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Union submission to the 104th session of the International Maritime Organization's Maritime Safety Committee proposing a new output regarding the digitization of VHF voice communication

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PURPOSE

This Staff Working Document contains a draft Union submission to the International Maritime Organization's (IMO) 104th session of the Maritime Safety Committee (MSC 104). The IMO has scheduled MSC 104 from 4 to 8 October 2021.

The draft submission suggests a new output to consider the need for a possible migration of very high frequency (VHF) radio of ships towards digital technologies and its regulatory and operational consequences.

The voice radio telephony in the VHF maritime mobile band is the most important communication for shipping. Congestion in the band has become a serious and continuously growing problem in several areas around the world. Due to its increased use for several other reporting requirements of ships, the amount of voice channels in the VHF maritime mobile band has been reduced. By technological means, in particular by converting the analogue voice signal into a digital data stream, the number of communication channels could be increased.

EU COMPETENCE

Navigation and radio-communication equipment are listed as items in Sections 4 and 5, respectively, of Commission Implementing Regulation (EU) 2020/1170[1]. The Implementing Regulation concerns design, construction and performance requirements and testing standards for marine equipment. It is based on the empowerment of the Commission to indicate, through implementing acts, the design, construction and performance requirements for marine equipment falling within the scope of Directive 2014/90/EU on marine equipment[2].

In light of all of the above, the present draft Union submission falls under EU exclusive competence.[3] This Staff Working Document is presented to establish an EU position on the matter and to transmit the document to the IMO prior to the required deadline of 2 July 2021.[4]

[1] OJ L 264, 12.8.2020, p. 1–269

[2] OJ L 257, 28.8.2014, p. 146–185

[3] An EU position under Article 218(9) TFEU is to be established in due time should the IMO Maritime Safety Committee eventually be called upon to adopt an act having legal effects as regards the subject matter of the said draft Union submission. The concept of '*acts having legal effects*' includes acts that have legal effects by virtue of the rules of international law governing the body in question. It also includes instruments that do not have a binding effect under international law, but that are '*capable of decisively influencing the content of the legislation adopted by the EU legislature*' (Case C-399/12 Germany v Council (OIV), ECLI:EU:C:2014:2258, paragraphs 61-64).

[4] The submission of proposals or information papers to the IMO, on issues falling under external exclusive EU competence, are acts of external representation. Such submissions are to be made by an EU actor who can represent the Union externally under the Treaty, which for non-CFSP (Common Foreign and Security Policy) issues is the Commission or the EU Delegation in accordance with Article 17(1) TEU and Article 221 TFEU. IMO internal rules make such an arrangement absolutely possible as regards existing agenda and work programme items. This way of proceeding is in line with the General Arrangements for EU statements in multilateral organisations endorsed by COREPER on 24 October 2011.

MARITIME SAFETY COMMITTEE
104rd session
Agenda item 21

MSC 104/21/X
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WORK PROGRAMME

Proposal for a new output regarding possible digitisation of VHF voice communication

Submitted by the European Commission on behalf of the European Union

SUMMARY

Executive summary:	This document proposes a new output to consider the need and related regulatory and operational consequences of possible migration of VHF voice communication towards digital technologies
Strategic direction, if applicable:	2
Output:	Not applicable
Action to be taken:	Paragraph 31
Related documents:	Resolution 803(19), Resolution A.954(23), Resolution A.954(23), Resolution MSC.68(68), ITU Resolution 363 (WRC-19), …

Introduction

1 The voice radio telephony in the VHF maritime mobile band is the most important communication for shipping. The congestion in the VHF maritime mobile band has become a serious problem in a number of member states of the Organization and is continuing to grow. Based on the allocation of channels to DSC, AIS and recently VDES the amount of voice channels in the VHF maritime mobile band has been reduced. By technological means, in particular by converting the analogue voice signal into a digital data stream for transmission, the number of resulting communication channels may be increased in the VHF maritime mobile band.

2 The channels and generic regulation about their respective usage by the maritime mobile service (MMS) in the VHF maritime mobile band are listed in Appendix 18 of the Radio Regulations (RR) of the International Telecommunication Union (ITU). A change of the current usage could be concluded by a World Radiocommunication Conference (WRC) only. Upon request of some of ITU's member states, WRC-19 decided to invite WRC-27 "to consider possible changes to Appendix 18 in order to enable use in the MMS for future

implementation of new technologies, for improving efficient use of the maritime frequency bands" (Resolution 363 (WRC-19)).

