# The Workshop on
# Enhancing Safety of Navigation with Maritime Digitalization
# Daejeon, Republic of Korea
# July 9 to 11, 2024

## Korean Maritime Cooperation Center

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**INTERNATIONAL MARITIME ORGANIZATION**

**SUMMARY SHEET**

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|---|---|
| **Title of the seminar/course/workshop:** | The Workshop on Enhancing Safety of Navigation with Maritime Digitalization |
| **Host:** | Ministry of Oceans and Fisheries (MOF), Republic of Korea |
| **Venue and date:** | Interciti hotel, Daejeon city, Republic of Korea<br>July 9 to 11, 2024 |
| **Type:** | Regional |
| **Organized by:** | Organized jointly by IMO, IALA, IHO, and the Republic of Korea |
| **Supported by:** | MOF (ITCP Fund) |
| **Number of Participants and Number of Countries and/or Organizations:** | [x] participants from [X] countries and [x] organizations |

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**Summary**

The "Enhancing Safety of Navigation through Maritime Digitalization" workshop was held from July 9 to 11, 2024, at the Interciti hotel in Daejeon City, Republic of Korea. This event was jointly organized by the International Maritime Organization (IMO), the International Hydrographic Organization (IHO), and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).

The workshop aimed to promote the development and implementation of digital services for maritime safety and environmental protection in the Asia-Pacific region. It provided a platform to share digital experiences, update participants on international developments, and discuss the readiness and initiatives of various participating countries.

A total of 42, including 15 participants from 8 countries (Bangladesh, Cambodia, Indonesia, Malaysia, the Philippines, Sri Lanka, Timor-Leste, and Vietnam) received updates on e-navigation and digitalization initiatives with global relevance, including digital navigational data systems; maritime autonomous surface ships; and S-100 and S-200 related data modelling products and their impacts on the digitalization and automation in the maritime industry.

Participants delivered presentations to share information on the status of maritime digitalization in their countries and were given tours of the Autonomous Ship Verification and Evaluation Research Centre in Ulsan, and HD Hyundai Heavy Industries.

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**Keywords:** Maritime digitalization, Maritime radiocommunications, Safety of Navigation, Capacity-Building, S-100, AIS, AtoN, VTS, Autonomous Ship

**WBS element:** Training and Development

**Co-ordinator(s):** Ministry of Oceans and Fisheries (MOF), Korean Maritime Cooperation Center (KMC) of the Republic of Korea

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## 1. INTRODUCTION

The "Enhancing Safety of Navigation through Maritime Digitalization" workshop was held from July 9 to 11, 2024, at the Interciti Hotel in Daejeon City, Republic of Korea. This event was jointly organized by the International Maritime Organization (IMO), the International Hydrographic Organization (IHO), and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).

This workshop will provide practical case studies of digital service delivery and facilitate discussions on enhancing navigation safety through maritime digitalization—a total of 42, including 15 participants from 8 countries registered for the workshop. The list of participants is attached in Annex 1, 2, and 3.


## 2. OBJECTIVE

The objective of the workshop is to promote the development and implementation of digital services for maritime safety and environmental protection in the Asia-Pacific region. It aims to share digital experiences, update participants on international developments, and discuss the readiness and initiatives of various participating countries.

## 3. VENUE, DATES, ROLES AND PARTICIPANTS

The "Enhancing Safety of Navigation through Maritime Digitalization" workshop was held from July 9 to 11, 2024, at the Interciti Hotel in Daejeon City, Republic of Korea. The event was jointly organized by the International Maritime Organization (IMO), the International Hydrographic Organization (IHO), and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).

The workshop included various representatives from both governments and private sectors. Participants shared case studies on digitalization from their respective countries and discussed ways to enhance maritime safety.

**Participant Information**

- Total Participants: 42
- Number of Countries Represented: 8 (Bangladesh, Cambodia, Indonesia, Malaysia, the Philippines, Sri Lanka, Timor-Leste, and Vietnam)
- Participant Composition: 30 participants (government sector), 12 participants (private sector)

**Joint Organizers**

- International Maritime Organization (IMO): Cafer Ozkan Istanbullu (representative)
- International Hydrographic Organization (IHO): Representative: Leonel Manteigas (representative)
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA): Omar Eriksson (representative)

**Key Speakers**

- Seong-yong Choi: Director General, Maritime Safety Policy Bureau, Ministry of Oceans and Fisheries (MOF) of the Republic of Korea
- Cafer Ozkan Istanbullu: Technical Officer, International Maritime Organization (IMO) presented developments related to the digitalization of maritime radiocommunications.
- Leonel Manteigas: Assistant Director, International Hydrographic Organization (IHO) contributed insights on navigation safety and maritime digitalization.
- Omar Eriksson: Deputy Secretary-General / Dean, International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)
- Minsu Jeon: Techincal Manager, International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), provided updates on maritime safety and digitalization
- MC: Dayoung Park, Researcher, Korea Maritime Cooperation Center (KMC), Republic of Korea

**Korean Speakers**

1. Sang-hyun Lee: ENC Team/General Manager, Korea Hydrographic and Research Association (KHRA), presented on “S-100 Korea updates”
2. Jin-Hyoung Park: Ph.D./CEO, AIVeNautics (AIVN), presented on “The maritime connectivity platform”
3. Han-jin Lee: Principal Researcher, Korea Research Institute of Ship & Ocean Engineering (KRISO), presented on “maritime digitalization”
4. In-ho Lee: Head of Green Solution Engineering / Director, HD Hyundai marine solution, presented on “Eco-Friendly Ship”
5. Jongbum Won: Principal Researcher, Korean Register (KR), presented on “Maritime Digitalization with Autonomous Ship”

**Developing Countries (Case Studies)**

1. GM Mustafizur Rahman: Nautical Surveyor, Bangladesh Merchant Marine office, presented on “Intergrated Maritime Navigation & Communication System in Bangladesh”

2. Dararith Heng: Deputy Director, Cambodia Merchant Marine Department, presented on “Port Electronic Data Interchange (Port EDI)”
3. Nurma Karima Sari: Maritime Safety to Navi Officer, Indonesia Directorate of Navigation DGST, presented on “The Update on Digitalization Initiatives in the Directorate General of Sea Transportation”
4. Mohd Hisham Rubani: Senior Principal Assistant Director, Malaysia Marine Department, presented on “Advanced AIS A to N and Digitalization”
5. Orly Wong: Assistant Department Chief of Coast Guard, Philippines Coast Guard, presented on “The Challenges and Opportunities in the Implementation of Maritime Digitalization: A Philippine Coast Guard Perspective”
6. Lorne Jasmin Lerio: Hydrographer, Philippines National Mapping and Resource Information Authority, presented on “Digitalizing Maritime Services: Readiness of the Philippine Hydrographic Office in Adopting Global Call”
6. Jayamal Jayawardane: Commander, Sri Lanka Navy, presented on “Maritime Digitalization Ensuring Safe Navigation In Sri Lanka Waters”
7. Rogerio Soares: Chef of Department Harbour, Timor-Leste Nat Director of Maritime Transportation, presented on “Ministry Transportation and Communication National Directorate of Maritime Transport Timor-Leste”
8. Duc Quan Pham: Senior Official, Viet Nam Maritime Administration, presented on “The role of the vessel Traffic System (VTS) in ensuring maritime safety and security in Vietnam”

## 4. COST

The funding for the workshop was provided by the Republic of Korea through the International Maritime Organization, in accordance with the Memorandum of Understanding on Technical Cooperation between the Republic of Korea and the International Maritime Organization and its financial contribution for 2024. The Korean Maritime Cooperation Center (KMC) was designated as the implementing organization for the workshop on enhancing capacity in maritime digitalization.

The invitees, as listed in Annex 1. A list of Participants received support from IMO for flight tickets, accommodation, other transportation costs, and daily subsistence allowance (DSA).

The representatives from international organizations such as IHO and IALA participated in the event on a self-funded basis.

Additionally, the necessary arrangements for organizing the event, such as event venue rental fees, accommodation, and catering services, as well as the recruitment and honorarium payments for Korean speakers, were executed by the implementing organization, KMC.

## 5. ACTIVITIES AND PROCEEDINGS

### *Session 1- Opening ceremony*

#### 1. Seong-yong Choi, Director General, the Maritime Safety Bureau, MOF

Choi Seong-yong, Director General of the Maritime Safety Bureau of the Ministry of Oceans and Fisheries, welcomed participants to the '6th Asia-Pacific Regional Workshop on Enhancing Maritime Digital Capabilities' and thanked key supporters from IALA, IHO, and IMO. Since 2018, the workshop has promoted maritime digital technologies in the Asia-Pacific region. Digitalization is essential for innovation in maritime safety, environmental protection, and efficient transport. The workshop will share the trends and applications of digital technologies and explore advanced

maritime mobility like green vessels and autonomous ships. Technical tours of facilities in the Republic of Korea will provide opportunities to experience the latest technologies and industry trends. The workshop aims to enhance understanding and cooperation in maritime digitalization.

***2. Cafer Ozkan Istanbullu, Technical Officer, IMO***

Cafer Ozkan Istanbullu, Technical Officer at the International Maritime Organization (IMO), welcomed participants to the "Workshop on Enhancing Safety of Navigation with Maritime Digitalization," supported by the Republic of Korea under a technical cooperation agreement with IMO. He highlighted the crucial role of digitalization in enhancing maritime safety, efficiency, and environmental protection, noting that technologies like e-navigation, Maritime Autonomous Surface Ships (MASS), and electronic navigational charts are transforming the industry. He emphasized the commitment of IMO to these advancements while ensuring that all Member States can keep up with changes through technical cooperation and assistance. Istanbullu expressed his gratitude to the Republic of Korea, IHO, and IALA for their support, and to KMC for hosting the event. He concluded by stressing the importance of the workshop in promoting global maritime digitalization and safety standards.

***3. Leonel Pereira Manteigas, Assistant Director, IHO***

Mr. Leonel Manteigas, Assistant Director of the International Hydrographic Organization (IHO), expressed his gratitude for participating in the "Workshop on Enhancing Safety of Navigation with Maritime Digitalization" in Daejeon, Republic of Korea. Representing IHO, he highlighted the workshop's alignment with the World Hydrography Day 2024 theme: "Hydrographic Information - Enhancing safety, efficiency, and sustainability in marine activities." Manteigas emphasized the critical role of the S-100 universal data model in revolutionizing nautical cartographic products and enhancing safety, efficiency, and sustainability in navigation. He stressed the importance of capacity building and collaboration among international organizations like IMO, IALA, and IHO to deliver effective capacity-building programs. He concluded by expressing his wish that participants will have a productive workshop focusing on sharing knowledge and best practices in maritime digitalization.

***4. Omar Eriksson, Deputy Secretary-General/Dean, IALA***

Omar Eriksson, Deputy Secretary-General and Dean of IALA, welcomed attendees to the "Workshop on Enhancing Safety of Navigation with Maritime Digitalization" in Daejeon, Republic of Korea. He emphasized the importance of these workshops in sharing the latest maritime digitalization developments, particularly in standardization and infrastructure improvements. Eriksson highlighted new communication technologies like VDES and AIS as key to advancing maritime safety and efficiency. He expressed IALA's commitment to supporting member states through technical cooperation and thanked the Republic of Korea, IMO, and IHO for their collaboration.

***Session 2 - International Trends in Maritime Digital Technology:***

**IMO** shared the status of digitalization work within the Organization, including the revision of SOLAS Chapter IV related to GMDSS modernization, the harmonization of e-Navigation, and the development of a non-mandatory MASS code. They also announced plans to discuss VDES security enhancements and the development of a mandatory MASS code.

**IHO** emphasized the characteristics and importance of the S-100 standard in digitalization and provided the timeline for applying the S-100 standard to ECDIS, which will be recommended from

January 1, 2026, and mandatory from January 1, 2029. They introduced capacity-building activities for sharing survey coverage and information on global waters.

**IALA** announced that it will transition to an intergovernmental organization (IGO) on August 22, 2024 and plan to hold their first General Assembly as an IGO from February 4 to 6, 2025, in Singapore. They also shared details of their capacity-building support activities, including those under the World-Wide Academy.

### *Session 3 - Cases of Maritime Digital Applications*

**KHRA** is preparing to apply ECDIS after developing and verifying new data following the transition from S-57 to S-100. Through ship operation simulations, It found that fuel consumption was reduced by 14.6% compared to S-57 when applying S-100.

**IALA** emphasized that e-Navigation is the foundation of maritime digitalization and that the S-200 standard, developed based on the S-100, includes integration, exchange, and representation of various maritime information. It supports identifying data differences between countries and operate related educational programs.

**IHO** stated that the application of S-100 will first focus on parts closely related to safety and efficiency, such as ENC, tides, and depths, ensuring interoperability before expanding to additional items. It emphasized the need for international cooperation in this process.

**AIVeNautics** introduced the Maritime Connectivity Platform (MCP) as a platform for digital maritime services, aiming to connect service providers and users to enhance navigation safety and efficiency. It briefly introduced the composition, international activities, and future plans of MCP.

### *Session 4,5 - Presentations of Participating Countries*

**Bangladesh** lacked facilities for maritime traffic monitoring and search and rescue, but recently installed seven coastal radio stations with support from the Korean government. It monitors ship location information integrated at the comprehensive control room in Dhaka (capital). Additionally, It provides online issuance services for certificates and seafarer documents through the national maritime single window. It is striving to implement the IMO Conventions and promote new industries in the maritime sector by applying international conventions domestically.

**Cambodia** developed the electronic information exchange system (Port EDI), enhancing efficiency and transparency through inter-agency function linkage for electronic processing of entry and departure procedures (pilot request and ship sanitation exemption) and fee payment according to the FAL Convention. Currently, the Ministry of Public Works and Transport, Customs, Immigration, and Quarantine Authorities are participating in service provision, with plans to expand the scope in the future.

**Indonesia** planned the e-Navigation roadmap to proceed in four stages from 2020 to 2038. It aims to improve maritime traffic management by integrating and collecting AIS, radar, and VHF information via e-Navigation and i-Motion (Indonesian Integrated Monitoring System on Navigation). It also aims to promote information sharing among relevant authorities for inbound ships through INAPORTNET, its single window concept. It plans to secure technology, build infrastructure, and develop future land-sea information exchange systems. Currently, it has designated 111 out of 636 routes and operates 23 VTS. It intends to continue collaborating with

other countries and organizations for capacity building and talent development in maritime digitalization.

**Malaysia** developed the Advanced AIS Remote Monitoring System (ARMS) by referencing the examples of the U.S. and French coast guards. It monitors the operational status of aids to navigation from a central control room onshore through internet and AIS. It aims to promote sustainable coastal development and digitalization, beyond enhancing maritime safety, by optimizing risk management and resource allocation.

**The Philippines** (Presentation 1), considering its geographic characteristics with a coastline of 36,289 km and 7,641 islands, is pursuing maritime digitalization to enable faster incident response and improved decision-making during maritime accidents. It currently uses voice communication and real-time messaging services via internet and smartphone apps and aims to develop and operate web-based e-Nav services with support from Korea's SMART-C project. Although the Philippines has a strong commitment to digitalization, it faces challenges such as data format standardization, cybersecurity, IT personnel deployment, infrastructure establishment, and prioritization by the government.

**The Philippines** (Presentation 2) emphasized the need for hydrographic surveys for about 43% of its territorial waters to ensure maritime safety. It noted that the lack of a sharing system for collected information between collecting agencies and other institutions reduces efficiency and utility. The Philippines National Mapping and Resource Information Authority (NAMRIA) aims to enhance maritime safety through the adoption of the S-100 standard and the digital transformation of hydrographic information, requiring infrastructure expansion, skill enhancement, and international cooperation.

**Sri Lanka** reported that 61% of maritime accidents in coastal waters involved coastal fishing boats as of 2023. It emphasized the importance of close cooperation and information exchange between domestic and international agencies for search and rescue operations. It shared information collected via an AIS information integration system established with India and identify and track distressed seafarers using an integrated coastal radar surveillance system at the information fusion center in Colombo (capital). It utilizes a web-based distress alert system and drift model system developed in Australia to send distress alerts to nearby vessels when a distress signal is received from a ship and to calculate the expected position of drifting vessels for search and rescue operations. It also shared information through a regional information-sharing platform in the Indian Ocean to implement crisis management, cooperation, and real-time information sharing.

**Timor-Leste** is planning to build AIS and radar systems to enhance maritime safety, prioritizing the installation of guiding lights and radar systems in the northern coastal waters where maritime traffic is dense. Since 2022, it has been developing Bollore Port as a container import and export hub but faces a shortage of government port management personnel for ship arrivals and departures. It prioritizes securing personnel and infrastructure for accepting digitalization in the maritime sector, aiming to implement this through continuous government support, technical education, and enhanced international cooperation.

**Vietnam** installed VTS at 14 out of its 34 ports, managing maritime traffic using real-time information collected through radar, AIS, and VHF. It is promoting maritime digitalization to enhance maritime safety and marine environmental protection and plans to continue developing domestic infrastructure, building capacity, and pursuing international cooperation to lead in this area.

***Session 6 - Trends in Advanced Maritime Mobility Development***

**MOF (Advanced Transportation Service Team)** introduced the overview, characteristics, and operational system of the maritime navigation service utilizing LTE-M, presenting actual usage cases and future development plans.

**KRISO** is promoting the international utilization of digital maritime services through the Global Maritime Digital Route Testbed (GMDRT), a follow-up project to Korea's e-Nav. It expects to take a comprehensive approach to the future maritime industry by integrating eco-friendly ships, autonomous ships, and maritime digital technology.

**HD Hyundai** introduced the eco-friendly policies of U.S. and Canadian ports and the Panama Canal and presented Korea's efforts to reduce carbon emissions and improve energy efficiency using alternative fuels.

**KR** shared major technologies and global market trends focusing on autonomous ships within maritime digitalization. It introduced the overview of the KASS project and outlined future challenges to be addressed.

***Discussion and Q&A***

Participants expressed concerns about the introduction of a mandatory MASS code, to which it was explained that the mandatory MASS code is not about making all ships autonomous but rather the mandatory application of MASS-related technologies. It was also clarified that typically, technological advancements are preceded by capacity-building efforts in Member States that need them.

Regarding the maritime navigation service, questions were raised about service and network usage fees, the availability of the service for foreign-flagged ships, and the use of unique identifiers like phone numbers. It was clarified that currently, the service is provided free of charge to Korean-flagged ships, and ship numbers are used for service registration.

There were inquiries about the Republic of Korea's testbed system related to the adoption of S-100. It was explained that in the Republic of Korea, as well as in other countries, domestic institutions related to each standard (S-10X) cooperate to implement it, emphasizing the importance of both domestic and international collaboration.

Indonesia, from the perspective of a later adopter of technology, expressed concerns that regulations developed as a result of technological advancement sometimes only reflect the views of leading countries. In response, IMO and IALA requested continuous interest and participation from Member States to ensure that various opinions are reflected in international discussions.

## 6. CLOSING CEREMONY

**1. In-Su Kim, Director of Advanced Transportation Service Team, MOF**

*Mr. In-Su Kim stated that the 6th IMO CB Workshop on Enhancing Safety on Navigation with Maritime Digitalization in Daejeon had successfully concluded. He mentioned that it provided a platform to share international trends in maritime digital technology and advanced maritime mobility development. He noted that the sessions presented by international organizations and various countries on these topics were highly beneficial. He emphasized that the Republic of Korea will*

*continue collaborating with the Asia-Pacific countries for safer and cleaner oceans. He also expressed special thanks to Omar Eriksson, Leonel Manteigas, and Cafer Ozkan Istanbullu for co-hosting.*

**2. Cafer Ozkan Istanbullu, Technical Officer, IMO**

*Mr. Cafer Ozkan Istanbullu, Technical Officer at IMO, stated that he reiterated his colleagues' sentiments about the success of the workshop. He expressed his admiration for the preparation and presentations of each delegation, noting the impressive progress towards digitalization in their respective countries. He thanked and congratulated everyone on their achievements to date and emphasized the importance of continued collaboration and events like this to ease future challenges.*

*He expressed gratitude to the Republic of Korea for organizing the event and inviting all participants and speakers. He also thanked his fellow speakers and participants for their dedication and efforts in attending the workshop. He acknowledged the Republic of Korea's commitment to continuing this initiative, appreciating its importance. He concluded by thanking everyone for having him as a representative and looked forward to future workshops.*

**3. Leonel Pereira Manteigas, Assistant Director, IHO**

*Leonel Pereira Manteigas, Assistant Director at IHO, highlighted the successful updates from IMO and IALA, noting the informative presentations on SOLAS, the universal data model, and maritime connectivity. He praised the excellent presentations from various countries and emphasized the importance of understanding capacities and developments to provide better support.*

*He discussed the significant transformations in maritime autonomous surface ships and navigation, stressing the commitment of IMO, IALA, IHO, and WMO to support these changes. He recognized the Republic of Korea's leading role in maritime developments and expressed his hope to have more workshops to enhance safety and efficiency in navigation.*

*He emphasized the importance of the workshop, the quality of presentations, the relevance of debates, and the value of networking. The Republic of Korea was recognized for being at the forefront of maritime developments.*

*Finally, he expressed his gratitude to the Republic of Korea and the Ministry of Oceans and Fisheries for their continued support for the maritime community and these relevant events.*

**4. Omar Eriksson, Denmark, Deputy Secretary-General/Dean, IALA**

*Omar Eriksson, Deputy Secretary-General and Dean of IALA, summarized the past few days of sharing information and knowledge, emphasizing the goal of exchanging updates on international developments and individual progress toward digitalization. He expressed encouragement by the tangible advancements in e-navigation, noting significant improvements over the years.*

*He enjoyed meeting everyone and hoped for continued interaction with many participants through the Academy and IALA before the next forum, highlighting ongoing discussions about training opportunities.*

*Eriksson mentioned he will not join the technical tour as he is traveling back to Europe tomorrow, and bid farewell to the participants, hoping to see them again soon.*

## 7. ACHIEVEMENTS AND CONCLUSIONS

### *Achievements*

1. Emphasis on Digitalization: The workshop highlighted the critical importance of adopting maritime digital technologies in the Asia-Pacific region. Participants discussed how digitalization can significantly enhance maritime safety, environmental protection, and efficient maritime transport.

