



Updates on the developments of the IMO MASS Code

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IMO – REGULATORY SCOPING EXERCISE

MSC 98 (06/2017) agreed to include in its 2018-2019 biennial agenda the **Regulatory Scoping Exercise (RSE)** for the use of **Maritime Autonomous Surface Ships (MASS)**, with a target completion year of 2020.

MSC 99 (05/2018) defined **the aim and objective**, the **preliminary definition of MASS and degrees of autonomy**, the **list of mandatory instruments** to be considered and the **methodology for the exercise**

MSC 103 (05/2021) approved **the outcome of the RSE**, refer to MSC.1/Circ.1638 - June 2021.

LEG 108 (07/2021) completed the RSE for MASS, refer to LEG.1/Circ. 11 – December 2021.

**BV M&O fully involved
in all steps
with French Flag**



IMO – GOAL BASED MASS CODE

MSC 104 (10/2021) & LEG 109 (03/2022) & FAL 46 (05/2022) agreed to develop a **goal-based MASS code**.

- target completion years are now **mid 2026** (non mandatory) & **2032** (mandatory).

MSC 105 (04/2022)

- agreed to re-establish **MASS CG** focusing on the high priority items and **MASS Code drafting**
- agreed to establish a **joint WG MSC/FAL/LEG** to address **common gaps & themes** identified during the RSE by the 3 committees

MSC 106 (10/2022)

- focussed on the **methodology for the MASS Code development** considering the generic guidelines for developing IMO Goal-Based Standards MSC.1/Circ.1394/Rev.2
- identified the Member States and Observer Organizations **volunteers** in developing sections of the MASS code



IMO – MASS CODE – VOLUNTEERS

Section of the MASS Code	Volunteering State and/or organization	Lead State or organization
Part 2, Operational context	China, Russian Federation	Russian Federation
Part 2, Management of safe operations	Denmark, France , Germany, Sweden, BIMCO, IALA, IHMA, IMCA, WMU	Germany
Part 2, Connectivity	Brazil, China, France , Italy, Pakistan, Russian Federation, Spain, Sweden, Turkey, United Arab Emirates, CIRM, IALA, ICS, IHMA, ISO, ITF, WMU	China/Turkey
Part 2, Maintenance and repair	Australia, Canada, France , IHMA	Australia/Canada
Part 3, Safety of navigation	Bahamas, Brazil, China, CIRM, France , India, Italy, Japan, Liberia, Pakistan, Poland, Republic of Korea, Russian Federation, Saudi Arabia, Singapore, Spain, Turkey, United Arab Emirates, United States, GlobalMET, IALA, ICS, IHMA, IMPA, INTERTANKO, ISO, Nautical Institute, WMU, World Sailing	Japan
→ Lookout Function	Finland, Spain, EC	Finland/EC
Part 3, Remote operation	Bahamas, Brazil, China, CIRM, France , India, Italy, Japan, Liberia, Marshall Islands, Pakistan, Poland, Republic of Korea, Russian Federation, Saudi Arabia, Singapore, United Kingdom, United Arab Emirates, United States, GlobalMET, IHMA, IMCA, IMPA, INTERTANKO, ISO, ITF, Nautical Institute, WMU, World Sailing	United Kingdom
Part 3, Structure, subdivision, stability & watertight integrity	Poland, Sweden, EC, BIMCO	Volunteer Welcomed
→ Static Stability	EC, EMSA	EMSA/EC
Part 3, Fire protection, fire detection and fire extinction	Brazil, Marshall Islands, Norway, Spain, Sweden, United Kingdom, IACS	Norway
Part 3, Life-saving appliances and arrangements	Canada, France , Sweden, United States	Canada/United States
Part 3, Special measures to enhance maritime security	Republic of Korea, Liberia, Spain, IHMA, IMCA	Volunteer Welcomed
Part 3, Search and rescue	Spain, France , CIRM, ICS, IMCA	Spain
Part 3, Cargo handling	Sweden, Italy, BIMCO, IPTA, WSC	Sweden
Part 3, Personnel safety & comfort	France , Philippines, Poland, Sweden, United Kingdom, GlobalMET, ITF, Nautical Institute,	ITF
Part 3, Towing and mooring	Canada, Italy, IHMA, IMPA	Canada
Part 3, Machinery installations	Australia, Canada, Italy, Norway, Sweden, United States, ITF	United States
Part 3, Electrical installations	Australia, Canada, Norway, Sweden, United States, ITF	United States
Part 3, Emergency response	Denmark, France , Germany, Marshall Islands, Republic of Korea, Sweden, IALA, IHMA	Republic of Korea

