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OUTCOME OF THE REGULATORY SCOPING EXERCISE AND GAP ANALYSIS OF THE FAL CONVENTION WITH RESPECT TO MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

1 The Facilitation Committee, at its forty-sixth session (9 to 13 May 2022), approved the *Outcome of the regulatory scoping exercise and gap analysis of the FAL Convention with respect to Maritime Autonomous Surface Ships (MASS)*, as set out in the annex, which provides an overview of the extent to which the FAL Convention might require amending or interpreting to address MASS operations. It further provides guidance to the Committee and interested parties to identify and decide on future work on MASS and, as such, facilitate the preparation of requests for, and consideration and approval of, new outputs.

2 Member States and international organizations are invited to take the annex into account when proposing future work on MASS for consideration by the Committee and bring it to the attention of shipowners, operators, academia and all other parties concerned.

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ANNEX

OUTCOME OF THE REGULATORY SCOPING EXERCISE AND GAP ANALYSIS OF THE FAL CONVENTION WITH RESPECT TO MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

1 INTRODUCTION

1.1 This document presents the outcome of the regulatory scoping exercise (RSE) and gap analysis of the Convention on Facilitation of International Maritime Traffic, 1965 (FAL Convention) with respect to maritime autonomous surface ships (MASS).

1.2 The outcome of the RSE provides an overview of the extent to which the existing regulatory framework under the purview of the FAL Committee might require amending or interpreting to address MASS operations. It further provides guidance to the FAL Committee and interested parties to identify and decide on future work on MASS and, as such, facilitate the preparation of requests for, and consideration and approval of, new outputs.

1.3 This outcome document follows the content and structure of the:

.1 *Outcome of the regulatory scoping exercise for the use of MASS* developed and approved by the Maritime Safety Committee (MSC) for conventions under MSC's purview (MSC.1/Circ.1638); and

.2 *Outcome of the regulatory scoping exercise and gap analysis of conventions emanating from the Legal Committee with respect to MASS* developed and approved by the Legal Committee (LEG) for conventions under LEG's purview (LEG.1/Circ.11);

in order to ensure a consistent approach to the MASS RSE across IMO's organs. However, where appropriate, deviations have been made in order to accommodate the particular nature of the FAL Convention.

2 BACKGROUND

2.1 MSC 98, in June 2017, noted that the maritime sector was witnessing an increased deployment of MASS to deliver safe, cost-effective and high-quality results. In this context, MASS could include ships with different levels of automation, from partially automated systems, which assisted the human crew, to fully autonomous systems, which were able to undertake almost all aspects of a ship's operation without the need for human intervention. Significant academic and commercial research and development (R&D) was ongoing on all aspects of MASS, including remotely controlled and autonomous navigation, vessel monitoring and collision avoidance systems.

2.2 Although technological solutions were being developed and deployed, delegations were of the view that there was a lack of clarity on the correct application of existing IMO instruments to MASS. Delegations believed that IMO needed to ensure that MASS designers, builders, owners and operators had access to a clear and consistent regulatory framework, guided by the *Principles to be considered when drafting IMO instruments* (resolution A.1103(29)), in order to be able to demonstrate compliance with IMO instruments.

2.3 Following consideration, MSC 98 agreed to include in its 2018-2019 biennial agenda an output on "Regulatory scoping exercise for the use of Maritime Autonomous Surface Ships (MASS)" with a target completion year of 2020.

2.4 In April 2018, LEG 105 also agreed to include a new output entitled "Regulatory scoping exercise and gap analysis of conventions emanating from the Legal Committee with respect to Maritime Autonomous Surface Ships (MASS)" in its 2018-2019 biennial agenda with a target completion year of 2022.

2.5 At MSC 99, in May 2018, the Committee started to develop a framework for the RSE and defined the aim, the objective, the preliminary definition of MASS and degrees of autonomy, the list of mandatory instruments to be considered and the applicability in terms of type and size of ships.

