INTERNATIONAL MARITIME ORGANIZATION

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MARITIME SAFETY COMMITTEE
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Agenda item 5

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REGULATORY SCOPING EXERCISE FOR THE USE OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

Comments on documents MSC 102/5/1, MSC 102/5/3 and MSC 102/5/4

Submitted by the Russian Federation

SUMMARY

Executive summary:	The document comments on remote control stations referred to in documents MSC 102/5/1, MSC 102/5/3 and MSC 102/5/4
Strategic direction, if applicable:	2
Output:	2.7
Action to be taken:	Paragraph 11
Related documents:	MSC 102/5/1, MSC 102/5/3, MSC 102/5/4 and MSC 102/5/29

Introduction

1 This document is submitted in accordance with paragraph 6.12.5 of the *Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.2) and comments on documents MSC 102/5/1, MSC 102/5/3 and MSC 102/5/4.

Background

2 Since 2020, in the Russian Federation, within the MARINET project of the National Technology Initiative, a-Navigation means have been tested in the real operational conditions on board ships MV **Mikhail Ulyanov**, MV **Pola Anfisa**, MV **Rabochaya** and dredger **Redut**, the information thereon is set out in document MSC 102/5/29.

3 The practical experience of design, installation and use of a-Navigation means in interaction with various shipping companies and Russian Maritime Register of Shipping makes it possible to provide substantial comments on a number of matters concerning remote control stations referred to in documents MSC 102/5/1, MSC 102/5/3 and MSC 102/5/4.

4 The Russian Federation, through this document, shares its views based on the accumulated practical experience. The review was done by MARINET RUT, the Centre for Promotion of Technologies of Autonomous Shipping, established by the Russian University of Transport together with the MARINET Departmental Centre under the order of the Minister of Transport of the Russian Federation.

Comments

5 It is the submitter's basic principle that MASS remote control should comply with the existing regulatory standards including those pertaining to the situation awareness and radio communication. In this light the submitter suggests a remote control station (RCS) should be considered equivalent to a navigation bridge and central control station under the relevant SOLAS provisions, but the RCS is located outside the autonomous ship and has a high degree of control automation.

6 The RCS is designed to simultaneously display to operator various data, those equivalent to the information on the ship's navigation bridge (figure 1):

.1 navigation systems interface including ECDIS equivalent, autonomous navigation system and control interfaces of ship onboard radars;

.2 video information display interfaces on the ambient surroundings and control of the optical surveillance and analysis system;

.3 interfaces of the remote engine and technical monitoring system allowing surveillance and control of the unattended engine-room;

.4 interfaces of video information display and internal ship's CCTV control;

.5 interfaces of the ship motion control (joystick system);

.6 radio interaction terminals for a RCS operator to interact with the onboard radio equipment (VHF and MF-HF radio stations, MF-HF radiotelex, Inmarsat station, Navtex receiver and public address system) connected to the corresponding devices onboard;

.7 microphones and speakers for interaction with the public address system and receiving audio signals and video communication with the crew onboard; and

.8 indicators and interfaces of the a-Navigation settings and diagnostics system.

7 In displaying video information on the ambient surroundings, the submitter thinks it preferable to keep the real angular positions and sizes of objects, for which purpose, in our case, video information display zone is a 5 display arc of 180 degrees, equivalent to the real 180-degree viewing arc as seen by the navigator on the bridge. The operator can rotate the view in horizontal plane (equivalent to a navigator's switching to a different view angle), amplify the chosen view zone (binocular equivalent), switch to the infrared band and to the virtual view model.

8 It is considered appropriate to have on MASS onboard radars remotely controlled to be through the RCS by a remote operator.

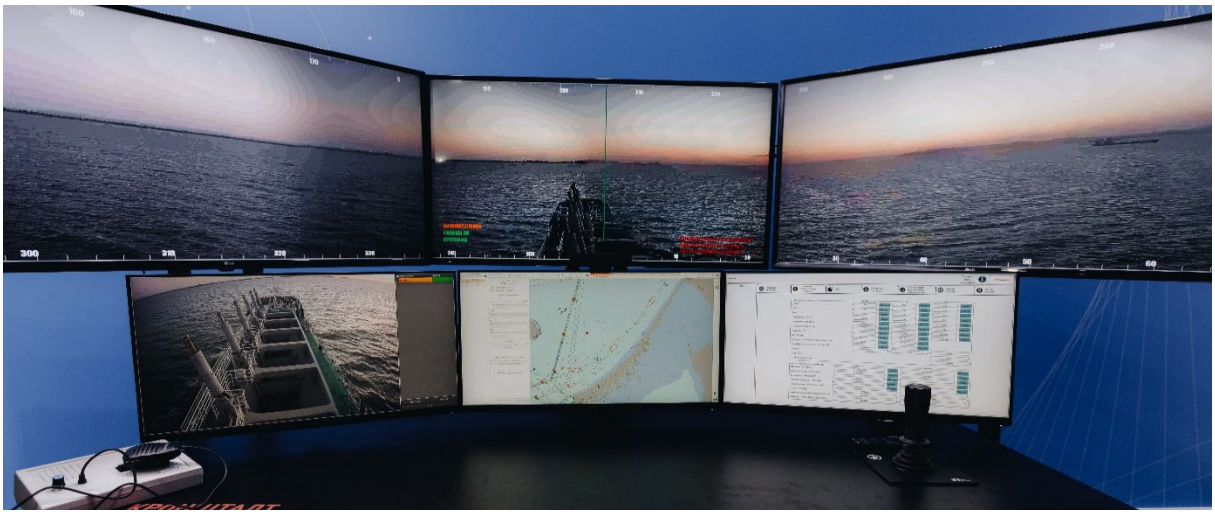

Figure 1

9 The RCS is similar to navigation bridge and qualified navigators will be familiarized with its use with no need for any significant further training.