IMO – MSC-LEG-FAL MASS JWG

MASS-JWG 2nd session (04/2023) – Report MSC 107/5/1 began to address the common identified by the three Committees issues (based on MSC.1/Circ.1638, LEG.1/Circ.11 and FAL.5/Circ.49)

The role and responsibilities of the **master of a MASS**:

- There should be a **human master responsible for a MASS**, regardless of mode of operation or degree or level of autonomy. Such master **may not need to be on board**, depending on the technology used in the MASS and human presence on board, if any.
- Regardless of mode of operation or degree or level of autonomy, the master of a MASS should have the **means to intervene** when necessary.
- A master may be **responsible for multiple MASS at the same time**, under certain conditions (*)
- **Several masters may also be responsible for a MASS on a single voyage**, under certain conditions (*) and a single master must be responsible at any given time.

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

- 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.

() which need to be further considered by the appropriate Committee/s.*



IMO – MSC-LEG-FAL MASS JWG

MASS-JWG 2nd session (04/2023) – Report MSC 107/5/1 began to address the common identified by the three Committees issues (based on MSC.1/Circ.1638, LEG.1/Circ.11 and FAL.5/Circ.49)

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

- **"Remote Operations Centre"** means a location remote from the MASS that can operate some or all aspects of the functions of the MASS.
- **One or more Remote Operations Centres may be responsible for a MASS on a single voyage**, under certain conditions (*). Only a single ROC must be responsible for a MASS at any one time.
- A person (a master) at a Remote Operations Centre **may be responsible for multiple MASS at the same time**, under certain conditions (*).

The role and responsibilities of the **Remote Operator**:

- **"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.

() which need to be further considered by the appropriate Committee/s.*



IMO – MSC107 MASS WORKING GROUP



MASS-WG (06/2023) – Report MSC 107-WP.9

- The Group agreed, as a general principle, that **no specific risk assessment methodology should be recommended** to be used in the MASS Code, so as to ensure that Administrations, ships designers and ship operators retain the flexibility to choose the methodology best suited for MASS, which would depend on a number of factors.
- The Group agreed that **principles and standards for software design and reliability** had been developed in other industries and the Organization should take existing standards into account, for application in the context of MASS.
- The Group agreed to use the **Guidance for Reviewing part 3 sections** of the MASS Code, which it had developed, taking into account the GBS experts' advice.
- The Group agreed that there was **no need to amend the COLREGs** and that Convention can be applied in full to any MASS but that the MASS Code needed to address how COLREGs need to be applied to MASS.



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IMO – MSC107 MASS WORKING GROUP

MASS-WG (06/2023) – Report MSC 107-WP.9

- The Group agreed to the following critical working terms:
 - **Operational Envelope (OE)**: The operational envelope should provide ship's operational capabilities and limitations and ship-specific capabilities and limitations.
 - **Concept of Operation (ConOps)**: Concept of Operation (ConOps) means a document describing the characteristics of a proposed system. The ConOps would be part of the certification as MASS. The ConOps must consider the operational envelope, technical designs of the MASS and ROC, communication lines, and the integration of humans as well as the design and organization of the ROC including how it is to be operated.
 - **Modes of operation**: Modes of operation means the conditions under which the functions of a MASS are controlled, i.e. remote-control or autonomous with or without persons on board.