2.6 MSC 100, in December 2018, approved the framework for the RSE, which contained definitions, a methodology consisting of a two-step approach and a plan of work and procedures (MSC 100/20/Add.1, annex 2) and invited interested Member States and international organizations to participate actively in the exercise. The Committee also approved the holding of an intersessional meeting of the Working Group on MASS between MSC 101 and 102, with the aim to finalize the RSE at MSC 102. Furthermore, the Committee requested the Secretariat to develop a web platform as part of the Global Shipping Information System (GISIS) to facilitate the RSE.

2.7 LEG 106, in March 2019, approved the framework for the LEG RSE and a plan of work and procedures (LEG 106/16, annex 3), following the same two-step approach and the same methodology developed by MSC 100, i.e. an initial review of the LEG instruments with the agreed methodology and an analysis of the most appropriate way of addressing MASS operations. The MASS module on GISIS was used as a web platform to share the initial review and analysis, provide comments, and revise the review and analysis based on the comments received from volunteering Member States. The results were reported to LEG 107.

2.8 FAL 43, in April 2019, agreed to include in its 2020-2021 biennial agenda a new output on "Regulatory scoping exercise for the use of Maritime Autonomous Surface Ships (MASS)" with a target completion year of 2020. Like the LEG, FAL decided to use the framework for the RSE for the use of MASS approved by MSC 100, and to use the MASS module on GISIS as a medium to share the initial review and analysis, provide comments and revise the initial review and the analysis based on the comments received. The FAL RSE was scheduled to be finalized at FAL 44.

2.9 Owing to the COVID-19 pandemic, FAL 44 (postponed from April to September 2020), MSC 102 (November 2020) and LEG 107 (December 2020), deferred consideration of this matter to FAL 45, MSC 103 and LEG 108, respectively.

2.10 MSC 103, in May 2021, finalized the RSE for the conventions under its purview and approved the outcome as set out in Outcome of the regulatory Scoping Exercise for the use of MASS (MSC.1/Circ.1638).

2.11 LEG 108, in July 2021, also finalized the RSE for the conventions emanating from LEG and approved the outcome as set out in Outcome of the Regulatory Scoping Exercise and Gap Analysis of Conventions emanating from the Legal Committee with respect to MASS (LEG.1/Circ.11).

2.12 Having noted the decision to postpone the agenda item on MASS during FAL 45, the Committee approved a FAL Committee Intersessional Working Group on MASS in October 2021 to complete the regulatory scoping exercise on the FAL Convention.

2.13 In October 2021, MSC 104 agreed to develop a road map on how to deal with Maritime Autonomous Surface Ships (MASS), to include a new output on "Development of a goal based instrument for maritime autonomous surface ships (MASS)", with a target completion year of 2025 in the biennial agenda of the Committee for 2022-2023 and the provisional agenda for MSC 105, to re-establish the MASS Working Group at MSC 105 and that the ultimate goal would be the preparation of a mandatory instrument to address MASS operations. The Committee requested the Chair to prepare a draft road map, including timelines, as well as the coordination of work with other IMO bodies, in consultation with the Secretariat, the submitters of the proposals and commenting documents to MSC 104, and the former Chair of the MASS Working Group, and submit this to MSC 105 for detailed consideration.

3 FRAMEWORK AND PROCESS OF THE RSE

Aim and objective

3.1 The aim of the FAL Committee RSE was to determine how safe, secure and environmentally sound MASS operations and the related facilitation matters might be addressed in IMO instruments.

3.2 The objective of the RSE on MASS conducted by the FAL Committee was to assess the degree to which the existing regulatory framework under its purview might be affected in order to address MASS operations.

Glossary

3.3 FAL used the glossary that was developed by MSC and used by MSC and LEG for instruments under their respective purviews to ensure a consistent approach throughout the Organization. The glossary, in particular the degrees of autonomy, was developed by MSC specifically for the purpose of the RSE and does not pre-empt future definitions that may be considered at a later stage.

3.4 For the purpose of the RSE, "MASS" was defined as a ship which, to a varying degree, can operate independently of human interaction.

3.5 To facilitate the process of the RSE, the degrees of autonomy were 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.