2. Strengthened International Cooperation: The event facilitated stronger cooperation among various countries and international organizations, establishing a robust foundation for future maritime digitalization and the development of advanced maritime mobility technologies.

3. Sharing of Latest Technologies: Attendees had the opportunity to experience cutting-edge technologies and industry trends firsthand, including a tour of the Autonomous Ship Verification & Evaluation Research Centre, which assesses the performance and safety of Maritime Autonomous Surface Ships (MASS).

4. Case Studies from Participating Countries: Presentations from different countries showcased their experiences and lessons learned in applying maritime digital technologies, providing valuable insights and promoting knowledge exchange.

5. Recognition of Standardization Importance: The significance of the S-100 standard in maritime digitalization was emphasized, underscoring its role as a fundamental framework for enhancing maritime safety and operational efficiency.

### *Performance Analysis*

The Workshop on Enhancing Safety of Navigation with Maritime Digitalization was conducted with the primary aim of enhancing participants' knowledge and skills in maritime digitalization, e-navigation, and related topics. The feedback from the participants provides valuable insights into the effectiveness and overall reception of the event.

Regarding attendance and participation, 15 respondents representing the invitees from developing countries indicated active engagement throughout the workshop.

Participants unanimously confirmed that they received the invitation on time and were well-informed about the event's objectives, scope, subject areas, and required participant profile. All participants also received necessary logistical information about the venue, travel arrangements, DSA payments, and accommodation.

Regarding pre-event assignments, 80% of participants found them useful, while the rest marked them as not applicable. This suggests that the pre-event assignments were beneficial for most attendees in preparing for the workshop.

All participants unanimously deemed the duration of the event appropriate, indicating effective time management.

When evaluating the event's venue and facilities, participants rated them as excellent across the board. This included the venue, facilities, and equipment, all receiving a 100% excellent rating.

The presentation materials were also highly praised, with all participants rating the clarity, technical content, comprehensiveness, and quantity as excellent. This indicates that the materials were well-prepared and effectively supported the learning process.

In terms of the presentations and lecturers, all aspects, including design and structure, clarity, technical content, and comprehensiveness, received a 100% excellent rating. This reflects the high quality and effectiveness of the presentations.

The use of course materials, IMO reference materials, other resource materials, group and practical activities, and field trips were all rated as excellent by all participants. This highlights the comprehensive and practical nature of the workshop.

The individual lecturers, including Omar Ericksson, Minsu Jeon, Leonel Manteigas, and Cafer Ozkan Istanbullu, received unanimous praise for their content, delivery, ability to transfer knowledge, and effectiveness in answering questions and suggesting solutions. This indicates that the lecturers were well-received and effective in their roles.

Participants highlighted several topics of interest and relevance, including maritime digitalization, e-navigation, and S100&S200, with the Vessel Traffic Services (VTS) also mentioned. Most respondents indicated that no additional topics were needed, suggesting that the workshop covered the relevant areas comprehensively.

Overall, 93% of participants felt that the workshop met its objectives, and 87% found the outcomes likely to be useful to their administration. All participants indicated they would transfer the knowledge gained to their colleagues, reflecting the practical value and applicability of the workshop content.

Participants' comments were overwhelmingly positive, with remarks such as "Excellent Workshop," "Very well organized and fruitful workshop," and "I will share information with colleagues when I return to Vietnam," underscoring the success and impact of the event.

***Conclusions***

The necessity of digitalization in the maritime sector was established during the workshop. Implementing digital technologies is essential to drive innovation in maritime safety, environmental protection, and efficient transport. It was concluded that applying international standards, such as S-100, is critical for improving maritime safety and operational efficiency. Achieving these goals requires robust international cooperation. The importance of collaboration among countries and support from international organizations was underscored as crucial for advancing technological capabilities and ensuring the even development of digitalization across the region.

Based on the result of the evaluation questionnaire, the workshop on capacity building for maritime digitalization was highly successful, with unanimous positive feedback on all aspects, ranging from logistics to content delivery. The event met its objectives, provided valuable insights and knowledge, and facilitated effective learning and engagement among participants. The positive reception and the commitment of attendees to share the gained knowledge reflect the workshop's success and impact.

## 8. FOLLOW-UP ACTION

***International Cooperation***

Regular engagement with the International Maritime Organization (IMO), International Hydrographic Organization (IHO), and International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) through meetings and collaborative projects is necessary to ensure up-to-date information sharing on digitalization efforts and standardization. Promoting joint research initiatives and pilot projects will foster practical advancements in maritime digital technologies.

***Technical Education and Infrastructure***

Developing comprehensive training programs in collaboration with leading maritime institutions will equip maritime professionals with the necessary digital skills. Investing in building and upgrading maritime infrastructure, such as coastal radio stations, AIS systems, and VTS, is essential to support digital operations.

***Legal and Policy Frameworks***

A thorough review of existing maritime laws and policies should be conducted to identify areas needing updates to accommodate digital technologies. Engaging with policymakers to draft new regulations will support the seamless integration of digitalization in maritime operations.

***Data Standardization and Security***

Working toward the global adoption of the S-100 standard and other relevant standards will facilitate interoperable and efficient data exchange. Implementing robust cybersecurity measures is vital to protect maritime digital infrastructure from potential threats and vulnerabilities.

***Technology Testing and Pilot Programs***

Establishing dedicated testbed facilities for experimenting with new maritime digital technologies will ensure their reliability and safety before wider deployment. Launching pilot programs in selected ports or maritime zones will gather practical insights and allow for necessary adjustments before full-scale implementation.

***Workshops and Seminars***

Planning and executing a series of follow-up workshops and seminars focusing on specific aspects of maritime digitalization, such as autonomous ships and e-Navigation will be beneficial. Inviting international experts to share their experiences and best practices will foster a global exchange of knowledge and innovation.

By taking these detailed follow-up actions, the momentum gained from the 6th Asia-Pacific Regional Workshop on Enhancing Safety of Navigation with Maritime Digitalization can be sustained and built upon, driving further advancements in maritime digitalization across the region.

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**ANNEX 1**
**List of Participants (to be extracted from Excel file)**

| No. | COUNTRY | NAME AND SURNAME | GENDER | POSITION | CONTACT DETAILS OF NATIONAL AUTHORITY | IMO-funded / self-funded / National |
|---|---|---|---|---|---|---|
| 1 | Cambodia | Acrun BO | Male | Chief Officer, Ministry of Public Works and Transport | boacrun92@gmail.com | IMO-funded |
| 2 | Cambodia | Dararith HENG | Male | Deputy Director, Merchant Marine Department | dararith.hg@gmail.com | IMO-funded |
| 3 | Bangladesh | GM Mustafizur RAHMAN | Male | Nautical Surveyor, Merchant Marine office, Dep of Ship. | gmmustafiz@gmail.com | IMO-funded |
| 4 | Sri Lanka | Thakshila GUNASENA | Male | Captain, Sri Lanka Navy | sectonh@gmail.com | IMO-funded |
| 5 | Sri Lanka | Jayamal JAYAWARDANE | Male | Commander, Sri Lanka Navy | sectonh@gmail.com | IMO-funded |
| 6 | Viet Nam | Duc Quan PHAM | Male | Senior Official, Vietnam Maritime Administration | quanpham1001@gmail.com | IMO-funded |
| 7 | Viet Nam | Van Minh DOI | Male | Senior Official, Vietnam Maritime Administration | doivanminh@gmail.com | IMO-funded |
| 8 | Indonesia | Nurma Karima SARI | Female | Maritime Safety to Navi Officer, Directorate of Navigation DGST | djpl@dephub.go.id | IMO-funded |
| 9 | Indonesia | Edo RACHMAD | Male | Sub Coord of Survey for Chan and Waterways, Directorate of Navigation DGST | edo_bimawardana@dephub.go.id | IMO-funded |
| 10 | Philippines | Orly WONG | Male | Ass Dep Chief of Coast Guard, Philippine Coast Guard | nhqpcg8@gmail.com | IMO-funded |
| 11 | Philippines | Lorne Jasmin LERIO | Female | Officer in Charge Maritime Af, National Mapping and Resource Inf | ljdlerio@namria.gov.ph | IMO-funded |

| No. | COUNTRY | NAME AND SURNAME | GENDER | POSITION | CONTACT DETAILS OF NATIONAL AUTHORITY | IMO-funded / self-funded / National |
|---|---|---|---|---|---|---|
| 12 | Malaysia | Mohd Hisham RUBANI | Male | Senior Princ Ass Director, Malaysia Marine Department | mhisham@marine.gov.my | IMO-funded |
| 13 | Malaysia | Tahira Binti ZAKI | Female | Assistant Director, Malaysia Marine Department | tahira@marine.gov.my | IMO-funded |
| 14 | Timor-Leste | ROGERIO SOARES | Male | Chef of Department Harbour, Nat Direc of Maritime Transp | rogeriosoaresdntm@gmail.com | IMO-funded |
| 15 | Timor-Leste | João FERNANDES | Male | Chef of Section Harbour Mas, Nat Direc of Maritime Transp | jfernandes5875@gmail.com | IMO-funded |
| * | Bangladesh | Quazi Muhammed AHSAN | Male | Nautical Surveyor and Examiner, Deparment of Shipping, Bangladesh | nse.ahsan@dos.gov.bd | IMO-funded |

* Quazi Muhammed AHSAN (Bangladesh) was informed by his organization one day before his departure that they had notified the relevant parties of his inability to attend due to "unavoidable circumstances."

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**ANNEX 2**
**List of IMO consultants and subjects covered by each of them**

| No. | COUNTRY | NAME AND SURNAME | GENDER | AFFILIATION | POSITION | REMARKS |
|---|---|---|---|---|---|---|
| 1 | Türkiye | Cafer Ozkan ISTANBULLU | Male | IMO | Technical Officer | Representative/ Speaker |
| 2 | Portugal | Leonel Pereira MANTEIGAS | Male | IHO | Assistant Director | Representative/ Speaker Self-Funded |
| 3 | Denmark | Omar Frits ERIKSSON | Male | IALA | Deputy Secretary-General / Dean | Representative/ Speaker Self-Funded |
| 4 | Republic of Korea | Minsu JEON | Male | IALA | Manager | IALA Speaker Self-Funded |
| 5 | Republic of Korea | Seong-Yong CHOI | Male | Ministry of Oceans and Fisheries | Director General, Maritime Safety Policy Bureau | |
| 6 | Republic of Korea | In-su KIM | Male | Ministry of Oceans and Fisheries | Director of Advanced Maritime Transportation Service Team | |
| 7 | Republic of Korea | Sangcheol SIM | Male | Ministry of Oceans and Fisheries | Director of Aid to Navigation Division | |
| 8 | Republic of Korea | Sam-jun LEE | Male | Ministry of Oceans and Fisheries | Deputy Director | |
| 9 | Republic of Korea | Chanock SHIN | Male | Ministry of Oceans and Fisheries | Assistant Director | |

| No. | COUNTRY | NAME AND SURNAME | GENDER | AFFILIATION | POSITION | REMARKS |
|---|---|---|---|---|---|---|
| 10 | Republic of Korea | Yong Chan BAE | Male | Ministry of Oceans and Fisheries | Assistant Director | |
| 11 | Republic of Korea | Jong-woo HWANG | Male | Korea Maritime Cooperation Center | Chair | |
| 12 | Republic of Korea | Wansoo AN | Male | Korea Maritime Cooperation Center | Chief Executive | |
| 13 | Republic of Korea | Dayoung PARK | Female | Korea Maritime Cooperation Center | Researcher | MC/Project Manager |
| 14 | Republic of Korea | Samel AN | Female | Korea Maritime Cooperation Center | Researcher | |
| 15 | Republic of Korea | Geuntaek RO | Male | Korea Maritime Cooperation Center | Researcher | |
| 16 | Republic of Korea | Seoyoung LIM | Female | Korea Maritime Cooperation Center | Administrator | |
| 17 | Republic of Korea | Hyunjung KIM | Male | Korea Maritime Cooperation Center | Translator | |
| 18 | Republic of Korea | Baek Soo KIM | Male | Korea Hydrography and Research Association | Board President | |
| 19 | Republic of Korea | Gwang-Youl PARK | Male | Korea Institute of Aids to Navigation | President | |

| No. | COUNTRY | NAME AND SURNAME | GENDER | AFFILIATION | POSITION | REMARKS |
|---|---|---|---|---|---|---|
| 20 | Republic of Korea | Naehyeok YU | Female | Korea Institute of Aids to Navigation | Senior Manager | |
| 21 | Republic of Korea | Chunghyeok LEE | Male | Korea Institute of Aids to Navigation | Senior Manager | |
| 22 | Republic of Korea | Soyeong LEE | Female | Mokpo National Maritime University | Researcher | |
| 23 | Republic of Korea | Jin Hyeong PARK | Male | AIVeNautics | CEO | Session speaker |
| 24 | Republic of Korea | Inho LEE | Male | HD HYUNDAI Marine Solution | Head of Green Solution Engineering / Director | Session speaker |
| 25 | Republic of Korea | Han Jin LEE | Male | Korea Research Institute of Ship & Ocean Engineering | Principal Researcher | Session speaker |
| 26 | Republic of Korea | Jongbum WON | Male | Korean Register | Principal Surveyor | Session speaker |
| 27 | Republic of Korea | Sang Hyeon LEE | Male | Korea Hydrography and Research Association | Team Leader | Session speaker |

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**ANNEX 3**
**List of Participants (registered)**

## 「 Workshop on Enhancing Safety of Navigation with Maritime digitalization 」 List of participants (7.9)

| No | Institution | Position | Name | Signature |
|---|---|---|---|---|
| 1 | Ministry of Oceans and Fisheries | Director General, Maritime Safety Policy Bureau | Seong-Yong CHOI | |
| 2 | Ministry of Oceans and Fisheries | Director of Advanced Maritime Transportation Service Team | In-su KIM | |
| 3 | Ministry of Oceans and Fisheries | Deputy Director | Sam-jun LEE | |
| 4 | Ministry of Oceans and Fisheries | Assistant Director | Chanock Shin | |
| 5 | Ministry of Oceans and Fisheries | Director of Aid to Navigation Division | Sangcheol SIM | |
| 6 | Ministry of Oceans and Fisheries | Assistant Director | Yong Chan BAE | |
| 7 | Korea Maritime Cooperation Center | Chair | Jong-woo HWANG | |
| 8 | Korea Maritime Cooperation Center | Chief Excecutive | Wansoo AN | |
| 9 | Korea Institute of Aids to Navigation | President | Gwang-Youl PARK | |
| 10 | Korea Hydrography and Research Association | Board President | Baek Soo KIM | |
| 11 | IALA | Deputy Secretary-General / Dean | Omar Frits Eriksson | |
| 12 | IALA | Manager | Minsu JEON | |
| 13 | IHO | Assistant Director | Leonel Manteigas | |
| 14 | IMO | Technical Officer | Cafer Ozkan Istanbullu | |
| 15 | Korea Research Institute of Ship & Ocean Engineering | Principal Researcher | Han Jin LEE | |
| 16 | Korea Hydrography and Research Association | Team Leader | Sang Hyeon LEE | |
| 17 | Korean Register | Principal Surveyor | Jongbum WON | |

| No | Institution | Position | Name | Signature |
|---|---|---|---|---|
| 18 | HD HYUNDAI Marine Solution | Head of Green Solution Engineering / Director | Inho LEE | |
| 19 | AIVeNautics | CEO | Jin Hyeong PARK | |
| 20 | Merchant Marine office, Dep of Ship. | Nautical Surveyor | GM Mustafizur RAHMAN | |
| 21 | Deparment of Shipping, Bangladesh | Nautical Surveyor and Examiner | Quasi Muhammed AHSAN | |
| 22 | Ministry of Public Works and Transport | Chief Officer | Acrun BO | |
| 23 | Merchant Marine Department | Deputy Director | Dararith HENG | |
| 24 | Directorate of Navigation DGST | Maritime Safety to Navi Officer | Nurma Karima SARI | |
| 25 | Directorate of Navigation DGST | Sub Coord of Survey for Chan and Waterways | Edo RACHMAD | |
| 26 | Malaysia Marine Department | Senior Princ Ass Director | Mohd Hisham RUBANI | |
| 27 | Malaysia Marine Department | Assistant Director | Tahira Binti ZAKI | |
| 28 | Philippine Coast Guard | Ass Dep Chief of Coast Guard | Orly WONG | |
| 29 | National Mapping and Resource Inf | Officer in Charge Maritime Af | Lorne Jasmin LERIO | |
| 30 | Sri Lanka Navy | Captain | Thakshila GUNASENA | |
| 31 | Sri Lanka Navy | Commander | Jayamal JAYAWARDANE | |
| 32 | Vietnam Maritime Administration | Senior Official | Duc Quan PHAM | |
| 33 | Vietnam Maritime Administration | Senior Official | Van Minh DOI | |
| 34 | Nat Direc of Maritime Transp | Chef of Department Harbour | ROGERIO SOARES | |
| 35 | Nat Direc of Maritime Transp | Chef of Section Harbour Mas | João FERNANDES | |
| 36 | Korea Institute of Aids to Navigation | Senior Manager | Naehyeok YU | |

| No | Institution | Position | Name | Signature |
|---|---|---|---|---|
| 37 | Mokpo National Maritime University | Researcher | Soyeong LEE | |
| 38 | Korea Maritime Cooperation Center | Researcher | Dayoung PARK | |
| 39 | Korea Maritime Cooperation Center | Researcher | Samel AN | |
| 40 | Korea Maritime Cooperation Center | Researcher | Geuntaek RO | |
| 41 | Korea Maritime Cooperation Center | Administrator | Seoyoung LIM | |
| 42 | Korea Maritime Cooperation Center | Translator | Hyunjung KIM | |
| 43 | Korea Institute of Aids to Navigation | Senior Manager | Naehyeok YU | |
| 44 | Korea Institute of Aids to Navigation | Senior Manager | Chunghyeok LEE | |
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## ANNEX 4

## Programme

**Workshop on**

# Enhancing Safety of Navigation with Maritime digitalization

**Interciti hotel, Daejeon city, Republic of Korea**

9 – 11 July 2024

## WORKSHOP PROGRAMME

The workshop aims to facilitate the development and implementation of digital services that can enhance maritime safety and marine environment protection in Asia. The workshop will provide examples of digital service delivery and an opportunity to discuss topics relating to enhancing the safety of navigation.