IMO – MSC108 MASS WORKING GROUP

MASS-WG (05/2024) – Report MSC 108-WP.7

- Scope of application: The WG agreed that the Code **applies to cargo ships** to which SOLAS chapter I applied, **except for cargo high speed craft and ships owned or operated by a Government, including warships**.
- Certificate and survey: The WG agreed that **SOLAS certificates would be the basis of MASS compliance** and that a **MASS certificate** would have to **list all the exemptions**, as stipulated in the MASS Code, for the relevant functions and equipment.
- Safety management certification: The WG agreed that responsibility for the safe operation of MASS remained with the ISM Company. However, **the “ROM” concept** (= establishment of an oversight mechanism for MASS and associated ROC(s) by establishing **Remote Operation Management**) should be retained as a complementary alternative ISM Code scheme of certification for the safe operation management of the ROC.
- Role of the master: The WG agreed that **when there is someone else on board, the master needed to be on board** to ensure the safety of the persons on board and to exercise the master's overriding authority.



IMO – MSC110 MASS WORKING GROUP

MASS-WG (06/2025) – Report MSC 110-WP.8

- Chapters 1 to 3, 6, 11, 14, 16 to 17bis, 19, 21, 22 to 26 finalized.
- Chapters 4, 5, 8 to 10 subject to subsequent consideration in conjunction with chapter 15 (human element).
- Revised road map: The WG confirmed the following updated road map :
 - the finalization and adoption of the non-mandatory MASS Code is planned for **May 2026 (MSC 111)** and will be followed by an experience-building phase;
 - the earliest possible adoption of the mandatory Code will be July 2030 for **entry into force in January 2032.**



IMO – MSC110 MASS WORKING GROUP

MASS-ISWG4 (10/2025) – Report MSC/ISWG/MASS 4/WP.1

- Chapter 15 finalized (Manning, Training and Watchkeeping).
 - Other human element matters finalized (within Chapters 5, 8, 9, 10 and Annex 2).
 - Linkage between remote operator and application of STCW to be further considered at MSC 111 as appropriate.
- Three-step approach agreed:**
- immediate measure: finalization of the non-mandatory Code with high level training provisions in Ch15;
 - interim measure: after finalization of the non-mandatory Code, establishment of guidance for the training, certification and watchkeeping of persons involved in MASS operations; and
 - final measure: setting out of standards for the training, certification and watchkeeping of persons involved in MASS operations in an appropriate instrument.
- The group agrees that the ROC may be considered by the Administration as a **directly associated location** to the navigational bridge or part of the machinery space.



IMO – MASS CODE

- PREAMBLE

- PART 1 – INTRODUCTION

Ch.01 Purpose, principles and objectives

Ch.02 Application

Ch.03 Code structure

Ch.04 Terminology and definitions

PART 2 - MAIN PRINCIPLES FOR MASS AND MASS FUNCTIONS [AND REMOTE OPERATIONS]

Ch.05 Surveys and certification

Ch.06 Approval process

Ch.07 Risk assessment

Ch.08 Operational context

Ch.09 System design

Ch.10 Software principles

Ch.11 Management of safe operations (GBS style)

Ch.12 Connectivity

Ch.13 Radiocommunications

Ch.14 Alert management (GBS style)

Ch.15 Human element

Ch.16 Maintenance

PART 3 - GOALS, FUNCTIONAL REQUIREMENTS AND EXPECTED PERFORMANCE

Ch.17 Safety of navigation

Ch.17bis Connectivity (no GBS style)

