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Agenda item 5

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

**Report of the Working Group**

**GENERAL**

1 The Working Group on Maritime Autonomous Surface Ships (MASS) met from 4 to 6 December 2018, chaired by Mr. Henrik Tunfors (Sweden).

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

ARGENTINA	NETHERLANDS
AUSTRALIA	NEW ZEALAND
BAHAMAS	NIGERIA
BANGLADESH	NORWAY
BELGIUM	PANAMA
BRAZIL	PERU
CANADA	PHILIPPINES
CHINA	POLAND
CYPRUS	PORTUGAL
DENMARK	REPUBLIC OF KOREA
FINLAND	RUSSIAN FEDERATION
FRANCE	SAUDI ARABIA
GERMANY	SINGAPORE
GREECE	SOUTH AFRICA
INDIA	SPAIN
INDONESIA	SWEDEN
IRAN (ISLAMIC REPUBLIC OF)	TURKEY
ITALY	UKRAINE
JAPAN	UNITED ARAB EMIRATES
LIBERIA	UNITED KINGDOM
MALTA	UNITED REPUBLIC OF TANZANIA
MARSHALL ISLANDS	UNITED STATES
MEXICO	

by the following Associate Member of IMO:

HONG KONG, CHINA

and by observers from the following intergovernmental organizations:

EUROPEAN COMMISSION (EC)  
INTERNATIONAL MOBILE SATELLITE ORGANIZATION (IMSO)

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)  
INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)  
COMITÉ INTERNATIONAL RADIO-MARITIME (CIRM)  
COMITÉ MARITIME INTERNATIONAL (CMI)  
BIMCO  
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)  
INTERNATIONAL MARITIME PILOTS' ASSOCIATION (IMPA)  
INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATIONS (IFSMA)  
INTERNATIONAL ASSOCIATION OF INDEPENDENT TANKER OWNERS  
(INTERTANKO)  
THE INSTITUTE OF MARINE ENGINEERING, SCIENCE AND TECHNOLOGY (IMarEST)  
WORLD SAILING LTD.  
THE ROYAL INSTITUTION OF NAVAL ARCHITECTS (RINA)  
INTERNATIONAL ASSOCIATION OF MARITIME UNIVERSITIES (IAMU)  
INTERNATIONAL TRANSPORT WORKERS' FEDERATION (ITF)  
GLOBAL MARITIME EDUCATION AND TRAINING ASSOCIATION (GlobalMET)  
THE NAUTICAL INSTITUTE (NI)  
ACTIVE SHIPBUILDING EXPERTS' FEDERATION (ASEF)

and by the following IMO training institute:

WORLD MARITIME UNIVERSITY (WMU)

#### **TERMS OF REFERENCE**

4 The Group, taking into account comments made and decisions taken in plenary, was instructed to:

- .1 finalize the framework for the regulatory scoping exercise, including the template and the plan and method of work, taking into account documents MSC 100/5, MSC 100/5/4 and MSC 100/5/8;
- .2 if time permits, consider principles for the development of interim guidelines for MASS trials and advise the Committee, as appropriate; and
- .3 submit a written report to the Committee by Thursday, 6 December 2018.

#### **Framework for the regulatory scoping exercise**

5 The Group reviewed the framework for the regulatory scoping exercise, including the template, taking into account the modifications proposed by the Correspondence Group (MSC 100/5, annex, appendix 1).

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***Degrees of autonomy***

6 The Group considered a number of proposals to amend the text of the degrees of autonomy and agreed to only make minor modifications, retaining the text proposed by the Correspondence Group.

7 During the discussion, the observer from ICS expressed the view that if the definition of degree one as developed by the Correspondence Group was to be retained, then this should be without any amendment. The pluralization of the term "seafarer" in the context of taking control suggested that more than one person might be required to take control of an automated or unsupervised operation when the equivalent operation might only require the involvement of a single seafarer. This might pre-empt the results of the regulatory scoping exercise.