### Day 1, Tuesday 9 July 2024

| Time | Activity | Chair/presenter |
|---|---|---|
| **10:00** | **Session 1, Opening ceremony** | **MC:** Dayoung Park, Researcher |
| 5 min | Welcome address from Korea | Seong-yong CHOI, MOF |
| 5 min | Welcome Address from IMO | Cafer Ozkan Istanbullu, IMO |
| 5 min | Welcome Address from IHO | Leonel Manteigas, IHO |
| 5 min | Welcome Address from IALA | Omar Eriksson, IALA |
| 20 min | Participants Introduction, Group Photo | |
| **10:40** | **Coffee Break** | |
| **11:00** | **Session 2, Update from international organizations** | **Chair:** Minsu Jeon, IALA |
| 15 min | Update from IMO<br>(digitalization in maritime radiocommunications and related developments at IMO) | Cafer Ozkan Istanbullu, IMO |
| 15 min | Update from IHO<br>(IHO Capacity Building contribute to the safety of navigation and maritime digitalization) | Leonel Manteigas, IHO |
| 15 min | Update from IALA | Omar Eriksson, IALA |
| 15 min | Discussion, Q A | |
| **12:00** | **Lunch** | **Venue: 16th floor, Interciti hotel** |
| **13:30** | **Session 3, Sharing Digital Experiences** | **Chair:** Leonel Manteigas, IHO |
| 15 min | S-100 Korea update | Sang-hyun Lee, KHRA |
| 15 min | IALA S-200 testbed, training and sea trial | Minsu Jeon, IALA |
| 15 min | S-100 contribute to the safety and efficiency of navigation and maritime digitalization | Leonel Manteigas, IHO |
| 15 min | The Maritime Connectivity Platform | Jin-hyoung Park, AIVN |
| 20 min | Discussion, Q A | |
| **14:50** | **Coffee Break** | |

**Workshop on**

# Ehancing Safety of Navigation with Maritime digitalization

Daejeon, Republic of Korea, 9-11 July 2024

| | | |
|---|---|---|
| **15:10** | **Session 4 and 5, Presentations of Participating Countries** | **Chair:** Omar, IALA |
| 20 min | Integrated Maritime Navigation and Communication System in Bangladesh | Bangladesh |
| 20 min | Port Electronic Data Interchange (Port EDI) | Cambodia |
| 20 min | The Update on Digitalization Initiatives in Directorate General of Sea Transportation, Indonesia | Indonesia |
| 20 min | Advance AIS AtoN and Digitalisation | Malaysia |
| 20 min | The Status of Safety of Navigation in the Philippines | Philippines |
| 20 min | Digitalizing Maritime Services: Readiness of Philippines Hydrographic Office in Adopting Global Call | Philippines |
| 20 min | Maritime Digitalization In Ensuring The Safe Navigation In Sri Lankan Waters | Sri Lanka |
| 20 min | Ministry Transportation and Communication National Directorate of Maritime Transport Timor-Leste: Maritime Interests ofTimor-Leste | Timor-Leste |
| 20 min | The role of the Maritime Traffic Monitoring and Coordination System (VTS) in ensuring maritime safety and security in Vietnam | Viet Nam |
| **18:10** | **Banquet** | **Venue: 4th floor, Interciti hotel** |

## Day 2, Wednesday 10 July 2024

| Time | Activity | Chair/presenter |
|---|---|---|
| **09:30** | **Technical tour 1** | |
| 30 min | Move (Daejeon→KRISO) | |
| 90 min | Korea Research Institute of Ships and Ocean Engineering | KRISO, Daejeon |
| 90 min | Lunch | Near KRISO(Chinese food) |
| 30 min | Move (KRISO→Daejeon) | |
| 30 min | Korea e-Navigation | Interciti hotel, Daejeon |
| **14:00** | **Coffee break** | |
| **14:20** | **Session 6, Maritime Mobility** | **Chair:** Cafer Ozkan Istanbullu, IMO Technical Officer |
| 20 min | Maritime digitalization | Han-jin Lee, KRISO |
| 20 min | Eco-Friendly Ship | In-ho Lee, HD Hyundai marine solution |
| 20 min | Maritime Digitalization with Autonomour Ship | Jongbum Won, KR |
| 20 min | Discussion, Q A | |
| **15:40** | **Session 7, Closing ceremony** | **MC:** Dayoung Park, Researcher |

**Workshop on**

## Ehancing Safety of Navigation with Maritime digitalization

Daejeon, Republic of Korea, 9-11 July 2024

| | | |
|---|---|---|
| 5 min | Closing remarks | Omar Eriksson, IALA |
| 5 min | Closing remarks | Leonel Manteigas, IHO |
| 5 min | Closing remarks | Cafer Ozkan Istanbullu, IMO |
| 5 min | Closing remarks | In-su Kim, Director of Advanced Transportation Service Team, MOF |
| **16:00** | **Closing** | |
| **-** | **Free evening** | |

### Day 3, Thursday 11 July 2024

| Time | Activity | Chair/presenter |
|---|---|---|
| **07:00** | **Technical tour 2** | Breakfast box |
| 4 hour | Move (Daejeon→Ulsan) | |
| 60 min | **Autonomous Ship Verification Evaluation Research Centre** | Ulsan |
| **12:00** | **Lunch** | In the MASS Center |
| 60 min | Move (Ulsan→Hyundai) | |
| **13:00** | **Hyundai Heavy Industries** | |
| 70 min | 1) Visit to the Asan Exhibition Hall<br>2) Watch a promotional film<br>3) Yard tour<br>4) Introduce the Ship Research Institute's Tank Building | |
| 50 min | Move to and Introduce the **General Research Building**<br>1) Arrive at the General Research Building<br>2) Introduce the Institute of Future Technology and Current Status of Ship Digital Technology Development | |
| **15:00** | Move (Ulsan→Daejeon) | |
| **19:00** | Farewell Dinner | **Venue:** Vesta buffet, Daejeon |

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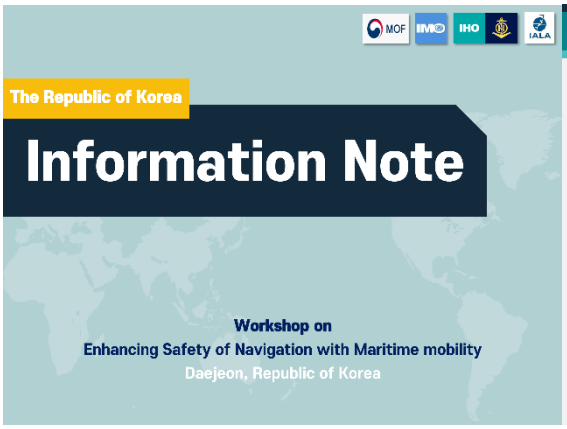
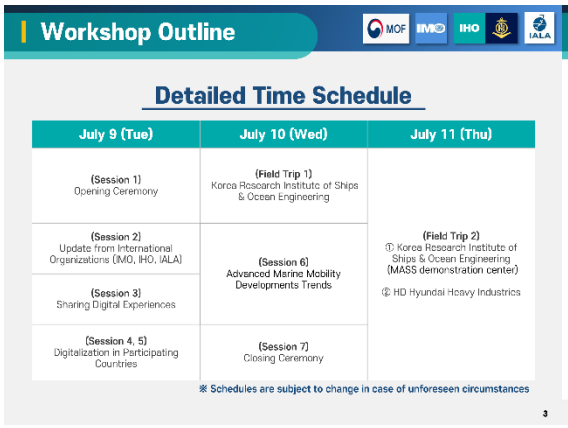
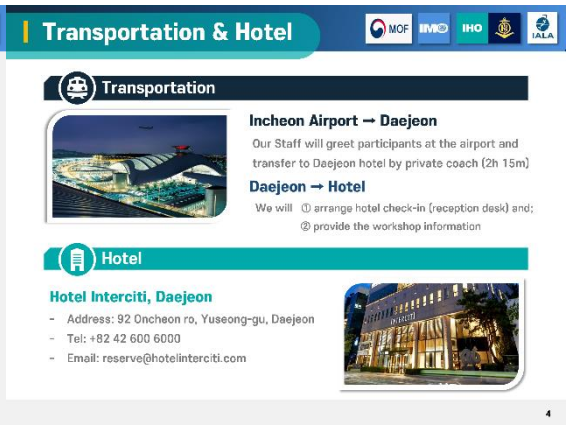
## ANNEX 5
## Pre-activity Assignments

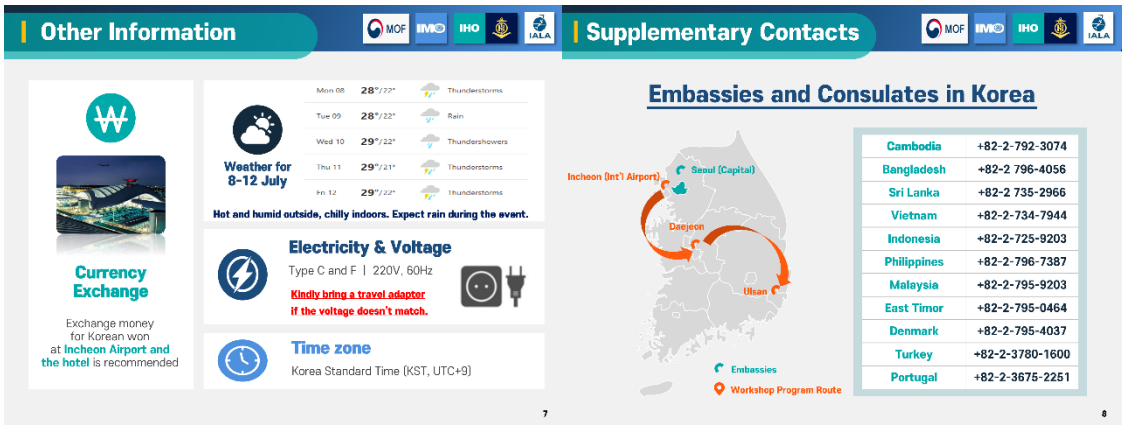









Other Information
MOF IMO IHO IALA
Currency Exchange
Exchange money for Korean won at Incheon Airport and the hotel is recommended
Weather for 8-12 July
Mon 08 28°/22° Thunderstorms
Tue 09 28°/22° Rain
Wed 10 29°/22° Thundershowers
Thu 11 29°/21° Thunderstorms
Fri 12 29°/22° Thunderstorms
Hot and humid outside, chilly indoors. Expect rain during the event.
Electricity & Voltage
Type C and F | 220V, 60Hz
Kindly bring a travel adaptor if the voltage doesn't match.
Time zone
Korea Standard Time (KST, UTC+9)
7
Supplementary Contacts
MOF IMO IHO IALA
Embassies and Consulates in Korea
Incheon (Int'l Airport)
Seoul (Capital)
Daejeon
Ulsan
Embassies
Workshop Program Route
Cambodia +82-2-792-3074
Bangladesh +82-2 796-4056
Sri Lanka +82-2 735-2966
Vietnam +82-2-734-7944
Indonesia +82-2-725-9203
Philippines +82-2-796-7387
Malaysia +82-2-795-9203
East Timor +82-2-795-0464
Denmark +82-2-795-4037
Turkey +82-2-3780-1600
Portugal +82-2-3675-2251
8


MOF IMO IHO IALA
Thank you
Workshop on
Enhancing Safety of Navigation with Maritime mobility
Daejeon, Republic of Korea

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## ANNEX 6
## Statements (Opening and closing ceremonies)
# OPENING CEREMONY

### 1. Seong-yong Choi, Director General, the Maritime Safety Bureau, MOF

*Ladies and gentlemen, it's a pleasure to meet you. I am Choi Seong-yong, Director General of the Maritime Safety Bureau of the Ministry of Oceans and Fisheries.*
*I sincerely welcome all participants to the '6th Asia-Pacific Regional Workshop on Enhancing Safety of Navigation with Maritime Digitalization'. First, I would like to express my deepest gratitude to Mr. Omar Eriksson, Deputy Secretary-General of the International Association of Marine Aids to Navigation and Lighthouse Authorities, Mr. Leonel Manteigas, Assistant Director of the International Hydrographic Organization, and Mr. Cafer Ozkan Istanbullu, Technical Officer of the International Maritime Organization, for their support in successfully organizing this workshop.*

*I would like to extend my special thanks and welcome to all the experts for giving valuable presentations at this workshop.*
*Beginning in 2018, this workshop marks its 6th anniversary this year and has been continuously striving to promote the adoption of maritime digital technologies in the Asia-Pacific region.*

*Honorable participants, Digitalization in the maritime sector is no longer an option but a necessity. This will bring innovation in various aspects such as maritime safety, environmental protection, and efficient maritime transport. In this workshop, we will share trends and application cases of maritime digital technology development from each country, and introduce the current status of the research and industry practices on advanced maritime mobility such as green vessels and maritime autonomous surface ships.*

*In particular, we have arranged opportunities to directly experience the latest technologies and industry trends through technical tours of facilities in Korea such as the Autonomous Ship Verification & Evaluation Research Centre that evaluates and verifies the performance and safety of MASS.*

*Distinguished participants, I hope this workshop will be an invaluable time to promote maritime digitalization in the Asia-Pacific region and enhance understanding of advanced maritime mobility technology development. I hope that through the various sessions and technical tours over the next three days, all of you will have a precious opportunity to share your knowledge and experiences and strengthen international cooperation.*

*Once again, thank you for your attendance, and I wish this workshop great success.*
*Thank you.*

### 2. Cafer Ozkan Istanbullu, Technical Officer, IMO

*The Director General Seong-Yong Choi,*
*Distinguished speakers, participants, ladies and gentlemen,*
*Good morning to you all.*

*On behalf of Mr. Arsenio Dominguez, the Secretary-General of the International Maritime Organization (IMO), it is my honour to welcome you to the "Workshop on Capacity Building for Maritime Digitalization". This event is generously supported by the Republic of Korea under the Memorandum of Understanding on technical cooperation between IMO and the Republic of Korea.*

*I extend our deepest gratitude to the Republic of Korea for their solid contribution to the enhancement of maritime safety and efficiency. This partnership highlights our shared dedication to advancing maritime technology and safety standards globally.*

*I would also like to acknowledge and thank the International Hydrographic Organization (IHO) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) for their invaluable support and contributions. Their expertise will significantly enhance our understanding of maritime digitalization trends.*

*I warmly welcome our distinguished participants from 8 countries in the region (Bangladesh, Cambodia, Indonesia, Malaysia, the Philippines, Sri Lanka, Timor-Leste, and Viet Nam). Your presence here is very much appreciated and it underscores the importance and the strength of technical cooperation activities such as this one.*

*Allow me to introduce myself. My name is Cafer Ozkan Istanbullu, and I have had the privilege of serving as a Technical Officer at the IMO since December 2020. I'm a former master mariner, I worked at sea for a while then became a Flag and Port State surveyor in the Turkish Maritime Administration. Shortly after that, I started a new adventure at the International Mobile Satellite Organization (IMSO) which lasted 13 years, until I joined the IMO Secretariat. I work in the Maritime Safety Division and mainly deal with matters related to radiocommunications, in particular, GMDSS and LRIT.*

*On a personal note, I'm delighted to be back again in South Korea after my two previous visits in 2002 and 2010. Some of you may not know but Turkey, my home country, and South Korea have a special bond that was established a long time ago with Turkey's participation in the Korean War in the 1950s. Ever since Koreans have called us "blood brothers", which is a true honour to me.*

*Dear participants,*
*This year's World Maritime theme is: "Navigating the Future: Safety First!". This theme is a pledge to uphold the highest standards of safety in every aspect of IMO's regulatory work while facing the challenges of a fast-changing world, with respect to challenges such as climate change; developments in technology, artificial intelligence; and new threats faced by the shipping industry. Therefore, I consider this event an opportunity to "navigate the future" in the region towards a better safety record.*

*Digitalization and data-driven technologies have gained an enormous pace over the last decades, from smart phones to autonomous cars, from the Internet of Things (IoT) to satellite communications, it is now everywhere. Of course, shipping is also taking its fair share from these developments. As the leading regulatory body in maritime, IMO is coordinating many of these developments together with its Member States, other international organizations, industry partners, and all interested parties. A lot is happening at the moment; e-navigation, Maritime Autonomous Surface Ships (MASS), digital communication technologies, and electronic navigational charts are just a few to name.*

*IMO is committed to utilizing digital technologies to improve maritime safety, security, and the protection of the marine environment. On the other hand, IMO takes new steps towards new technologies and systems with caution to ensure that all Member States can keep up with these changes and no one is left behind. In this respect, technical cooperation and assistance, in particular, workshops like this play a key role in achieving this objective.*

*In closing, I would like to express my sincere appreciation to the Republic of Korea for their continued support and partnership with the IMO. Special thanks to the KMC for hosting this activity, in particular Miss Dayoung Park and Miss Erica Lee, they have been so brilliant and meticulous in every detail. Also, thanks to Mr. Leonel Manteigas from IHO, Mr. Omar Ericsson and Mr. Minsu Jeon from IALA,*

*and my colleagues in the Technical Cooperation and Implementation Division for their time, effort, dedication, and support for this event.*

*Last but not least, thank you to all participants. Your presence here is important in understanding and contributing to the future of maritime digitalization and ensuring we meet the highest standards of safety and efficiency globally.*
*I wish you all a productive and insightful workshop.*

**3. Leonel Pereira Manteigas, Assistant Director, IHO**

*Mr. Seong-yong CHOI, Director General of Maritime Affairs and Safety Policy Bureau, Ministry of Oceans and Fisheries (MOF),*
*Mr. Cafer Ozkan Istanbullu, Technical Officer, Maritime Safety Division, IMO*
*Mr. Omar Eriksson, Deputy Secretary-General and Dean of the World Wide Academy, International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)*
*Distinguished guests and participants in the Workshop on Enhancing Safety of Navigation with Maritime Digitalization in the now-raining Daejeon city, Republic of Korea,*

*Please accept my warmest greetings on behalf of the IHO Secretary General and the International Hydrographic Community and my biggest thanks for the opportunity to participate once again in this important event for the Maritime community.*

*It is an honor for me to be here to represent the International Hydrographic Organization in this technical workshop organized by the Ministry of Oceans and Fisheries of ROK and with my distinguished colleagues from our sister organizations, the IMO and IALA.*

*This workshop is related to the enhancement of the Safety of Navigation with Maritime Digitalization which is aligned with the theme of the World Hydrography Day 2024: "Hydrographic Information - Enhancing safety, efficiency, and sustainability in marine activities". We are in a very important time for the implementation of an important, called by some, revolution, in the Nautical Cartographic products with the implementation of the S-100 a universal data model that will contribute in a determining way to enhance the safety, efficiency, and also sustainability of the navigation and other marine activities. This data model as we will see will integrate different kinds of information from different areas and different organizations but goes far beyond creating the conditions to go from the 2,5 dimensions to a 4 dimension with the integration of the possibility to have the change of the depths with the water level and with the time.*

*For the IHO and the Hydrographic Community this is our main focus since we are in a critical time for the respective implementation but, as you will see we can't forget others. The full community is joining efforts together to meet the established road map for the implementation.*

*The Capacity Building has an important role and in the IHO we are in a time of changes to what I believe would be a Capacity Building more capable and effective. I will talk about this and the way the IHO develops the Capacity Building strategy in my presentation.*

*The program of this workshop is intense and with very relevant topics, so I wish all of you an excellent workshop that can contribute to the discussion, sharing, and knowledge on the topics that we will discuss here in the next few days. On the other side, this workshop is also a very good example of the best practices in terms of partnership with three international organizations, in the workshop's organization the IMO, IALA, and IHO, to move together and deliver the respective capacity-building programmes, when possible "as one" to have more effective and efficient activities contributing to enhancing the safety of navigation with maritime digitalization.*
*Thank you very much for your kind attention.*

**4. Omar Eriksson, Deputy Secretary-General/Dean, IALA**

*Distinguished Guests, Ladies and Gentlemen,*

*It is my great pleasure to welcome you to the "Workshop on Enhancing Safety of Navigation with Maritime Digitalization." As the Deputy Secretary-General and Dean of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), I am honored to address this esteemed gathering here in Daejeon, Republic of Korea.*

*First and foremost, I would like to extend my sincere gratitude to all of you for attending this important workshop. For several years now, we have been conducting these capacity-building workshops across the Asia-Pacific region. The primary goal of these workshops is to enlighten participating countries about the latest developments in maritime digitalization. We focus on the pioneering work being carried out by international organizations such as the International Maritime Organization (IMO), IALA, and the International Hydrographic Organization (IHO). Moreover, these workshops provide a crucial platform for gathering feedback from these nations on how they are advancing their digitalization initiatives and plans.*

*The international trends in digitalization have largely centered around the development of standards, such as the S-100 based data models, which are fundamental to the efficient transfer of information. Standardization is indeed the backbone of digitalization, enabling seamless integration and communication across various maritime services. However, while these standards are indispensable, there is a growing need for the development of better infrastructure to ensure that this data and information can be efficiently transported from point A to point B.*

*This challenge is particularly pronounced at sea, where the lack of robust infrastructure has often impeded progress. Yet, we are now witnessing significant strides forward. With the advent of new communication channels like VDES (VHF Data Exchange System), NAVDAT, and AIS (Automatic Identification System), alongside the rise of satellite-based internet connectivity, the maritime industry is on the cusp of a digital revolution. These advancements are critical—they not only enhance safety and efficiency but also pave the way for the comprehensive digitalization of maritime operations.*

*At IALA, we are fully committed to supporting our member states as they adapt to these rapid technological changes. Through technical cooperation and targeted assistance, we aim to provide the resources and knowledge necessary for every nation to benefit from digitalization, ensuring that no one is left behind.*

*I would like to extend my heartfelt gratitude to the Republic of Korea for their invaluable support, as well as to IMO and IHO for our ongoing collaboration. Additionally, I would like to thank KMC for hosting this important event. The success of this workshop depends on the active participation and shared expertise of all attendees, and I am confident that our discussions will contribute significantly to promoting global maritime digitalization and safety standards.*

*I am confident that today's workshop will provide you with valuable insights and inspiration for your ongoing digitalization efforts. The discussions and exchanges we have here today will be instrumental in shaping the future of maritime digitalization, not just within the Asia-Pacific region but globally. I eagerly look forward to hearing your perspectives, learning from your experiences, and working together to chart a course toward a safer, more efficient, and digitally connected maritime industry. Thank you once again for your participation, and I wish you a fruitful and engaging workshop.*

# CLOSING CEREMONY

**1. Omer Frits ERIKSSON, Denmark, Deputy Secretary-General/Dean, IALA**

*Here we are after a couple of days of sharing information, sharing knowledge, and trying to understand where we are. The whole purpose was of course to cross-pollinate each other and for us to tell you what is happening in the international arena for you to tell us where you are on your journey towards full-fledged digitalization at home. And I for one have to say that I am quite encouraged by developments because I've seen these reports now for a few years and they're getting better and better and they're getting closer and closer to something real, something tangible in terms of, I could use the word, e-navigation. We talk about e-navigation more than e-navigation in Ireland nowadays. But it's been a great pleasure to meet each and every one of you. And I hope that at least some of you we will from the Academy, from IALA, we will have some more interaction before we meet next time in this forum. I hope that I'm talking with a couple of you, a few of you, about training opportunities with the Academy. So that's an offering that is there. And I, incidentally, will not be coming for the technical tour. I will be traveling back to Europe tomorrow. So, I have to say goodbye. And au revoir, as they say. I hope to see you again. And have a good day tomorrow.*

