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WORK PROGRAMME

Proposal for a new output to develop an overarching IMO Strategy on digitalization to ensure standardization and harmonization

Submitted by China, Liberia, Republic of Korea, Singapore, United Arab Emirates, ISO and BIMCO

SUMMARY

Executive summary:	Digitalization is a crucial component of decarbonization because it has the potential to significantly enhance efficiency in ship design, ship operation, and port operation. In recent years, digitalization has become a key driving force globally and presents a significant opportunity for the maritime industry to enhance efficiency and sustainability. It is imperative that IMO lead the way in harnessing this potential. The co-sponsors therefore highlight the need for IMO to communicate its strategy on digitalization more proactively and assertively. By doing so, IMO can make sure that all stakeholders, including those outside IMO, are aware of and aligned with its digital agenda, thereby promoting greater collaboration among stakeholders, wider adoption of standards, and more effective implementation of digital solutions. Thus, the co-sponsors propose a new output to develop an IMO strategy on digitalization for the Organization to create a more integrated approach to maritime digitalization in the Organization and across the maritime industry.
Strategic direction, if applicable:	2 (Integrate new and advancing technologies in the regulatory framework) and 7 (Ensure the regulatory effectiveness of international shipping)
Output:	Not applicable
Action to be taken:	Paragraph 37
Related documents:	Resolution A.1173(33); C 128/4(a)/1; MSC.1/Circ.1595, NCSR 10/22; FAL 47/22; EGDH 9/14; ISWG-SP 1/WP.1, ISWG-SP 1/2 and ISWG-SP 1/3

Introduction

1 This document, submitted in accordance with paragraph 4.7 of the *Organization and method of work of the Facilitation Committee* (FAL.3/Circ.217/Rev.1), proposes a new output to develop an IMO strategy for the Organization to contribute to a more integrated approach to maritime digitalization in the Organization.

Background

2 Digitalization, recognized as a crucial element in the process of decarbonization, has the potential to significantly improve efficiency in various sectors of the maritime industry, including ship design, ship operation, and port operation.

3 In recent years, digitalization has increasingly played a pivotal role in driving innovation, resilience, efficiency, and growth in various sectors, by governments as well as among industries. It is redefining traditional reporting obligations, business models, reshaping industry landscapes, and paving the way for new opportunities. In the context of the maritime industry, digitalization opens vast possibilities for enhancing operational efficiency, resilience, and sustainability.

4 IMO has and continues to play a critical role in harnessing the potential of digitalization in the maritime domain. This is evidenced through the adoption of an e-navigation strategy implementation plan (MSC.1/Circ.1595), new environmental reporting requirements from MEPC, as well as the latest revisions in the FAL Convention. However, there is much potential to better enhance the coordination of the different committees in how digitalization is applied, e.g. in the definition of data sets, the specific reporting formats, and in the use of digital signatures. The co-sponsors therefore propose that IMO develop an overarching strategy on digitalization to provide a clear "roadmap" for its strategic directions.

5 Such a strategy can provide a clear direction for IMO to tackle current and future challenges related to its various digital initiatives, including but not limited to Maritime Autonomous Surface Ships (MASS), Maritime Single Windows (MSW) and e-navigation. A strategy will not only send a strong signal on the priorities of the Organization, but also signal the importance of digitalization externally, such as for industry stakeholders.

Need

6 The necessity for a comprehensive digitalization strategy is becoming increasingly evident as digitalization emerges as a key catalyst for innovation and transformation, both within and outside IMO.

7 In a recent survey, conducted by BIMCO, IAPH, IFSMA and FONASBA, a key finding showed that 40% of the shipping industry was not aware of the IMO resolution mandating the use of a "single window" for data exchange from 1 January 2024. Another result was that only 36% of port calls offered fully electronic exchange of data. Both findings illustrate the current plight of the maritime industry. An effective digitalization strategy would address the need for harmonization of reporting requirements, ensuring compliance with IMO instruments.

