

MARITIME SAFETY COMMITTEE  
107th session  
Agenda item 5

MSC 107/5/1  
2 May 2023  
Original: ENGLISH  
Pre-session public release:

**DEVELOPMENT OF A GOAL-BASED INSTRUMENT FOR  
MARITIME AUTONOMOUS SURFACE SHIPS (MASS)**

**Report of the MSC-LEG-FAL Joint Working Group on Maritime  
Autonomous Surface Ships (MASS) on its second session**

**Note by the Secretariat**

**SUMMARY**

<i>Executive summary:</i>	This document provides the report of the MSC-LEG-FAL Joint Working Group on Maritime Autonomous Surface Ships (MASS) on its second session.
<i>Strategic direction, if applicable</i>	2
Output	2.23
<i>Action to be taken:</i>	Paragraph 67
<i>Related document:</i>	MASS-JWG 2/WP.1

**General**

1 The MSC-LEG-FAL Joint Working Group on Maritime Autonomous Surface Ships (MASS) met from 17 to 21 April 2023 and was chaired by Professor Gen Goto (Japan). The Co-Chair, Mr. Henrik Tunfors (Sweden), was also present.

2 The Group was attended by delegations from the following Member States:

ARGENTINA	EGYPT
BAHAMAS	ETHIOPIA
BELGIUM	FIJI
BRAZIL	FINLAND
CANADA	FRANCE
CHILE	GERMANY
CHINA	INDONESIA
CROATIA	IRAQ
CYPRUS	JAPAN
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	LATVIA
DENMARK	LIBERIA
	MALAYSIA

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MALTA	POLAND
MARSHALL ISLANDS	REPUBLIC OF KOREA
MEXICO	RUSSIAN FEDERATION
MYANMAR	SINGAPORE
MOROCCO	SOUTH AFRICA
NETHERLANDS (KINGDOM OF THE)	SPAIN
NEW ZEALAND	SWEDEN
NICARAGUA	TÜRKİYE
NIGERIA	UNITED ARAB EMIRATES
NORWAY	UNITED KINGDOM
PAKISTAN	UNITED STATES
PANAMA	URUGUAY
PERU	VIET NAM
PHILIPPINES	

as well as a representative from the following Associate Member of IMO:

HONG KONG, CHINA

and by an observer from the following intergovernmental organization:

EUROPEAN COMMISSION (EC)

3 The session was also attended by observers from the following non-governmental organizations in consultative status:

INTERNATIONAL CHAMBER OF SHIPPING (ICS)  
INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)  
COMITÉ INTERNATIONAL RADIO-MARITIME (CIRM)  
COMITÉ MARITIME INTERNATIONAL (CMI)  
INTERNATIONAL ASSOCIATION OF PORTS AND HARBORS (IAPH)  
BIMCO  
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)  
OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)  
INTERNATIONAL MARITIME PILOTS' ASSOCIATIONS (IMPA)  
INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATIONS (IFSMA)  
INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS  
(INTERTANKO)  
INTERNATIONAL GROUP OF PROTECTION AND INDEMNITY ASSOCIATIONS  
(P & I CLUBS)  
INTERNATIONAL PARCEL TANKERS ASSOCIATION (IPTA)  
INTERNATIONAL MARINE CONTRACTORS ASSOCIATION (IMCA)  
INTERNATIONAL HARBOUR MASTERS' ASSOCIATION (IHMA)  
INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)  
WORLD SHIPPING COUNCIL (WSC)  
THE NAUTICAL INSTITUTE (NI)  
PACIFIC ENVIRONMENT

by the following IMO training institute:

WORLD MARITIME UNIVERSITY (WMU)

and by the following Memorandum of Understanding:

INDIAN OCEAN MEMORANDUM OF UNDERSTANDING ON PORT STATE  
CONTROL (IO MOU)

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## Terms of reference

4 The terms of reference for the Joint MSC-LEG-FAL Working Group on Maritime Autonomous Surface Ships (hereinafter, "the Group"), jointly approved by LEG 109 (LEG 109/16/1, paragraph 13.14), MSC 105 (MSC 105/20, paragraph 7.27) and FAL 46 (FAL 46/24, paragraph 14.17), are as follows:

- .1 the Joint MSC-LEG-FAL Working Group on Maritime Autonomous Surface Ships (MASS) has been established as a cross-cutting mechanism to address common high-priority issues identified by the regulatory scoping exercises for the use of MASS conducted by the three Committees; and
- .2 based on the outcome of the regulatory scoping exercises conducted by the respective committees and any other requests for input or recommendations from the three Committees, the Joint MSC/LEG/FAL MASS Working Group is instructed to:
  - .1 develop a work plan, taking into account the road maps developed and updated by the three Committees;
  - .2 address the common issues (based on MSC.1/Circ.1638, LEG.1/Circ.11 and FAL.5/Circ.49) identified by the three Committees; and
  - .3 provide advice to the Committees after every meeting.

## Seminar on legal issues relating to MASS, including UNCLOS

5 The Group noted that a seminar on legal issues relating to MASS, including UNCLOS, was held prior to the MASS-JWG 2 meeting on 17 April 2023. The Group also noted that the views expressed by the speakers were their own and did not reflect those of any delegation or the Organization.

## Report on the outcome of Council and the three Committees

6 The Group considered the outcome of C 127, C 128, MSC 106, FAL 47 and LEG 110, as provided in MASS-JWG 2/2, MASS-JWG 2/2/4 and MASS-JWG 2/2/5, respectively.

## Update on the work and progress made in developing the goal-based MASS Code

7 In order to avoid duplication of work and to be aware of the ongoing work carried out by the MSC-established intersessional Correspondence Group, the Group invited its Coordinator, Mr. Charles McHardy (Marshall Islands), to outline the progress made on developing the non-mandatory goal-based MASS Code. The Coordinator highlighted that the MSC MASS Correspondence Group had faced some issues that concern the three Committees and recommended that the Group address those issues, including potential limits on the control of MASS from a Remote Operations Centre.

## Consideration of legal aspects

8 The Group considered the role of the master as reflected in the table in the annex to MASS-JWG 2/WP.2, as well as the input provided in the following documents referred to it by LEG 110: LEG 110/11/2, LEG 110/11/4, LEG 110/11/5 and LEG 110/11/6.

9 While one delegation highlighted that consideration of documents MASS-JWG 2/2/3 and LEG 110/11/4 was premature at this stage, others expressed the view that issues and principles of a horizontal nature would aid in closing the gaps and themes identified in the RSEs.

10 Following discussion and mindful that the development of the MASS Code should be considered by MSC, the Group agreed to discuss the principles related to the common issues presented in these documents, including the terms used, rather than focusing on the text itself (see paragraphs 54 to 58).

### **Consideration of the content of the table for addressing MASS common issues**

11 To facilitate discussion on common issues relating to MASS, the Group agreed to use the table provided in document MASS-JWG 2/WP.2, consolidating views from the documents submitted to this session, using the format proposed in annex 1 to document MASS-JWG 1/WP.1. Guiding questions have been included therein to facilitate further discussion on the most salient points raised in the submissions.