**2. Leonel Pereira MANTEIGAS, Portugal, Assistant Director, IHO**

*Mr. In-su Kim, Director of the Advanced Transportation Service Team, Ministry of Oceans and Fisheries (MOF),*
*Mr. Cafer Ozkan Istanbullu, Technical Officer, Maritime Safety Division, IMO*
*Mr. Omar Eriksson, Deputy Secretary-General and Dean of the World Wide Academy, International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)*
*Distinguished guests and participants on the Workshop on Enhancing Safety of Navigation with Maritime Digitalization.*

*I really appreciated the participation in this workshop that provided the opportunity to discuss with the participants the objectives and main focus of the IHO CB programme, receive updates from our sister organizations such as the developments at IMO related to the digitalization in Maritime and the updates from IALA that soon will become an Inter-Governmental Organization.*
*Some very informative and relevant presentations related to the S-100 Universal data model were provided by IHO, IALA, the Korea Hydrographic Research Association, and the Republic of Korea, and also the Maritime Connectivity Platform from AIVeNautics Corporation. The excellent presentations from the participating Countries were, for me, very relevant and useful since for each organization is very important to assess and debate the capacities, development, and concerns of the Coastal states, and the presentations provided an important contribution.*
*Today we did visit KRISO and had the privilege to watch more relevant presentations related to the Korean e-Navigation, Maritime digitalization, Eco-Friendly Ships, and Maritime Digitalization with Autonomous Ships.*
*We all know that there are important transformations progressing in this area, such as the Maritime autonomous surface ships and the e-Navigation that require the adaptation of structures, data, information, and products to support them.*
*From the IHO side, we have this big challenge that is the S-100 data model, involving IMO, IALA in the S-200, IOC in the S-300, WMO and others in the S-400, and the military information in the S-500. We have a plan established and approved for the implementation, and the hydrographic community is concerned but committed as we heard here.*
*I am pretty sure that you will agree with me on the importance of this workshop, on the quality of the presentations, the relevance of the debates, and the value of networking. Taking this into consideration, the Republic of Korea once again demonstrated to be in the frontline of the maritime*

*developments and I really hope that there will be more similar workshops to allow us to progress together on the safety and efficiency of the navigation.*
*Finally, I would like to present my recognition and thanks to ROK and the Ministry of Oceans and Fisheries (MOF) for the continuous support to the Maritime community in diverse and different ways and also in supporting these relevant events.*

**3. Cafer Ozkan ISTANBULLU, Türkiye, Technical Officer, IMO**

*I promise not to exceed my time. First of all, I can just echo what I heard from my colleagues. it's been a very successful workshop, I believe. I'm very impressed with the level of preparation each delegation has made and presented during their presentations. It's been really eye-opening. And it's encouraging also to see the level of progress made towards digitalization in your own countries. It's very promising. Again, thank you, and congratulations on your progress so far. And of course, there's still more to do. But I think with the collaboration and events like this, it will no longer be a big challenge. Everything is going to be much easier. easier with I'd like to thank of course the Republic of Korea for organizing this event, inviting all participants including speakers. Also, thanks sincerely to fellow speakers for their time and for sharing their information with the workshop and also to you participants. I know everyone is so busy in their data labs and making the effort to come here, spending time with us, listening to each other, and having conversations. I think thank you very much for all of your dedication and efforts. With that, I'd like to again thank you for having me here as a representative. I understand this was the sixth workshop and not the last one as well. So, I understand the Republic of Korea is committed to continuing this initiative, which is very much appreciated. Thank you very much.*

**4. In-Su KIM, Republic of Korea, Director of Advanced Transportation Service Team, MOF**

*Thank you for giving me a final remark. Distinguished participants, the 6th ASAP-SPEC Regional Workshop on Enhancing Safety on Navigation with My Time Stylization held in Daejeon over the past two days has successfully concluded. This workshop was a valuable opportunity to share international trends in maritime digital technology application cases from various countries and the current status of advanced maritime mobility development. In particular, I believe the sessions on the current status of maritime digital technology presented by international organizations and various countries, as well as the development trend in advanced maritime mobility, were very beneficial. The Republic of Korea will continue to cooperate with countries in the Asia Pacific region to create a safer and cleaner ocean.I would like to express my deepest gratitude to Mr. Omar Eriksson from IALA, Mr. Leonel Pereira Manteigas from IHO, and Mr Cafer Ozkan Istanbullu from IMO. I hope this workshop has been meaningful and free time for all participants, and I look forward to seeing you again at the 7th workshop next year. Thank you.*

***

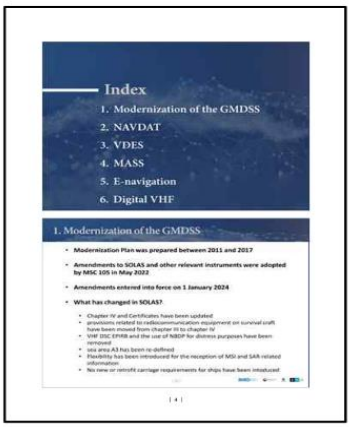
# ANNEX 7

## Synopsis of lectures

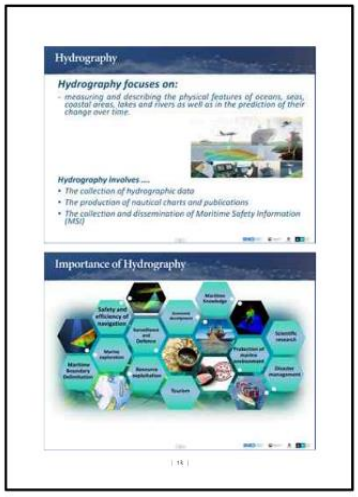








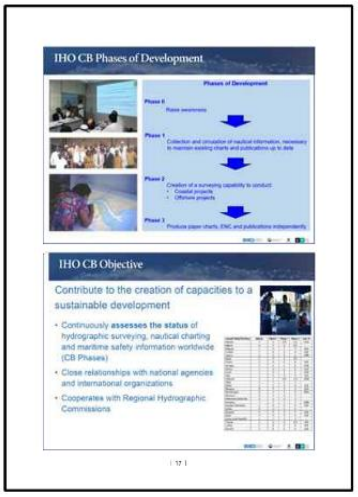



Hydrography
Hydrography focuses on:
- measuring and describing the physical features of oceans, seas, coastal areas, lakes and rivers as well as in the prediction of their change over time.
Hydrography involves ....
• The collection of hydrographic data
• The production of nautical charts and publications
• The collection and dissemination of Maritime Safety Information (MSI)
Importance of Hydrography

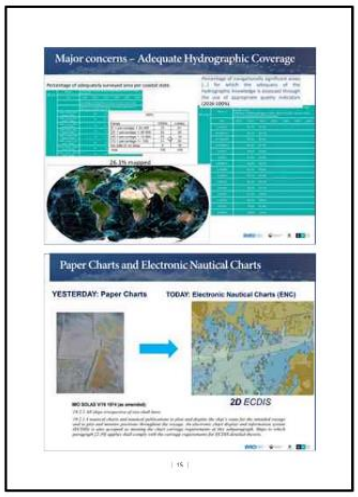

THE FUTURE: S-101 Future ENC and S-100 products
4D ECDIS (include vertical dimension and real time information)
THE FUTURE: S-101 Future ENC and S-100 products
THE TRANSITION FROM S-57 TO S-100:
A REALITY BY 2030!!!
1ST JAN 2026


IHO CB Expected contribution to raise the Funds
Fund Generation Project Team
IC-ENC Circular Letter – No. 01 of 2024
IHO CB Activities


… Safety and Efficiency of Navigation
Theme for World Hydrography Day 2024:
"Hydrographic Information - Enhancing safety, efficiency and sustainability in marine activities"
Major concerns – Maritime Safety Information


IHO CB Phases of Development
Phases of Development
IHO CB Objective
Contribute to the creation of capacities to a sustainable development
• Continuously assesses the status of hydrographic surveying, nautical charting and maritime safety information worldwide (CB Phases)
• Close relationships with national agencies and international organizations
• Cooperates with Regional Hydrographic Commissions


Partnerships
IMO
WMO
UNESCO
IAEA
IALA
FIG
IHO e-Learning Center
Open up the future of oceans in your palm today


Major concerns – Adequate Hydrographic Coverage
Paper Charts and Electronic Nautical Charts
YESTERDAY: Paper Charts
TODAY: Electronic Nautical Charts (ENC)
2D ECDIS


IHO CB Activities
Broad variety of activities
• High level visits
• Technical visits
• Training
• Education
• Technical assistance
• Involvement in comprehensive projects
IHO CB offers every year
• 2 students for Master of Science Programme in Hydrographic Science at the University of Southern Mississippi (USA), sponsored by the Republic of Korea (1 year, August to August) (CL27/2023) - Normally invitation in August of previous year
• 7 students for the GEOMAC courses in Cartography Cat B – UKHO - sponsored by Nippon Foundation (4.5 months, July to December) (CL03/2024) - Normally invitation in January/February
• 10 students for Cat B Hydrographic Survey Programme or Cat B in Nautical Cartography sponsored by the Republic of Korea (20 weeks, June -November) (CL44/2023) - Normally invitation in December previous year to February


Empowering Women in Hydrography
The 2nd Session of the IHO Assembly (A-2) approved the Empowering Women in Hydrography (EWH) project to the Work Programme of the IHO CBSC
The goal was to initiate, organize and track a series of activities and initiatives which will enable more women to participate equitably in the field of hydrography and to assume more leadership roles within the hydrographic community.
Empowering Women in Hydrography
UN DECADE OF THE OCEAN


IHO
THANK YOU


A marine aid to navigation (AtoN) is "a device or system external to a vessel that is designed and operated to enhance the safe and efficient navigation of vessels and/or vessel traffic"
Four types of Membership
• 95 National Members (Coastal States)
• 81 Associate Members
• 165 Industrial Members


Publications
IALA Standards – an integrated framework


Session 2
Updatefrominternationelorganizations
Update from IALA
Omar Eriksson, IALA


IALA MEMBERSHIP IN THE WORLD IN APRIL 2024
IALA members over the last 12 years (2012 to 2024)


Example of hierarchy of AtoN documentation
Governance structure
General Assembly meets every 4 years
Council (24 members) meets biannually
Council Working Groups:
Strategy Group
Finance and Audit Committee
Policy Advisory Panel
Legal Advisory Panel


IALA
UPDATE FROM IALA
July 2024
IALA


IALA Strategic Vision and Goals
vision
Harmonization of Aids to Navigation Signals
IALA Maritime Buoyage System (IVAS)


The Committees
• AtoN Requirements and Management (ARM)
• Engineering and Sustainability (ENG)
• Vessel Traffic Services (VTS)
• Digital technologies (DTEC)
Overview of the work programme 2025-2027

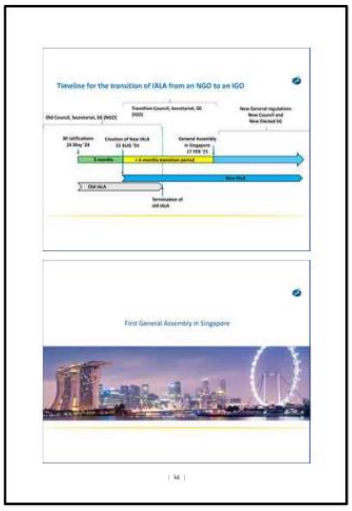

The IGO Project
IALA's cooperation with other international organizations
IMO
CIRM
IMSO

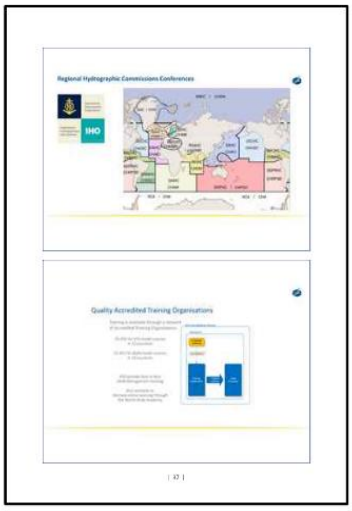

The World-Wide Academy
Training and capacity building
Primary goals of the Academy
That all coastal States can fulfil the obligations related to Marine Aids to Navigation placed upon them in SOLAS Chapter V; and
that all coastal States can claim conformance with relevant IALA Standards


Quality Accredited Training Organisations
AtO's are our training gearing mechanism
GEAR UP

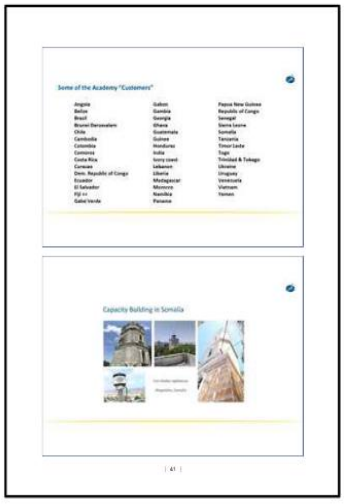

Cooperation – Delineation between IMO and other IGO's
Regulatory work
IMO
Non-binding standards, recommendations and guidelines and input into the regulatory work
IALA
Transition to an Inter-Governmental Organization
Convention was signed by the French Government (depositary) on 27th January 2021
Open for signature for 12 Months
51 signatures by now.
Now 31 States have ratified the IALA Convention


Assisting coastal States worldwide
ENLIGHTEN
EDUCATE
ENGAGE
Activities
Attended various meetings
IMO Technical Cooperation Committee
IHO Regional Hydrographic Commission meetings
Asia-Pacific Heads of Maritime Safety Agencies
Various CB workshops, mainly in Asia
Courses
Risk management Courses
L1.1 AtoN Manager courses
L1.2 Aton Master courses
Assist with VTS training in MARTRAIN in Malaysia (IANA)
Deliver training on behalf of the IMO
Technical Needs Assessment missions


Timeline for the transition of IALA from an NGO to an IGO
First General Assembly in Singapore

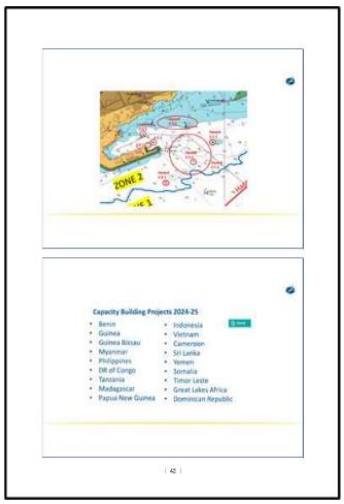

Regional Hydrographic Commissions Conferences
IHO
Quality Accredited Training Organisations

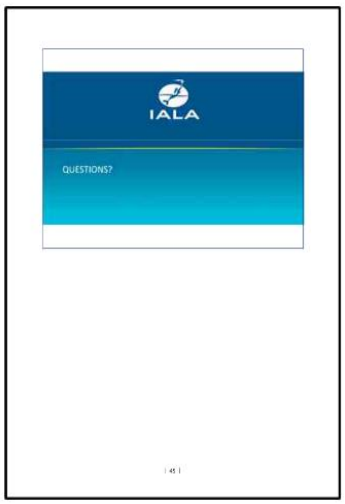

IMO funded Training support to Solomon Islands
Technical Needs Assessment Missions
50 Missions
2.100+ Recommendations


Some of the Academy "Customers"
Capacity Building in Somalia


Sponsors
There are the four of us


Workshop on
Capacity Building for
Maritime Digitalization
Current Status of
S-100 projects in ROK
SangHyun Lee
ENC Team/ General Manager
KHRA

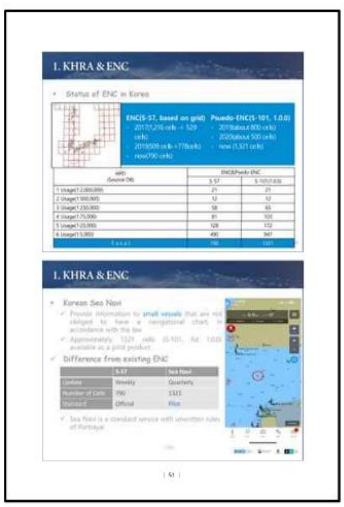

ZONE 2
Capacity Building Projects 2024-25
Benin
Guinea
Guinea Bissau
Myanmar
Philippines
DR of Congo
Tanzania
Madagascar
Papua New Guinea
Indonesia
Vietnam
Cameroon
Sri Lanka
Yemen
Somalia
Timor Leste
Great Lakes Africa
Dominican Republic

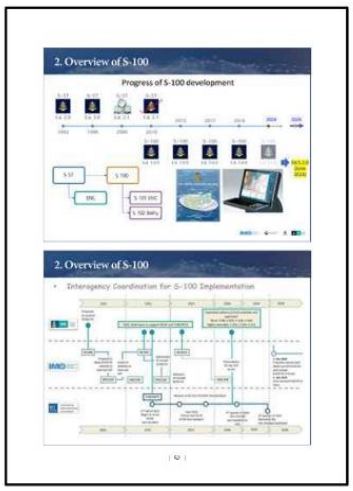

IALA
QUESTIONS?

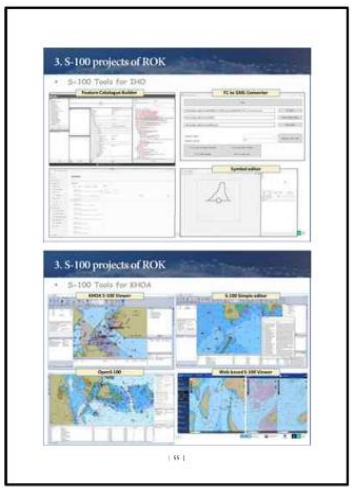

Index
1. KHRA&ENC
2. Overview of S-100
3. S-100 projects of ROK
4. Simulation Result of S-100 service
5. Future
1. KHRA & ENC
KHRA
ENCs


Delivering as one
IALA
Annual coordination meeting
Cooperation with universities
WMU


Geolino3
SharingDigitalExperiences
S-100 Korea update
Sang-hyun Lee, KHRA


1. KHRA & ENC
Status of ENC in Korea
1. KHRA & ENC
Korean Sea Navi
Difference from existing ENC


2. Overview of S-100
Progress of S-100 development
2. Overview of S-100
Interagency Coordination for S-100 Implementation


3. S-100 projects of ROK
S-100 Tools for IHO
3. S-100 projects of ROK
S-100 Tools for IEHOA

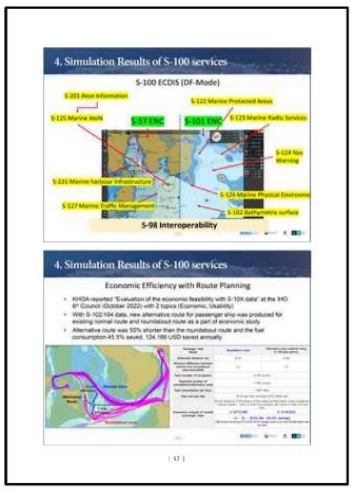

4. Simulation Results of S-100 services
Usability Test of S-100 Service
4. Simulation Results of S-100 services
Simulation Overview

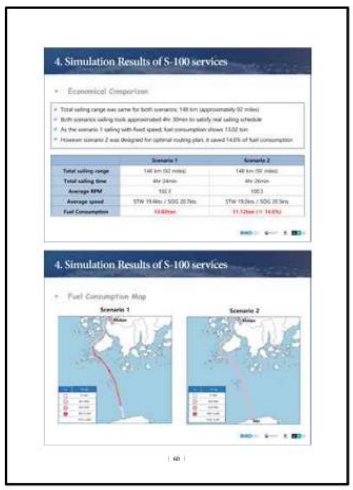

2. Overview of S-100
S-100 S.2.0
2. Overview of S-100
S-100 based Product Specifications

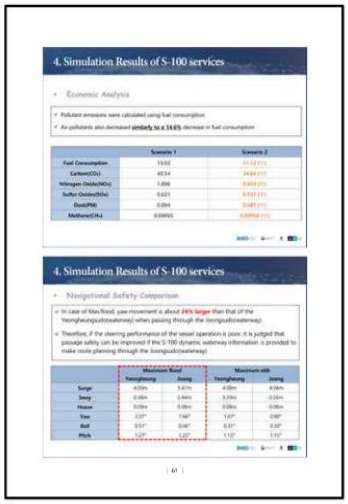

4. Simulation Results of S-100 services
Shore based ECDIS
4. Simulation Results of S-100 services
S-100 Testing Center


4. Simulation Results of S-100 services
Simulation Scenario
4. Simulation Results of S-100 services
Route Planning and Target Area


2. Overview of S-100
S-100 WORLD
3. S-100 projects of ROK
IHO GI Registry

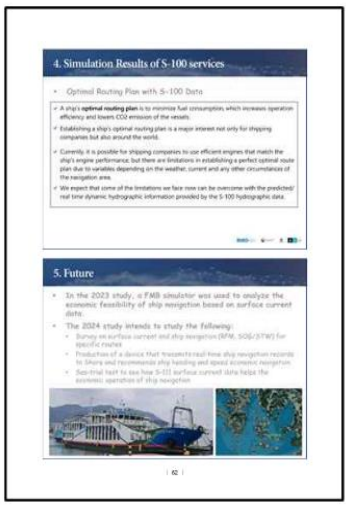

4. Simulation Results of S-100 services
S-100 ECDIS (DF-Mode)
S-98 Interoperability
4. Simulation Results of S-100 services
Economic Efficiency with Route Planning


4. Simulation Results of S-100 services
Economical Comparison
4. Simulation Results of S-100 services
Fuel Consumption Map


4. Simulation Results of S-100 services
Economic Analysis
4. Simulation Results of S-100 services
Navigational Safety Comparison