8 Another example lies in the implementation of the e-navigation route exchange format (RTZ), which will likely be included as a mandatory revision to the ECDIS performance standard (NCSR 10/22/add.1 – Annex 4). This format enables routes created in one ECDIS to be transferred to various other makes and models of ECDIS and to other equipment, such as radars, vessel tracking systems, integrated bridge systems, back-of-bridge planning applications, and shore-based planning tools. In later years, this file format has also been used to provide ships with reference routes and for informing, e.g. a VTS about a ship's intended voyage. Despite the straightforward specification of the currently used RTZ standard and implementation guide (Annex S of IEC 61174 Ed.4), inconsistent application has led to a lack of full exploitation of its evident potential, mainly due to lack of initial coordination by a central body or organization.

9 Similar risks are anticipated for other digitalization initiatives such as the development of, for example, MASS, MSW and digital signatures.

10 IMO, in its role as the primary international forum and the global regulator for shipping, should therefore take a proactive role to ensure a harmonized approach to international maritime digitalization. Many technologies under development are dependent on a well-defined coordination, without which the potential benefits may be missed.

Digitalization of data and processes

11 IMO has over the years initiated several digitalization projects to enhance the efficiency, security, and environmental performance of shipping. Presently the initiatives rest with several committees and sub-committees within IMO. While their individual efforts are commendable, the absence of a comprehensive strategy could potentially lead to a lack of harmonization across the development and missed opportunities for synergies.

12 Some digital initiatives are listed here:

.1 e-Navigation and S-100 framework (NCSR);

.2 Maritime services (NCSR and FAL);

.3 MASS (MSC, LEG and FAL);

.4 Digital signatures (MSC and FAL);

.5 Electronic certificates for ship operation (MSC, MEPC and FAL);

.6 Electronic certificates for the seafarers (MSC and HTW);

.7 Electronic record books (MEPC, NCSR and PPR);

.8 MSW, Just-in-Time framework (FAL);

.9 IMO Compendium (FAL);

.10 Electronic reporting (MEPC, MSC and FAL);

.11 Cybersecurity (MSC and FAL);

.12 Communication and transmission (NCSR);

.13 Inspection databases and PSC data exchange (MSC and FAL);

.14 Maritime Safety Information (MSC and NCSR); and

.15 Remote survey and remote inspection (III and SDC).

13 There are also several industry standards which are already being applied by manufacturers and operators of maritime systems and equipment. While these may be adequate for individual use cases, they may not contribute towards global maritime interoperability of digital solutions.

14 In this regard, it is important to note that stakeholders outside of IMO may not be as familiar with its developments and strategic directions. This further emphasizes the need for a clear and vocal strategy.

15 It is foreseen that a comprehensive and overarching strategy on digitalization outlining IMO's direction may foster greater alignment and collaboration, thereby enabling external stakeholders to better understand IMO's digital ambitions. It will also provide a clear roadmap and define the boundaries of the scope of IMO, ensuring all efforts are aligned towards a common goal and smart collaboration across the maritime industry.

Digitalization of reporting requirements

16 Another important element of maritime digitalization is the harmonization of the reporting requirements to ensure compliance with IMO instruments.

17 The Expert Group on Data Harmonization (EGDH) is responsible for the technical maintenance and extension of the IMO Compendium. This is done based on input papers to the Expert Group. Some of these input papers are in turn based on reporting or communication requirements developed by other committees and sub-committees.

18 An IMO digitalization strategy would create awareness of the on-going developments and would encourage the Organization to define any reporting requirements in the electronic format already during development and not only as reporting forms established late in the process, as it currently does.

19 The digitalization strategy would further ensure that any work on data harmonization within the Organization is based on what already exists in the IMO Compendium to ensure data interoperability between systems (MSW, PSC databases, flag States, recognized organizations). Data sets required by other IMO committees should be referred back to EGDH/FAL for inclusion in the IMO Compendium.