3.6 The above list does not represent a hierarchical 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

3.7 The Convention on Facilitation of International Maritime Traffic (FAL Convention), 1965 was reviewed at a Section level. It was acknowledged that the FAL Convention also contained non-mandatory provisions, as highlighted in appendix 1. The non-mandatory parts have been considered as part of the RSE, when deemed necessary, to obtain a complete understanding of how the mandatory provisions would be affected in order to address MASS operations (e.g. recommended practices).

Type and size of ships

3.8 The application of the RSE was restricted to the applicability of the instrument under consideration.

Web platform for the conduct of the RSE

3.9 A web platform as part of GISIS was developed by the Secretariat to facilitate the RSE. The web platform was connected to the IMO web accounts, providing access only to registered IMO Members.[1] All IMO Members have read-only access to the web platform and the information contained in the web platform will be retained for future reference until the Committee decides otherwise.

Methodology

3.10 The review of the FAL Convention was conducted by a volunteering Member State in two steps. At pre-set intervals, IMO Members were able to submit comments on the work done by the volunteering Member State through the web platform.

3.11 As a first step, an initial review of each section of the FAL Convention was undertaken and, for each degree of autonomy, one of the following answers was allocated to each provision:

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.

[1] 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.

3.12 Once the first step was completed, a second step was conducted to analyse and determine the most appropriate way of addressing MASS operations, taking into account the human element,[2] by:

I developing interpretations; and/or

II amending existing instruments; and/or

III developing new instruments; or

IV none of the above as a result of the analysis.

4 RESULTS OF THE REGULATORY SCOPING EXERCISE

4.1 The results of the RSE for the FAL Convention are set out in appendix 1 and provide, for all degrees of autonomy:

.1 the most appropriate way(s) of addressing MASS operations in those instruments;

.2 the reason(s) for selecting the most appropriate way(s); and

.3 identification of potential gaps/themes that require addressing.

4.2 Overall, the RSE concluded that the FAL Convention is able to address MASS operations into the instrument without major amendments. The results of the RSE mainly demonstrate that sections 1, 2 and 4 of the FAL Convention require a review or interpretation to accommodate MASS operations. Most requirements in section 3 of the FAL Convention have no application to MASS, however some provisions may require amendments. Sections 5, 6 and 7 do not affect MASS and are applicable in their current wording.

Assumptions made for the purpose of the RSE

4.3 The assumptions listed below should be considered when interpreting the results in appendix 1.

.1 There are no seafarers on board on Degrees Three and Four.

.2 Transport of passengers in international traffic would require certified seafarers to be on board the vessel for emergency duties and evacuation. Passenger-MASS manned with certified seafarers are considered as Degree Two, independent of the autonomous technology applied.

.3 An autonomous system in Degree Four is regarded to be similar to "remotely controlled" MASS where operations are conducted from another location.

.4 Seafarers could take control of a remotely controlled or fully autonomous system, i.e. Degrees Two, Three and Four, if they are on board.

4.4 While they will not necessarily be used during subsequent work, any future assumptions will need to be agreed upon.

[2] Refer to resolution A.947(23), Human element vision, principles and goals for the Organization.

5 COMMON POTENTIAL GAPS AND/OR THEMES AND POTENTIAL LINKS BETWEEN INSTRUMENTS

Potential gaps and/or themes

5.1 Having reviewed the results of the RSE of the FAL Convention, the following issues were identified as the main potential gaps and/or themes that may require clarification to accommodate MASS within the existing regulatory framework:

.1 the role and responsibility of the master and crew;

.2 the role and responsibility of the remote operator;

.3 persons rescued at sea, stowaways and refugees;

.4 sharing of information;

.5 definitions and terminology; and

.6 certificates and other documents.

5.2 It should be noted that these potential gaps and themes are not exhaustive and that the order in which they are presented does not reflect any order of priority.

The role and responsibility of the master and crew

5.3 The RSE identified provisions that require an action by the master or crew controlling shipboard systems and performing shipboard functions. It was concluded that it may be necessary to clarify who, if anybody, would have to satisfy the role of the master and crew in the case of a MASS with no seafarers on board, i.e. in Degree Three and Four. If circumstances so require, qualified seafarers could take control of a MASS (Degrees Two, Three and Four) if they are on board.