3 As a migration from analogue voice communication to digital voice communication may have further implications, e.g. on the actual operation of radio stations, and may go far beyond a mere re-allocation of channels, the Organization should develop a mature view of this issue in due time.

IMO's objectives

4 International regulation of radiocommunication in the maritime context has been established more than 100 years ago. For vessels in distress, radiocommunication is the first and often only means of alerting. For bridge-to-bridge communication and for communication with coast stations in coastal waters (sea area A1), VHF voice communication is the main vehicle; it is in permanent use by the seafarer to secure safety of navigation.

5 The system currently established for maritime voice radiocommunication, in particular in the context of distress and for situations that require a formal amount of urgency or safety, is the Global Maritime Distress and Safety System (GMDSS). Chapter IV of the SOLAS Convention is the regulatory basis of the GMDSS; it contains the relevant definitions, functional requirements and the necessary carriage requirements. The existence of chapter IV of the SOLAS Convention and of a considerable number of related instruments vindicates the importance of radiocommunication for the seafarer.

6 This proposal relates also to a possible regulatory development and integration of a new digital voice radiocommunication system into the SOLAS Convention and related instruments. It would directly contribute to Strategic direction 2 ("Integrate new and advancing technologies in the regulatory framework") and is clearly within the scope of IMO's mission.

Need

7 Voice communication in the VHF maritime mobile band will keep its role as the permanent communication tool in its traditional field. A lack of VHF radiocommunication channels is detrimental to a future availability of robust and appropriate voice radiocommunication. New technologies need to be explored to overcome the shortage in the frequency spectrum. It would, therefore, be prudent to consider whether there is a compelling need for migration of VHF voice communication towards digital technologies and, if so, to prepare a general overview of the IMO instruments that would need to be amended, as well as to suggest a possible migration plan to guide future work in IMO, but also to feed into ITU, IALA and other relevant international organizations.

Analysis of the issue

8 As a result of considerations which started in 1994, ITU has published recommendation ITU-R M.1084-5 in its current version of 2012, titled "Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service". This recommendation describes a technical solution at the current level of technology at that time, suggesting the implementation of narrower analogue communication channels in the frequency band and a sophisticated and more compressed channelling arrangement. One drawback of such narrowing of the analogue communication channel would be a loss of robustness of the radiocommunication link. In fact this recommendation has never been applied.

9 Within certain physical limits, a digital communication channel may overcome the robustness problem of a narrowed analogue channel, whilst still offering an improvement of spectrum usage efficiency. With current technology and as a rule of thumb, up to four digital voice channels may possibly replace one analogue channel in the same amount of frequency spectrum. Considering the scarceness of frequency spectrum in the maritime VHF band, a migration to digital voice communication may be a solution.

10 However, a digital radiocommunication system provides a different feel to an operator who is familiar with an analogue radiocommunication system. With a digital system, there is no perceivable noise on the radio channel any more. However, at the border of the coverage area the reception of a transmission could rather cease in an instant, instead of notably and slowly disappearing in the increasing noise, as was the case with an analogue system. Even if this may be just a psychological issue in a highly technological context, it may need discussion by the Organization in order to make sure that the human element is addressed properly.

11 It may also be beneficial to consider new possibilities that may become available by a digital migration, instead of creating just a digital clone of the current GMDSS. An increase of technological options of organizing radio circuits may be in reach, e.g. an advanced group call functionality, however these options would need careful consideration by the Organization in order to correspond with the seafarers needs. Such new functionality may also have implications for SAR communication.

12 A very important part of the discussions foreseen would be the migration plan. The pros and cons of a slow migration, with analogue and digital technology operated in parallel, would need to be considered versus the pros and cons of a sharp and complete transition at a specific date. Such discussion of a migration plan would need to be in the context of practicability and of maritime safety and, again, its implications for the seafarer.

13 Finally, as there are more GMDSS equipped leisure vessels existing than vessels that are subject to the SOLAS Convention, it should also be discussed whether in any case the current usage of VHF channels 70 for DSC distress alerting (possibly including the continuation of an automatic watch by ALL vessels) and of VHF channel 16 for analogue distress communication may be maintained.

Analysis of the implications

14 A migration to digital voice communication in the maritime VHF band would require, besides a review of chapter IV of the SOLAS convention, a review of those related instruments that have an impact on VHF voice communication, such as relevant performance standards. ITU, supported by the Organization, would be requested to review Appendix 18 of the RR via a WRC, and to review those ITU-R recommendations that are relevant in the context of maritime VHF voice communication.