### ***Role and responsibilities of the master of a MASS***

12 The Group had a dynamic exchange on the role and responsibilities of the master of a MASS, and a range of views were expressed, including that:

- .1 there is no need for a new definition for the master of a MASS as MASS are ships and the role of the master is the same as for conventional ships;
- .2 the functions of the master of a MASS operating MASS require detailed consideration before deciding on his or her roles and responsibilities;
- .3 consideration of the definition of the master of a MASS would be premature at this stage as it is unclear how fully autonomous ships will be operated and how it will allow for human intervention;
- .4 the person in charge of MASS operations has to have overall responsibility of a MASS, even for those operating in fully autonomous mode;
- .5 reference to the terms "command" and "control" when defining the role of the master of a MASS needs to be thoroughly considered;
- .6 if there is a crew or persons on board, a master should be on board as well, to ensure their safety; and
- .7 a master of a MASS may not need to be on board, depending on the technology.

13 Following the discussion and taking the above views into account, the Group agreed that:

- .1 there should be a human master responsible for a MASS, regardless of mode of operation or degree or level of autonomy;
- .2 such master may not need to be on board, depending on the technology used on the MASS and human presence on board, if any; and
- .3 regardless of mode of operation or degree or level of autonomy, the master of a MASS should have the means to intervene when necessary.

14 In connection with the above and considering the necessary future work at its third session, the Group also agreed to:

- .1 request the Secretariat to compile a list of provisions on the roles and responsibilities of a master in IMO instruments and UNCLOS; and
- .2 discuss whether some of such roles of the master can be delegated or entrusted to some other party, considering the different modes of operation or degrees or levels of autonomy.

15 In addition to the above list to be provided by the Secretariat, the Group agreed to invite submissions on related provisions on the master, including from instruments not under the purview of IMO.

#### ***Possibility of a master of a MASS being responsible for multiple MASS***

16 The Group considered the possibility of the master of a MASS being responsible for multiple MASS at the same time and supported the view in principle. However, several delegations highlighted that priority consideration should be given to identifying the particular circumstances during which this may not be allowed. These include emergency situations and navigation in congested areas or in locations where the marine environment is at risk.

17 The Group agreed that a detailed discussion on the circumstances where a master of a MASS could be responsible for several MASS was needed, and thus agreed that it was for the relevant Committee(s) to further consider what those conditions are.

#### ***Possibility of several masters being responsible for a MASS on a single voyage***

18 Many delegations expressed the view that several masters can be responsible sequentially for a MASS operation over a single voyage, but some delegations underscored the importance of having only one master at any given time, and that further clarification is required as to the timing when handing over command takes place.

19 Following discussion, the Group agreed that several masters may be responsible for a MASS on a single voyage, under certain conditions, and that only one master should be responsible at any given time. The Group also agreed that it was for the relevant Committee(s) to further consider what those conditions are.

#### ***Competences of, and requirements for, the master and crew of a MASS***

20 The Group considered the competences of, and requirements for, the master and crew of a MASS, and agreed that the required qualification should be based on the STCW Convention and Code, and that additional requirements or modifications of the requirements of the STCW Convention may be necessary, depending on the roles of the master and crew of a MASS that will be identified. In addition, the Group agreed that the applicability of the Maritime Labour Convention (MLC) to the master and crew of a MASS would need to be considered at the appropriate forums.

21 The Group noted that the term "seafarer" had different connotations: *first*, qualifications under the STCW Convention and Code, and *second*, labour conditions under the MLC. Therefore, the Group concluded that these aspects require separate consideration, such that matters relating to the STCW Convention are to be considered by MSC and HTW, while matters relating to the MLC are under the purview of the International Labour Organization (ILO).

22 With respect to the above, the Group noted the information provided by the Secretariat on the current joint work of IMO and ILO which concerned the abandonment of seafarers and seafarers' rights in general. The two main vehicles for addressing MLC issues are the Special Tripartite Committee under that Convention, and the Joint ILO/IMO Tripartite Working Group established at the request of the Maritime Safety and Legal Committees, through the IMO Council. In this regard, the Secretariat indicated that it would consult with the ILO Secretariat to identify options on bringing developments relating to MASS to the attention of ILO.

### ***Role and responsibilities of the crew of MASS***

23 The Group noted the view expressed by some delegations that the crew of MASS could include both "remote crew" and "onboard crew", but that in any case these terms needed further consideration.

24 However, there was consensus in the Group that it was premature to discuss the roles of the crew of MASS before having a detailed consideration of the role of the master of a MASS, which may affect the roles and responsibilities of the former. Therefore, the Group agreed not to discuss the roles of the crew of MASS at this stage, and to add it to the work plan for MASS--JWG 3.

### ***Role and responsibilities of a Remote Operations Centre (ROC)***

25 The Group discussed the term to be used for the location from where MASS may be controlled remotely and, after some discussion, agreed to use "Remote Operations Centre (ROC)" rather than "Remote Control Station".

26 The Group had a dynamic exchange on the definition of an ROC, and a range of views were expressed, including that:

- .1 apart from an ROC that has overall control of the operation of MASS, it is possible to have a workstation controlling MASS within that ROC, which may also be set up on another ship;
- .2 the interaction of MASS with Vessel Traffic Services (VTS) needs to be considered when defining an ROC;
- .3 the Group should only look into the overarching high-level aspects relating to ROCs, as the technical work or further definition of relevant terms was a matter for MSC;
- .4 reference to real-time control should be included in the definition;
- .5 the definition of an ROC should not only relate to safety functions, but also to other functions such as the provision of cargo information;
- .6 the definition should include text that clarifies that an ROC is "under the effective jurisdiction of the flag State"; and
- .7 an ROC is not to operate some systems but instead, some functions.

27 Subsequently, the Group agreed as follows (see also annex 1):

"Remote Operations Centre means a location remote from the MASS that can operate some or all aspects of the functions of the MASS."

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**Operation of a MASS by different ROCs**

28 The Group considered the possibility of a MASS being operated from different ROCs during a single voyage.

29 In connection with the above, a range of views were expressed, including that:

- .1 while it may be technologically possible to switch between ROCs, the details should be discussed by MSC;
- .2 the implications of having multiple ROCs in different locations, including in the territorial jurisdiction of different States, should not be discussed at this stage as this poses considerable legal and technical challenges;
- .3 the ROC may be realized in various ways, and the availability of back-up ROCs may need to be considered; and
- .4 the "genuine link" requirement under UNCLOS should also apply to an ROC.

30 Taking the views above into account, the Group did not exclude the possibility that one or more ROCs may be responsible sequentially for a MASS on a single voyage, under certain conditions, which need to be further considered by the relevant Committee(s). The Group also agreed that only a single ROC must be responsible for a MASS at any one time.

31 Furthermore, the Group agreed that there should be further consideration on:

- .1 the conditions that may allow for the handover of responsibility for a MASS from one ROC to another ROC; and
- .2 the issues that will arise when the ROC is located outside of the flag State of a MASS.

