

# **Maritime Autonomous Surface Ships (MASS) and Shipping**

## **: Focusing on the Current development at the IMO**

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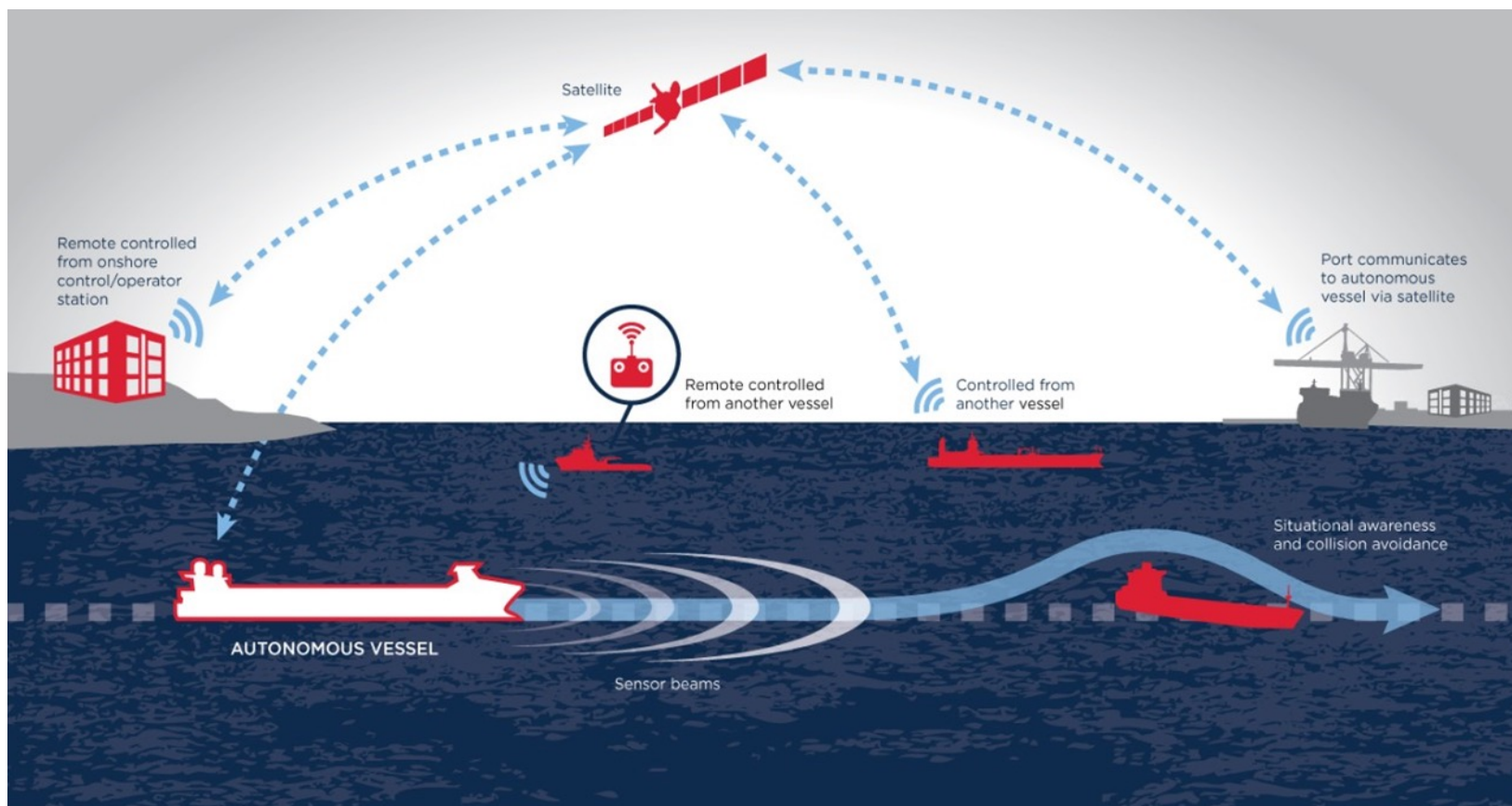
## 1. Definition

MASS can be defined as “ship[s] which, to a varying degree, can operate independently of human interaction”.

Only covers commercial ships. – Not apply to warships, to ‘autonomous surface vehicles’ or ‘autonomous underwater vehicles’.

## 2. Four 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***



# 3. INTERNATIONAL MARITIME ORGANIZATION (IMO) AND MASS

In **2017**, MSC agreed to include the issues of MASS on its agenda.

## 1) In **2021**, IMO **completed a regulatory scoping exercise on MASS**

⇒ Assess how existing IMO instruments apply to ships with varying degrees of automation.

Maritime Safety  
Committee

MSC.1/Cir.1638

(3 June 2021)

Legal  
Committee

LEG.1/Circ.11

(15 Dec 2021)

Facilitation  
Committee

FAL46/14

(3 Nov 2021)

⇒ The Marine Environment Protection Committee (MEPC) has yet to consider the impact of MASS on the IMO conventions under its purview.