***Instruments***

8 Regarding the proposed amendments to the "Instruments" section, the Group did not agree with the additional text recommended by the Correspondence Group and made additional modifications to clarify that the instruments should be reviewed at regulation or rule level and that the review of mandatory instruments should be prioritized.

***Methodology***

9 The Group agreed with the amendments proposed by the Correspondence Group to the "Methodology" section and made further modifications to the text in order to clarify that the second step (i.e. the analysis to determine the most appropriate way of addressing MASS operations) should only be conducted after completing the first step (i.e. the identification of rules/regulations in IMO instruments that apply or not to MASS). A number of delegations were of the view that the second step should not be delayed if, for any reason, the review of all the instruments could not be completed during the first step. As a compromise solution, the Group agreed to address the completion of the first step when discussing the method of work (see paragraphs 15 to 17 below).

***Template***

10 The Group also agreed to amend the template for the regulatory scoping exercise by deleting the second step, taking into account the discussion on the plan of work and procedures (see paragraph 18 below).

***Working arrangements and procedures***

11 The Group discussed the working arrangements for the regulatory scoping exercise, including the use of a web platform, as recommended by the Secretariat (MSC 100/5/4), and agreed, inter alia, that a web platform should be developed for the regulatory scoping exercise.

12 In considering the first step, the Group agreed that the initial review of instruments could be conducted simultaneously by different volunteering Member States, in collaboration with interested international organizations.

13 The Group also prepared procedures for the first and second step of the scoping exercise, including a plan of work with specific deadlines for the initial review of instruments and the subsequent analysis, including commenting stages and final consideration.

14 The Group had a discussion regarding the decision to prioritize degrees of autonomy two and three. In this respect, a number of delegations indicated that it was important that the review of all degrees of autonomy should be conducted at the same time. Others were of the opinion that degrees two and three should be the priority according to the decisions taken in plenary. After some consideration, the Group agreed to add a paragraph in the procedures indicating that priority should be given to degrees of autonomy two and three during the scoping exercise.

15 The Group also discussed how to determine the completion of the first step before moving into the second step. The Group agreed that either the Committee or a group authorized by the Committee should review the results of the first step and decide whether the second step could commence or if further work would be required before commencing the second step. The Group noted that due to the time required to conduct the initial review of instruments and the deadlines for submissions of documents to MSC 101 (i.e. April 2019), it would not be possible to consider the results of the first step at the next session of the Committee. The Group further noted that in 2019 there would only be one session of the Committee. Accordingly, and in order to complete the scoping exercise in 2020, the Group agreed to recommend a meeting of an intersessional MSC working group, in September 2019, to that effect. Subject to the Committee's agreement, the terms of reference of the intersessional MSC working group could be prepared at MSC 101, which should include the relevant authorization to review the results of the first step and to decide whether the second step could commence or not, on behalf of the Committee.

16 The Group noted that the intersessional MSC working group, if established, would be expected to have a heavy workload due to the number of instruments to be reviewed by different volunteering Member States and that by referring this work to an intersessional meeting, MSC 101 would be able to focus on the development of guidelines on MASS trials (see paragraph 23 below).

17 Notwithstanding the above and although MSC 101 was not expected to take any actions related to the conduct of the scoping exercise, the Group agreed that the Secretariat should submit a status report to MSC 101 containing information on the progress of the regulatory scoping exercise for consideration and in order to address any necessary actions.

18 The Group subsequently discussed the method of work during the second step and, after consideration, agreed that the initial analysis should be high level instead of regulation-by-regulation. The Group further agreed that this work should preferably be conducted by the volunteering Member State(s) that conducted the initial review of the instrument in question, including any international organizations that might have collaborated with the initial review. In this context, the Group agreed that a summary with recommended actions should be prepared by each volunteering Member State and submitted to MSC 102 for final consideration with a view of completion of the regulatory scoping exercise at that session.