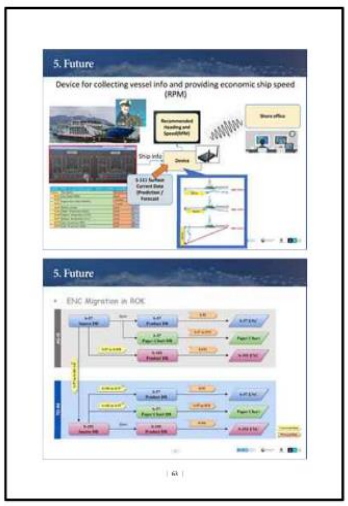

5. Future
THANK YOU
Contact Info.


What is Marine AtoN?
IALA Standards


4. Simulation Results of S-100 services
Optimal Routing Plan with S-100 Data
5. Future

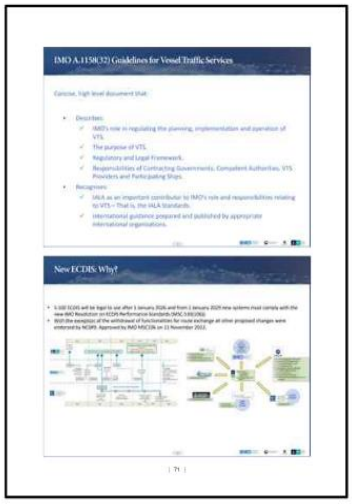

Session2
SharingDigitalExperiences
IALA S-200 testbed, training and sea trial
Minsu Jeon, IALA

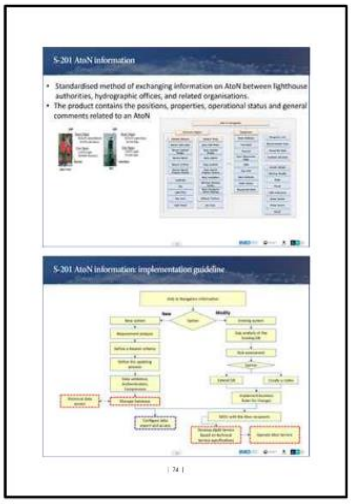

Digitalization and Automation in the Maritime industry: e-Navigation
20th Conference and 15th General Assembly in Rio de Janeiro, Brazil

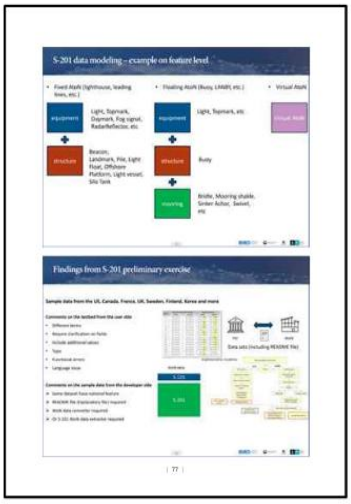

5. Future
Device for collecting vessel info and providing economic ship speed (RPM)
5. Future
ENC Migration in ROK

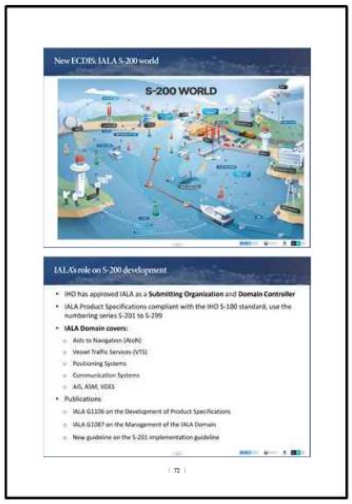

Workshop on Capacity Building for Maritime Digitalization
IALA S-200 testbed, training and sea trial
Minsu JEON
Technical manager
IALA

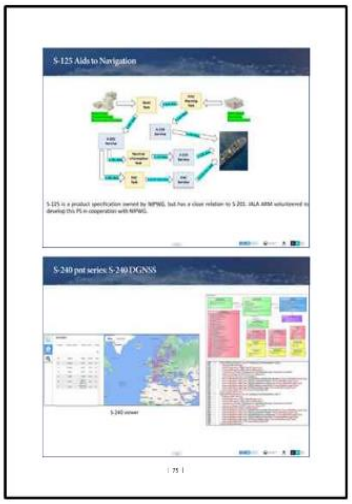

Summary of the recent works of IALA Committies
Work of IALA on MASS
«FEW»
«SOME»
«MANY»
«MORE»


IMO A.1158(32) Guidelines for Vessel Traffic Services
New ECDIS: Why?


S-201 AtoN information
S-201 AtoN information: implementation guideline

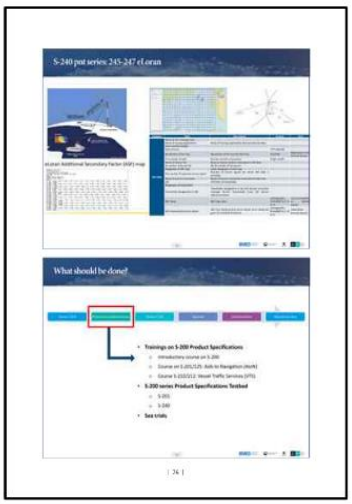

S-201 data modeling – example on feature level
Findings from S-201 preliminary exercise


New ECDIS: IALA S-200 world
S-200 WORLD
IALA's role on S-200 development


S-125 Aids to Navigation
S-240 port series: S-240 DGNSS


Sea trial S-124/125
S-200 Pilot training

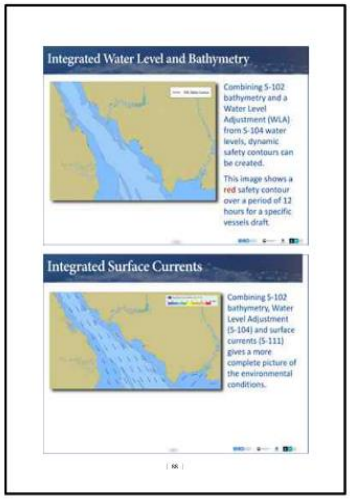

S-200 publications
Development status of S-200 series PS


S-240 port series: 245-247 el.oran
What should be done?

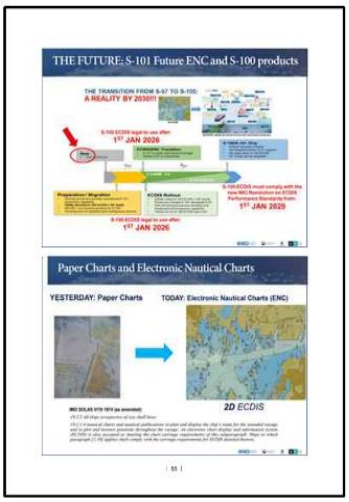

2nd IALA-IHO joint workshop on S-100/200 development
THANK YOU


Sessions
SharingDigitalExperiences
S-100 contribute to the safety and efficiency of navigation and mari time digitalization
Leonel Manteigas, IHO


S-100 A RECOGNIZED UNIVERSAL DATA MODEL
IMO
S-100 and the IMO
In 2022, the International Maritime Organization (IMO), amended its Electronic Chart Display and Information System (ECDIS) standard to leverage S-100 based ENCs beginning in 2026.
S-100 ECDIS will be voluntary starting 1 January 2026
From 1 January 2029 new systems must comply with the new IMO Resolution on ECDIS Performance Standards (MSC.530(106))


Integrated Water Level and Bathymetry
Combining S-102 bathymetry and a Water Level Adjustment (WLA) from S-104 water levels, dynamic safety contours can be created.
This image shows a red safety contour over a period of 12 hours for a specific vessels draft.
Integrated Surface Currents
Combining S-102 bathymetry, Water Level Adjustment (S-104) and surface currents (S-111) gives a more complete picture of the environmental conditions.


Workshop on Capacity Building for Maritime Digitalization
IMO
S-100 contribute to the safety and efficiency of navigation and maritime digitalization
Leonel Manteigas
IHO Assistant Director for Coordination & Capacity Building


THE FUTURE: S-101 Future ENC and S-100 products
THE TRANSITION FROM S-57 TO S-100:
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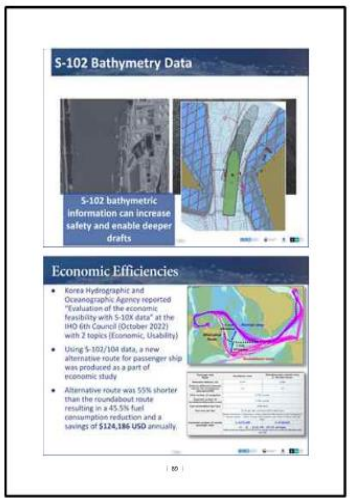
Paper Charts and Electronic Nautical Charts
YESTERDAY: Paper Charts
TODAY: Electronic Nautical Charts (ENC)
2D ECDIS


S-102 Bathymetry Data
S-102 bathymetric information can increase safety and enable deeper drafts
Economic Efficiencies
Korea Hydrographic and Oceanographic Agency reported "Evaluation of the economic feasibility with S-10X data" at the IHO 6th Council (October 2022) with 2 topics (Economic, Usability)
Using S-102/104 data, a new alternative route for passenger ship was produced as a part of economic study
Alternative route was 55% shorter than the roundabout route resulting in a 45.5% fuel consumption reduction and a savings of $124,186 USD annually.


Index
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3. Transition to S-100
4. S-100 Benefits
5. Conclusions
… Safety and Efficiency of Navigation
Theme for World Hydrography Day 2024: "Hydrographic Information - Enhancing safety, efficiency and sustainability in marine activities"


THE FUTURE: S-101 Future ENC and S-100 products
4D ECDIS (include vertical dimension and real time information)
IHO
Phase 1 / Route Monitoring
Phase 2 / Route Planning


S-98 - INTEROPERABILITY SPECIFICATION: A CORE COMPONENT OF S-100
The single layer ENC S-57 will be replaced by multiple interacting layers of navigational products in S-100 ECDIS
S-98 defines how multiple layers interact and how they are portrayed
S-98 defines how to draw a safety contour on a grid of S-102 depths
S-102 contains a grid of depth values with no predefined contours
S-102 supresses S-101 Depth Areas
Conclusions
More Safety
Course and time optimization
UKC optimization
Autonomous navigation


IHO
THANK YOU


0. Preliminaries
IALA
"Digitalization, Digital Transformation, and Connectivity in Maritime Sectors"
0. Preliminaries
"What about being digitally connected during your navigation?"
Messenger
Viber
WeChat
Telegram
KakaoTalk
WhatsApp
Line
Zalo


1. Background and the general
1. Background and the general
Safe and secure delivery for VTS Digitalized VTS-Center


Seminar
SharingDigitalExperiences
The Maritime Connectivity Platform
Jin-hyoung Park, AIVN


Index
1. Background and the general
2. Concept of Maritime Connectivity Platform
3. Working structure
4. Maritime Identity Registry (MIR)
5. Maritime Service Registry (MSR)
6. Maritime Messaging Service (MMS)
7. MCP in operation
8. Summary
1. Background and the general
Today's voyage planning: a true story
A MODERN FLEET
400 SHIPS


1. Background and the general
1. Background and the general
Reliable provision of Maritime Services Prerequisites are already fulfilled

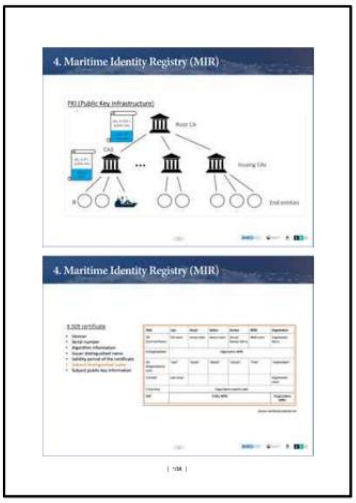

Workshop on
Capacity Building for
Maritime Digitalization
IMO
Maritime Connectivity Platform
: fairway to digital maritime services
Jin Hyoung PARK
Ph.D./CEO
AIVeNautics Corp., Republic of Korea

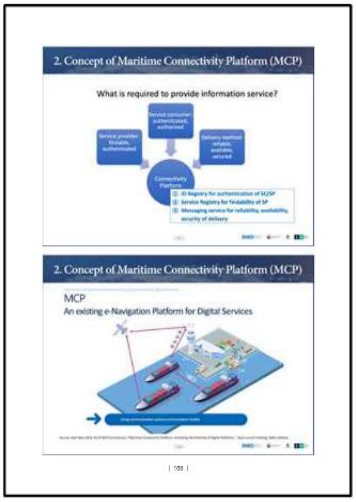

1. Background and the general
Today's voyage planning: a true story
1. Background and the general
A mindblowing perspective


1. Background and the general
Digital Platforms Enabling Digitalization and e-Navigation
1. Background and the general
Maritime Connectivity Platform: 15 years of experience & work
SMART
STM

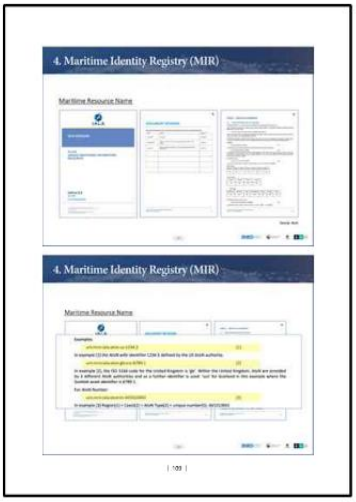

1. Background and the general
THE MARITIME CONNECTIVITY PLATFORM
1. Background and the general
EfficienSea
ACCSEAS
STM Validation Project
MONALISA 1.0
EfficienSea 2
MONALISA 2.0
SMART-Navigation

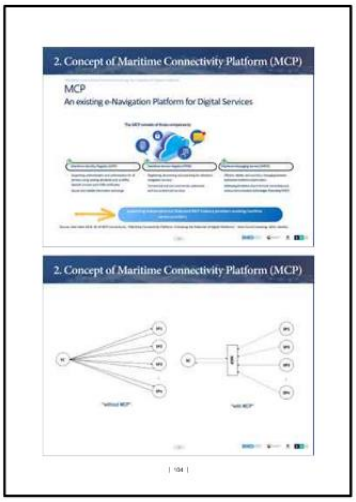

3. Working structure
MCP
Reorganisation and professionalization of the working structure
3. Working structure
MCP
Actual Status

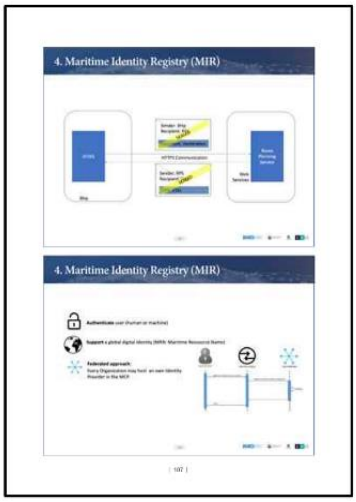

4. Maritime Identity Registry (MIR)
PKI (Public Key Infrastructure)
4. Maritime Identity Registry (MIR)


2. Concept of Maritime Connectivity Platform (MCP)
What is required to provide information service?
2. Concept of Maritime Connectivity Platform (MCP)
MCP
An existing e-Navigation Platform for Digital Services

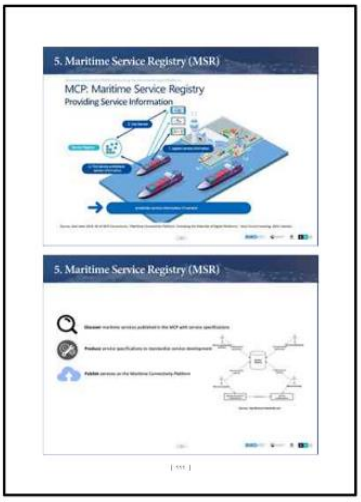

3. Working structure
MCP
Being recognized by IMO
4. Maritime Identity Registry (MIR)
MCP: Maritime Identity Registry
Providing Identity and Authentication

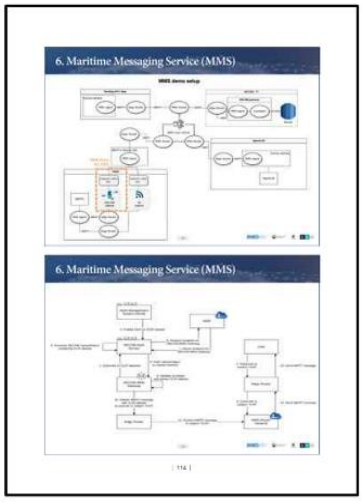

4. Maritime Identity Registry (MIR)
Maritime Resource Name
4. Maritime Identity Registry (MIR)
Maritime Resource Name


2. Concept of Maritime Connectivity Platform (MCP)
MCP
An existing e-Navigation Platform for Digital Services
2. Concept of Maritime Connectivity Platform (MCP)


4. Maritime Identity Registry (MIR)
4. Maritime Identity Registry (MIR)

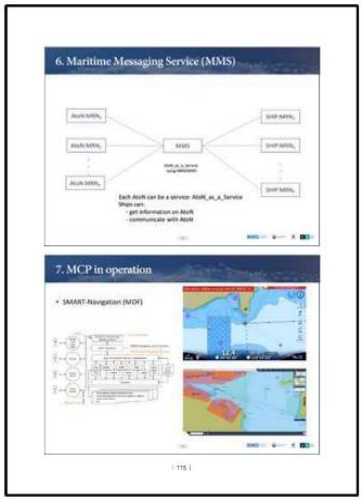

4. Maritime Identity Registry (MIR)
Vetting procedures
4. Maritime Identity Registry (MIR)

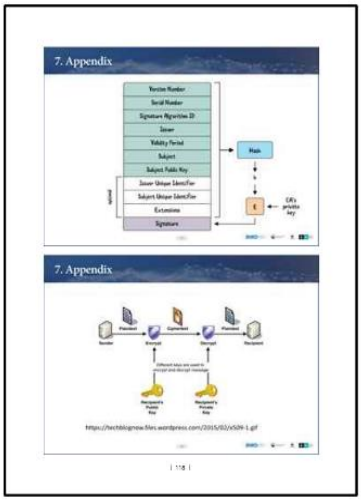

5. Maritime Service Registry (MSR)
MCP: Maritime Service Registry
Providing Service Information
5. Maritime Service Registry (MSR)


6. Maritime Messaging Service (MMS)
6. Maritime Messaging Service (MMS)


8. Summary
THANK YOU

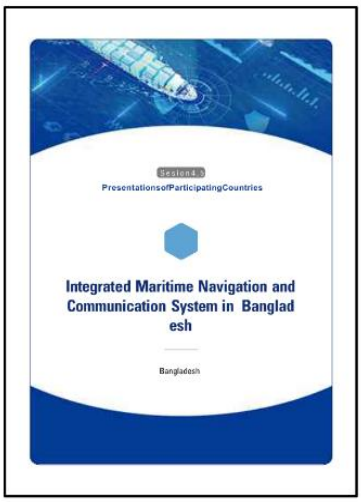

5. Maritime Service Registry (MSR)
5. Maritime Service Registry (MSR)


6. Maritime Messaging Service (MMS)
7. MCP in operation


7. Appendix
7. Appendix


6. Maritime Messaging Service (MMS)
MCP: Maritime Messaging Service
An existing e-Navigation Platform for Digital Services
6. Maritime Messaging Service (MMS)

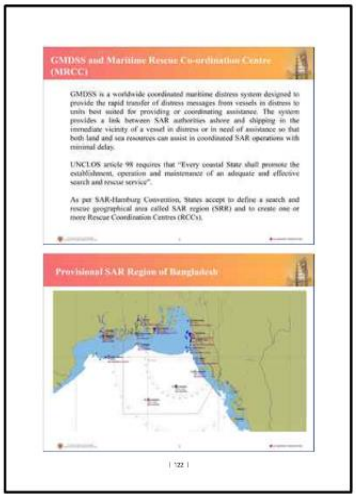

7. MCP in operation
Navelink -- our history
7. MCP in operation
MMS-R1
MCP
MMS-R2
MMS-R3


Session 3
PresentationsofParticipatingCountries
Integrated Maritime Navigation and Communication System in Banglad esh
Bangladesh


Integrated Maritime Navigation & Communication System in Bangladesh
Digitalization in the Maritime sector in Bangladesh
Maritime digitalization is the application of existing and emerging digital technologies to transform business models in the maritime industry with the intent to push revenue growth and enhance maritime safety
Bangladesh is currently implementing digitalization in maritime sector through following measures :
1. EGIMNS project (Establishment of GMDSS & Integrated Maritime Navigation System)
2. VTIMS system
3. Maritime single window(MSW)


ICT Part - Dhaka C & C
ICT Part - CRS

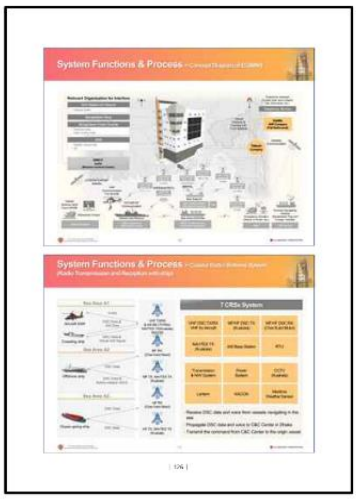

System Functions & Process
Project Benefits
Accident Prevention and casualty investigation
Increased light dues
License Fee and vat tax revenue
Reduction of ship's establishment and operational cost
Lighthouse Tourism