**Operation of multiple MASS by a person at an ROC**

32 The Group agreed that a person (a master) at an ROC may be responsible for multiple MASS at the same time, under certain conditions, which need to be further considered by the appropriate Committee(s).

**Requirements for an ROC**

33 The Group agreed that the requirements for an ROC in the table in annex 1 was a matter to be further discussed by MSC when developing the MASS Code.

**Role and responsibilities of a remote operator**

34 During the consideration of the role and responsibilities of a remote operator, a range of views were expressed, including that:

- .1 the term "remote operator" includes a remote master and remote crew, and is linked with an ROC; and
- .2 persons not directly taking part in the operation of the MASS, e.g. persons undertaking marine research operations from MASS working at an ROC, should not be considered as remote operators.

35 Following the discussion, the Group agreed to the following definition for a remote operator (see also annex 1):

"Remote operator means a qualified person who is employed or engaged to operate some or all aspects of the functions of a MASS from a Remote Operations Centre."

36 Notwithstanding the above, the Group noted that the following required further discussion:

- .1 whether the remote operator is part of the MASS crew; and
- .2 qualifications required of a remote operator by the flag State.

### ***Competences of, and requirements for, remote operators***

37 The Group agreed that the requirements for a remote operator in table 4 of annex 1 should be further discussed at MSC when developing the MASS Code.

### ***Designation of a master of a MASS in an ROC***

38 The Group discussed which person at an ROC would be designated as the master for a MASS when such MASS is operated remotely. In the ensuing discussion, a range of views were expressed, including that:

- .1 such determination would depend on how the ROC is organized, which should be considered in the development of the MASS Code, and thus is not appropriate to be discussed in the Group;
- .2 the master of a MASS would be the person that has overall responsibility for the operation of the MASS, whether he or she is on board or in an ROC;
- .3 the master of a MASS is the person appointed by the shipowner, which would also apply for a master of a MASS in an ROC; and
- .4 within an ROC, there may be masters of MASS, as well as remote operators that are not masters of MASS.

39 Taking into consideration the views expressed, the Group agreed that this matter required further discussion in the Group.

### ***Requirement for a master to be on board when there are persons or crew on board***

40 The Group discussed whether it was necessary to have a master on board, rather than at the ROC, when there are person(s) or crew on board a MASS.

41 Some delegations did not believe that it was acceptable to have persons or crew on board without the master also being on board, as this posed a threat to the safety of life at sea, for example, when remote connection to a MASS is lost or in cases of emergency. There were further questions on how a remote master would be able to observe the necessary level of situational awareness.

42 However, other delegations stated that the master of a MASS may not need to be on board when there is crew on board, as the most senior member of the crew will be able to take over responsibility in cases of need, such as the unavailability of the master in the ROC.



43 After discussion, the Group agreed that this matter needs to be further discussed by MSC as part of the development of the MASS Code. Where consideration of this matter has implications on liability, those implications will be considered by the Legal Committee.

***Issues of jurisdiction and responsibility of the flag State with respect to the location of ROCs***

44 The Group recognized that the location where an ROC is established may give rise to complex legal issues on jurisdiction and the responsibility of the flag State, in particular the concurrence of the territorial jurisdiction of the State in which the ROC is located and flag State jurisdiction. In the ensuing discussion, a range of views were expressed, including that:

- .1 exercising of effective flag State jurisdiction and control is of paramount importance, consistent with article 94 of UNCLOS;
- .2 it may be necessary to establish a "genuine link" in a situation where an ROC is located in a place other than the flag State of a MASS, and that the requirements for establishing such "genuine link" should be further discussed by the Legal Committee;
- .3 the discussion in LEG 110 relating to the "genuine link" requirement, in the context of measures to prevent unlawful practices associated with the fraudulent registration and fraudulent registries of ships, may be pertinent to the discussion of the Group;
- .4 a similar framework to that of the ISM Code may be adopted, whereby a flag State Administration has oversight of a "company" located outside its territorial jurisdiction and operating ships under its flag. This oversight mechanism ensures that the flag State can audit a "company", leading to its certification (Document of Compliance); and
- .5 those complex legal issues on jurisdiction and the responsibility of the flag State will certainly be raised in light of the provisions of UNCLOS, as the jurisdiction of the flag State and the consequent "genuine link" required by international law, in particular articles 91 and 94 of UNCLOS, cannot be replaced by private law contracts or other arrangements.

45 Given the legal challenges of having an ROC located in a State other than the flag State, some delegations proposed that the discussions be limited, for the time being, to cases where the ROC is located within the territorial jurisdiction of the flag State. However, a number of other delegations expressed the view that the discussion should not be limited to such cases as it would constitute a non-viable constraint.

46 In relation to the "genuine link" requirement:

- .1 one delegation proposed that the "genuine link" required under article 91 of UNCLOS between the flag State and the ship, where the ROC is located outside the jurisdiction of the flag State, could be addressed by establishing a "contractual link" between the ship, the shipowner/ship operator, and the ROC. The practice of including a contractual clause dealing with the proposed jurisdiction and proper law of the contract in the event of any dispute between the relevant parties is well-established in merchant shipping generally, and for cargo ships, in particular. This approach may address the challenge posed for a flag State in permitting an ROC to operate one or more of its MASS outside the jurisdiction of the said flag State, under UNCLOS as the "umbrella treaty" and under customary international maritime law for those flag States who have not ratified UNCLOS; and

- .2 some delegations observed that articles 91 and 94 of UNCLOS require a high degree of responsibility from the flag State and Remote Operations Centres situated outside the territory of the flag State would create insurmountable legal challenges in light of UNCLOS and general international law, and that such responsibility cannot be replaced by a contractual link.

47 Subsequently, the Group agreed that the matter of jurisdiction, including the conditions of having an ROC outside the territorial jurisdiction of the flag State, was a matter for the consideration of the Legal Committee. The Group also agreed that the interpretation of UNCLOS pertained to its States Parties. However, this does not preclude IMO, as the competent body for global shipping, from facilitating arrival at practical and legally feasible solutions when dealing with MASS.

48 The Group also agreed that relevant proposals, such as to consider a similar framework to that of the ISM Code (see paragraph 44.4) should be considered by the relevant Committee(s).

49 With regard to the application of the ISM Code to MASS, the Group agreed that this should be referred to MSC for further consideration.

#### **Draft section of the MASS Code reflecting on the legal framework of the Code**

50 As requested by LEG 110, the Group considered document LEG 110/11/3, paragraph 25.3, proposing a subsection or paragraph in the introduction section of the MASS Code reflecting on the legal framework of the Code, as follows:

"The Code is required to conform to generally accepted international regulations, procedures and practices developed by the International Maritime Organization (IMO) as the competent international organization for global shipping and to take any steps which may be necessary to secure their observance."

51 A query was raised as to whether inclusion of the text proposed is in line with the common practice of the Organization. In relation thereto, one delegation emphasized that it is necessary to provide for such consistency with UNCLOS and other rules of international law, particularly when the subject of regulation is a new development, and also to actually address conformity with those rules in the conduct of States in the use of MASS.