20 This would also allow new regulations to directly reference already existing data elements in the IMO Compendium and by that simplify implementation and increase consistency of regulations that involve the electronic exchange of data.

Including ships in maritime digitalization

21 While ship agents and other parties in the local port are central participants in the maritime digitalization effort, it is also important to facilitate the participation of the ships themselves. Much of the reporting requirements and many data items are directly associated with the ship, its crew and cargo. The availability and quality of this information require the participation of the ships and its crew in the reporting processes.

22 If the ship is not included as an integral part in a new IMO strategy on digitalization, a risk is that future requirements and solutions add new and unnecessary workload on the crew. The ship crew is already today using a substantial part of their time on various recording and reporting tasks and a central goal of a digitalization strategy should be to reduce this workload.

23 A reduction in the crew's workload can be achieved through automation of recording and reporting tasks, but this requires that new requirements and procedures are designed to facilitate digitalization and automation. This includes the definition of data sets, the processes used to acquire the data and how the data is transmitted from ship to shore. The latter also requires the use of digital signatures to ensure authenticity, integrity, and confidentiality of transmitted data.

Digital signatures

24 Another important issue related to digitalization is the use of digital signatures. Due to the international nature of shipping, there are challenges in organizing and making verification data available to the stakeholders. Digital signatures are necessary both for cyber security and for verifying the identity of senders of information. The latter may be for legal or liability issues. Such signatures will be used in all types of data exchanges, e.g. on ship or crew certificates, on VHF Data Exchanges (VDES), electronic record book, electronic bunker delivery note or in conjunction with the MSW.

25 The digitalization strategy should also ensure a consistent use of digital signatures in the different instruments and a harmonization of how these signatures are managed. This may also require inputs from the LEG Committee on international acceptance of such signatures.

IMO objectives

26 The IMO objectives for developing a comprehensive and overarching strategy on maritime digitalization is to enhance the efficiency, safety, and environmental sustainability in the shipping industry by using emerging technologies, leading to safer shipping practices by allowing for better risk management, monitoring, and response mechanisms through data sharing. Digitalization aims to create a more connected, integrated industry that is woven seamlessly into the global supply chain. By streamlining digital processes, it allows for more effective and efficient information exchange between ports and ships, and simplifies complex procedures, thus saving time and reducing operational costs. The utilization of digital technologies can also promote the design, construction, and operation of ships in more efficient and innovative ways.

27 Notably, the recently adopted *Strategic Plan for the six-year period 2024 to 2029*, as set out in Assembly resolution A.1173(33), provides the commitment and direction which IMO is heading towards on digitalization. That said, the Strategic Plan is kept relatively broad and high-level and may not be disseminated widely for external stakeholders to fully align or synergize their efforts with IMO. In this regard, a comprehensive strategy on maritime digitalization could provide greater clarity and oversight of IMO's various digitalization-related workstreams.

Analysis of implications

28 There would be no direct cost to the maritime industry or administrative requirements or human element issues arising during the development of this output as the objectives are simply to align new and existing initiatives, and the Checklist for identifying administrative requirements and human element issues, set out in annex 1 and annex 2 respectively, has been completed on this basis.

29 The co-sponsors would like to highlight the importance of this output to address the need for harmonization, which otherwise may lead to adverse impacts on efficiency and decarbonization, maritime safety, security, and the protection of the marine environment.

Benefits

30 An effective IMO strategy on digitalization would also address the need for harmonization of reporting requirements, ensuring compliance with IMO instruments. It would promote the early adoption of electronic formats in the development of new and necessary reporting requirements, as opposed to the current practice of establishing these formats late in the process. It would also encourage data harmonization based on existing elements in the IMO Compendium, thereby ensuring interoperability between systems (e.g. MSW and exchanging Maritime Safety Information (MSI)).