Ch.18 Remote operations

Ch.19 Structure, subdivision, stability and watertight integrity

Ch.20 Fire protection, fire detection and fire extinction

Ch.21 Life-saving appliances and arrangements

Ch.22 Special measures to enhance maritime security

Ch.23 Search and rescue

Ch.24 Carriage of cargoes

Ch.xx Personnel safety and comfort

Ch.25 Anchoring, towing and mooring

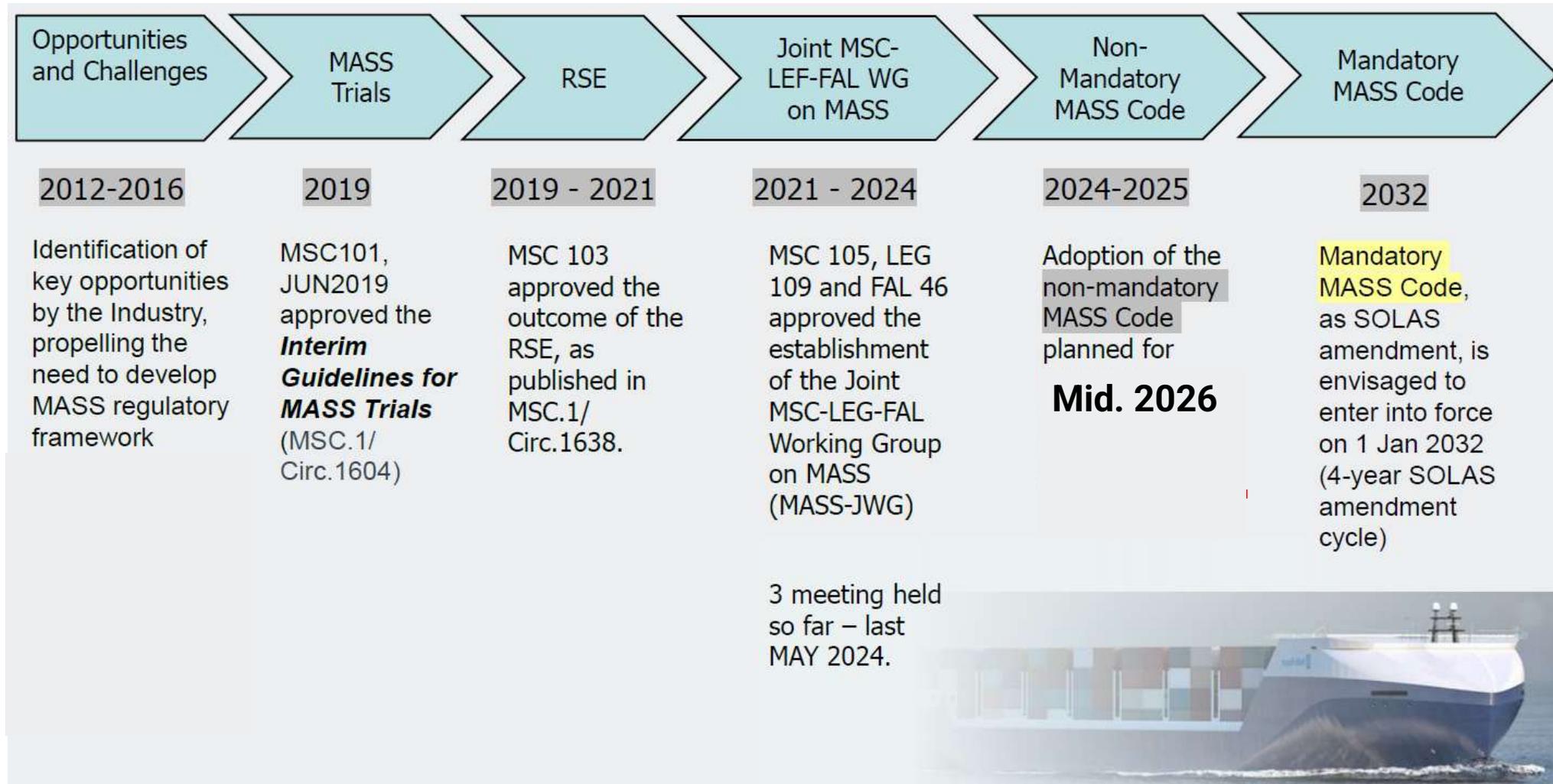
Ch.26 Machinery and electrical installations

Ch.27 Electrical installations

Ch.28 Emergency response



IMO – REGULATORY DEVELOPMENT TIMELINE



OTHER REGULATORS WORKING GROUPS

IACS – DEFINITION OF HIGH LEVEL IACS POSITION ON MASS

BV M&O involved in IACS Safe Digital Transformation Panel (SDTP)



ISO – TERMINOLOGY RELATED TO AUTONOMOUS SHIP SYSTEMS

BV M&O involved in ISO/DTS 23860 and other TC8 / SC26 standards development



INSA – NAVAL BOAT CODE REVIEW

Participation in the working group on Unmanned Systems



REGIONAL AGREEMENT



DANISH MARITIME AUTHORITY



MEMORANDUM OF UNDERSTANDING (MOU) BELGIUM, DENMARK, NETHERLANDS, NORWAY, UK (04/2024) + FRANCE & GERMANY (2025)

The Department for Transport and Maritime and Coastguard Agency of the United Kingdom of Great Britain and Northern Ireland, the Kingdom of Belgium, the Ministry of Infrastructure and Water Management of the Netherlands and the Danish Maritime Authority have signed a "Memorandum of Understanding" (MoU), with the aim to **enhance collaboration on facilitating the increased use of novel digital technologies and autonomous systems on board ships.**

With this MoU, the signed nations have agreed to share knowledge regarding ongoing activities, and efforts are made to involve other North Sea countries.