19 In order to coordinate the work, the Group prepared a table containing information on Member States that had volunteered to lead or support the initial review of different instruments. The Group agreed that Member States willing to volunteer for the initial review of instruments after MSC 100 should inform the Secretariat no later than 31 December 2018. In this respect, the Group noted that the Secretariat would create a dedicated email account for MASS-related communications ([MASS@imo.org](mailto:MASS@imo.org)). It was also recommended that volunteering Member States leading the initial review of instruments should designate a focal point for future communications. In this context, the Group requested the Secretariat to publish the list of instruments and volunteering/supporting Member States, including contact details of focal points, in the web platform, once available.

20 The Group agreed that in cases where more than one Member State was willing to lead the initial review of the same instrument, they should agree and decide who would be leading the initial review of the specific instrument or if it should be divided.

21 The Group noted that the Secretariat would have to assist with certain tasks during the regulatory scoping exercise, such as pre-populating the information, assigning relevant permissions to users and dealing with any other administrative issues, as appropriate.

### ***Final framework***

22 The Group finalized the framework for the regulatory scoping exercise, as set out in the annex, including the template, the list of instruments and the plan of work and procedures, for the Committees' approval.

### **Principles for the development of guidelines on MASS trials**

23 As instructed, the Group considered possible principles to be taken into account by Member States and interested parties when developing Guidelines on MASS trials. After a discussion, the Group agreed to the following provisional principles:

- .1 single document: the Guidelines should be developed as a single document addressing Administrations, the industry and other relevant stakeholders;
- .2 generic: the Guidelines should be generic;
- .3 not too technical: the Guidelines should be not too technical or prescriptive;
- .4 goal-based: the Guidelines should be goal-based, describing functions and goals to be achieved;
- .5 information sharing: the Guidelines should encourage information sharing, both with the Organization (feedback) and other stakeholders;
- .6 reporting mechanism: the Guidelines should include reporting to the relevant coastal State(s) on the trial(s) to be conducted, so as to enable the dissemination of information on the trials to all ships in the specified area;
- .7 precautionary approach: the Guidelines should ensure the safe, secure and environmentally sound operation of MASS;
- .8 mandatory instruments: the Guidelines should provide that MASS trials are to be in line with mandatory instruments; and
- .9 scope for specific trials: the Guidelines should provide that a scope should be specified for each trial to be conducted (e.g. mooring, navigation, new equipment, etc.).

### **Action requested of the Committee**

24 The Committee is invited to approve the report in general and, in particular, to:

- .1 approve the framework for the regulatory scoping exercise, including the plan of work and procedures (paragraphs 5 to 22 and annex);

- .2 request the Secretariat to develop the web platform for the regulatory scoping exercise, taking into account the agreed framework (paragraph 11);
- .3 encourage interested Member States and international organizations to participate actively in the regulatory scoping exercise (paragraph 12);
- .4 agree to the holding of an intersessional MSC working group from 2 to 6 September 2019 and agree to develop terms of reference for the group at the next session of the Committee (paragraph 15);
- .5 request the Secretariat to submit a status report to MSC 101 containing information on the progress of the regulatory scoping exercise for consideration and in order to address any necessary actions (paragraph 17);
- .6 invite Member States willing to volunteer to lead or support the initial review of specific instruments to inform the Secretariat ([MASS@imo.org](mailto:MASS@imo.org)) no later than 31 December 2018 (paragraph 19);
- .7 request the Secretariat to assist with certain tasks during the regulatory scoping exercise, such as pre-populating the information, assigning relevant permissions to users and dealing with any other administrative issues, as appropriate (paragraph 21); and
- .8 note the provisional principles for the development of guidelines on MASS trials and invite interested parties to submit proposals to the next session of the Committee taking into account these principles (paragraph 23).

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## ANNEX

### FRAMEWORK FOR THE REGULATORY SCOPING EXERCISE

#### Aim

1 The aim of the regulatory scoping exercise is to determine how safe, secure and environmentally sound Maritime Autonomous Surface Ships (MASS) operations might be addressed in IMO instruments.