52 In this context, the Group noted examples provided by delegations such as in the HSC Code where a similar reference is made to other IMO treaties like SOLAS and the International Load Lines Convention, 1966.

53 While there was generally no opposition to the inclusion of such a text, the Group agreed that the text should be considered and discussed at the appropriate time at MSC, bearing in mind that the development of the MASS Code is the sole responsibility of MSC.

#### **Consideration of remaining common issues**

54 The Group considered document MASS-JWG 2/3/2, proposing to redefine the acronym "MASS" as "Maritime Autonomous Ships and Systems". Such reference to autonomous ship systems rather than just a ship in its entirety, would include both systems for MASS operation installed on ships, and systems for an ROC and related facilities on land. In considering the proposal, there was acknowledgment in the Group that there was a difference of opinion on definitions and terminology relating to the concept of MASS, that consideration of this matter was broader than just agreement on the use of the term "MASS", and that this should be further discussed in the Group.

55 The Group agreed to continue to use the acronym MASS, as Maritime Autonomous Surface Ships, and its current definition, noting that it may change in the future. The Group also agreed that definitions and terminology regarding MASS should be further discussed by MSC when developing the MASS Code.

56 The Group further agreed that, for the time being, "systems" was not to be added as it had a wider meaning than is currently contemplated for the scope of MASS in the work of the Organization. In addition, the acronym MASS was well established in the industry and had been used for many years.

57 The Group also agreed that the modes of operation or degrees or levels of autonomy should be discussed by MSC.

58 The Group agreed that the certificates and other documents listed on the Work Plan for MASS-JWG 2 should be discussed at MASS-JWG 3 and that sharing of information, connectivity and cybersecurity should be added to the workplan for MASS-JWG 3.

59 The Group also had a discussion on clarifying the process for getting items discussed in the MASS-JWG. The Chair of MSC confirmed that when a common issue was identified by a committee and sent to the MASS-JWG for its consideration, delegations would not need to submit further papers.

#### **Draft revised work plan**

60 The Group updated the work plan, as set out in annex 2, for approval by the three Committees.

#### **Seminar on implications, challenges and opportunities of MASS operations for ports and public authorities**

61 Following a proposal by the FAL Committee (MASS-JWG 2/2/4, paragraph 6), the Group agreed to hold a seminar on implications, challenges and opportunities of MASS operations for ports and public authorities, on the first day of its next meeting.

#### **Next meeting of the MASS-JWG and proposed provisional terms of reference**

62 Having recalled the agreement of the three Committees (MSC 106, FAL 47 and LEG 110) as well as C 128, to authorize the MASS-JWG to meet twice in each calendar year until decided otherwise by the three Committees, the Group agreed to hold its next session from 11 to 15 September 2023. As agreed earlier (see paragraph 61), a seminar on implications, challenges and opportunities of MASS operations for ports and public authorities will be held on the first day of the meeting.

63 In alignment with the draft updated work plan, the Group also reviewed and revised its terms of reference, for consideration and approval by the three Committees (annex 3).

#### **Seminars and capacity-building regarding MASS**

64 The Group supported a proposal by the delegation of Argentina for the holding of seminar(s) on technological developments relating to MASS, with a view to providing relevant information to Member States, in particular developing States, and encouraging their participation in the consideration of MASS in the Organization.

65 To that end, the Group requested the Secretariat to consult with interested Member States in order to identify topics, suitable speakers, and, as appropriate, potential sponsors, for consideration at MASS-JWG 3, together with proposed dates.

66 Some Member States stated their disposition to sponsor or co-sponsor seminars and other capacity-building activities, which was welcomed.

### **Actions requested of the MSC/LEG/FAL Committees**

67 The MSC/LEG/FAL Committees are invited to approve the report in general and, in particular, to:

- .1 note that a seminar on legal issues relating to MASS, including UNCLOS, was held prior to MASS-JWG 2 (paragraph 5);
- .2 concur with the agreement of the Group that (paragraph 13 and annex 1):
  - .1 there should be a human master responsible for a MASS, regardless of mode of operation or degree or level of autonomy;
  - .2 such master may not need to be on board, depending on the technology used in the MASS and human presence on board, if any; and
  - .3 regardless of mode of operation or degree or level of autonomy, the master of a MASS should have the means to intervene when necessary;
- .3 note that the Group requested the Secretariat to compile a list of provisions on the roles and responsibilities of a master in existing IMO instruments and UNCLOS in order to identify which roles of the master can be delegated or entrusted to some other party, and invited submissions on related provisions on the master, including from instruments not under the purview of IMO (paragraphs 14 and 15);
- .4 concur with the agreement of the Group that a detailed discussion on the circumstances where a master of a MASS could be responsible for several MASS was needed, and that it was for the relevant Committee(s) to further consider what those conditions are (paragraph 17);
- .5 concur with the agreement of the Group that several masters may be responsible for a MASS on a single voyage, under certain conditions, and that it was for the relevant Committee(s) to further consider what those conditions are (paragraph 19);
- .6 concur with the agreement of the Group that however only a single master should be responsible for a MASS at any one time (paragraph 19);
- .7 note the information provided by the Secretariat on possible ways forward in bringing developments relating to MASS to the attention of ILO (paragraph 22);
- .8 note that the Group agreed that it was premature to discuss the roles of the crew of MASS before having had a detailed consideration of the role of the master of a MASS, and decided to add it to the work plan for MASS-JWG 3 (paragraph 24);

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- .9 concur with the agreement of the Group on the term "Remote Operations Centre" and its definition (paragraph 27 and annex 1);
- .10 concur with the agreement of the Group not to exclude the possibility that one or more ROCs may be responsible for a MASS on a single voyage, under certain conditions, which would need to be further considered by the appropriate Committee(s) (paragraph 30);
- .11 concur with the agreement of the Group that, however, only a single ROC must be responsible for a MASS at any one time (paragraph 30);
- .12 note that the Group agreed to further consider the conditions that may allow for the handover of responsibility for a MASS from one ROC to another ROC, and the issues that will arise when the ROC is located outside of the flag State of a MASS (paragraph 31);
- .13 concur with the agreement of the Group that a person (a master) at an ROC may be responsible for multiple MASS at the same time, under certain conditions, which need to be further considered by the appropriate Committee(s) (paragraph 32);
- .14 note that the requirements for an ROC in the table in annex 1 was a matter to be further discussed by MSC when developing the MASS Code (paragraph 33).
- .15 concur with the agreement of the Group on the definition for a "remote operator" (paragraph 35 and annex 1);
- .16 note that the requirements for a remote operator in table 4 of annex 1 should be further discussed by MSC when developing the MASS Code (paragraph 37);
- .17 note the discussion on the designation of a master of a MASS in an ROC (paragraphs 38 and 39);
- .18 note that further discussion within the Group and the relevant Committee(s) is required on the question of the need for a master to be on board when there are person(s) or crew on board (paragraphs 40 to 43);
- .19 note that the Group agreed that the matter of jurisdiction, including the conditions of having an ROC outside the territorial jurisdiction of the flag State, was a matter for the consideration of the Legal Committee (paragraph 47);
- .20 note that the Group also agreed that the interpretation of UNCLOS pertained to its States Parties, but this did not preclude IMO, as the competent body for global shipping, from facilitating arrival at practical and legally feasible solutions when dealing with MASS (paragraph 47);
- .21 note that the Group also agreed that relevant proposals, such as to consider a similar framework to that of the ISM Code, should be considered by the relevant Committee(s) (paragraph 48);
- .22 recommend that MSC further consider the application of the ISM Code to MASS (paragraph 49);