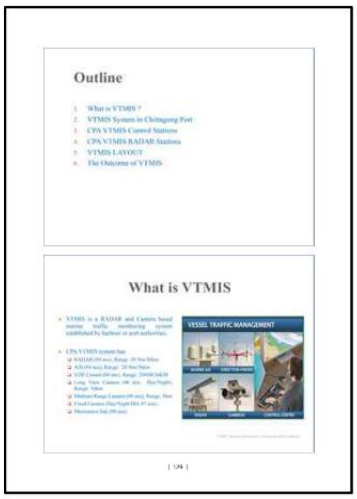

GMDSS and Maritime Rescue Co-ordination Centre (MRCC)
GMDSS is a worldwide coordinated maritime distress system designed to provide the rapid transfer of distress messages from vessels in distress to units best suited for providing or coordinating assistance. The system provides a link between SAR authorities ashore and shipping in the immediate vicinity of a vessel in distress or in need of assistance so that both land and sea resources can assist in coordinated SAR operations with minimal delay.
UNCLOS article 98 requires that "Every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service".
As per SAR-Hamburg Convention, States accept to define a search and rescue geographical area called SAR region (SRR) and to create one or more Rescue Coordination Centres (RCCs).
Provisional SAR Region of Bangladesh

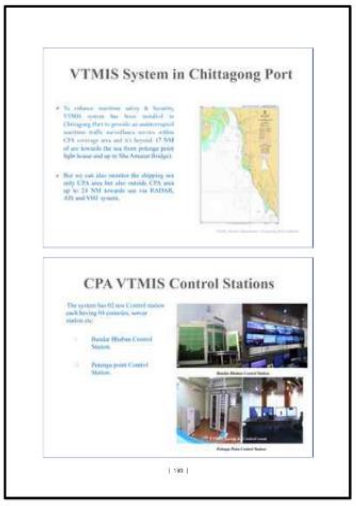

Construction Part
Steel Tower Part

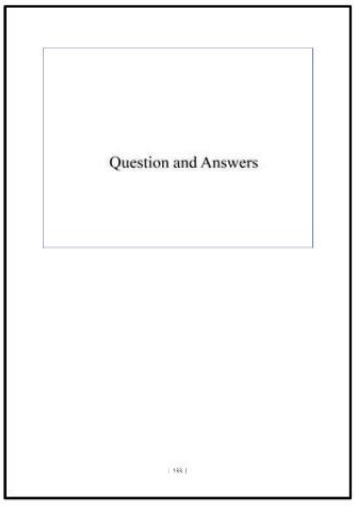

Project Benefits
International
People
Government
World Class Service
Welcome To
Vessel Traffic Management & Information System (VTMIS)


Project Overview
Background
Project Objectives
Project Scope
ICT Part
Construction Part
Steel Light Tower

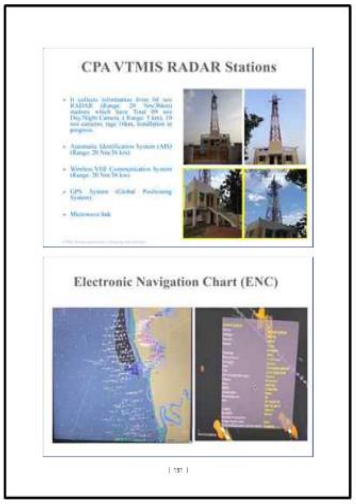

System Functions & Process
System Functions & Process

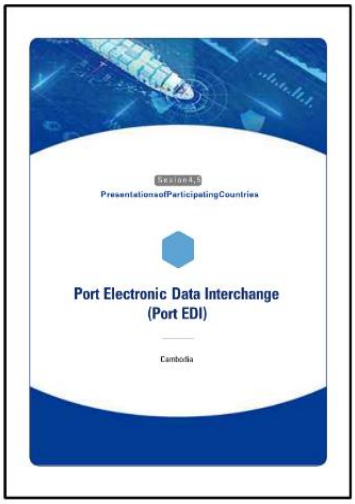

Outline
What is VTMIS ?
VTMIS System in Chittagong Port
CPA VTMIS Control Stations
CPA VTMIS RADAR Stations
VTMIS LAYOUT
The Outcome of VTMIS
What is VTMIS
VESSEL TRAFFIC MANAGEMENT


VTMIS System in Chittagong Port
CPA VTMIS Control Stations

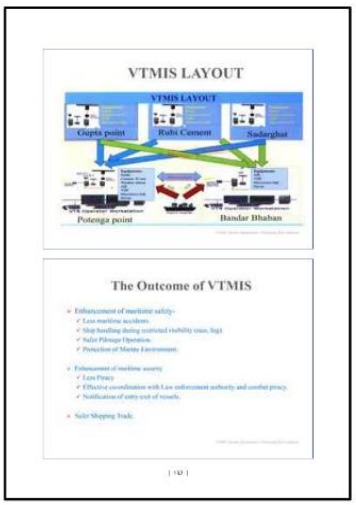

Question and Answers


Index
1. History
2. Overview
3. Workflow
4. Future Perspective
5. Video
1. History
Previous Ship Clearance Formality Procedure
Complexity
Accuracy
Time Consumption
Lack of Transparency


CPA VTMIS RADAR Stations
Electronic Navigation Chart (ENC)


Session4.5
PresentationsofParticipatingCountries
Port Electronic Data Interchange (Port EDI)
Cambodia

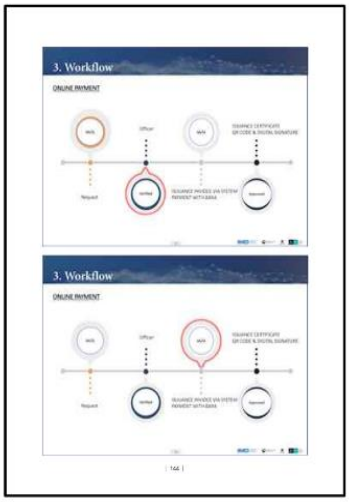

1. History
2. Overview


VTMIS LAYOUT
Gupta point
Rubi Cement
Sadarghat
Potenga point
Bandar Bhaban
The Outcome of VTMIS


Workshop on Capacity Building for Maritime Digitalization
Port Electronic Data Interchange (Port EDI)
HENG Dararith
Deputy Director
Merchant Marine Department

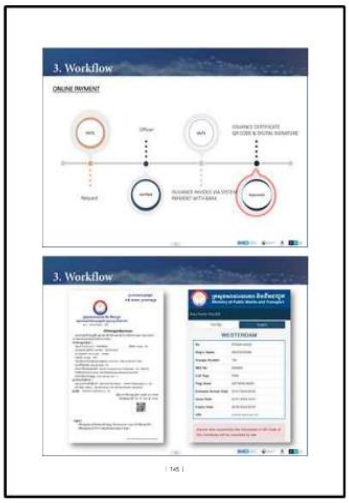

2. Overview
Relevant Authorities
Customs Officer
Immigration Officer
Quarantine Officer
Port Authority
2. Overview
Private Sector
Shipping Line (SA)
Shipping Agent (SL)


3. Workflow
3. Workflow
General declaration
Cargo declaration
Ship's store declaration
Crew's effects declaration
Dangerous goods manifest
Crew list
Passenger list
FAL Convention


3. Workflow
ONLINE PAYMENT
3. Workflow
ONLINE PAYMENT


Section 4.3
PresentationsofParticipatingCountries
The Update on Digitalization Initiat ives in Directorate General of Sea Transportation, Indonesia
Indonesia


3. Workflow
SA/SI
1. Entry Permit
2. Pre Arrival Notice
Ship's Profile
Vessel Call
3. Workflow


3. Workflow
ONLINE PAYMENT
3. Workflow


Workshop on
Capacity Building for
Maritime Digitalization
The Update on Digitalization Initiatives in the Directorate General of Sea Transportation
Norma Karima Sari
Marine Safety and Aids to Navigation Officer
Directorate of Navigation, DGST
Ministry of Transportation of Indonesia


3. Workflow
OUTWARD
Pilot Order
Departure Declaration
General declaration
Cargo declaration
Ship's store declaration
Crew's effects declaration
Dangerous goods manifest
Crew list
Passenger list
3. Workflow
ONLINE PAYMENT


4. Future Perspective
Port Extension
System Integration with SA/SL
System Integration with related ministries
THANK YOU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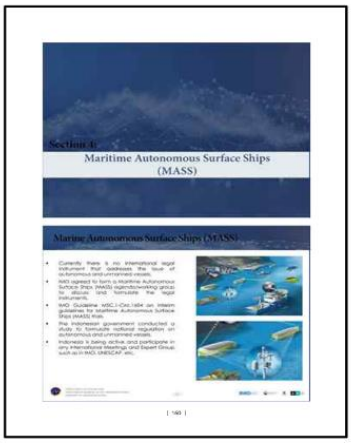
1. Indonesia Overview
2. E-Navigation
3. I-Motion
4. Maritime Autonomous Surface Ships (MASS)
Section 1:
Indonesia Overview


Section 4:
Maritime Autonomous Surface Ships (MASS)
Marine Autonomous Surface Ships (MASS)


THANK YOU
Directorate of Navigation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1. Introduction
2. Advance RMS Features
3. Conclusion
1. Introduction
Advance AIS Remote Monitoring System (ARMS)

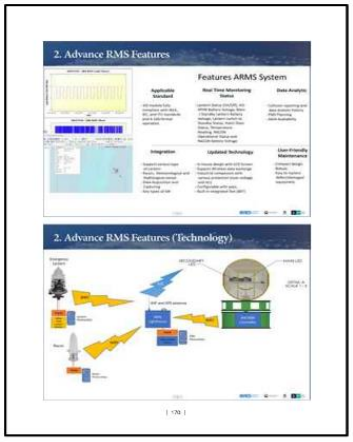

Autonomous Ships in Trials
Autonomous Ships in Trials


Session 4.3
PresentationsofParticipatingCountries
Advance AIS AtoN and Digitalisation
Malaysia

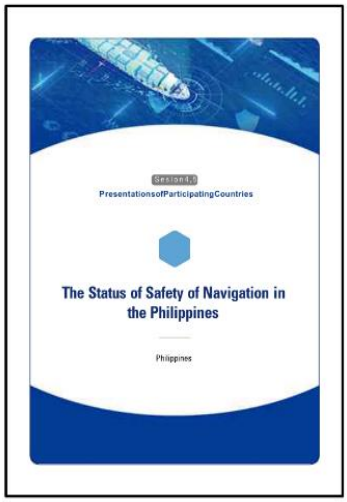

1. Introduction
500+
installation
Phase 1 (2017)
Phase 2 (2022)


Challenges
Way Forward
A WAY FORWARD!

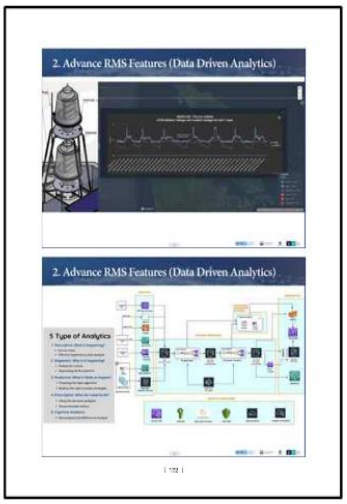

Workshop on
Capacity Building for
Maritime Digitalization
Advance AIS AtoN and Digitalization
Presenter Name: Mohd Hisham Rohani
Title/Position: Senior Principal Assistant Director
Organization : Marine Department Malaysia ,
Ministry of Transport


2. Advance RMS Features
Features ARMS System
2. Advance RMS Features (Technology)


2. Advance RMS Features (Technology)
MOBILE APP
GOOGLE SPREADSHEET
2. Advance RMS Features (Dynamic Dashboard)


Session 4
PresentationsofParticipatingCountries
The Status of Safety of Navigation in the Philippines
Philippines


Importance of Digitalization in Maritime Operations
Enhancing situational awareness
7,641 islands
36,289 km in coastline length
In 2023, data indicated:
Ship calls - 125,950
Passenger Traffic - 15,793,335
Importance of Digitalization for the PCG
Improving response times and decision-making


2. Advance RMS Features (Data Driven Analytics)
2. Advance RMS Features (Data Driven Analytics)
5 Type of Analytics


Workshop on Capacity Building for Maritime Digitalization
The Challenges and Opportunities in the Implementation of Maritime Digitalization: A Philippine Coast Guard Perspective
CG CDR OBLY A WONG
Assistant Deputy Chief of Coast Guard Staff
for Maritime Safety Services, CG-8
PHILIPPINE COAST GUARD


Current State of Digitalization in PCG
Overview of existing tools and technologies used
Use of voice over IP (VoIP) and instant messaging (IM) software application
PCG database
Current State of Digitalization in PCG
Challenges faced in adopting digital solutions
Infrastructure to support digital solutions
Priority of the national government


3. Conclusion
Implementation of Advance Remote Monitoring System:
i) Significantly bolster the safety of navigation for coastal state development.
ii) Gain deeper insights into AtoN patterns, conditions and environmental factors that affecting AtoN efficiency.
iii) This proactive approach not only enhances maritime safety but also facilitates sustainable coastal development by mitigating risks and optimizing resource allocation towards maritime digitalization.
THANK YOU
Contact Info.


Scope of Presentation
1. Introduction to the Philippine Coast Guard
2. Importance of digitalization in maritime operations
3. Current state of digitalization in PCG
4. Key challenges
5. Opportunities for digitalization of the PCG
6. Conclusion
Introduction to the Philippine Coast Guard
MARINE ENVIRONMENTAL PROTECTION
MARITIME SAFETY
MARITIME LAW ENFORCEMENT

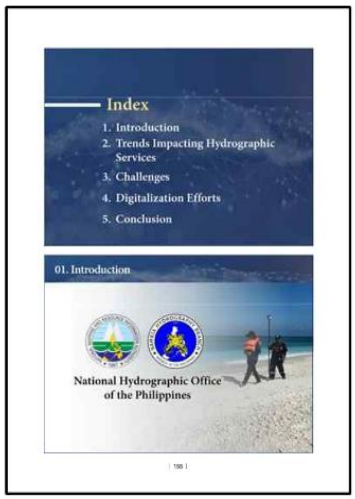

Key Challenges
Lack of standardized data format
Different third-party IT providers, different data format
Cybersecurity concerns
Policy on data protection and privacy
Assignment of trained personnel
Personnel tends to be reassigned to other offices
Opportunities for Digitalization of PCG
Digitalization projects
Sustainable Maritime Transport Cooperation (SMART C) Traffic Programme
to develop, operate and pilot trial a web-based e-Navigation service for the Philippines


Cadet onboard training monitoring system
CHED
MARINA
PCG
DICT
Effective monitoring of cadet onboard training
Colocation of onboard training monitoring system server
Cadet onboard training monitoring system
The PCG manages the system
The system will generate auto-generated sea service certificate
The certificate is given to cadets that finished onboard training on a vessel for one year


Workshop on Capacity Building for Maritime Digitalization
Digitalizing Maritime Services: Readiness of the Philippine Hydrographic Office in Adopting Global Call
Lorena Jasmin Lerio
Hydrographer
National Mapping and Resource Information Authority
PHILIPPINES


Trends Impacting Hydrographic Services
2. Trends Impacting Hydrographic Services
Blue and Ocean Economy
Climate Trends
Renewable Energy: OSW Development


Conclusion
The PCG acknowledges the importance of digitalization
A whole of nation approach is needed in implementing maritime digitalization
The PCG is steadfast in supporting digitalization projects
THANK YOU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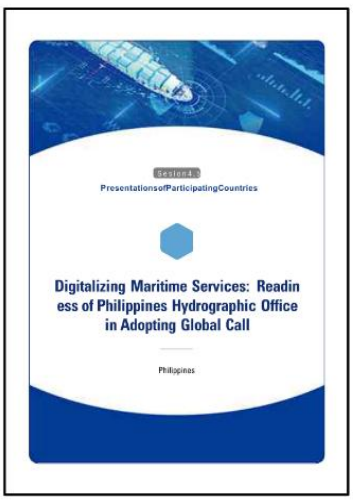
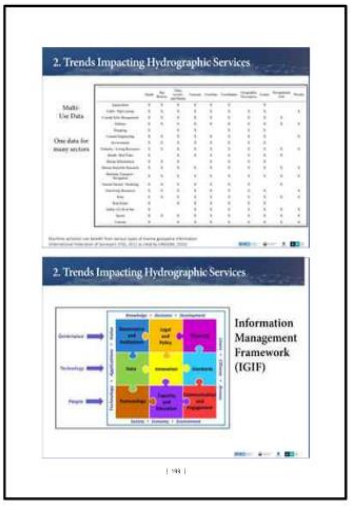
1. Introduction
2. Trends Impacting Hydrographic Services
3. Challenges
4. Digitalization Efforts
5. Conclusion
01. Introduction
National Hydrographic Office of the Philippines


2. Trends Impacting Hydrographic Services
UK Hydrographic Office
"Leave no one behind."
Nautical Product Sunset?
2. Trends Impacting Hydrographic Services
2010
2016
2017
High Density ENC (HD ENC)


Session 4
PresentationsofParticipatingCountries
Digitalizing Maritime Services: Readiness of Philippines Hydrographic Office in Adopting Global Call
Philippines

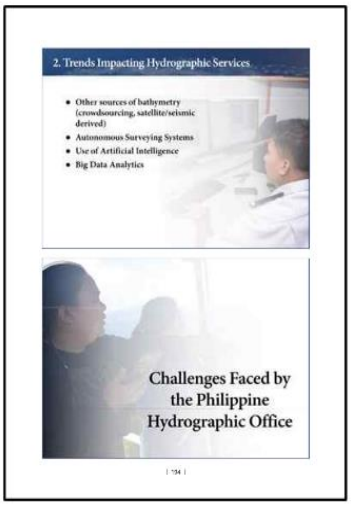

NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY
Hydrography Branch
PRODUCTS AND SERVICES
IC-ENC
01. Introduction


2. Trends Impacting Hydrographic Services
2. Trends Impacting Hydrographic Services
MSDI
HO
S-100
COMPLIANT
open data
public
Marine Spatial Data Infrastructure


2. Trends Impacting Hydrographic Services
Multi-Use Data
One data for many sectors
2. Trends Impacting Hydrographic Services
Information Management Framework (IGIF)


3. Challenges
Modern Hydrographic Office
Traditional Roles SOLAS
New Roles Non-navigational / client driven
Survey
Nautical charts & publications
Navigational Warnings
Maritime Boundary
Maritime Activities
Disaster Risk Management
3. Challenges
Information Management Framework - Land


Digitalization Efforts
5. Digitalization Efforts
Philippine National SDI Milestones


2. Trends Impacting Hydrographic Services
Other sources of bathymetry (crowdsourcing, satellite/seismic derived)
Autonomous Surveying Systems
Use of Artificial Intelligence
Big Data Analytics
Challenges Faced by the Philippine Hydrographic Office


3. Challenges
Information Management Framework - Water
3. Challenges
IMO State Audit Scheme (Oct. 2023)
Audit Recommendations: Areas for further development.
"Areas for further development include:
- Since the State was on archipelago with an extended coastline and seaborne transport has importance in the economy of the State, the nautical and hydrographic services are important for aiding safe navigation of ships in coastal waters of the State. The capability and resources of NAMRIA needs to be enhanced to complete the planned hydrographic surveys, improve the quality of hydrographic data and updating of nautical charts and publications in a timely manner."
(highlight for emphasis)


6. Digitalization Efforts
Hydrospatial Data and Information Systems NAMRIA Modernization
5. Digitalization Efforts
Identifying other maritime data and data suppliers.
ICT Infrastructure assessment.