5.4 New kind of certification and identification for remotely controlled operations would be required for the duties or liabilities when operating a remotely controlled or fully automated vessel. Considerations may be necessary for declaration made on arrival and departure in section 2 as well as the treatment of stowaways, refugees and persons rescued at sea in section 4.

5.5 This appeared to be an overarching issue that requires consideration across all IMO instruments and in coordination with all responsible committees.

The role and responsibility of the remote operator

5.6 RSE also showed a need to clarify the role of a remote operator, when a ship is controlled and operated from a remote location and a master is not physically present on board. It may be necessary to clarify the arrangements and obligations solving situations and pre-arrival information declaration regarding stowaways, refugees and persons rescued at sea.

Persons rescued at sea, stowaways and refugees

5.7 In case of an unmanned MASS, considerations may be required on the obligations and functions of searching, identifying and managing stowaways, refugees and persons rescued at sea. The absence of seafarers or basic accommodation facilities may also require further clarification on the decision to place persons rescued at sea, stowaways and refugees back on board, unmanned MASS for transport to the subsequent port. The process for ensuring the confidentiality of information shared may also require further consideration when a stowaway declares himself/herself as a refugee.

Sharing of information

5.8 Greater degrees of autonomy of ships imply that technologies are taking on the role of information sharing and MASS requires increasing availability of accurate, up-to-date necessary data and reliable communications. Although not specifically addressed in the Convention, effective information exchange is key to trade facilitation. To enable automated processes in an environment which MASS will operate in, information exchange across all authorized and relevant stakeholders might have to be in machine-readable and decentralized format based on open and interoperable interfaces to enable automated processes.

Definitions and terminology

5.9 Following consideration of the MASS definitions in a FAL context as well as supplementary terminology, it was agreed that the matter of a glossary, including the need for amending the MASS definition and developing supplementary terminology, should be further considered after the RSE had been completed, in liaison with the other Committees having undertaken RSEs and considering relevant documents in this regard.

5.10 It was also agreed that the introduction of new technologies and new actors is also relevant in the context of existing definitions and general terminology.

Certificates and other documents

5.11 On the provisions related to the formalities on the arrival, stay and departure of ships, shipowners are required to present to the public authorities their certificates and other documents pertaining to its registry, measurement, safety, manning and other related matters. Considerations on the relevant certificates and other documents and the data they include may require amendment if and when new certification for MASS is developed.

Potential links with MSC instruments

5.12 The RSE undertaken by MSC for the instruments under its purview identified the following common potential gaps and/or themes (MSC.1/Circ.1638, paragraph 5.2):

.1 meaning of the terms master, crew or responsible person;

.2 remote control station/centre;

.3 remote operator as a seafarer;

.4 provisions containing manual operations, alarms to the bridge;

.5 provisions requiring actions by personnel (fire, spillage cargo management, onboard maintenance, etc.);

.6 certificates and manuals on board;

.7 connectivity, cybersecurity;

.8 watchkeeping;

.9 implication of MASS in SAR;

.10 information to be available on board and required for the safe operation; and

.11 terminology.

5.13 It was recognized that not all of these common potential gaps and/or themes are of the same nature. Some of them are critical and fundamental issues which may shape the course of addressing MASS operations, while others concern more technical aspects.

5.14 Some of these common potential gaps and/or themes are at the core of how to introduce MASS operation safely and effectively in the regulatory framework and are regarded as high-priority issues that cut through several IMO instruments and may require a policy decision before addressing individual instruments. Among these are, for instance:

.1 meaning of the terms master, crew or responsible person;

.2 remote control station/centre; and

.3 remote operator designated as seafarer.

5.15 MSC concluded that many common potential gaps and/or themes, which cut across several instruments, could preferably be addressed holistically through a new instrument (e.g. a MASS Code), which can be made mandatory by means of amending an existing IMO convention, such as SOLAS (MSC.1/Circ.1638, paragraph 6.2). Addressing every instrument separately could lead to inconsistencies, confusion and raise potential barriers for the application of existing regulations to conventional ships.

