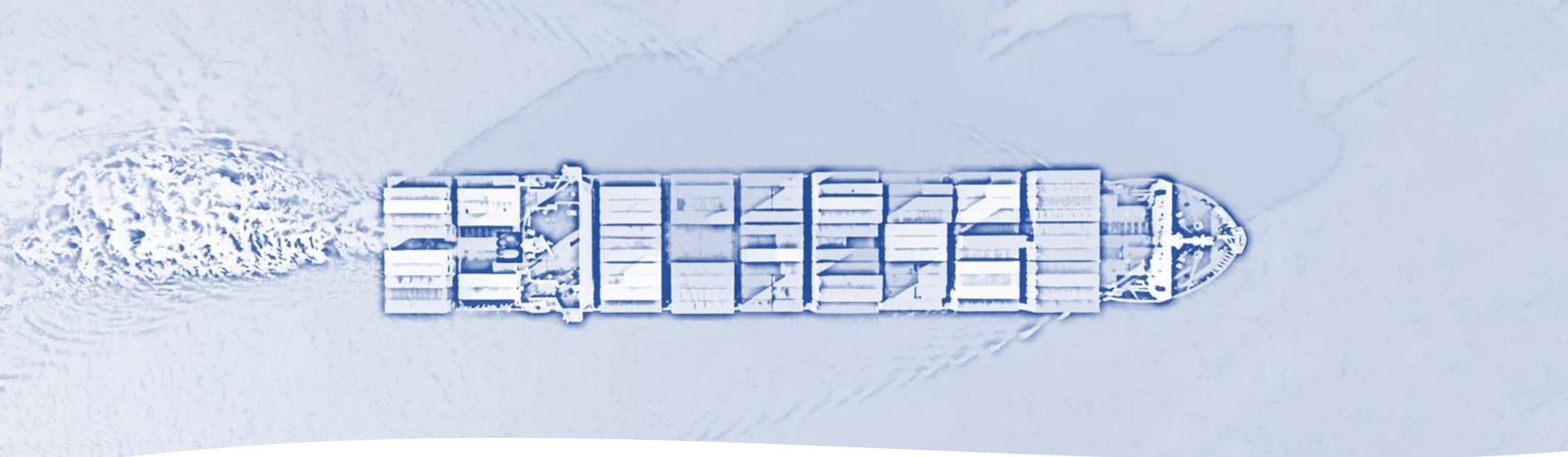




Remotely operated and autonomous ships:  
*New issues for the law of the sea?*

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# 1. Introduction

- Technology has always been a principal driver of the law of the sea:
  - *Law of the sea* (e.g., cannon shot rule/TS; submarines/ transit passage; oil and gas drilling/continental shelf; scientific research technologies/MSR; etc.).
  - *Generally accepted rules and standards (GAIRAS) for shipping* (e.g., steel hulls, steam engine, bulkers, tankers, refrigeration, containerization, polar class, etc.)
- What does MASS mean for the United Nations Convention on the Law of the Sea, 1982 (LOSC)?
  - LOSC was intended to address ‘all issues relating to the law of the sea’ [preamble]: context and purpose for interpretation.
  - LOSC was intended to address international navigation and shipping.
  - What might be the law of the sea consequences of MASS, given the emerging characteristics of this technology and the LOSC assumption of humans crewing ships?



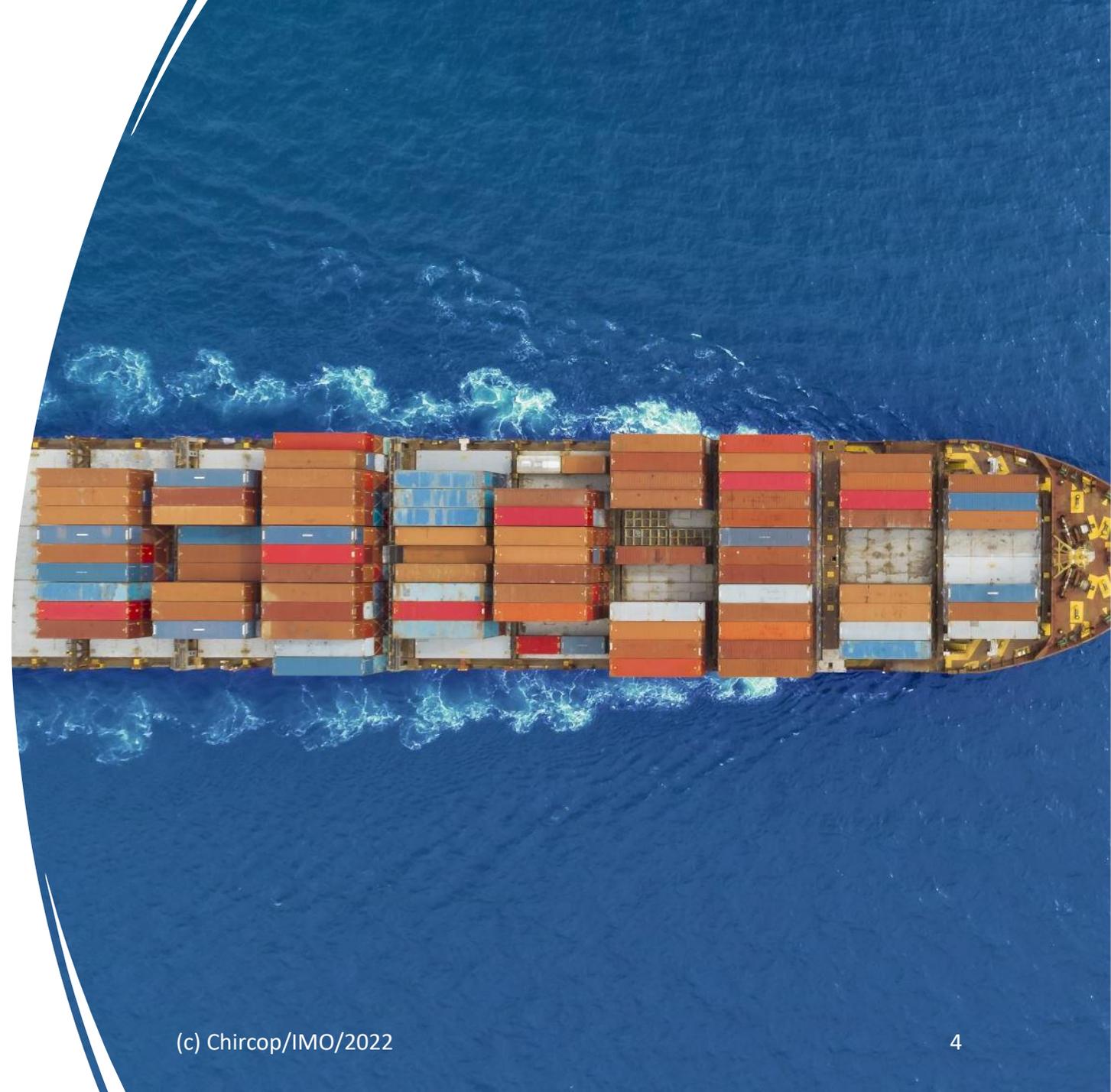
# Degrees of autonomy (IMO, 2018)