#### Objective

2 The objective of the regulatory scoping exercise on MASS conducted by the Maritime Safety Committee is to assess the degree to which the existing regulatory framework under its purview may be affected in order to address MASS operations.

#### Glossary

3 For the purpose of the regulatory scoping exercise, "Maritime Autonomous Surface Ship (MASS)" is defined as a ship which, to a varying degree, can operate independent of human interaction.

4 To facilitate the process of the regulatory scoping exercise, the degrees of autonomy are organized as follows:

**Degree one:** ***Ship with automated processes and decision support:*** Seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated and at times be unsupervised but with seafarers on board ready to take control.

**Degree two:** ***Remotely controlled ship with seafarers on board:*** The ship is controlled and operated from another location. Seafarers are available on board to take control and to operate the shipboard systems and functions.

**Degree three:** ***Remotely controlled ship without seafarers on board:*** The ship is controlled and operated from another location. There are no seafarers on board.

**Degree four:** ***Fully autonomous ship:*** The operating system of the ship is able to make decisions and determine actions by itself.

5 The above list does not represent a hierarchic order. It should be noted that MASS could be operating at one or more degrees of autonomy for the duration of a single voyage.

#### Instruments

6 The list of mandatory instruments related to maritime safety and security to be considered as part of the regulatory scoping exercise is set out in appendix 1. These instruments should be reviewed on a regulation or rule level. Subsidiary mandatory instruments established under each parent instrument should also be considered to the level necessary to establish how they will be affected.

7 The review of mandatory instruments should be prioritized. In instruments containing both mandatory and non-mandatory parts, non-mandatory parts may be considered as part of the regulatory scoping exercise, when deemed necessary, to obtain a complete understanding of how the mandatory provisions are affected in order to address MASS operations (e.g. STCW Convention and Code).

### **Type and size of ships**

8 The application of the regulatory scoping exercise should be restricted to the applicability of the instruments under consideration.

### **Methodology**

9 As a first step, the regulatory scoping exercise will identify provisions in IMO instruments which, as currently drafted:

- .1 .A apply to MASS and prevent MASS operations; or
- .2 .B apply to MASS and do not prevent MASS operations and require no actions; or
- .3 .C apply to MASS and do not prevent MASS operations but may need to be amended or clarified, and/or may contain gaps; or
- .4 .D have no application to MASS operations.

10 Once the first step is completed, a second step will be conducted to analyse and determine the most appropriate way of addressing MASS operations, taking into account, inter alia, human element,\* technology and operational factors by:

- .1 .I equivalences as provided for by the instruments or developing interpretations; and/or
- .2 .II amending existing instruments; and/or
- .3 .III developing new instruments; or
- .4 .IV none of the above as a result of the analysis.

11 Appendix 2 provides the template to be used to guide the documentation of results and, if necessary, present the results of the first step of the regulatory scoping exercise.

### **Plan of work and procedures**

12 A plan of work and procedures for the regulatory scoping exercise is provided in appendix 3.

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\* Refer to resolution A.947(23), *Human element vision, principles and goals for the Organization*.



## APPENDIX 1

### **List of instruments related to maritime safety and security**

COLREG 1972 – International Regulations for Preventing Collisions at Sea, 1972

CSC 1972 – International Convention for Safe Containers (CSC), 1972, as amended

LL 1966 – International Convention on Load Lines, 1966

LL PROT 1988 – Protocol of 1988 relating to the International Convention on Load Lines, 1966

SAR 1979 – International Convention on Maritime Search and Rescue, 1979

SOLAS 1974 – International Convention for the Safety of Life at Sea, 1974, as amended

SOLAS AGR 1996 – Agreement concerning specific stability requirements for ro-ro passenger ships

SOLAS PROT 1978 – Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974

SOLAS PROT 1988 – Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974

SPACE STP 1973 – Protocol on Space Requirements for Special Trade Passenger Ships, 1973

STCW 1978 – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended

STCW-F 1995 – International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, 1995