5.16 It was also recognized that consideration of amendments to instruments, or development of a new instrument, requires agreement on the use of terminology and is a policy decision. One of the issues to be addressed was considered to be the re-evaluation of the degrees of autonomy, taking into account the lessons learned during the RSE. This work could include the development of a glossary (MSC.1/Circ.1638, paragraph 6.4).

5.17 MSC agreed that any future proposals for changes in the regulatory framework required justification, and, consequently, it was recognized that any future work on MASS needed to be approved following a proposal for a new output (MSC.1/Circ.1638, paragraph 6.10).

Potential links with instruments emanating from LEG

5.18 The RSE undertaken by LEG on the different conventions emanating from the Legal Committee identified the following common gaps and themes that may require clarification to accommodate MASS within the existing regulatory framework (LEG.1/Circ.11):

.1 the role and responsibility of the master;

.2 the role and responsibility of the remote operator;

.3 questions of liability;

.4 definitions/terminology of MASS; and

.5 certificates.

5.19 LEG concluded that, in general, MASS could be accommodated within the existing regulatory framework of LEG conventions without the need for major adjustments. The priorities identified by MSC in MSC.1/Circ.1638 linked well with those identified by LEG. The core of the high-priority issues to be decided were general policy decisions on terminology and the roles and responsibilities of new actors concomitant with the introduction of new technologies relating to MASS. LEG concluded that coordination among committees will be necessary moving forward, in particular regarding terminology and definitions.

5.20 LEG concluded that conventions not under the auspices of IMO, such as the United Nations Conventions on the Law of the Sea (UNCLOS), would need to be considered in IMO's future work on MASS. These considerations would be particularly relevant if IMO developed an instrument to regulate MASS operations.

Gaps and themes that are common across MSC, LEG and FAL instruments

5.21 Following the cross examination of the results, the following gaps and themes were found to be common across MSC, LEG and FAL instruments:

.1 the role and responsibility of the master and crew;

.2 the role and responsibility of the remote operator;

.3 definitions/terminology of MASS; and

.4 certificates and other documents.

6 PRIORITIES FOR FURTHER WORK

6.1 This section has been developed using the available information in sections 4 to 5, appendix 1 and also taking into account the results of the LEG and MSC RSEs (LEG.1/Circ.11 and MSC.1/Circ.1638, respectively), to identify priorities for further work to address MASS operations in a FAL Convention context.

Amending the FAL Convention

6.2 In line with the outcome of the second step of the FAL Convention RSE, amending or interpreting the FAL Convention has been identified as the most appropriate way to address the majority of barriers identified vis-à-vis MASS operations, more specifically on the information required on arrival and departure, a new kind of certification for remotely controlled operations, sharing of information, as well as arrangements and obligations concerning the solving of situations and pre-arrival information regarding persons rescued at sea, stowaways and/or refugees.

6.3 In contrast to the result of the MSC RSE, the development of a new instrument was identified only in relation to the more overarching issues identified in paragraph 5.21. These are issues that the FAL Convention shares with most other IMO instruments and should be addressed in liaison with other Committees.

Definitions and terminology

6.4 It was recognized that consideration of amendments to instruments, or development of a new instrument, requires agreement on the use of certain definitions and terminology, which requires policy decisions, as appropriate in liaison with other Committees.

6.5 One of the issues to be addressed was considered to be the re-evaluation of the degrees of autonomy, taking into account the lessons learned during the RSE. This work could include the development of a "MASS glossary" for all IMO instruments.

Non-mandatory provisions

6.6 It was recognized that the MASS operations are taking place already notwithstanding the progress of IMO instruments in addressing MASS operations on international voyages. The introduction of non-mandatory provisions could help facilitate the ongoing and continued operation and development of MASS. The development of such non-mandatory provisions could provide an opportunity to gather information and experience from the practical use of MASS also in the context of the FAL Convention. Such non-mandatory provisions could ultimately form a part of a mandatory instrument where appropriate.

