecture (ZTA) principles ensuring continuous verification of users and devices accessing networks or data.
IV Develop API-driven single-window portals with a user-centric, multilingual design to simplify access for seafarers, operators, and regulators alike.

C. Driving Innovation through Emerging Technologies

Harnessing blockchain, AI, IoT, and Digital Twins will revolutionize the maritime ecosystem by enhancing transparency, automation, decision-making, and operational efficiency.

Strategic Recommendations:

I Pilot and gradually scale blockchain-enabled solutions for seafarer certification and employment verification to eliminate credential fraud and streamline job matching.
II Deploy AI/ML models for risk analytics, anomaly detection, and automated compliance alerts, augmenting human decision capabilities.
III Integrate IoT sensors onboard vessels and in ports for real-time tracking of ship locations, emissions, and safety parameters, enhancing situational awareness and environmental compliance.
IV Develop digital twin simulations to model ship and port operations for predictive maintenance, training, and emergency response planning without operational disruptions.

D. Seamless Interoperability & Global Integration

DGS must prioritize openness and international alignment to ensure digital governance tools effectively interface with global maritime data systems, facilitate trade and foster multilateral cooperation.

Strategic Recommendations:

Build open, standards-based API frameworks aligned with IMO, EU, and International Electro-Technical Commission (IEC) standards to enable seamless data exchange across government ministries, port authorities, and international partners.

a) Actively participate in global maritime digital forums and working groups to benchmark best practices, influence standard development, and secure data interoperability agreements.
b) Enhance mutual recognition of digital certificates through bilateral and multilateral agreements, streamlining seafarer mobility and vessel compliance globally.

E. Human Capital & Capacity Building

Sustainable digital transformation relies on upskilled personnel capable of managing complex technologies and adapting to evolving governance models.

Strategic Recommendations:

Develop and roll out a Maritime Digital Competency Framework covering AI, cybersecurity, blockchain, and data governance tailored for maritime officials and IT professionals.

a) Establish a dedicated Digital Governance Academy in collaboration with IMU and MTIs to provide continuous learning, certification, and leadership development in maritime digital administration.
b) Organize annual IT workshops, hackathons, and innovation challenges that leverage industry participation to spark novel solutions and build a vibrant maritime tech ecosystem.

F. Strategic Partnerships & Collaboration

Recommendations:

Deepen collaboration with C-DAC for accelerating indigenous technology development in cloud platforms, cybersecurity, AI analytics, and quantum-safe systems.

a) Strengthen ties with Indian Register of Shipping, Shipping Corporation of India, and NTCPWC for co-developing smart compliance tools, fleet digitization, and green shipping initiatives.
b) Engage actively with academic institutions and industry consortia to foster R&D, technology incubation, and innovation diffusion.

Table 36 Challenges: Strategic Approach

Challenge	Strategic Approach
Cybersecurity Threats	Invest in layered security defences: SOC, SIEM, end-to-end encryption, AI-enabled threat intelligence & response.
Interoperability Gaps	Adopt and regularly update open standards; initiate cross-agency interoperability task forces for alignment.
Skilled Workforce Deficit	Institutionalize mandatory technology training, reskilling programs, and digital literacy drives.
Scalability Concerns	Choose microservices and modular platforms with API-first designs to enable incremental scaling and technology insertion.
Sustainability & Green Compliance	Leverage IoT and AI for real-time emission monitoring and analytics; partner for green technology adoption and innovation.

6.4 Vision Beyond Governance: Strategic Recommendations for Global Leadership by 2047

By 2047, the Directorate General of Shipping envisions itself as a pioneering force behind a fully integrated digital maritime ecosystem that offers seamless, transparent services powered by advanced technologies such as artificial intelligence, blockchain, and sophisticated data analytics. This integrated ecosystem will consolidate licensing, certification, compliance monitoring, vessel tracking, and communication systems into a unified platform that leverages open, secure architectures aligned with international maritime standards. Through this transition, DGS will achieve a digitally resilient environment capable of real-time decision-making, predictive operational insights, and automated administrative functions. Blockchain technology will underpin tamper-proof credentials and records, fostering trust and enabling the automation of complex contractual processes within the maritime sector. These technical capabilities will be further complemented by dynamic analytics dashboards, providing policymakers and stakeholders with timely intelligence to enhance regulatory oversight and industry engagement.

In parallel, India aims to establish itself as a global research and development powerhouse in maritime technology by fostering vibrant innovation hubs strategically located at key port cities and academic institutions. These hubs will serve as collaborative centers where academia, industry leaders, startups, and technology experts converge to accelerate breakthroughs in autonomous vessel operation, digital twin simulations, green propulsion systems, and robust maritime cybersecurity solutions. The government's commitment to supporting this innovative ecosystem will be reflected through accelerator programs, fiscal incentives, seed funding, and regulatory sandboxes specifically tailored for maritime technology enterprises. Strategic partnerships between domestic and international stakeholders will drive the co-creation of cutting-edge solutions in artificial intelligence, Internet of Things deployment, sustainable fuels adoption, and supply chain optimization. Importantly, this research agenda will maintain a strong focus on sustainability, directing resources toward the development of environmentally friendly technologies that reduce emissions and foster eco-friendly port infrastructure.