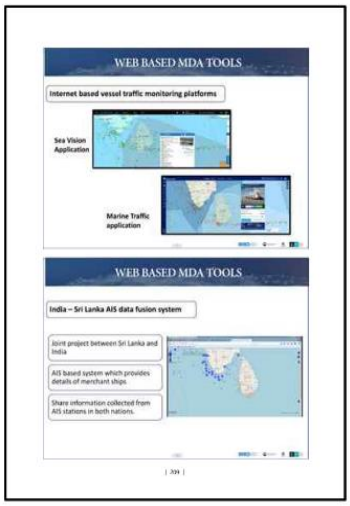

3. Challenges
Philippine maritime area is vast
Over 43% of navigable waters are yet to be surveyed using modern standards
Large amount of data generated or collected by non-NAMRIA institutions
3. Challenges
Hydrographic Surveys Status, IHO C-55 (MSC 81/24/4 as of August 2023) :
0-200m in depth adequately surveyed - 13.45%
Greater than 200m in depth adequately surveyed - 62.61%


3. Challenges
S-100 Data Model
Low awareness or limited knowledge of the S-100 framework
Only 18.7% of personnel have attended an introduction to S-100 training (NAMRIA)
Management in Silos
Lack of resources
Technological infrastructure requires significant upgrades
Un-coordinated efforts for S-100 requirements
Resistance to change
Policy constraints
4. Challenges
Biggest industry challenges

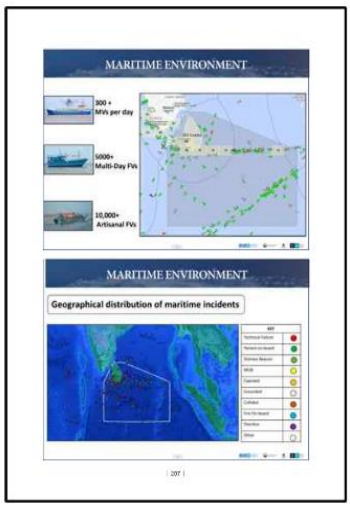

5. Digitalization Efforts
PH Tides Mobile Application
Philippine Geoportal
Navigational Warning Map App
Maritime Safety Information System
6. Digitalization Efforts
NOAA
Empowering Women in Hydrography
Newoman with Category A Certification in Hydrography
Only two women with Category B Certification in Hydrography
Hydrographic Leaders Programme
Mentorship opportunities
Local and International Collaboration/Partnerships
Capacity Building, Funding

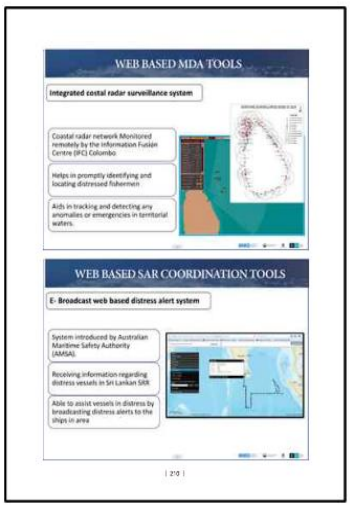

Conclusion
The Philippine Hydrographic Office has established fundamental practices, yet there are notable deficiencies in its readiness to embrace the MSDI, the S-100 Universal Data Model, and other global trends.
These deficiencies predominantly lie in awareness, training, capacity building, ICT, and data management practices among data suppliers. Closing these gaps demands a unified and thorough approach, including bolstered training initiatives, improved national mechanisms for data sharing and exchange, modernized ICT, and securing long-term adequate funding and resources.
THANK YOU
LinkedIn


CONTENT
Maritime environment – Sri Lanka
Maritime safety concerns
Web based Maritime Domain Awareness systems
web based SAR coordinating tools
Conclusion
MARITIME ENVIRONMENT
Sri Lanka SAR area of responsibility
India SRR
Maldives SRR
480 NM (886.9 KM)
Indonesia SRR
Approx. 1,770,062.24 Km²
27 Times of Land Area
840 NM (1555.6 KM)
Australia SRR


WEB BASED MDA TOOLS
Internet based vessel traffic monitoring platforms
Sea Vision Application
Marine Traffic application
WEB BASED MDA TOOLS
India – Sri Lanka AIS data fusion system
Joint project between Sri Lanka and India
AIS based system which provides details of merchant ships
Share information collected from AIS stations in both nations.


Session 4.5
PresentationsofParticipatingCountries
Maritime Digitalization In Ensuring The Safe Navigation In Sri Lankan Waters
Sri Lanka

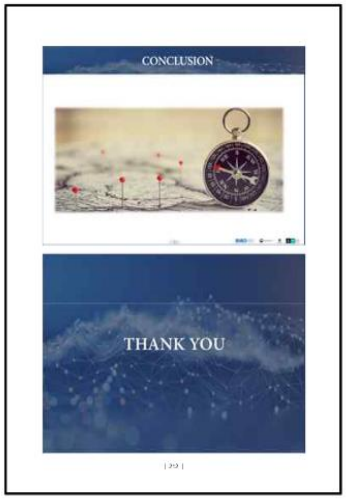

MARITIME ENVIRONMENT
300 + MVs per day
5000+ Multi-Day FVs
10,000+ Artisanal FVs
MARITIME ENVIRONMENT
Geographical distribution of maritime incidents


WEB BASED MDA TOOLS
Integrated costal radar surveillance system
Coastal radar network Monitored remotely by the Information Fusion Centre (IFC) Colombo
Helps in promptly identifying and locating distressed fishermen
Aids in tracking and detecting any anomalies or emergencies in territorial waters.
WEB BASED SAR COORDINATION TOOLS
E- Broadcast web based distress alert system
System introduced by Australian Maritime Safety Authority (AMSA).
Receiving information regarding distress vessels in Sri Lankan SRR
Able to assist vessels in distress by broadcasting distress alerts to the ships in area

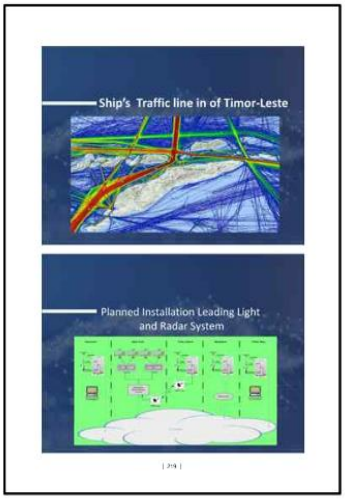

Workshop on
Capacity Building for Maritime Digitalization
MARITIME DIGITALIZATION ENSURING SAFE NAVIGATION IN SRI LANKAN WATERS
Capt (C) Nadun Gunasena
Cdr (H) Jayamal Jayawardane
Sri Lanka Navy


MARITIME ENVIRONMENT
Statistics of maritime incidents - 2023
MARITIME SAFETY CONCERNS
SAFE NAVIGATION
Marine environment pollution
Maritime distresses
Piracy & armed robbery
Search and rescue


WEB BASED SAR COORDINATION TOOLS
Web based Drift Model system
AMSA has provided drift modeling system for the use of MRCC Colombo
System is used to calculate approximate future position of floating objects
WEB BASED SAR COORDINATION TOOLS
Indo-Pacific Regional Information Sharing (IORIS) platform
Web-based tool designed for maritime coordination and information sharing
Allows users to plan and coordinate maritime operations, manage crises, and share information in real-time
Supports over 90 national and regional agencies from more than 55 countries
IORIS

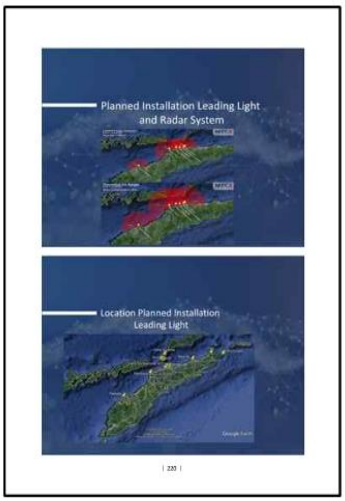

CONCLUSION
THANK YOU


Maritime Interests of Timor-Leste
Training Programs: Develop comprehensive training programs to educate maritime professionals about digital technologies, including data analytics, Internet of Things (IoT), artificial intelligence (AI), and blockchain.
Skill Development: Focus on developing skills relevant to digitalization, such as software development, cybersecurity, data analysis, and project management.
Timor-Leste
As a youngest country just established in the 21st century Tim
or-Leste are still lack of necessary capacity to embrace digitali
zation and unlock its full potential for improved efficiency, saf
ety, and sustainability.
There is no e-navigation system or smart Digital port like in other cou
ntry.
For the communication between ship to port we have only through r
adio communication in each regional port include old Dili Port as the
main port for ferries connected Between Dili-Oecusse as well as Dili-
Atauro even for cruise, yacht, navy, etc.
Tibar Bay Port as PPP project under operated by Bollore took over th
e Export and import of Containers and General cargoes since Septem
ber 2022 however for berthing and unberthing necessary is under Ha
rbor Master /DNTM (regulated by the government)


Ship's Traffic line in of Timor-Leste
Planned Installation Leading Light and Radar System

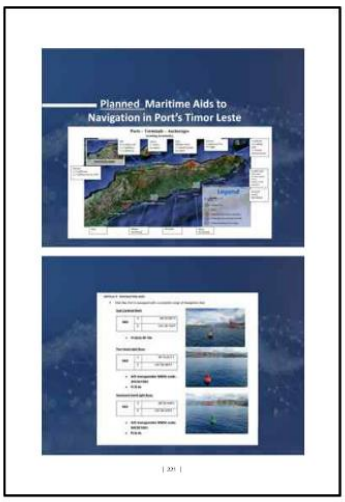

Session 4.3
PresentationsofParticipatingCountries
Ministry Transportation and Communi cation National Directorate of Maritim e Transport Timor-Leste: Maritime Inte rests of Timor-Leste
Timor-Leste

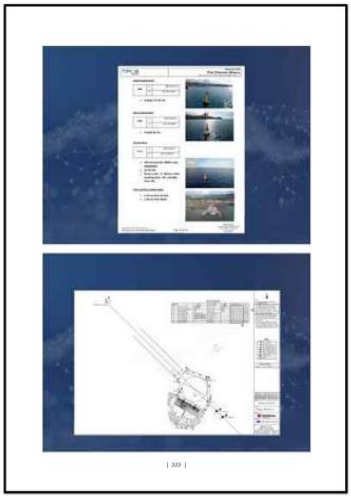

Main Ports
Old Dili Port : Domestic Passengers and Cruise Ship
Tibar Bay Port : Export and import of Containers and General cargoes,
Hera Oil Terminal : Oil products import;
Pertamina Oil Terminal: Oil products import;
Maliana Port, : Enclave Oecusse ,(Domestic ferry services);
Beloi Port : Atauro Island (Domestic ferry services).
IMO International Conventions
Several Vital Conventions has been Ratified:
UNCLOS
IMO Convention
SOLAS
MARPOL
STCW
Collision Avoidance (CollReg);

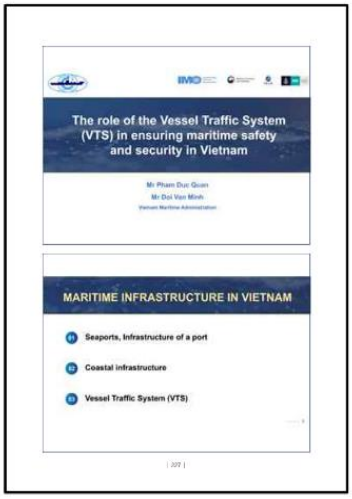

Planned Installation Leading Light and Radar System
Location Planned Installation Leading Light


Capacity Building Workshop on Strengthening and Enhancing Digitalization in Maritime Transport
Daejeon, Republic of Korea 9-11 July 2024
Ministry Transportation and Communication National Directorate of Maritime Transport Timor-Leste
1. Rogerio Soares
2. João de Fatima Fernandes


National Regulations already Drafted
Ship Registry (approved by CoM);
Ship Inspection Services;
Technical Inspections of Ships:
Maritime Radio-Communications;
Aids to Navigation;
Pilotage Services;
Types of Control in UNCLOS
Flag State : Responsible Agency: DNTM
Port State : Responsible Agency: DNTM (Regulatory) and Ports Administrations (only implementation for operations in ports).
Costal State : Responsible Agency: DNTM (coordination agency on emergencies and SAR) and Navy or Police (maritime operation and control of unlawful acts).

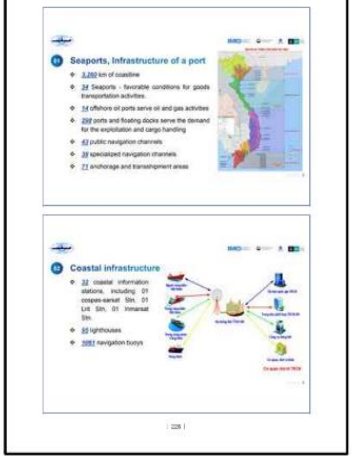

Planned Maritime Aids to Navigation in Port's Timor Leste



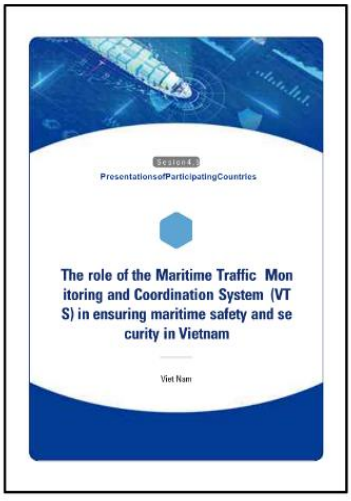

The role of the Vessel Traffic System (VTS) in ensuring maritime safety and security in Vietnam
Mr Pham Duc Quan
Mr Doi Van Minh
Vietnam Maritime Administration
MARITIME INFRASTRUCTURE IN VIETNAM
01 Seaports, Infrastructure of a port
02 Coastal infrastructure
03 Vessel Traffic System (VTS)


03 Vessel Traffic Service (VTS)
Current situation
Port authorities relied on public service ships to conduct on-site inspections, which was inefficient, wasting on time, fuel, and personnel. This approach also failed to adequately observe and cover overall traffic conditions in the port areas.
03 Vessel Traffic Service (VTS)
Management solutions
The authorities have developed a comprehensive Vessel Traffic Service (VTS) system. This advanced monitoring, management, and coordination system leverages modern digital technologies to enhance safety, security, and environmental protection.
VTS is a service system applying modern and digital technology. The VTS system is installed at ports and docks, similar to an air traffic control system for maritime operations. It utilizes a range of equipment, including radar, surveillance cameras (CCTV), VHF radio, and Automatic Identification System (AIS), to track and record the movements of vessels, ensuring their safety.


THANK YOU

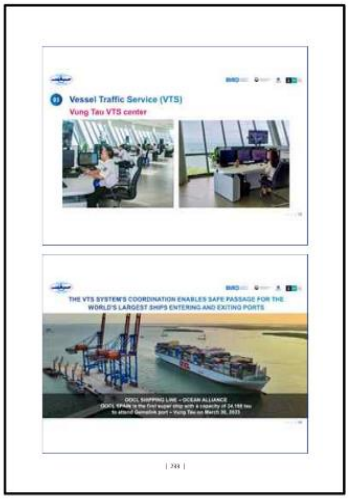

01 Seaports, Infrastructure of a port
3,260 km of coastline
34 Seaports - favorable conditions for goods transportation activities.
14 offshore oil ports serve oil and gas activities
268 ports and floating docks serve the demand for the exploitation and cargo handling
43 public navigation channels
38 specialized navigation channels
71 anchorage and transshipment areas
02 Coastal infrastructure
32 coastal information stations, including 01 cospas-sarsat Stn, 01 LIS Stn, 01 Inmarsat Stn.
55 lighthouses
5061 navigation buoys


03 Vessel Traffic Service (VTS)
Management solutions
14 Vessel Traffic Service (VTS) have been established in key areas with high levels of maritime activity by Vietnamese maritime authorities.
These VTS centers are directly managed, operated, and maintained by the regional port authorities: Hai Phong, Ho Chi Minh, Da Nang, Nghe An, Thanh Hoa, Quy Nhon, An Giang, Dong Nai, Can Tho, Kien Giang
03 Vessel Traffic Service (VTS)
Effectiveness of VTS
The VTS system gives port authorities access to information about ships operating within the monitored areas, including their location, port of arrival, and cargo details. This real-time data allows the VTS centers to promptly warn and guide pilots and captains, ensuring the safe entry and exit of vessels through the navigation channels.
The VTS system plays a crucial role in search and rescue efforts. When receiving distress calls, the VTS centers immediately transfer the information to relevant agencies and notify surrounding ships to coordinate the emergency response.
The VTS system collects comprehensive data on ships' locations, identities, destinations, and cargoes. It closely monitors maritime traffic to prevent security threats, limit environmental pollution, and quickly respond to incidents like oil spills.


Session 4 :
PresentationsofParticipatingCountries
The role of the Maritime Traffic Mon itoring and Coordination System (VT S) in ensuring maritime safety and se curity in Vietnam
Viet Nam


03 Vessel Traffic Service (VTS)
Current situation
The Vietnamese maritime sector experiences high traffic, with over 100,000 vessel arrivals and departures at its seaports annually.
This substantial shipping activity also poses potential risks to maritime safety, security, and the environment.
03 Vessel Traffic Service (VTS)
Current situation
Previously, vessel operations were inspected and supervised using VHF radio, telephone, and fax communication.
VHF (Very High Frequency)
FAX machine


03 Vessel Traffic Service (VTS)
Haiphong VTS center
03 Vessel Traffic Service (VTS)
VTS center

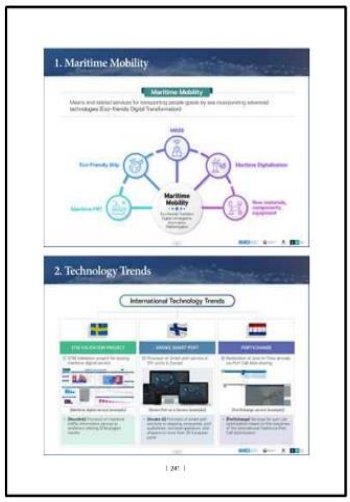

Vessel Traffic Service (VTS)
Vung Tau VTS center
THE VTS SYSTEM'S COORDINATION ENABLES SAFE PASSAGE FOR THE WORLD'S LARGEST SHIPS ENTERING AND EXITING PORTS


THANK YOU FOR YOUR ATTENTION!


Index
1. Maritime Mobility
2. Technology Trends
3. SMART-Navigation
4. GMDRT Project
5. Conclusion
1. Maritime Mobility
Eco-friendly ships
Autonomous ships
Digitalization in maritime transport
Evolution of Ships


THE VTS SYSTEM'S COORDINATION ENABLES SAFE PASSAGE FOR THE WORLD'S LARGEST SHIPS ENTERING AND EXITING PORTS
EVERGREEN SHIPPING LINE, PART OF THE OCEAN ALLIANCE
ONE SHIPPING LINE – THE ALLIANCE

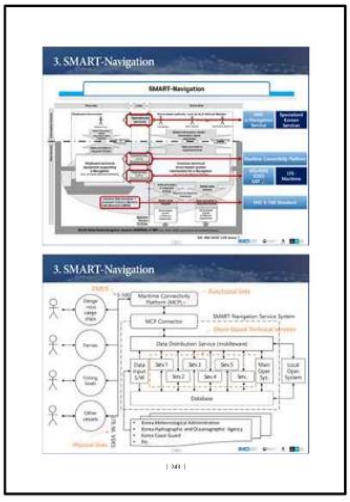

Session 6
MaritimeMobility
Maritime digitalization
Han-jin Lee, KRISO


1. Maritime Mobility
Maritime Mobility
2. Technology Trends
International Technology Trends

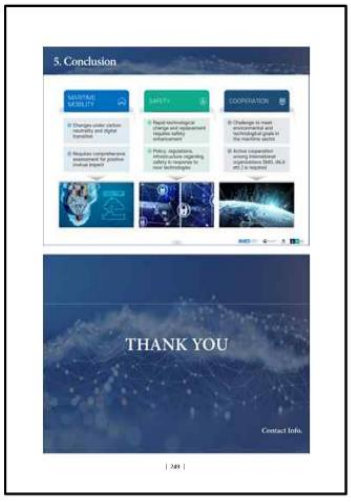

THE VTS SYSTEM'S COORDINATION ENABLES SAFE PASSAGE FOR THE WORLD'S LARGEST SHIPS ENTERING AND EXITING PORTS
Hapag-Lloyd
HAPAG-LLOYD SHIPPING LINE – THE ALLIANCE
HMM
HYUNDAI SHIPPING LINE – THE ALLIANCE

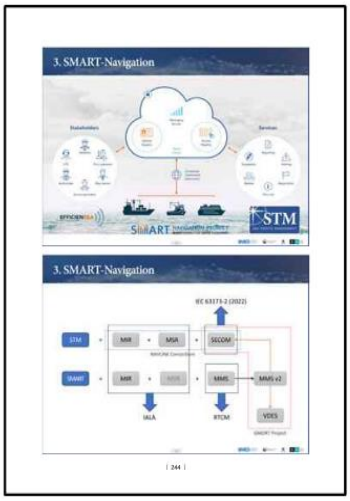

Workshop on
Capacity Building for
Maritime Digitalization
Maritime Digitalization
Han Jin LEE
Principal Researcher
KRISO (Korea Research Institute of Ships & Ocean Engineering)


2. Technology Trends
e-Navigation in R.O.Korea
2. Technology Trends
R&D Activities in R.O.Korea


3. SMART-Navigation
SMART-Navigation
3. SMART-Navigation

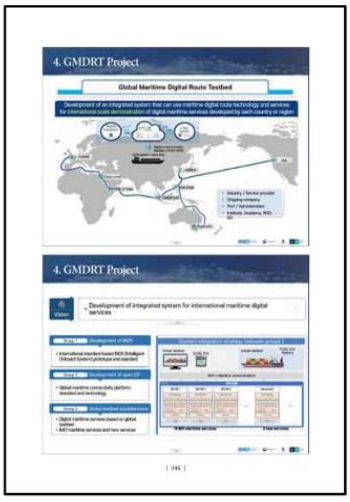

4. GMDRT Project
Open Digital Incubator Initiative (ODI)
4. GMDRT Project
GMDRT Services (1/2)


5. Conclusion
THANK YOU
Contact Info.


3. SMART-Navigation
STM
3. SMART-Navigation


4. GMDRT Project
GMDRT Services (2/2)
4. GMDRT Project
Simulation based Testbed & Test Voyage


Sessions
MaritimeMobility
Eco-Friendly Ship
In-ho Lee, HD Hyundai marine solution