**Instrument: SOLAS chapter IV – Radiocommunications**

Degree of autonomy	The most appropriate way(s) of addressing MASS operations (I, II, III, IV)	Reason for selecting the most appropriate way(s) of addressing MASS operations	Potential gaps/themes that require addressing
Degree One	II	Potential gaps may be addressed by amending existing instrument, possibly as they are introduced.	<ul style="list-style-type: none"> <li>• New terms and definitions</li> <li>• New requirements for automated processes and decision support system</li> </ul>
Degree Two	II, III	<p>Since remotely controlled operations have not been a part of this instrument, <i>developing a new instrument</i> would be the most appropriate way to address the requirements for remote control centres.</p> <p>In addition, necessity for new requirements and frequencies could be addressed by developing new instrument as well.</p>	<ul style="list-style-type: none"> <li>• New terms and definitions</li> <li>• Requirements for remote control stations' technical issues</li> <li>• Functional and maintenance requirements</li> </ul>
Degree Three	III	<p>Since remotely controlled operations have not been a part of this instrument, <i>developing a new instrument</i> would be the most appropriate way to address the requirements for remote control centres.</p> <p>In addition, necessity for new requirements and frequencies could be addressed by developing a new instrument as well.</p>	<ul style="list-style-type: none"> <li>• New terms and definitions</li> <li>• Requirements for remote control stations' technical issues</li> <li>• Functional and maintenance requirements</li> <li>• Radio watch requirements and radio personnel</li> <li>• Distress, safety and urgency calls and related requirements</li> </ul>
Degree Four	III	Since fully autonomous ships with most probably having main control centre ashore have not been foreseen in this instrument, <i>developing new instrument</i> would be the most appropriate way to	<ul style="list-style-type: none"> <li>• New terms and definitions</li> <li>• Requirements for main control stations' technical issues</li> <li>• Functional and maintenance requirements</li> <li>• Radio watch requirements and radio personnel</li> </ul>

## 2) In **2019**, MSC 101: **Interim Guidelines for MASS Trials**

- “at least the same degree of safety, security and protection of the environment as provided by the relevant instruments”.
- The scope of application of mandatory instruments should be determined by the flag State, taking into account several factors.

## 3) In **2021**, MSC 104: commenced work on **the development of a goal-based instrument** regulating the operation of MASS.

- The best way to address MASS in the IMO regulatory framework
- The ultimate goal would be the preparation of a mandatory instrument to address MASS operations.

#### 4) In **2022**, MSC 105:

- **Road map for developing a goal-based Code for MASS**

- a non-mandatory Code is to be adopted in 2024 while a mandatory MASS Code is to be developed in 2025, for entry into force on 1 January 2028.

- **The establishment of a MASS Correspondence Group**

To develop a non-mandatory MASS Code for cargo ships, with a view to considering the application to passenger ships.

- **The establishment of a Joint MSC/LEG/FAL working group**

Common high-priority issues identified across MSC, LEG and FAL instruments:

- The role and responsibility of **the master and crew**;
- The role and responsibility of **the remote operator**;
- Definitions/terminology of MASS; and
- Certificates and other documents.

## 4. EVALUATION

- **Can we solve all the issues relating to MASS by adopting a new mandatory MASS code or by revising the IMO instruments?**
- UNCLOS is a framework convention that was intended to be updated by IMO instruments.
- 1982 UNCLOS provides a legal framework for jurisdictions and obligations of flag States, coastal States, and port States.
- MASS should be operated within the UNCLOS legal framework and several practical and interpretive issues should be discussed at the IMO.
- The high-priority common potential gaps are closely linked to provisions in UNCLOS, in particular enforcement jurisdictional issues.



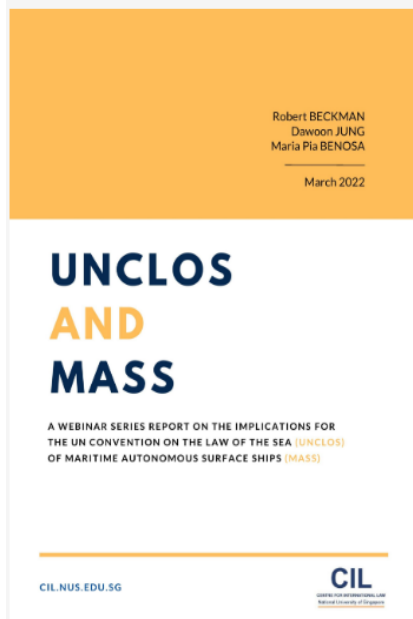
## 5. CONCLUSION

1. In developing a MASS code, there is a need to consider UNCLOS as an overarching legal framework.

“While the United Nations Convention on the Law of the Sea (UNCLOS) was not considered as part of the LEG RSE, as it is not an IMO convention, MASS will need to operate within the legal framework set out in UNCLOS. As a result, UNCLOS will need to be considered in IMO's future work on MASS, particularly if IMO develops an instrument regulating MASS operations.”  
(LEG.1/Circ.11)(15 December 2021)

2. a Joint MSC/LEG/FAL working group agreed on organizing a seminar on legal issues, **including UNCLOS**, to be considered for the development of a MASS Code and MASS-related measures. (MSC 106/5)(13 November 2022), para.12.

[HTTPS://CIL.NUS.EDU.SG/PUBLICATION/UNCLOS-AND-MASS/](https://cil.nus.edu.sg/publication/unclos-and-mass/)



## UNCLOS and MASS

categories: [Event Reports](#)

The Ocean Law and Policy team of the Centre for International Law (CIL) organized a series of three webinars in late 2021 and early 2022 to address the impact of MASS on the 1982 UN Convention on the Law of the Sea (UNCLOS). These webinars were part of CIL's broader research project into MASS and UNCLOS under the Maritime Port Authority (MPA)-CIL Oceans Governance Research Programme funded by the Singapore Maritime Institute. The objective of this Report is to set out the background for CIL's research on MASS as well as summarize the key issues discussed during the webinars. The Report will first address (1) the background to CIL's Research Project on MASS including IMO's consideration of MASS (2017–2021) and the implications of MASS on UNCLOS and will then (2) summarize the key issues that were discussed during the three webinars.

Click to view the webinars

- [MASS and the Marine Environment](#)
- [MASS and Flag States: The nexus between UNCLOS and the IMO Conventions](#)
- [MASS, Maritime Law Enforcement and Maritime Security](#)

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