31 In essence, a robust digitalization strategy is vital to enable the maritime industry to fully leverage the potential of digitalization, ensure alignment of initiatives, and facilitate a seamless transition towards an efficient and paperless environment.

Urgency

32 The success of maritime digitalization relies on technology, systems and platforms which seamlessly can "speak to each other" by exchanging data and information on common or compatible platforms between shoreside infrastructure and shipboard equipment. By developing a comprehensive strategy on digitalization, IMO will provide a clear path to addressing current and future digital challenges and avoid building solutions in silos, which may be disconnected to other solutions.

33 Such a strategy would not only solidify the Organization's priorities but also signal the significance of digitalization to maritime stakeholders, aligning all efforts towards a common objective.

34 This output is an urgent issue and should be included in the biennial agenda of the Committee, with two sessions to complete (2026).

Proposal and output

35 The co-sponsors therefore propose a new output titled:

"The development of a comprehensive strategy on maritime digitalization"

36 The scope of this output is to:

.1 supplement the IMO Strategic Plan and its strategic directions to build the path towards a digital and paperless maritime environment as well as to align and harmonize the various initiatives to digitalize data exchange and processes;

.2 consider developing an IMO process for all relevant committees (MSC and MPEC) and sub-committees in the Organization on how to develop new instruments that involve the electronic exchange of data which would define procedures for early involvement of the EGDH in defining data elements that are used in the digital communication and by that ensure increased consistency and reduced complexity of the IMO Compendium; and

.3 complement on-going work outputs related to digitalization, including, but not limited to, the development of a non-mandatory MASS Code, implementation of the FAL Convention, in particular MSW, etc.

Action requested of the Committee

37 The Committee is invited to examine the content of this document and agree that the proposed output be added to the Committee's agenda.

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ANNEX 1

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS (FAL.3/CIRC.217, ANNEX 5)

This checklist should be used when preparing the analysis of implications required in submissions of proposals for inclusion of outputs. For the purpose of this analysis, the term "administrative requirement" is defined in accordance with resolution A.1043(27), as an obligation arising from a mandatory IMO instrument to provide or retain information or data.

Instructions:

(A) If the answer to any of the questions below is **YES**, the Member State proposing an output should provide supporting details on whether the requirements are likely to involve start-up and/or ongoing costs. The Member State should also give a brief description of the requirement and, if possible, provide recommendations for further work, e.g. would it be possible to combine the activity with an existing requirement?

(B) If the proposal for the output does not contain such an activity, answer **NR** (Not required).

(C) For any administrative requirement, full consideration should be given to electronic means of fulfilling the requirement in order to alleviate administrative burdens.

1. Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members, etc.	NR ☑	Yes ☐ Start-up ☐ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
2. Record keeping? Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education, etc.	NR ☑	Yes ☐ Start-up ☐ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
3. Publication and documentation? Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing, etc.	NR ☑	Yes ☐ Start-up ☐ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
4. Permits or applications? Applying for and maintaining permission to operate, e.g. certificates, classification society costs, etc.	NR ☑	Yes ☐ Start-up ☐ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		
5. Other identified requirements?	NR ☑	Yes ☐ Start-up ☐ Ongoing
Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)		

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ANNEX 2

CHECKLIST CONSIDERATION OF HUMAN ELEMENT ISSUES BY IMO BODIES

	1 **Question**	**2** **Yes/No**	**3** **IMO references**	**4** **Considerations**	**5** **Instructions**
Workload			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
1	**Does the "output" affect workload?**	**NO**			
1.1	**On board, especially in the already intensive phases of the voyage and port operations to:**		*Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies* (MSC-MEPC.7/Circ.8) *Guidelines on fatigue* (MSC.1/Circ.1598) *Principles of minimum safe manning* (resolution A.1047(27)) *Guidelines for the investigation of accidents where fatigue may have been an issue* (MSC/Circ.621)		