- .23 recommend that MSC take into account, at the appropriate time, the proposal in document LEG 110/11/3, paragraph 25.3, as part of its work on the development of the MASS Code (paragraphs 50 to 53);
- .24 concur with the agreement of the Group to continue to use the acronym MASS as "Maritime Autonomous Surface Ships", and its current definition, noting that it may change in the future, and that definitions and terminology regarding MASS should be further discussed by MSC when developing the MASS Code (paragraphs 55 and 56).
- .25 note that the Group agreed that the modes of operation or degrees or levels of autonomy should be discussed by MSC (paragraph 57).
- .26 endorse the updated work plan for the third session of the Joint MSC-LEG-FAL Working Group on MASS (paragraph 60 and annex 2);
- .27 note that the third session of the Joint MSC-LEG-FAL Working Group on MASS is scheduled to take place from 11 to 15 September 2023, together with a seminar on implications, challenges and opportunities of MASS operations for ports and public authorities for MASS on the first day thereof (paragraphs 61 and 62);
- .28 approve the revised terms of reference (paragraph 62 and annex 3);
- .29 note that the Group supported a proposal for the holding of a seminar(s) on technological developments relating to MASS, with a view to providing relevant information to Member States, in particular developing States, and encouraging their participation in the consideration of MASS in the Organization (paragraphs 64 to 66); and
- .30 take further action, as appropriate.

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ANNEX 1

IDENTIFICATION OF THE PREFERRED OPTIONS FOR ADDRESSING  
MASS COMMON ISSUES OF THE MSC, LEG AND FAL COMMITTEES

Table 1: The role and responsibilities of the master of a MASS

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/1 (IFSMa)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3 (United Kingdom)	5 MASS-JWG 2/3/1 (Singapore)
<b>Role of the master of a MASS<sup>1</sup></b>	The MASS master may be a master on board, "remote master" or the responsible person for a fully autonomous ship.  "Remote master" is a master who is in a remote control station/centre outside the ship.	The role of a shipmaster must be constructively met by the presence of a designated person ashore, duly qualified and capable of exercising discretion, and not merely substituted by a legal or corporate entity.  MASS must be under the command and control of a shipmaster capable of exercising both situational awareness and good seamanship.	Except for fully autonomous MASS, there will be a person, whether on board or ashore, who performs the role of planning, preparing and conducting the safe voyage of a MASS.	"Remote master", in relation to an automated ship, means a person (except a pilot) who has command or charge of the ship without being on board.	It is not necessary to change; the definition of "Master" in the STCW Convention (the person having command of a ship) as it is sufficiently broad and flexible to encompass and refer to the master of a MASS.
<b>MASS-JWG 2</b>	<p><b>1. There should be a human master responsible for a MASS, regardless of mode of operation or degree or level of autonomy.</b></p> <p><b>2. Furthermore, such master may not need to be on board, depending on the technology used in the MASS and human presence on board, if any.</b></p> <p><b>3. Regardless of mode of operation or degree or level of autonomy, the master of a MASS should have the means to intervene when necessary.</b></p> <p><i>For further discussion by MASS-JWG 3: the roles that a master of a MASS performs, considering the different degrees/levels of autonomy or modes of operation, and whether some of such roles can be entrusted to some other party. (A list of provisions on the roles of a master under different IMO instruments and UNCLOS will be provided for the reference of the Group. Delegations are invited to provide information on relevant provisions under instruments not under the purview of IMO.)</i></p>				

<sup>1</sup> Several views refer to the notion of "command", "control" or "being in charge" in relation to the role and responsibilities of a MASS master. It may be useful to clarify what is meant by those terms, or its scope, or the extent of oversight associated therewith.

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/1 (IFSMA)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3 (United Kingdom)	5 MASS-JWG 2/3/1 (Singapore)
<b>Discussion points</b>					
<b>Is the term "MASS master" applicable?</b>	<b>Yes</b>	<b>Yes</b> "MASS shipmaster"	<b>Yes</b>	<b>No</b> "Remote master" instead of MASS master	<b>No</b> A new term "MASS Master" does not appear to be necessary, as the STCW definition for the "Master" remains relevant in the MASS context.
<p><b>What are the responsibilities of the MASS Master?<sup>2</sup></b></p> <p><b>Which responsibilities of the MASS Master may be delegated?</b></p> <p><b>What are the specific responsibilities of a MASS Master in relation to MASS in degree 3 or 4 of autonomy?</b></p>	The MASS master is responsible for MASS control, including navigation, taking measures to ensure the safety of the ship's navigation, marine environment protection, keeping order on board, preventing harm to the ship, as well as to the people and cargo on board.	<p>MASS operating in degrees 1 and 2 have crew or personnel onboard and will be under the control of a shipmaster; a ship with crew or personnel on board cannot be deemed to be operating in degrees 3 and 4.</p> <p>In the case of MASS without seafarers on board (degrees 3 and 4), the shipmaster and any crew necessary for the provision of technical advice and support, shall be ashore at a designated operations centre.</p>	<p>The conventional master has intrinsic and appendant roles.</p> <p>- Intrinsic:</p> <ul style="list-style-type: none"> <li>• planning, preparing and conducting a safe voyage;</li> <li>• maintaining the safety and security of the ship;</li> <li>• maintaining order in the ship</li> </ul> <p>- Appendant: representing the shipowner</p> <p>In the context of MASS, it needs to be discussed whether some of the intrinsic roles of the master can be performed by someone other than the MASS master.</p>	There should be a single Remote Master with overall responsibility. Whilst the Remote Master may not always be directly controlling the ship, the Remote Master is always in command, bears ultimate responsibility for the ship and is responsible for overall decision-making. This mirrors the understanding of the role of the master on a non-MASS ship. The remote master must be able to hand over responsibilities to another remote master.	In general, the responsibilities of the crew (and master) of the MASS should be function-based. The scope of responsibilities should also be equivalent to that of the crew of a conventional ship, as far as their functions remain relevant in the context of MASS.

<sup>2</sup> In document MASS-JWG 2/2/2, Japan noted that there may be a need to clarify how the term "responsibilities of MASS master" is differentiated from the term "roles of MASS master".