Common gaps and themes

6.7 Along with the results of the RSE drawn from MSC and LEG, and as mentioned in paragraph 5.21, some common potential gaps and/or themes were regarded as high-priority issues that cut through several IMO instruments, including the FAL Convention, and might require a policy decision before addressing individual instruments such as the FAL Convention. Among those are, for instance:

.1 the role and responsibility of the master and crew;

.2 the role and responsibility of the remote operator;

.3 definitions/terminology of MASS; and

.4 sharing of information.

6.8 Both MSC and LEG have concluded that the role and responsibilities of the master and the remote operator are high-priority issues that must be addressed as foundation for any further work. Any discussion on the roles and responsibilities of the new actors emerged from the introduction of MASS-related new technology would rely on clear definition of the actors. Coordination across IMO instruments should be reached on the future use of terminology before beginning considerations on amending the Convention or developing a new instrument to accommodate MASS.

Proposals for new outputs

6.9 The need for justification in relation to any future proposals for changes in the regulatory framework was agreed and, consequently, it was recognized that any future work on MASS need to be approved following a proposal for a new output. Therefore, all activities described in this section require new outputs to be agreed by FAL.

Addressing MASS operations in IMO instruments under the remit of the Facilitation Committee

6.10 Considering the conclusions drawn from MSC 103 and LEG 108, FAL recognized that the complexity of MASS operations requires an efficient and systematic approach with a timeline for future work, and when addressing the high-priority issues identified in this section, liaison with other committees should be considered.

High-priority issues for addressing MASS operations in IMO instruments

6.11 Commencement of developing and establishing rules and regulations to address MASS operations may require certain issues of high priority, as set out in paragraphs 6.2 to 6.8, to be considered in order to determine what, how and when to address MASS operations and to provide a foundation for future work. This effort would benefit from the sharing of experience gained by early MASS operations.

6.12 A possible way forward in addressing MASS operations in IMO instruments including the FAL Convention is set out in table 1.

Issue	**Planned activities and result**
Consideration of how to approach MASS operations in IMO instruments including the FAL Convention	
Development of amendments to the FAL Convention/new instrument	Consideration on how to develop amendments to the Convention/new instrument
Definitions and terminology for MASS operations in the IMO regulatory framework	Consideration on need of supplementing definition and terminology, and if deemed necessary, agreeing on such, in liaison with other committees
High-priority common gaps and themes in relation to MASS operations and IMO's regulatory framework: - the role and responsibility of the master and crew; - the role and responsibility of the remote operator; - definitions/terminology of MASS; and - sharing of information.	Consideration of the high-priority common gaps and themes, where appropriate, in liaison with other committees
Development of non-mandatory instruments	Consideration on how to develop guidelines for MASS operations, in liaison with other Committees

Table 1: Addressing MASS operations in IMO instruments including the FAL Convention

7 REFERENCES TO THE MATERIAL PRODUCED BEFORE AND DURING THE FAL RSE

IMO documents

7.1 A list containing a reference to IMO documents published before and during the RSE is provided in appendix 2.

7.2 A list of all IMO documents related to the RSE conducted by MSC and LEG are set out in appendix 3 of the *Outcome of the regulatory scoping exercise for the use of MASS* by the Maritime Safety Committee for conventions under its purview (MSC.1/Circ.1638); and appendix 3 of the *Outcome of the regulatory scoping exercise and gap analysis of conventions emanating from the Legal Committee with respect to Maritime Autonomous Surface Ships (MASS)* by the Legal Committee for conventions under its purview (LEG.1/Circ.11), respectively.

MASS module of GISIS

7.3 The detailed analyses and all comments made by IMO Members, have been recorded in the MASS module of GISIS. This web platform is connected to the IMO web accounts, providing access to registered IMO Members only.

Appendix 1

Results of the regulatory scoping exercise at instrument level

The application of IMO instruments, as currently drafted, is divided in the following categories:

A applied to MASS and prevented MASS operations; or

B applied to MASS and did not prevent MASS operations and required no actions; or

C applied to MASS and did not prevent MASS operations but might need to be amended or clarified, and/or might contain gaps; or

D had no application to MASS operations.

The most appropriate way(s) of addressing MASS operations are categorized with the following four options:

I equivalence as provided for by the instruments or developing interpretations; and/or

II amending existing instruments; and/or

III developing a new instrument; or

IV none of the above as a result of the analysis.