4. GMDRT Project
Global Maritime Digital Route Testbed
4. GMDRT Project


4. GMDRT Project
5. Conclusion


Workshop on
Capacity Building for
Maritime Digitalization
Eco-Friendly Ship
Inho Lee
Head of Green Solution Engineering/Director
HD HYUNDAI MARINE SOLUTION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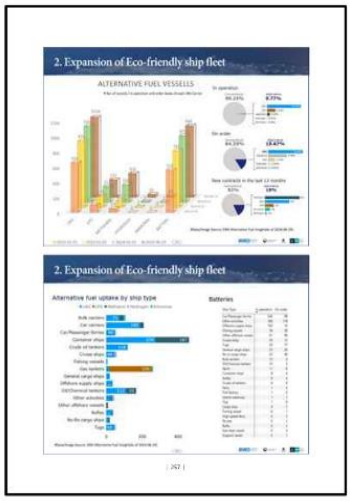
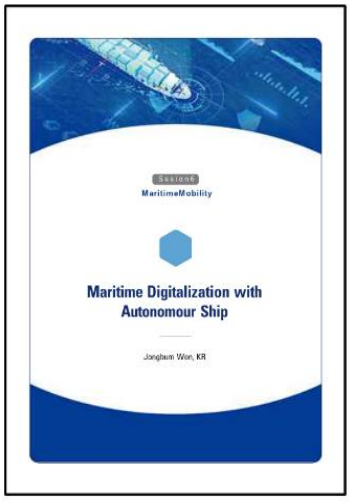
1. Paradigm Change of Shipping industry
2. Expansion of Eco-friendly ship fleet
3. Digital Transformation
4. Insight for Shipping Industry
1. Paradigm Change of Shipping Industry
GLOBAL ENERGY TRANSITION
ALTERNATIVE FUEL APPLICATION

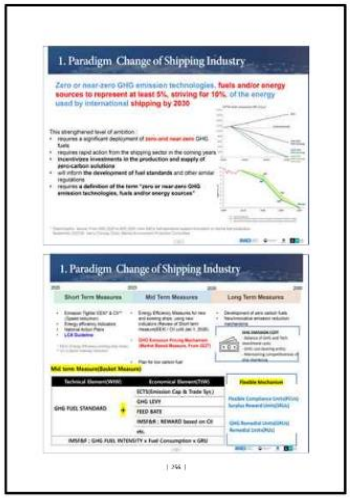

2. Expansion of Eco-friendly ship fleet
ALTERNATIVE FUEL VESSELLS
2. Expansion of Eco-friendly ship fleet


4. Insight for Shipping Industry
THANK YOU


1. Paradigm Change of Shipping Industry
ENERGY EFFICIENCY IMPROVEMENT
ZERO EMISSION AT BERTH/ANCHORAGE
1. Paradigm Change of Shipping Industry
DECISION OF MEPC 80th


2. Expansion of Eco-friendly ship fleet
HD HYUNDAI GROUP Engine and Future Technology Development Status
3. Digital Transformation
SMART SHIP
ONSHORE CONNECTIVITY
AUTONOMOUS SHIP


Session6
MaritimeMobility
Maritime Digitalization with Autonomour Ship
Jongbum Won, KR


1. Paradigm Change of Shipping Industry
Zero or near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of the energy used by international shipping by 2030
1. Paradigm Change of Shipping Industry
Short Term Measures
Mid Term Measures
Long Term Measures


3. Digital Transformation
OceanWise
"Carbon Emissions Reduction Solution"
3. Digital Transformation


Workshop on Capacity Building for Maritime Digitalization
Maritime Digitalization with Autonomous Ship
Jongbum WON
Principal Researcher
Korean Register


Background of Autonomous Ships
What is an Autonomous Ship?
Background of Autonomous Ships


Development Progress of Autonomous Ships
Development Progress of Autonomous Ships


KASS Consortium
Technology Development Demonstration Outline


Background of Autonomous Ships
Global Market trends

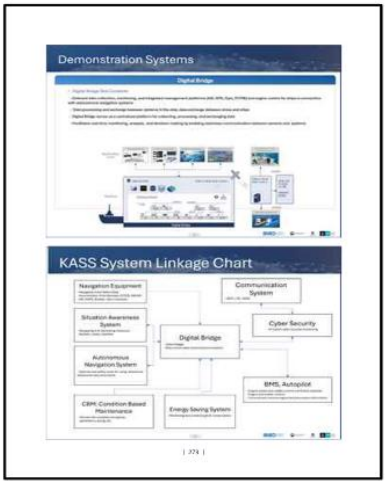

Development Progress of Autonomous Ships
Outline of MASS Project in Korea


Roadmap for demonstration of autonomous ships
Navigation Route


Development Progress of Autonomous Ships
Development Progress of Autonomous Ships


Outline of MASS Project in Korea
Road Map


Demonstration Systems
Demonstration Systems


Demonstration Systems
KASS System Linkage Chart
Navigation Equipment
Communication System
Situation Awareness System
Digital Bridge
Cyber Security
Autonomous Navigation System
BMS, Autopilot
CBM: Condition Based Maintenance
Energy Saving System


Challenges -International standards
Challenges -International Cooperation


THANK YOU

**ANNEX 8**
**Synopsis of Evaluation Questionnaires**

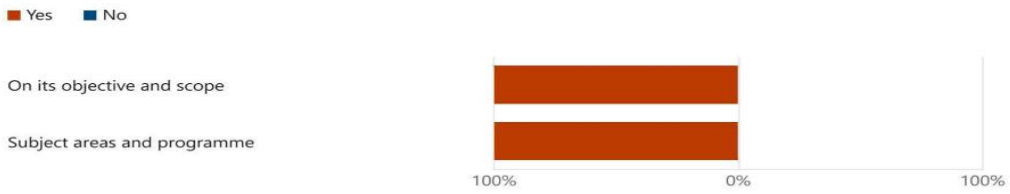
## Workshop on capacity building for maritime digitalization

15 Responses | 09:23 Average time to complete | Active Status

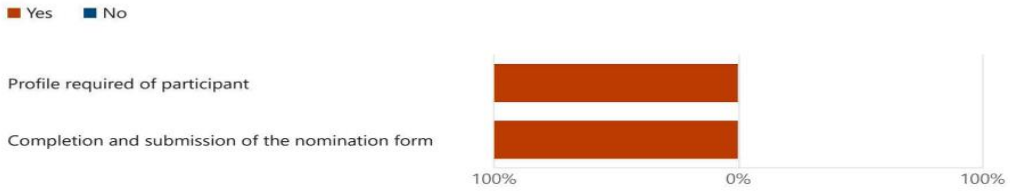
1. Was the invitation received in good time?

| | |
|---|---|
| Yes | 15 |
| No | 0 |

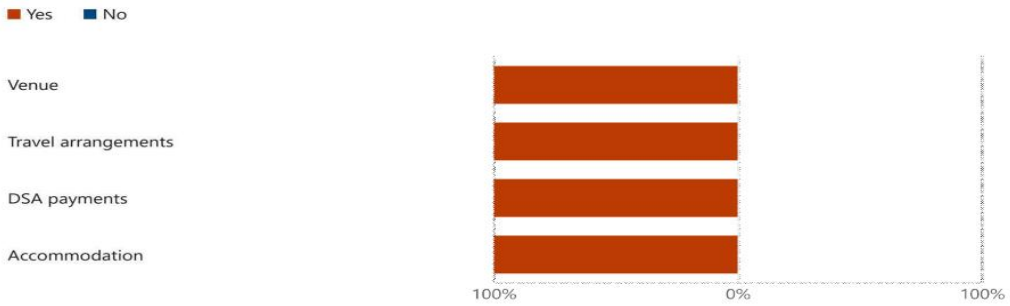
2. Did you receive the information listed below about the event before your participation?




3. Were the instructions on the following clear and easy to understand?

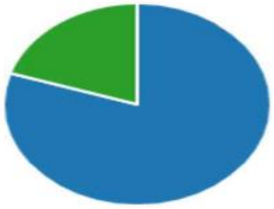



4. Did you receive logistical information on:



5. If you were given a pre-event assignment, was it useful?

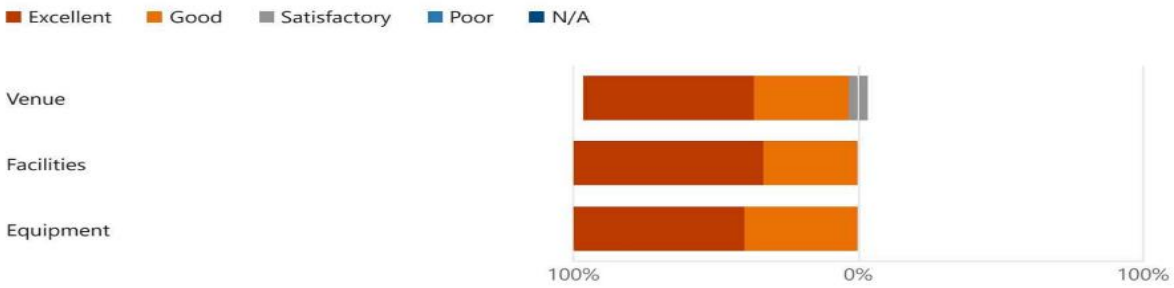
| | |
|---|---|
| Yes | 12 |
| No | 0 |
| N/A | 3 |



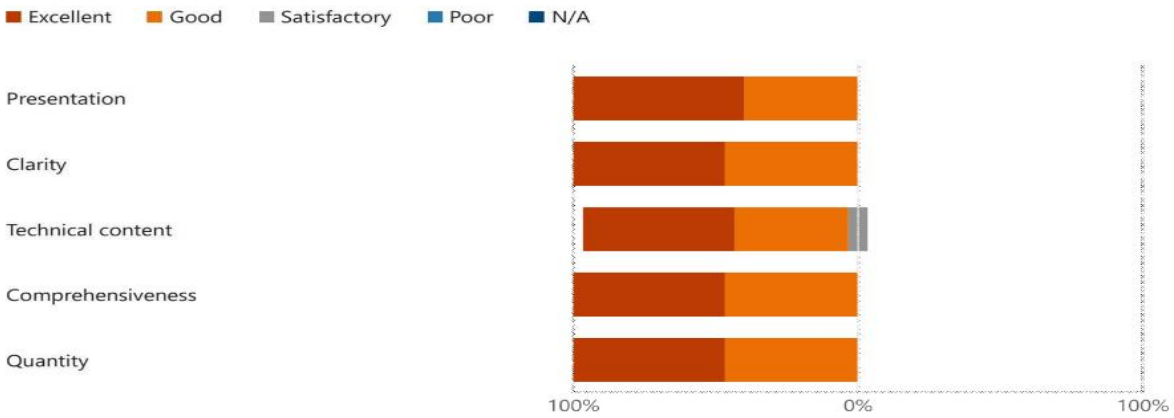
6. To cover the topics fully, was the event:

| | |
|---|---|
| too long | 0 |
| just right | 15 |
| too short | 0 |

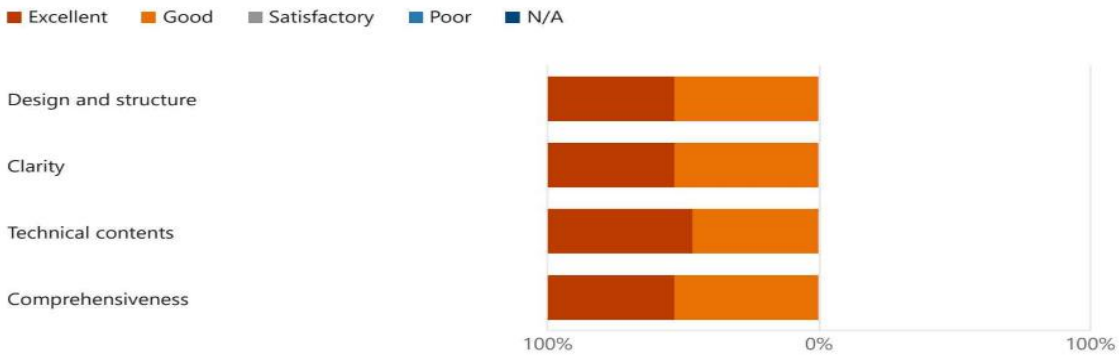
7. How would you rate the event with regard to the following?



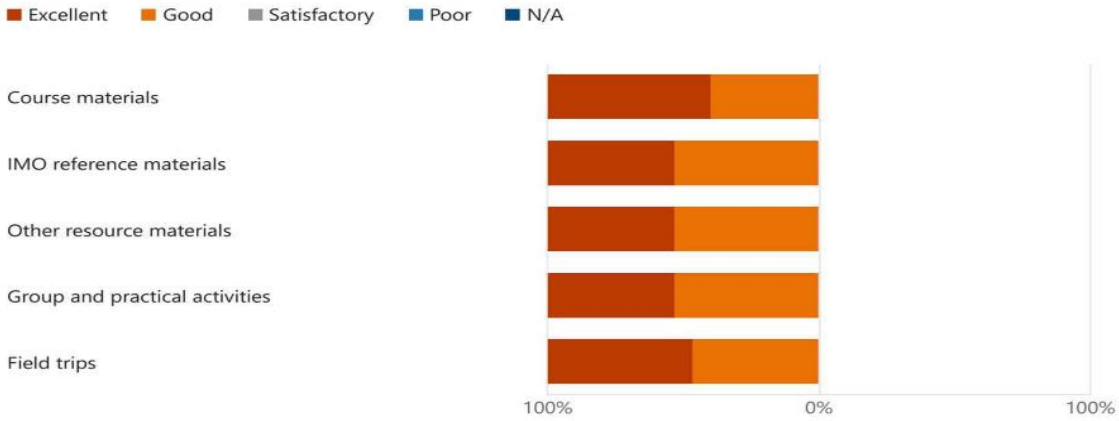

8. How would you rate the following aspects of the materials?



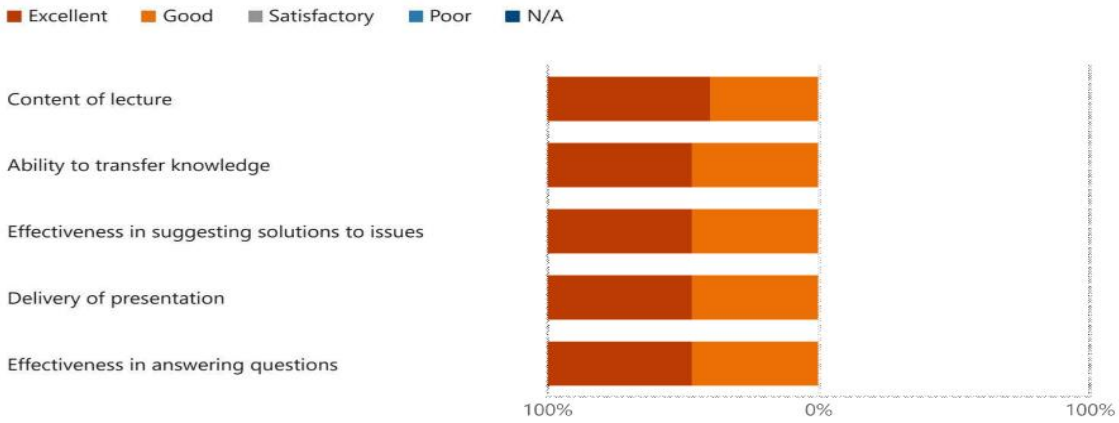
9. How would you rate the following aspects of the presentations?



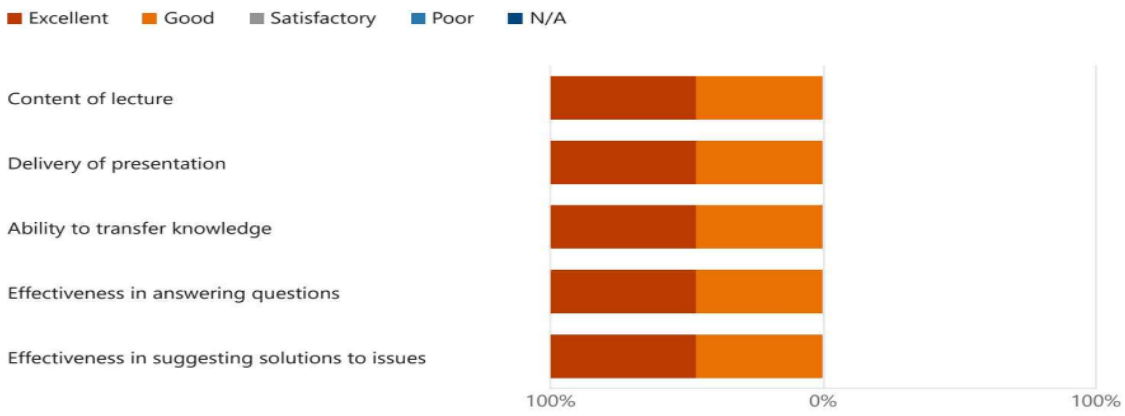

10. How would you rate the use of the following?



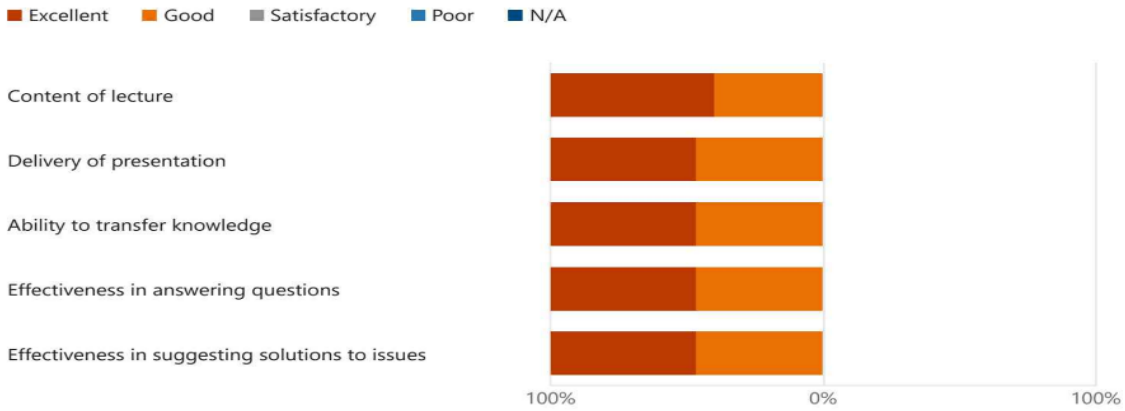

11. Please rate each lecturer with regard to the following:
**Omar Ericksson**



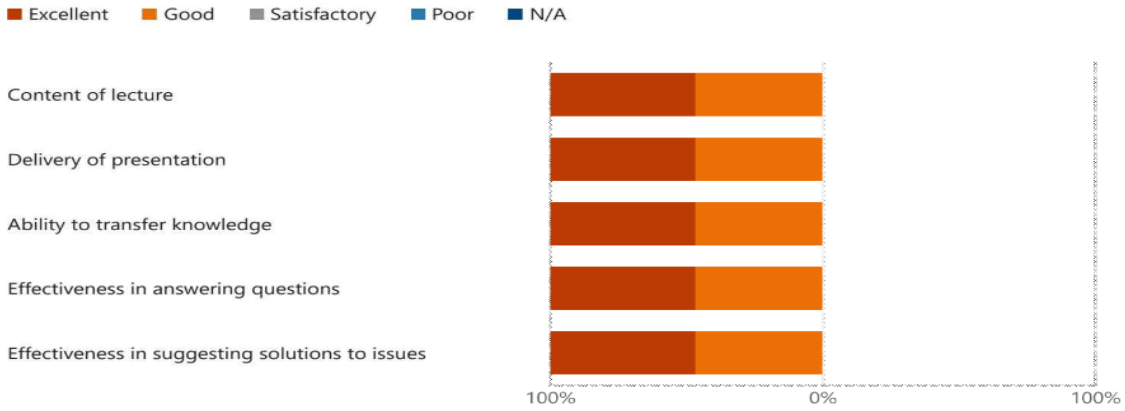
12. **Minsu Jeon**




13. **Leonel Manteigas**




14. **Cafer Ozkan Istanbullu**



15. What topics were of most interest and relevance to your Administration?

15
Responses

Latest Responses
*"E-nav and S100&S200"*
*"Topics covering implementation of S100 & e navigation "*
*"VTS"*

**4** respondents (**27**%) answered **Maritime digitalization** for this question.


16. Are there any topics which should be added?

| | |
|---|---|
| Yes | 2 |
| No | 13 |

17. If yes, please list them:

15
Responses

Latest Responses
*"Nil"*
*"NA"*
*"No"*

**8** respondents (**53**%) answered **No** for this question.


18. Do you consider that the objective of the event was met?

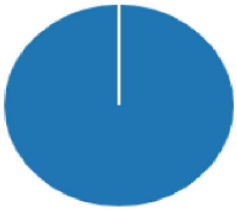
| | |
|---|---|
| Yes | 14 |
| No | 1 |

19. Are the outcomes achieved likely to be useful to your Administration?

| | |
|---|---|
| Yes | 13 |
| No | 2 |

20. Will you have the opportunity to transfer the knowledge gained to your colleagues at work?

| | |
|---|---|
| Yes | 15 |
| No | 0 |



21. Comments

11
Responses

Latest Responses
*"Excellent Workshop"*
*"Very well organized and fruitful workshop"*
*"I will share information with colleagues when I return to VietNam"*

**7** respondents (**64**%) answered **workshop** for this question.

**ANNEX 9**

**Copies of Certificates**

INTERNATIONAL MARITIME ORGANIZATION

# CERTIFICATE

This is to certify that

has participated in the

**Workshop on Capacity Building for Maritime Digitalization**

held in Daejeon, Republic of Korea, from 9 to 11 July 2024

jointly organized by

the International Maritime Organization and

the Ministry of Oceans and Fisheries of the Republic of Korea

in collaboration with

the International Hydrographic Organization and

the International Association of Marine Aids to Navigation and Lighthouse Authorities

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**Vincent Job**
Senior Deputy Director
Subdivision for Maritime Development
Technical Cooperation and Implementation Division
International Maritime Organization