STP 1971 – Special Trade Passenger Ships Agreement, 1971

TONNAGE 1969 – International Convention on Tonnage Measurement of Ships, 1969

## APPENDIX 2

### Template for the regulatory scoping exercise

Instrument: [Name of instrument]

Rule/Regulation	First step		
	Degree of autonomy	MASS application (.A, .B, .C, .D)	Comments/Remarks (explain analysis conducted in determining MASS application and potential gaps)
	Degree one		
	Degree two		
	Degree three		
	Degree four		
	Degree one		
	Degree two		
	Degree three		
	Degree four		

#### References:

#### Degrees of autonomy:

- Degree one: Ship with automated processes and decision support
- Degree two: Remotely controlled ship with seafarers on board
- Degree three: Remotely controlled ship without seafarers on board
- Degree four: Fully autonomous ship

#### MASS application:

- .A apply to MASS and prevent MASS operations; or
- .B apply to MASS and do not prevent MASS operations and require no actions; or
- .C apply to MASS and do not prevent MASS operations but may need to be amended or clarified, and/or may contain gaps; or
- .D have no application to MASS operations.

## APPENDIX 3

### **Plan of work and procedures for the regulatory scoping exercise**

#### **1 General**

1.1 This note provides draft procedures for the regulatory scoping exercise on Maritime Autonomous Surface Ships (MASS).

1.2 The regulatory scoping exercise should be conducted taking into account the agreed framework and methodology and any relevant decisions of the Committee.

#### **2 Web platform for the conduct of the regulatory scoping exercise**

2.1 A web platform will be developed by the Secretariat as part of GISIS to facilitate the regulatory scoping exercise.

2.2 The platform will be developed in two stages, as follows:

- .1 a form for uploading the initial review of IMO instruments (to be completed by 15 February 2019); and
- .2 additional forms to allow submission of comments and other functionalities (e.g. printing, exporting, filtering, etc. (to be completed by the end of March 2019)).

2.3 The web platform will be connected to the IMO web accounts, providing access only to registered IMO Members.\* All IMO Members will have read-only access to the web platform.

2.4 The web platform should make a clear distinction between the first and the second step of the agreed methodology.

2.5 The information contained in the web platform should be retained for future references until the Committee decides otherwise.

#### **3 First step**

##### **3.1 Initial review of IMO instruments**

3.1.1 The initial review should be conducted by volunteering Member States, either individually or as a group. In case of a group, only one Member State will be provided with access to upload and edit the information.

3.1.2 The initial review involves only the first step of the agreed methodology.

3.1.3 Member States can volunteer to conduct the initial review of either a whole or part of an instrument (e.g. specific chapters) for all degrees of autonomy or for specific ones. Priority should be given to the consideration of degrees two and three.

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\* Whenever the term "IMO Member" is used in this document, it includes Member Governments, associated Member Governments, intergovernmental organizations with observer status and non-governmental organizations in consultative status.

3.1.4 Only users authorized by the Member State conducting the initial review of a specific instrument will be allowed to upload and edit the information.

3.1.5 If necessary, the Secretariat will assist with the pre-population of the number and titles of rules and regulations on the web platform.

3.1.6 Upon completion of the initial review, the web platform will be locked for editing.

### **3.2 Commenting stage**

3.2.1 Once the initial review is completed, IMO Members will be authorized to submit comments through the web platform.

3.2.2 Comments could be submitted either on specific rules/regulations or as general comments on the instrument under review (e.g. in case of gaps in regulations).

3.2.3 As part of the commenting stage, the web platform should provide an option to indicate whether the IMO Member agrees or disagrees with the initial review. If the option "disagree" is chosen, then an explanatory comment should be provided specifying the alternative MASS application.

3.2.4 Each IMO Member will only be able to submit one comment per rule/regulation and degree of autonomy under consideration and one general comment on the instrument under consideration. In order to facilitate the subsequent consideration, comments on specific rules/regulations and general comments on the instrument under consideration will be limited to specific number of characters (to be determined according to IT functionalities).