<https://mobiliteit.belgium.be/en/publications/memorandum-understanding>

<https://dma.dk/news-archive/2023/september/the-danish-maritime-authority-enters-a-new-north-sea-cooperation-on-promotion-of-digital-technologies-and-autonomous-systems-on-board-ships>



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EU OPERATIONAL GUIDELINES ON TRIALS OF MASS Version 1 - 10/2020

The aim of these Operational Guidelines is to **provide assistance & guidance for relevant Administrations and the Applicant(s)** that want to **perform tests/trials on MASS systems** (at full or reduced geometrical scale of the ship) in a safe, secure and environmentally friendly manner, also when conducted within specified monitoring areas such as VTS areas and SRS operational areas.

https://transport.ec.europa.eu/transport-modes/maritime/maritime-autonomous-ships-and-shipping_en

EU OPERATIONAL GUIDELINES FOR TRIALS OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)	
EU OPERATIONAL GUIDELINES FOR SAFE, SECURE AND SUSTAINABLE TRIALS OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)	
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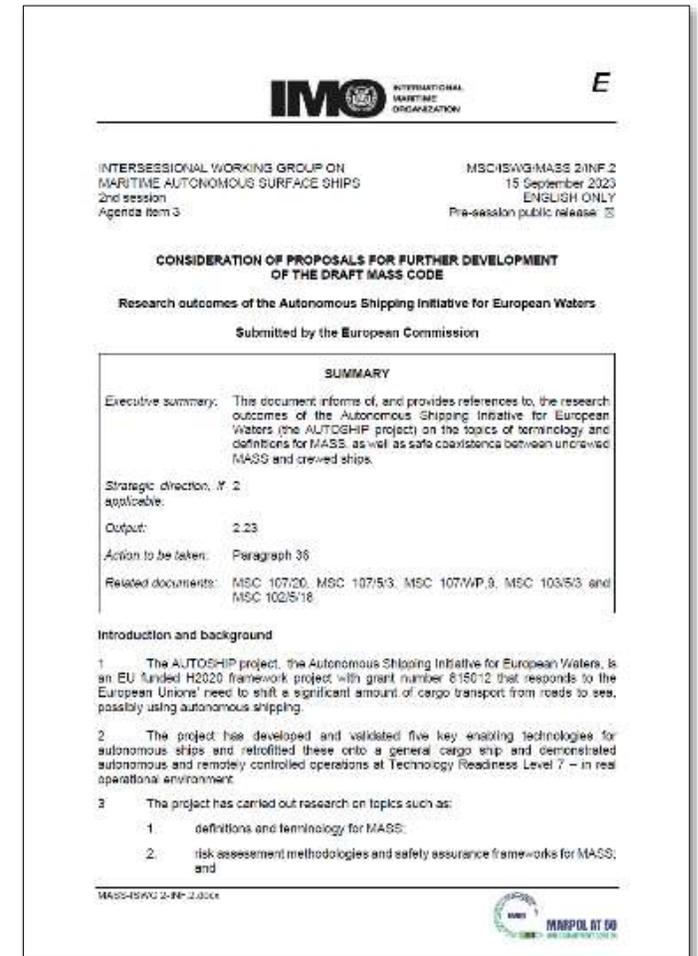


RESEARCH OUTCOMES OF THE AUTONOMOUS SHIPPING INITIATIVE FOR EUROPEAN WATERS

MSC/ISWG/MASS 2/INF.2 – 09/2023

This document informs of, and provides references to, the **research outcomes** of the Autonomous Shipping Initiative for European Waters (the **AUTOSHIP project**) on the topics of **terminology and definitions for MASS**, as well as safe coexistence between uncrewed MASS and crewed ships.

**BV M&O fully involved
in the IMO input paper submission
with the European Commission**





Thank you



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