	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/1 (IFSMA)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3 (United Kingdom)	5 MASS-JWG 2/3/1 (Singapore)
<b>Does the MASS master need to be on board?</b>	<b>No</b>  The MASS master may be a master onboard, "remote master" or the responsible person for a fully autonomous ship.	<b>No</b>  MASS operating in degrees 1 to 4 are required to have a shipmaster whether onboard or ashore.  MASS operating in degrees 1 and 2 have crew or personnel on board and will be under the control of a shipmaster.	<b>No</b>  It does not seem necessary for a MASS master to be on board as long as he/she can plan, prepare and conduct a safe voyage of the MASS remotely.	<b>No</b>  The master of a MASS does not need to be on board a MASS. They should be able to be located anywhere.	<b>No</b>  The definition "Master" does not make explicit reference to the physical location of the master, nor does it state that the master is required to be on board the ship.  The master has command of the ship whether present on board the ship or at a remote location off the ship.
<b>Will MASS without crew need to have a shipmaster and crew ashore?</b>	<b>Yes</b>  When operating a fully autonomous ship that does not have a ship's remote crew, the shipowner must identify the person responsible for managing the fully autonomous ship, who performs all the functions and duties assigned to the ship's master by applicable international instruments and the regulations of the flag State of the autonomous ship.	<b>Yes</b>  For MASS without seafarers on board, the shipmaster and any crew necessary for the provision of technical advice and support, shall be ashore at a designated operations centre.	-	<b>Yes</b>  "Remote Master" in relation to an automated ship, means a person (except a pilot) who has command or charge of the ship without being on board.	-

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/1 (IFSMA)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3 (United Kingdom)	5 MASS-JWG 2/3/1 (Singapore)
<p><i>Can a master serve or operate multiple MASS at the same time?</i></p> <p><i>Can several masters serve or operate a MASS on a single voyage?</i></p>	-	<p><b>Yes</b></p> <p>A shipmaster may be in command and control of one or more MASS.</p>	<p><b>Yes</b></p> <p>As long as the safe operation of MASS is not impaired, it would be efficient to permit a single person at a remote control station/centre to perform the task of remote operation for multiple MASS simultaneously.</p> <p>It should be permitted that a MASS master be succeeded by another MASS master in that role during a single voyage, provided that the succession of tasks between remote control stations/centres is made clearly and seamlessly without a gap.</p>	<p><b>Yes</b></p> <p>A <u>remote operator</u> may be involved in the operation of more than one MASS at a time, or swarm operations.</p> <p>The remote master must be able to hand over responsibilities to another remote master.</p>	-
<p><b>MASS-JWG 2</b></p>	<p><b>A master may be responsible for multiple MASS at the same time, under certain conditions, which need to be further considered by the appropriate Committee/s.</b></p> <p><b>Several masters may also be responsible for a MASS on a single voyage, under certain conditions, which need to be further considered by the appropriate Committee/s. However, a single master must be responsible for a MASS at any one time.</b></p>				
<p><i>What are the competences of, and requirements for, a MASS master?</i></p>	<p>A MASS master must have a valid shipmaster diploma and other certificates following the requirements of applied international instruments and national regulations established by the Administration.</p>	<p>The MASS shipmaster must be fully STCW-qualified and hold the necessary qualifications to carry out their responsibilities when operating MASS at degrees 3 and 4.</p>	<p>A MASS master must have appropriate competence for MASS operation including planning, preparing and conducting the safe voyage of MASS.</p>	<p>The current qualifications of a master apply, however, in the future this may change.</p>	<p>A master may require different skills and knowledge from other crew members in the MASS context.</p>

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/1 (IFSMA)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3 (United Kingdom)	5 MASS-JWG 2/3/1 (Singapore)
<b>MASS-JWG 2</b>	<i>This matter will be considered by MSC and HTW.</i>				
<b>Should the MASS master be designated as a seafarer?</b>	Yes	Yes	- This issue deals mainly with the applicability of the Maritime Labour Convention to MASS masters/crews and requires a separate consideration.	<b>No</b> Not a seafarer when the remote master is based in/at an ROC on shore, although they may be a seafarer when serving on the MASS they are operating or in other ships/MASS.  Under MLC UK legislation, a master is a seafarer so that they have protection/have to comply with hours of work rules. MASS masters in a shore-based location will be covered by local health and safety and employment regulations.	-
<b>MASS-JWG 2</b>	<i>There are two aspects to the question of designation of a MASS master as a seafarer: qualifications under the STCW, and labour conditions under the MLC. These issues will require separate consideration and therefore the JWG will not discuss this at the moment. (STCW matters will be considered by MSC and HTW, while matters relating to the MLC are under the purview of ILO.)</i>				

Notes:

1. The "degrees of autonomy" refers to paragraph 3.4 of the annex to MSC.1/Circ.1638.
2. The STCW Convention defines a "master" as "the person having command of a ship".
3. Views have been expressed that a MASS master must be a sentient human being (MASS-JWG 2/2/1) or a natural person (MASS-JWG 2/3).
4. If MASS masters are designated as seafarers, their qualifications would have to be considered within the scope of the STCW Convention, which would be under the purview of the MSC and HTW Sub-Committees.

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**Table 2: The role and responsibilities of the MASS Crew**

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/3 (United Kingdom)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3/1 (Singapore)
<b>Role of the MASS crew</b>	"MASS onboard crew" is a master, other officers and operational staff on board.  "MASS remote crew" is a remote master, remote operators and responsible persons controlling MASS remotely and/or providing assistance to the crew in the MASS operation.	-  <i>Not necessary to define MASS crew as not different to crew on a non-MASS; there may need to be a reporting hierarchy on board a MASS but the master would retain overall responsibility wherever they are situated.</i>	<i>Important terms such as "master", "crew", "responsible person", "seafarer", etc. appear in many of the requirements in the Navigation section of the draft MASS Code. To define these terms, the roles of these entities should be clarified first.</i>	-
<b>MASS-JWG 2</b>	<p><b>Having a "remote crew" for MASS is possible. When referring to the master and crew of MASS, there is an understanding that they are separate, and that the crew excludes the master.</b></p> <p><b><i>A discussion on the roles of the crew of a MASS is premature and should follow further discussions by JWG 3 on the role of the master.</i></b></p>			
<b>Discussion points</b>				
<b>Is the term "MASS crew" applicable?</b>	MASS onboard crew MASS remote crew	-	-	-
<b>What are the responsibilities of MASS crew?</b>	<p>The remote crew shall provide remote control of the MASS or render assistance in MASS control to the crew.</p> <p>The remote crew may include a MASS remote master, MASS remote operators and responsible persons. Members of the remote crew of an autonomous ship follow the instructions of the shipowner relating to ship control, including ship navigation and work schedule.</p>	-	<p>Masters of conventional ships perform various roles that include:</p> <ul style="list-style-type: none"> <li>(i) planning, preparing and conducting a safe voyage;</li> <li>(ii) maintaining the safety and security of the ship;</li> <li>(iii) maintaining order in the ship; and</li> <li>(iv) representing the shipowner.</li> </ul> <p>"MASS master" would not be able to perform all of such roles effectively if he/she is controlling the ship remotely from ashore. If such roles are allocated to one of the crew members on board except for the role of planning, preparing and conducting a safe voyage</p>	<p>In general, the responsibilities of the crew (and master) of the MASS should be function-based. The scope of responsibilities should also be equivalent to the crew of a conventional ship, as far as their functions remain relevant in the context of MASS.</p> <p>MASS crew may have additional responsibilities for new functions that originate from operating MASS, such as those relating to operating a MASS from the Remote Operations Centre.</p>