1. Ship with automated processes and decision support: Seafarers are on board to operate and control shipboard systems and functions. Some operations may be automated.
2. Remotely controlled ship with seafarers on board: The ship is controlled and operated from another location, but seafarers are on board.
3. Remotely controlled ship without seafarers on board: The ship is controlled and operated from another location.
4. Fully autonomous ship: The operating system of the ship is able to make decisions and determine actions by itself.

# 3. Law of the sea considerations

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- Definition of ship:
  - 'Ship' and 'vessel' are not defined in LOSC.
  - MASS as 'ship' or 'vessel' is not likely a legal issue.
  - Reliance on definitions in generally accepted international rules and standards (GAIRAS) adopted by IMO under LOSC is sufficient.
- Jurisdictional questions?
  - Flag State: jurisdictional responsibilities.
  - Coastal State: navigational rights and regulation of passage.
  - Port State: port entry and PSC inspections.



# Flag State

Right to register any class of ship (91).

Registered ships enjoy navigation rights irrespective of class (90).

Flag State enjoys a mixture of exclusive/primary and concurrent jurisdiction over its ships depending on their location.

Flag State has a due diligence duty to exercise effective jurisdiction and control (administrative, technical, social matters) (94; *SRFC Adv Op*).

## Flag State due diligence responsibilities (Arts 94, 98, 211, 217, etc.)

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To assume jurisdiction over its ships and take measures 'as are necessary' to ensure safety at sea [94(2)(b); 94(3)].

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To ensure ships are in the charge of properly qualified master and officers [94(4)(b)].

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To ensure ships are crewed in accordance with their class [94(3)(b); 94(4)(b)].

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To ensure the master and crew are conversant/required to comply with international safety, collisions avoidance, pollution prevention, radio communications rules [94(4)(c)].

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To ensure conformity with generally accepted international regulations, procedures and practices and take steps to secure their observance [94(5)].

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To require master to offer assistance to persons in distress at sea [98].

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To ensure compliance with international rules and standards and provide for effective enforcement, including to prevent operation of ships not in compliance with manning requirements [211; 217].

# Interpretational issues

Documents and navigational equipment on board [94(4)(a)]:  
'as are appropriate'

Manning requirement [94(4)(b)]: is 'in the charge of' limited to an onboard crew or could this be constructively interpreted to include a shore-based team?

Qualification requirements [94(4)(b),(c)]: do these extend to shore-based personnel?

Crewed according to ship's class [94(4)(b)]: includes temporary crews? Shore based team?

Radio communications/ reporting on board [94(4)(c)]: would a shore based-crew be able to discharge this requirement?

Provision of assistance at sea [98]: can a crewless vessel discharge this duty?

Flag State jurisdiction over master and crew [94(1)]: how can it be exercised when the vessel is fully autonomous or remotely controlled from another jurisdiction?

# Coastal State



- Coastal State enjoys sovereignty over its internal waters (e.g. ports).
- Coastal State sovereignty over the territorial sea is subject to the regime of innocent passage regulation ([21].
  - Must not apply 'design, construction, manning or equipment [standards] unless they are giving effect to generally accepted international rules or standards.'
  - Until the IMO regulates MASS, can the coastal State require the crew to be on board, e.g., in heavy traffic areas?
  - Arts. 41-42 (straits): coastal State likely cannot impose a manning requirement. Safety regulation focuses on sea lanes and TSS. Non-discrimination.

## Port State

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- Potential PSC inspection issues (e.g., 218)
  - Boarding.
  - Can inspection of MASS vessel/equipment be extended to other onshore equipment, processes, etc.? Who should the inspector interview?
  - Communication of findings to person responsible for the vessel.

## 4. Conclusion

- LOSC should be regarded as a living instrument whose context and purpose are responsive to new technologies.
- Importance of contextual, pragmatic and functional interpretation of LOSC.
- IMO is the competent organization for the development of GAIRAS under LOSC.
- LOSC rules on shipping are nourished by GAIRAS: MASS is not an exception.
- GAIRAS already play an important role in LOSC interpretation and will continue to do so with MASS.
- MASS issues can be likely addressed through GAIRAS.