3.2.5 After an agreed period, the web platform will be locked for comments.

### **3.3 Consideration of comments and presentation of results**

3.3.1 The volunteering Member State(s) that conducted the initial review should consider all comments received and modify the initial review, as appropriate.

3.3.2 In order to facilitate the consideration of comments, the web platform should provide statistics of the number of IMO Members that had agreed or disagreed with the initial review.

3.3.3 The volunteering Member State(s) should also prepare a summary of results addressing in particular the main issues identified during step one in respect to specific degrees of autonomy and the specific gaps identified, if any.

3.3.4 The above summary of results should be submitted by the volunteering Member State(s) for consideration by the Committee or by a group authorized to that effect.

### **3.4 Consideration of the results of the first step**

3.4.1 The Committee or a group authorized by the Committee should consider the results of the first step submitted by the volunteering Member State(s), taking into account the information in the web platform, and making any necessary final modifications, as appropriate.

3.4.2 When the consideration is completed, the Committee or a group authorized by the Committee should authorize the commencement of the second step.

3.4.3 Upon completion of the first step, the information related to step one will be closed for editing or modification.

## **4 Second step**

### **4.1 Analysis of the most appropriate way of addressing MASS operations**

4.1.1 The initial analysis should be conducted, preferably by the volunteering Member State(s) that conducted the initial review.

4.1.2 The initial analysis involves the second step of the agreed methodology.

4.1.3 Only users authorized by the Member State conducting the initial analysis of a specific instrument will be allowed to upload and edit the information related to the second step.

4.1.4 Upon completion of the initial analysis, the web platform will be locked for editing.

4.1.5 The initial analysis should be high level and should not be conducted regulation by regulation.

### **4.2 Commenting stage**

4.2.1 Once the initial analysis is completed, IMO Members will be authorized to submit comments through the web platform.

4.2.2 As part of the commenting stage, the web platform should provide an option to indicate whether the IMO Member agrees or disagrees with the initial analysis. If the option "disagree" is chosen, then an explanatory comment should be provided, specifying the most appropriate way of addressing MASS operations.

4.2.3 Each IMO Member will only be able to submit one comment per analysis.

4.2.4 After an agreed period, the web platform will be locked for comments.

### **4.3 Consideration of comments and presentation of results**

4.3.1 The volunteering Member State(s) that conducted the initial analysis should consider all comments received and modify the initial analysis, as appropriate.

4.3.2 In order to facilitate the consideration of comments, the web platform should provide statistics of the number of IMO Members that had agreed or disagreed with the initial analysis.