Alongside technological advancement, the vision emphasizes the creation of an inclusive, seafarer-centric digital platform designed to empower India's maritime workforce. This comprehensive mobile platform will unify critical services such as digital certification, employment opportunities, grievance redressal, financial support, healthcare access, and career development resources, ensuring they are accessible anytime and anywhere. The platform will prioritize ease of use and inclusivity by supporting multiple languages and accommodating low-bandwidth environments. Leveraging artificial intelligence, it will provide personalized recommendations for skill upgrades, training programs, and job matching

tailored to individual seafarers' profiles. Additionally, considerable attention will be dedicated to seafarer welfare by integrating telemedicine services, mental health support, family outreach channels, onboard welfare initiatives, and insurance frameworks. The continued involvement of seafarer unions, welfare boards, and international organizations will ensure the platform remains responsive and secure, adhering to best practices in data privacy and digital identity protection.

Moreover, DGS will assume leadership in championing green maritime governance by establishing real-time carbon tracking corridors, leveraging IoT sensors and advanced analytics to monitor emissions, fuel consumption, ballast water management, and waste treatment across critical shipping lanes and port operations. This digital environmental monitoring framework will be tightly integrated with international compliance regimes, such as those set by the International Maritime Organization and the European Union Emissions Trading System, enabling automatic reporting and flagging of noncompliance**. In recognizing the importance of incentivizing sustainability, India will offer benefits including expedited port clearances, fiscal advantages, and access to green financing for vessels and operators demonstrating exemplary environmental stewardship. Transparency will be enhanced through publicly accessible dashboards that provide real-time insights into carbon emissions and compliance status, fostering accountability across the maritime sector. Active collaboration with international environmental agencies and technology partners will underpin the deployment of sensors, development of standards, and rollout of pilot projects, thus ensuring robustness and scalability of green shipping initiatives.

Together, these strategic goals and initiatives will propel the Directorate General of Shipping to deliver a transformative and future-ready maritime governance ecosystem. By investing thoughtfully in technology, research, workforce empowerment, and sustainability, DGS will position India at the forefront of global maritime innovation, establish a resilient and inclusive maritime community, and set new international benchmarks for environmentally responsible maritime governance by the year 2047.

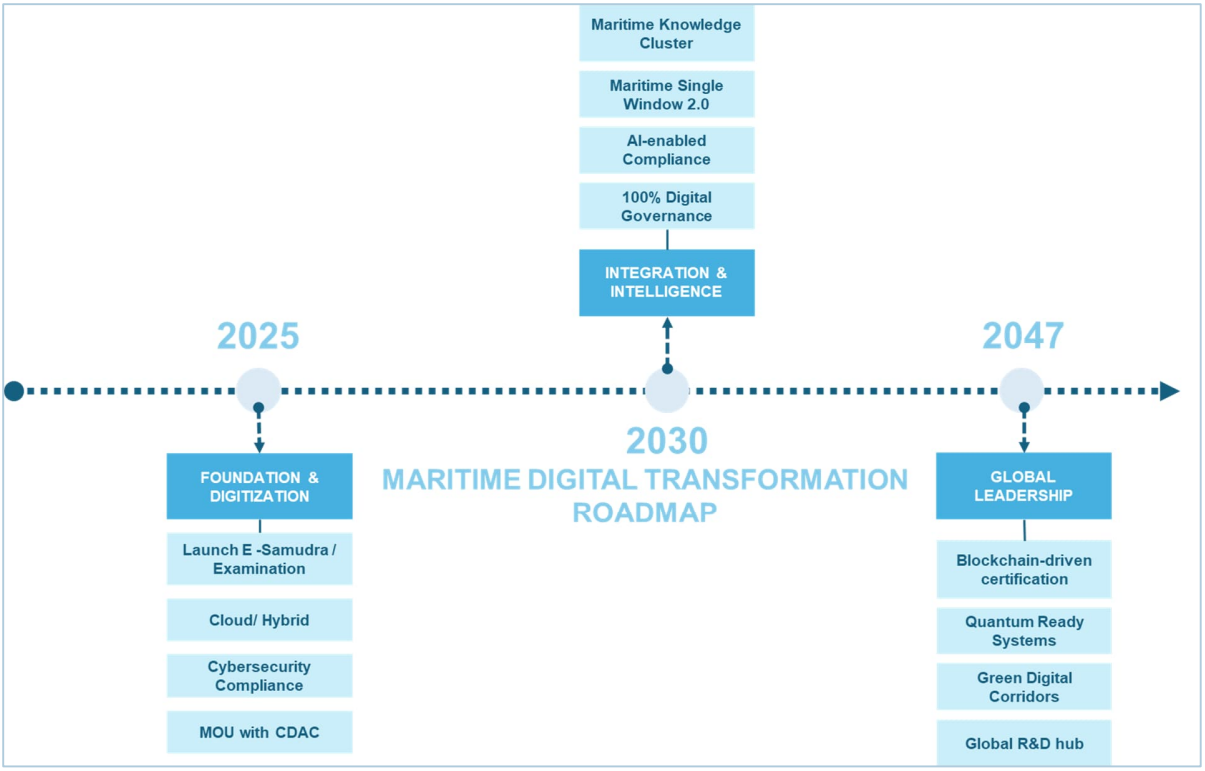


Figure 51 Roadmap Ahead for DG Shipping

IT & E-Governance Branch Team

MINISTRY OF PORTS, SHIPPING AND WATERWAYS
DIRECTORATE GENERAL OF SHIPPING
GOVERNMENT OF INDIA

Website: https://dgshipping.gov.in/