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/3 (United Kingdom)	3 MASS-JWG 2/2/2 (Japan)	4 MASS-JWG 2/3/1 (Singapore)
			of the MASS, it should be discussed whether such crew is also a "MASS master" or needs to be called by a different term.	
<b>What are the competences of, and requirements for, MASS crew?</b>	Proper diplomas and qualification certificates stipulated by the STCW Convention are necessary	As per current STCW requirements	-	In relation to the above, MASS crew will probably require additional skills and knowledge, the most obvious one being skills in working in a digital environment. Additional courses and training may be required to equip the crew of conventional ships with the necessary competencies before they are permitted to crew a MASS. The skills, knowledge, courses and training required would depend on the particular role of the crew member in question.
<b>MASS-JWG 2</b>	<b><i>This matter will be considered by MSC and HTW.</i></b>			
<b>Designated as seafarer</b>	Yes	Yes They are seafarers when on board the vessel.	-	
<b>MASS-JWG 2</b>	<b><i>There are two aspects to the question of designation of the crew of a MASS as seafarers: qualifications under the STCW, and labour conditions under the MLC. These issues will require separate consideration and therefore the JWG will not discuss this at the moment. (STCW matters will be considered by MSC and HTW, while matters relating to the MLC are under the purview of ILO.)</i></b>			

Note: If the crew of a MASS were designated as seafarers, their qualifications should be considered within the scope of the STCW Convention, which would be discussed by the MSC and HTW Sub-Committees.

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**Table 3: The role and responsibilities of the Remote Operations Centre**

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/2 (Japan)	3 MASS-JWG 2/3 (United Kingdom)	4 MASS-JWG 2/3/1 (Singapore)	5 MASS-JWG 2/3/2 (Republic of Korea)
<b>Role of Remote [Operation/Control] [Station/Centre]</b>	<p>"Remote control station" is a system connected to MASS for its remote control.</p> <p>"Remote control centre" is a facility where Remote control stations and remote operators are accommodated.</p>	<p>-</p> <p><i>It is necessary to determine the priority and respective responsibilities in case of different decisions on board and by the remote control centre/station in terms of fall-back response.</i></p>	<p>"Remote Operations Centre" is a place or location from where at least one remote operator is operating a MASS.</p> <p>The definition of ROC should focus on the function of the ROC rather than the location of the ROC.</p>	<p>"Remote Control Centre" is a site remote from the ship that can control some or all of the autonomous ship system processes.</p> <p><i>This definition from ISO/TS 23860:2022 is relevant and sufficiently broad to encompass any related remote operations in future.</i></p>	<p>"Remote Control Station/Centre" refers to a facility where the remote operator supports or manages the operation of MASS using data such as sensor-based video, sound, and weather information sent by the ship.</p> <p><i>It should remotely control and monitor MASS or the autonomous navigation systems.</i></p>
<b>MASS-JWG 2</b>	<b>"Remote Operations Centre" means a location remote from the MASS that can operate some or all aspects of the functions of the MASS.</b>				
<i>Discussion points</i>					
<b>What is the appropriate term?</b>	remote control station remote control centre (different meanings)	-	Remote Operations Centre	Remote Operations Centre  The term "Operations" is preferable as it can accommodate a broader range of functions, rather than just the sole function of "Control".  The term "Centre" is preferable as it may potentially consist of several individual control stations.	Remote Operations Centre
<b>MASS-JWG 2</b>	<b>Remote Operations Centre</b>				

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/2 (Japan)	3 MASS-JWG 2/3 (United Kingdom)	4 MASS-JWG 2/3/1 (Singapore)	5 MASS-JWG 2/3/2 (Republic of Korea)
<b>Where is the ROC/RCS located?</b>	The remote control station should be located outside of the ship and having a high degree of control automation.	-  <i>Consideration should also be given to whether there could be more than one remote station.</i>	An ROC could be a mobile location and is simply the place where the MASS is controlled and is not on the MASS itself.	-	It should be located away from the ship.
<b>Can different Remote [Operation/Control] [Stations/Centres] succeed each other in the remote operation of MASS during a single voyage?</b>	-	<b>Yes</b>  It should be permitted that a MASS master be succeeded by another MASS master in that role during a single voyage, provided that the succession of tasks between remote control stations/centres is made clearly and seamlessly without a gap.	-	-	-
<b>MASS-JWG 2</b>	<p><b>One or more Remote Operations Centres may be responsible for a MASS on a single voyage, under certain conditions, which need to be further considered by the appropriate Committee/s. Only a single ROC must be responsible for a MASS at any one time.</b></p> <p><i>The following will need further consideration:</i></p> <ol style="list-style-type: none"> <li><b>1. The conditions that may allow for the handover of responsibility from one ROC to another ROC;</b></li> <li><b>2. Issues that will arise when the ROC is located in [a jurisdiction] other than the flag State of a MASS.</b></li> </ol>				
<b>Can a person at Remote [Operation/Control] [Station/Centre] be permitted to serve as the MASS master for multiple MASS?</b>	-	<b>Yes</b>  It would be efficient to permit a single person at a remote control station/centre to perform the task of remote operation for multiple MASS simultaneously.	<b>Yes</b>  A remote operator may be involved in the operation of more than one MASS at a time, or swarm operations.	<b>Yes</b>  "Remote Control/Operations Centre/Station" may control and/or supervise more than one MASS at any one time	-

		1 MASS-JWG 1/WP.1	2 MASS-JWG 2/2/2 (Japan)	3 MASS-JWG 2/3 (United Kingdom)	4 MASS-JWG 2/3/1 (Singapore)	5 MASS-JWG 2/3/2 (Republic of Korea)
	<b>MASS-JWG 2</b>	<b>A person (a master) at a Remote Operations Centre may be responsible for multiple MASS at the same time, under certain conditions, which need to be further considered by the appropriate Committee/s.</b>				
	<b>What are the requirements for the remote control station/centre?</b>	<p>MASS remote control should meet the requirements of the existing safety regulations, including environment surveillance and radio communications.</p> <p>Following that, the remote control station should be equivalent to the ship's bridge according to SOLAS, but located outside of the ship and having a high degree of control automation.</p>	-	<p>Should be discussed in the development of the MASS Code.</p> <p>An ROC may be based on another ship or a land-based location including portable cabins, buildings set up as permanent ROCs, portable devices accessible from different locations.</p>	-	<p>The remote operator shall be provided with sufficient and accurate information from data collection and analysis to ensure the safe operation and efficient function of MASS.</p> <p>The remote control station/centre should be able to control the autonomous ship for all the hazardous situations that may arise during operations.</p> <p>Controls and control systems shall be designed with human factors in mind and shall be arranged in a logical manner reflecting functional importance so that they can be easily identified, recognized and operated by the operator.</p> <p>It should have sufficient qualified personnel, including remote operators, considering the number, type and size of MASS operating in the remote control station/centre, and should have access to the same level of information as the seafarer on board.</p>



Notes

1. "Remote Control Centre" is defined in ISO/TS 23860: "Remote Control Centre" is a site remote from the ship that can control some or all of the autonomous ship system processes.
2. Views were expressed that matters relating to jurisdiction should be considered (i.e. in relation to the location of the remote control station/centre. (MASS-JWG 1/2/1 (China), MASS-JWG 2/3 (United Kingdom)).
3. A view was expressed that there is a need to provide a contractual link between a MASS shipmaster and a named port in the MASS Code (paragraph 9.4, MASS-JWG 2/2/1 (IFSMA)).
4. Further views specific to the role of the remote control station/centre in relation to fully autonomous ships are provided in paragraph 10, MASS-JWG 2/3/2 (Republic of Korea).