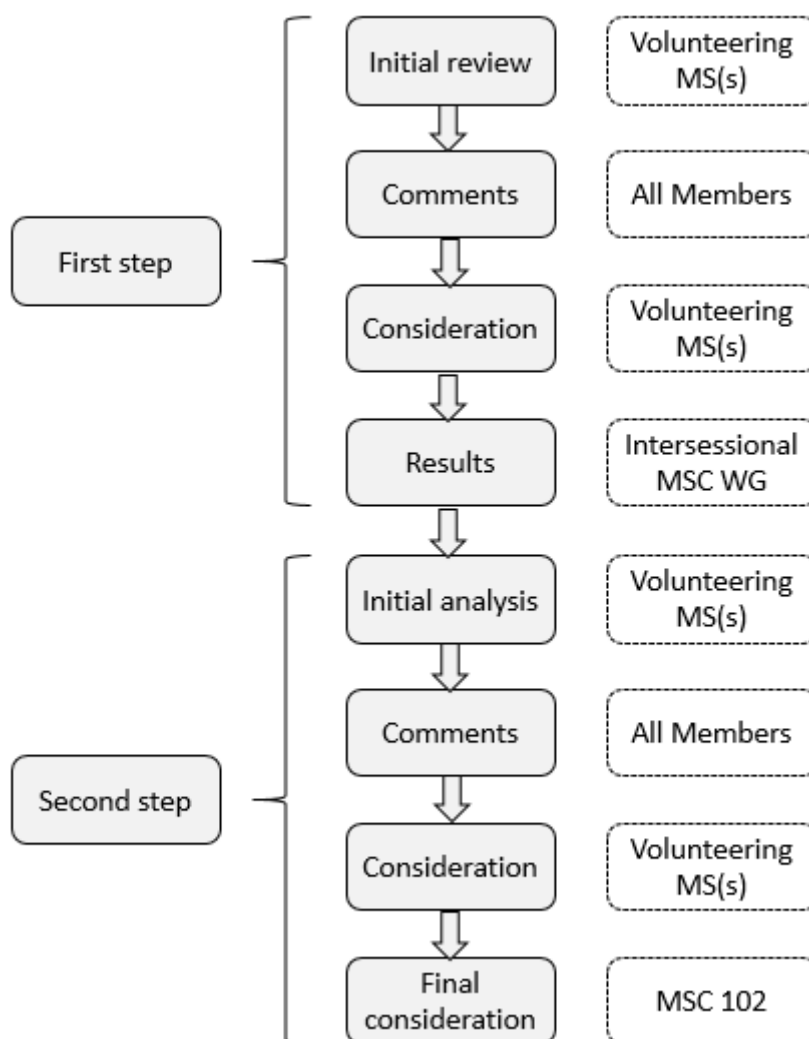
4.3.3 The volunteering Member State(s) should also prepare a summary determining the most appropriate way of addressing MASS operations specific to degrees of autonomy.

4.3.4 The above summary should be submitted by the volunteering Member State(s) for the Committee's consideration.

### **4.4 Final consideration**

4.4.1 The Committee should consider the results of the first and second steps taking into account any relevant information, as appropriate.

### Process for the regulatory scoping exercise



### Timeline for the regulatory scoping exercise

Action	Deadline	Who?
Upload of the initial review of IMO instruments	April 2019	Volunteering Member State(s)
Commenting stage related to the initial review	May/June 2019 (two months)	All IMO Members
Consideration of comments and presentation of results	July 2019 (one month)	Volunteering Member State(s)
Consideration of the results of the first step	[2 to 6 September 2019]	[Intersessional MSC working group]
Analysis of the most appropriate way of addressing MASS operations (second step)	September/October 2019 (two months)	Volunteering Member State(s)
Commenting stage related to the initial analysis	November 2019 (one month)	All IMO Members

Action	Deadline	Who?
Consideration of comments and presentation of results	December 2019/January 2020 (two months) – deadline for submissions to MSC 102	Volunteering Member State(s)
Final consideration	May 2020	MSC 102

**List of instruments and volunteering Members undertaking or supporting the review of instruments**

Instrument	Chapter/ Section	Degree of autonomy	Member State preparing the initial review	Supporting/assisting
SOLAS 1974				
	Chapter II-1	All	France	Sweden, Iran (Islamic Republic of)
	Chapter II-2	All	Japan	
	Chapter III	All	Netherlands	Belgium
	Chapter IV	All	Turkey	China, Japan
	Chapter V	All	China	Denmark, Japan, Singapore
	Chapter VI	All	Japan	
	Chapter VII	All	Japan	
	Chapter IX	All	Norway	China, Republic of Korea, Russian Federation
	Chapter XI-1	All	Finland	
	Chapter XI-2	All	Finland	
SOLAS AGR 1996				
SOLAS PROT 1978				
SOLAS PROT 1988				
STCW 1978 and STCW Code		All	United States	Japan, New Zealand, Republic of Korea, Russian Federation,
STCW-F 1995		All	Japan	New Zealand
COLREG 1972		All	Marshall Islands	China, Japan, Singapore, United States
CSC 1972		All	Japan	Finland
LL 1966		All	India	
LL PROT 1988		All	India	
SAR 1979		All	Spain, France	Turkey
SPACE STP 1973				
STP 1971				
TONNAGE 1969				