Convention on Facilitation of International Maritime Traffic, 1965 (FAL Convention)

Degree of autonomy	The most appropriate way(s)	Reason for selecting the most appropriate way(s) of addressing MASS operations	Potential gaps/themes that require addressing
General	**IV**	Sections 5, 6 and 7 do not need any change.	In sections 5, 6 and 7, no gaps have been identified.
Degree One	**IV**	No need of changes in any section.	No gaps have been identified in any section.

Degree of autonomy	The most appropriate way(s)	Reason for selecting the most appropriate way(s) of addressing MASS operations	Potential gaps/themes that require addressing
Degree Two	**II or III**	The issue of the remote operator/master is an overriding issue that needs to be solved taking into account all instruments in coordination with all responsible committees, and amendment of the definition of the master would be needed.	Since there is the possibility that "master", "crew", "responsible person", etc. are not on board, the meanings of such personnel of the ship should be clarified.
	II	Documents required by Standard 2.1 and Recommended Practice 2.2.2, on arrival and for departure, might be in need of amendment if and when new certification for MASS is developed.	Certification for remote operated or unmanned MASS.
	II	The understanding of the position of the master in Standards 4.2, 4.3.2.1, 4.4.2, 4.6.1, Recommended Practice 4.6.2, and Standards 4.6.3, 4.8 and 4.15.3, having the command of ship is a part of a broader discussion when the master is not physically on board the vessel.	Identification of the master. Treatment of persons rescued at sea, stowaways and refugees.

Degree of autonomy	The most appropriate way(s)	Reason for selecting the most appropriate way(s) of addressing MASS operations	Potential gaps/themes that require addressing
Degrees Three and Four	**II or III**	The issue of the remote operator/master is an overriding issue that needs to be solved taking into account all instruments in coordination with all responsible committees, and amendment of the definition of the master would be needed.	Since there is the possibility that "master", "crew", "responsible person", etc. are not on board, the meanings of such personnel of the ship should be clarified.
	II	Documents required by Standard 2.1 and Recommended Practice 2.2.2, on arrival and for departure, might be in need of amendment if and when new certification for MASS is developed.	Certification for remote operated or unmanned MASS.
	I or II	The understanding of the position of the master in Standards 4.2, 4.3.2.1, 4.4.2, 4.6.1, Recommended Practice 4.6.2, Standards 4.6.3, 4.8 and 4.15.3, having the command of ship is a part of a broader discussion when the master is not physically on board the vessel. Ways of addressing this obligation in Standard 4.4.1 need to be clarified. Unmanned ships might not be provided with basic accommodation facilities. Standard 4.10.1 might need a prohibition of putting stowaways back on board an unmanned vessel for transport to subsequent ports. The Standard 4.8 needs an understanding that stowaways on board a vessel where no adequate provisioning, accommodation, proper medical attention and sanitary facilities are available, is considered a necessary reason to deviate from the planned voyage to seek disembarkation of the stowaway(s), in order to avoid that the stowaway remains on board for a significant period of time. Procedures regarding arrangements for thorough search, prevention, solving situations, asserting information regarding the stowaway pre-arrival and return or repatriation of stowaways should be addressed with appropriate guidelines. The Standards 4.3.2.3, 4.3.2.4 and 4.4.1 do not specifically put this obligation on the seafarers on board and the task may be sub-contracted to service providers on shore.	Identification of the master. Treatment of persons rescued at sea, stowaways and refugees.

Appendix 2

IMO documents related to the FAL RSE

FAL 44/14	Finland	Report on the results of the regulatory scoping exercise on the FAL Convention
FAL 44/14/1	Secretariat	Progress on regulatory scoping exercise and gap analysis by MSC and LEG
FAL 44/INF.5	Finland	Strategic themes in MASS perspective
FAL/ISWG/MASS 1/4	Secretariat	Report of the FAL Committee Intersessional Working Group on Maritime Autonomous Surface Ships (MASS) on its first session
FAL 46/14	Secretariat	Report of the Facilitation Committee on its forty-sixth session