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**Table 4. The role and responsibilities of the Remote Operator**

	1 MASS-JWG 1/WP.1	2 MASS-JWG 2/3 (United Kingdom)	3 MASS-JWG 2/3/1 (Singapore)	4 MASS-JWG 2/3/2 (Republic of Korea)
<b>Role of the remote operator</b>	"Remote operator" is a remote crew member and seafarer reporting to a master and directly controlling the MASS via a remote control station located outside the ship.	"Remote Operator", in relation to an automated ship, means a person who is employed or engaged to control any operation of the ship without being on board.	"Remote Operator" means any persons who is engaged in the remote operation of the MASS.  <i>Having a sufficiently broad definition would be helpful to ensure the continued relevance of the term in the face of future technological developments and methods of operation.</i>	<i>The role and tasks of the remote operator will be determined according to the mode of operation of MASS. The scope of the role of the remote operator can be considered as provided in table 1 (Para 13, MASS-JWG 2/3/2).</i>
<b>MASS-JWG 2</b>	<b>"Remote operator" means a qualified person who is employed or engaged to operate some or all aspects of the functions of a MASS from a Remote Operations Centre.</b>  <i>For further discussion: whether the remote operator is part of the MASS crew.</i>			
<i>Discussion points</i>				
<i>Is the term "remote operator" applicable?</i>	Yes	Yes	Yes	Yes
<i>What are the responsibilities of a remote operator?</i>	Members of the remote crew of an autonomous ship follows the instructions of the shipowner relating to ship control, including ship navigation and work schedule. The instructions of the charterer concerning the commercial operation of the ship are mandatory for members of the remote crew.  Remote operators and responsible persons of the remote crew follow the commands of the MASS master	A remote operator may be involved in the operation of more than one MASS at a time, or swarm operations. The implications for this, and the limits need to be considered in more detail.	-  <i>The responsibilities of the crew of the MASS should be function-based.  The scope of responsibilities should also be equivalent to that of the crew of a conventional ship, as far as their functions remain relevant in the context of MASS.</i>	The remote operator shall perform tasks such as operating, monitoring and managing autonomous ships at the remote control station/centre for effective control of the ship.  The remote operator, who is responsible for operating and monitoring autonomous ships, may intervene when necessary, and has authority and responsibility for the fully autonomous ship.

	<b>Competence of, and requirements for remote operator</b>	Current STCW requirements and regulations of the flag State of the autonomous ship	Current STCW requirements (any specific new requirements for new roles in the future)	-	-
	<b>MASS-JWG 2</b>	<i>This matter will be considered by MSC and HTW.</i>			
	<b>Designated as seafarer</b>	Yes	<b>No</b> Under MLC the seafarer has protection and has to comply with requirements with regards to hours of work. The local HSE and employment regulations would apply for remote operators. If remote operators were considered seafarers this could also cause issues with calculation and qualifying sea-time (how it is counted and recognized for Certification of Competency or Re-validation of Certificates of Competency), financial implications, as well as health and safety implications, as MLC requirements are different to land-based HSE regulations.	-	-
	<b>MASS-JWG 2</b>	<i>There are two aspects to the question of designation of remote operators of MASS as seafarers: qualifications under the STCW, and labour conditions under the MLC. These issues will require separate consideration and therefore the JWG will not discuss this at the moment. (STCW matters will be considered by MSC and HTW, while matters relating to the MLC are under the purview of ILO.)</i>			

Notes:

1. The question of whether the remote operator should be designated as a seafarer and considered as one of the crew members of the ship was raised in MASS-JWG 1/2/1 (China).
2. If remote operators are designated as seafarers, their qualifications would have to be considered within the scope of the STCW Convention, which would be under the purview of the MSC and HTW Sub-Committees.

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**ANNEX 2**

**DRAFT WORK PLAN OF THE JOINT WORKING GROUP ON MASS**

<b>Timeline</b>	<b>Action</b>
<i>MSC 107 (June 2023)</i>	<i>Consider results from MASS-JWG 2 and take action, as appropriate.</i>
<p>MASS-JWG 3 11 to 15 Sep. 2023</p>	<p>Further address the common issues, taking into account the discussions and outcome of FAL 47, LEG 110 and MSC 107, including:</p> <ul style="list-style-type: none"> <li>• the role and responsibilities of the MASS master and MASS crew;</li> <li>• certificates and other documents;</li> <li>• sharing of information as part of the obligation to communicate with coastal and port States, port authorities, etc.; and</li> <li>• issues relating to connectivity, cybersecurity and remotely controlled operations.</li> </ul> <p>Consider the following, as and when requested by the Committees:</p> <ul style="list-style-type: none"> <li>- definitions and terminology regarding MASS</li> <li>- the issues associated with the "Remote Operations Centre" and "remote operator", including situations when the Remote Operations Centre is located outside of the flag State</li> </ul> <p>Update the work plan</p> <p>Report to the committees the outcome of MASS-JWG 3 for endorsement and further instruction, as appropriate.</p>
<p><i>LEG 111 (2024)</i> <i>FAL 48 (2024)</i></p>	<i>Consider results from MASS-JWG 2 and 3 and take action, as appropriate.</i>

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### ANNEX 3

#### DRAFT TERMS OF REFERENCE FOR THE THIRD MEETING OF THE JOINT MSC/LEG/FAL MASS WORKING GROUP

The MASS-JWG 3, following the outcome of the regulatory scoping exercises conducted by the three Committees\* and discussions during MASS-JWG 2, is instructed to:

- .1 further address the common issues, taking into account the discussions and outcome of FAL 47, LEG 110 and MSC 107, including:
  - .1 the role and responsibilities of the MASS master and MASS crew;
  - .2 certificates and other documents;
  - .3 sharing of information as part of the obligation to communicate with coastal and port States, port authorities, etc.; and
  - .4 issues relating to connectivity, cybersecurity and remotely controlled operationsbased on annex 1 to MASS-JWG 2/WP.1, as appropriate;
- .2 Consider the following, as and when requested by the Committees:
  - .1 definitions and terminology regarding MASS; and
  - .2 issues associated with the "Remote Operations Centre" and "remote operator", including situations when the Remote Operations Centre is located outside of the flag State.
- .3 update the Work Plan; and
- .4 provide a written report to the Committees after the meeting.

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\* MSC.1/Circ.1638, LEG.1/Circ.11 and FAL.5/Circ.49.