	1 **Question**	2 **Yes/No**	3 **IMO references**	4 **Considerations**	5 **Instructions**
1.1.1	Operations including navigation, cargo and engineering				
1.1.2	Maintenance of the ships structure and its equipment				
1.1.3	Onboard administration in support of the ships' management systems				
1.1.4	Onboard administration related to regulation involving flag States, classification societies, port State and other bodies such as charterers and port authorities				
1.1.5	Increased workload or time pressure on personnel if involved in implementation of changes prior to the implementation date				
1.2	**Ashore, in a manner that would affect the ships operation to:**				
1.2.1	Companies' administration				
1.2.2	Flag State, port State and classification societies administration such that certification and other processes are compromised or delayed				

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
Decision-making			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
2	**Does the "output" impact decision-making on board the ship?**	**NO**			
2.1	By confusion with existing requirements and regulations				
2.2	By changing responsibilities as laid out in the ISM Code				
2.3	By creating complexity in its implementation and/or in the safety management systems				
2.4	By requiring increased mental effort, such as the need to find, transform and analyse data or result in the need to make judgements based on incomplete information				
2.5	By limiting the time available to establish situational awareness, decide, communicate (possibly across time zones) or check				
2.6	By increasing reliance on judgement and administrative controls to manage major risks such as oil spills and collisions				

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
Living and Working Environment			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
3	**Does the "output" affect the living and working environment?**	**NO**	*Guidelines on the basic elements of a shipboard occupational health and safety programme* (MSC-MEPC.2/Circ.3) *Guidelines on fatigue* (MSC.1/Circ.1598)		
3.1	By interfering with existing arrangements for abandonment, fire-fighting and other emergency plans or procedures				

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
3.2	By introducing new materials that could create an explosion, fire, environmental or occupational health risk				
3.3	By introducing new high energy sources such as high-voltage, high pressure fluids				
3.4	By affecting access or egress and causing lack of ventilation in working spaces				
3.5	By affecting the habitability of accommodation spaces due to noise, vibration, temperatures, dust and other contaminants				
Operation and Maintenance			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
4	**Does the "output" affect the operation and maintenance of the ship, its structure or systems and equipment?**	**NO**	*Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies* (MSC-MEPC.7/Circ.8) *Guidelines for bridge equipment and systems, their arrangement and integration (BES)* (SN.1/Circ.288) *Principles of minimum safe manning* (resolution A.1047(27))		

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
			Issues to be considered when introducing new technology on board ships (MSC/Circ.1091) *Guideline on software quality assurance and human-centred design for e-navigation* (MSC.1/Circ.1512) *Guidelines for the standardization of user interface design for navigation equipment* (MSC.1/Circ.1609)		
4.1	By introducing equipment that the user may find difficult to operate or maintain or may be unreliable				
4.2	By introducing new and/or novel technology, or technology that changes the role of the person				
4.3	By introducing requirements for new competencies and roles				
4.4	By overloading existing infrastructure such as power generation and ventilation systems				
4.5	By poor integration with existing systems and controls				
4.6	By introducing new and unfamiliar operations/procedures				

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
4.7	By introducing new and unfamiliar operating interfaces				
4.8	By introducing risks to the ship during any modifications required prior to the implementation date of the output				

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
Measures to address the human element			*Other relevant references may be added* *Strike out references that are not relevant*	*If answer to question is "yes" identify considerations. If answer is "no" make proper justification*	*Identify how human element considerations should be addressed in the output*
5	**Does the "output" require changes to:**	**NO**	*Shipboard technical operating and maintenance manuals* (MSC.1/Circ.1253) *Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies* (MSC-MEPC.7/Circ.8)		
5.1	Training				
5.2	Practical skill development and competences				
5.3	Operating, management and/or maintenance procedures				
5.4	Information/manuals for operation and maintenance				
5.5	Spares outfit				

	1 Question	2 Yes/No	3 IMO References	4 Considerations	5 Instructions
5.6	Occupational safety requirements including guarding and PPE				
5.7	Shore support				