15 During a possible migration to digital voice communication in the maritime VHF band it may also be required that all functions of current analogue VHF voice radios be supported. At the end of the process, a new communication system may have emerged, but it would be important to ensure that the GMDSS would be fully functional at all times by implementing a robust transition system.

16 The cost of purchasing a new digital radio is expected to be not higher than the cost of an analogue radio. No installation of additional infrastructure on board a vessel (such as antenna, power supply etc.) would be required, as the existing infrastructure can be reused without changes.

17 A necessary replacement of VHF radios may well be in line with the normal life cycle of radios. In any case the cost for replacing an existing VHF radio only constitutes a very minor fraction when considering the over-all cost of maintaining the technical equipment on board a vessel.

18 A complete checklist for identifying administrative requirements is set out in annex 1.

Benefits

19 A migration to digital voice communication in the maritime VHF band could improve the spectrum efficiency by virtually multiplying the number of available communication channels.

20 In addition, digital voice communication may offer an improved functionality for the benefit of seafarers, SAR organizations and administrations, such as an immediate and automatic identification of the originator of a transmission.

21 Digital voice communication could maintain or improve the voice quality across the whole reception/transmission area.

Industry standards

22 Several digital communication standards, which may contain proprietary elements, are well established in other industry sectors, e.g.:

.1 digital Private Mobile Radio (dPMR);
.2 Next Generation Digital Narrowband (NXDN)
.3 Digital mobile radio (DMR)
.4 Trans-European Trunked Radio System (Tetra)

23 Recently, the European standardization body ETSI has begun to develop a dPMR-derived standard called “dPMR Marine”.

Output

24 This new output is to consider whether there is a compelling need to migrate VHF voice communication towards digital technologies and, if so, to prepare a general overview of the IMO instruments that may need to be amended and to suggest a possible migration plan.

25 It is proposed that the title of the new output be "Consideration of the need and related regulatory and operational consequences of a possible migration of VHF voice communication towards digital technologies”.

Human element

26 A checklist for considering human element issues by IMO bodies is provided in annex 2.

Urgency

27 Communication is a key element of maritime safety. This output enables the future

availability of VHF radiocommunication channels and should be progressed as a matter of urgency.

28 Whilst voice communication is a key element for safe shipping, the allocation of analogue voice channels to the VDES for use on or after 1 January 2024 may reduce the remaining availability of voice communications channels substantially in some areas. As this would result in a heavier communication load on the remaining available analogue voice channels, miscommunication or no communication at all could occur in certain areas and situations.

29 Owing to the above reasons, although the European Union well understands the heavy workload of the NCSR Sub-Committee, it proposes to consider this issue at NCSR 9 and NCSR 10 with a view to its approval by MSC 107 in due time before WRC-23, in order to begin consideration of relevant changes of SOLAS chapter IV and related instruments between WRC-23 and WRC-27.

30 A check/monitoring sheet for the process of amending the SOLAS Convention is provided in annex 3.

Action requested of the Committee

31 The Committee is invited to include in its biennial agenda a new output, as described in paragraph 24 and 25, and to add it to the agenda of the next NCSR Sub-Committee (NCSR 9).

ANNEX 1

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS

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 requirements" is defined in resolution A.1043(27), i.e. administrative requirements are an obligation arising from future IMO mandatory instruments 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 FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES

Instructions: If the answer to any of the questions below is: (A) **YES**, the preparing body should provide supporting details and/or recommendation for further work. (B) **NO**, the preparing body should give proper justification as to why human element issues were not considered. (C) **NA** (Not Applicable) - the preparing body should give proper justification as to why human element issues were not considered applicable.	
Subject Being Assessed: (e.g. resolution, instrument, circular being considered) Introduction of digitization of VHF voice communication	
Responsible Body: (e.g. Committee, Sub-Committee, Working Group, Correspondence Group, Member State) Sub-Committee on Navigation, Communications and Search and Rescue (NCSR)	
1. Was the human element considered during development or amendment process related to this subject?	☑Yes ☐No ☐NA
2. Has input from seafarers or their proxies been solicited?	☑Yes ☐No ☐NA
3. Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section)	☑Yes ☐No ☐NA
4. Have human element solutions been made as an alternative and/or in conjunction with technical solutions?	☑Yes ☐No ☐NA
5. Has human element guidance on the application and/or implementation of the proposed solution been provided for the following:	
● Administrations?	☑Yes ☐No ☐NA
● Shipowners/managers?	☑Yes ☐No ☐NA
● Seafarers?	☑Yes ☐No ☐NA
● Surveyors?	☑Yes ☐No ☐NA
6. At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise?	☐Yes ☐No ☐NA
7. Does the solution address safeguards to avoid single person errors?	☑Yes ☐No ☐NA
8. Does the solution address safeguards to avoid organizational errors?	☐Yes ☑No ☐NA
9. If the proposal is to be directed at seafarers, is the information in a form that can be presented to and easily understood by the seafarer?	☑Yes ☐No ☐NA
10. Have human element experts been consulted in development of the solution?	☐Yes ☑No ☐NA
11. Human element: Has the proposal been assessed against each of the factors below?	
❑ CREWING. The number of qualified personnel required and available to safely operate, maintain, support and provide training for system.	☑Yes ☐No ☐NA
❑ PERSONNEL. The necessary knowledge, skills, abilities and experience levels that are needed to properly perform job tasks.	☑Yes ☐No ☐NA
❑ TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills and abilities to achieve desired job/task performance.	☑Yes ☐No ☐NA

❑	OCCUPATIONAL HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc. to properly manage risks.	☐Yes ☐No ☑NA
❑	WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health, and comfort of those on working on board, such as noise, vibration, lighting, climate and other factors that affect crew endurance, fatigue, alertness and morale.	☐Yes ☐No ☑NA
❑	HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury, or death in a catastrophic event such as fire, explosion, spill, collision, flooding or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment.	☐Yes ☐No ☑NA
❑	HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive and sensory abilities of the user population.	☑Yes ☐No ☐NA

Comments:

(1) Justification if answers are NO or Not Applicable.
(2) Recommendations for additional human element assessment needed.
(3) Key risk management strategies employed.
(4) Other comments.
(5) Supporting documentation.

The justification as to why human element issues were not considered NO or NA (Not Applicable) is as follows:

(8) This will not have effect on organizational procedures and hence errors.
(10) It was not considered necessary to engage specialist support as the human element benefits are quite straightforward in this proposal.
(11d) Not considered appropriate.
(11e) Not considered appropriate.
(11f) Not considered appropriate.

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ANNEX 3

CHECK/MONITORING SHEET FOR THE PROCESS OF AMENDING THE CONVENTION AND RELATED MANDATORY INSTRUMENTS (PROPOSAL/DEVELOPMENT)

Part I – Submitter of proposal (refer to paragraph 3.2.1.1)

1	MSC104/21/.. Submitted by [France], Germany, The Netherlands,…
2	MSC 104
3	1th July 2021

Part II – Details of proposed amendment(s) or new mandatory instrument (refer to paragraphs 3.2.1.1 and 3.2.1.2)

1	*Strategic direction*
	2
2	*Title of the output*
	Consideration of the need and regulatory and operational consequences of the proposed migration of VHF voice communication towards digital technologies
3	*Recommended type of amendments* (MSC.1/Circ.1481) (delete as appropriate)
	• Four-year cycle of entry into force
4	*Instruments intended for amendment (SOLAS, LSA Code, etc.) or developed (new code, new version of a code, etc.)*
	• Amendment of SOLAS chapter IV • Development/amend of MSC resolution on performance standards of VHF voice communications and MSC resolution on guidelines for the use of VHF voice communications • Revision of relevant IMO instruments such as MSC. 74(69), SN.1/Circ.289, etc.
5	*Intended application (scope, size, type, tonnage/length restriction, service (International/non-international), activity, etc.)*
	Same as VHF voice communications By regulatory application all ships of 300 gross tonnage and upwards engaged on international voyage and cargo ships of 500 gross tonnage and upwards not engaged on international voyage and passenger ships irrespective of size would be covered. It has however to be taken into account that this change may also have an implication on non-convention ships which are under national regulations, as such ships participate on a voluntary base in the GMDSS and the ship movement service.
6	*Application to new/existing ships*
	New and existing ships
7	*Proposed coordinating sub-committee*
	Sub-Committee on Navigation, Communication and Search and Rescue (NCSR)
8	*Anticipated supporting sub-committees*
	None
9	*Timescale for completion*
	Two sessions
10	*Expected date(s) for entry into force and implementation/application*

	1 January 2028/2032
11	*Any relevant decision taken or instruction given by the Committee*