10 The RCS can be located either ashore or on board another ship: convoy navigation is part of the ongoing tests, where the RCS for monitoring and control of the hopper barge is installed on board dredger, the head-ship of the dredging convoy.

Action requested of the Committee

11 The Committee is invited to take note of the information on MASS trials carried out in the Russian Federation for the purpose of further MASS trials worldwide and to comment as it may deem appropriate.

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REGULATORY SCOPING EXERCISE FOR THE USE OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

Comments on documents MSC 102/5/4, MSC 102/5/9, MSC 102/5/10, MSC 102/5/11, MSC 102/5/12, MSC 102/5/16 and MSC 102/INF.17

Submitted by the Russian Federation

SUMMARY

Executive summary:	This document provides comments on issues of MASS development strategic prospects mentioned in documents MSC 102/5/4, MSC 102/5/9, MSC 102/4/10, MSC 102/5/11, MSC 102/5/12, MSC 102/5/16 and MSC 102/INF.17
Strategic direction, if applicable:	2
Output:	2.7
Action to be taken:	Paragraph 12
Related documents:	MSC 102/5/4, MSC 102/5/9, MSC 102/4/10, MSC 102/5/11, MSC 102/5/12, MSC 102/5/16 and MSC 102/INF.17

Introduction

1 This document is submitted in accordance with paragraph 6.12.5 of the *Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.2) and comments on documents MSC 102/5/4, MSC 102/5/9, MSC 102/5/10, MSC 102/5/11, MSC 102/5/12, MSC 102/5/16 and MSC 102/INF.17.

Background

2 The valuable research conducted by the participating States under the RSE, as well as practical experience in creating legal and technical basis for widespread use of MASS in the Russian Federation, provides an opportunity to produce important comments in respect of phased MASS development.

3 Positions expressed in MSC 102/5/4, MSC 102/5/9, MSC 102/4/10, MSC 102/5/11, MSC 102/5/12, MSC 102/5/16 and MSC 102/INF.17 include two major provisions:

.1 The fundamental frontier in the use of autonomous vessels is linked to the presence or absence on board a ship of a crew capable of stepping into the control of such a ship. If there is such a crew, then changes in international regulations concerning MASS might be minor, if at all required.

.2 In the near future MASS will coexist with conventional ships which will still comprise the majority of the overall fleet.

4 The Russian Federation supports these positions and considers it appropriate to suggest the vision of several strategic prospects of the MASS development, which underpins the measures introduced in the Russian Federation in respect of MASS.

Comments in respect of the strategic prospects of MASS development

5 The key difference between MASS and conventional ships is the use of digital tools of autonomous navigation (a-Navigation) which allow to perform a wide range of functions traditionally accomplished by crew with the help of computer autonomous systems and remote control systems.

6 At the same time, a-Navigation facilities are not the subject of the legal relationships and collaboration with other participants of navigation. Thus, they are not replacing human beings in operating the vessel, but rather assist the latter (shipowner, master, remote operator) in operating a ship. The responsibility for operating a ship and the safety of navigation still lies with the people.

7 Current navigation regulations, reflecting the aims and functions of operating a vessel to provide for the safety of navigation, were formed over decades on the basis of extensive practical experience and statistics analysis, casualties and scientific research. Full or partial abandonment of such functions in respect of any category of vessels, in particular MASS, without sufficient practical experience of the exploitation of such vessels poses risks to the safety of navigation. Due to the coexistence of MASS and conventional ships it seems expedient that there should be single regulations with regard to both types of ships.

8 We consider that the process of introducing a-Navigation technology must be phased and smooth with a gradual introduction of a-Navigation technologies not only to the fleet in general but also to individual vessels. Similar to the research results of the MUNIN project, our practical experience indicates the necessity for symbiosis of three MASS operation methods – automatic, remote and manual. Choice of each of them should be determined by a shipping company depending on the relevant conditions, type of vessel and the nature of its exploitation. As the technologies will mature and the practical experience of MASS use will be accumulated, the operation in automatic mode will become more widespread and will prevail over manual operation.

9 The main driver for the use of a-Navigation at the first stage is enhancing the safety, downgrading the influence of a human factor simultaneously with increasing the control over the crew's work aboard the vessel. At the same time the automation of the routine functions, better situational awareness and control will lower pressure on the crew members and as a result there will be fewer people required on the vessel.

10 Only wide practical experience gained at the first stage will help to come up with comprehensive technical and legal requirements and standards for MASS, and move on to the next stage where the maturity of the technology and trust therein will allow for some of the current regulations to be revisited with emphasis moving from human centric requirements to those specific to computer systems and networks. The emergence of such specific regulations together with the savings due to scale will lead to further decrease of MASS exploitation expenses and their wider use. At the same time the emergence of new regulations focusing on a-Navigation will obviously require applying them to conventional vessels, for example, in respect of information exchange, use of computer and telecommunication systems aboard the vessel.

11 We support the position of Committee Members with regard to the necessity of the development of unified information infrastructure for MASS and find it appropriate to implement this on the basis of and in the framework of the Strategy on e-Navigation introduction. The link between these strategic trends e-Navigation and a-Navigation – seems to us to be a fruitful way not only for MASS introduction, but also for the creation of a global intellectual network of maritime transport.

Action requested of the Committee

12 The Committee is invited to note the above approach to the strategic prospects of the MASS development and use it to under the RSE.