

Digitalization and Maritime Autonomous Surface Ships (MASS)



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INTERNATIONAL, NATIONAL REGULATION

AGENDA

1. Introduction
2. Autonomous ships in the world...Why?
3. Cost-benefit
4. Implication for international maritime law



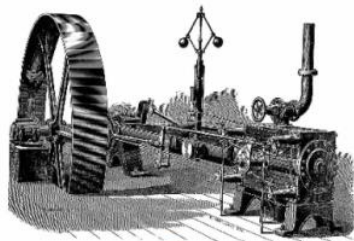
1. Introduction

- **IMO Maritime Safety Committee's 99th session (May 2018) undertook first consideration of a scoping exercise for MASS (target 2020)**



- **Are MASS a potential game-changer in shipping, and if so, in what respect?**

The fourth shipping revolution is on



1800



1. Mechanized
Power



1900



2. Mass
Production



1970



3. Computerized
Control

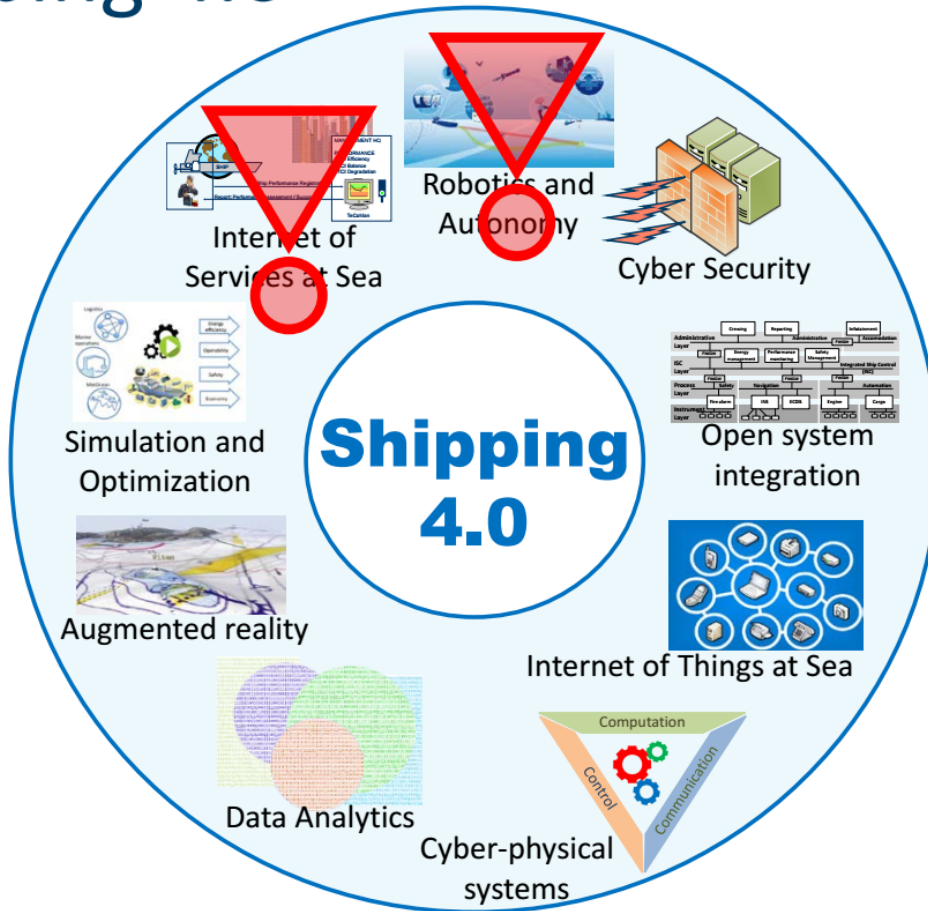


2010



4. Shipping 4.0

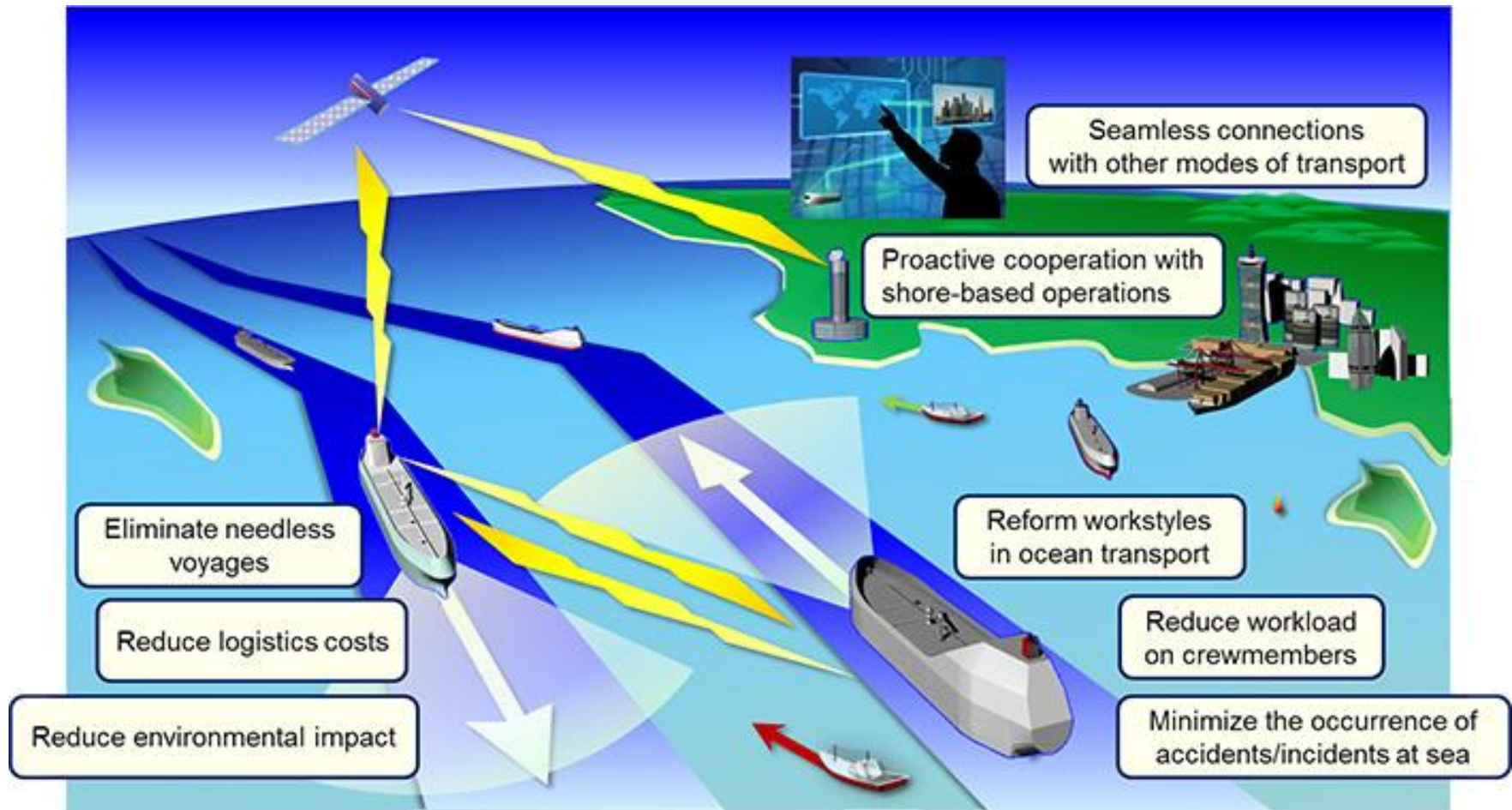
Shipping 4.0



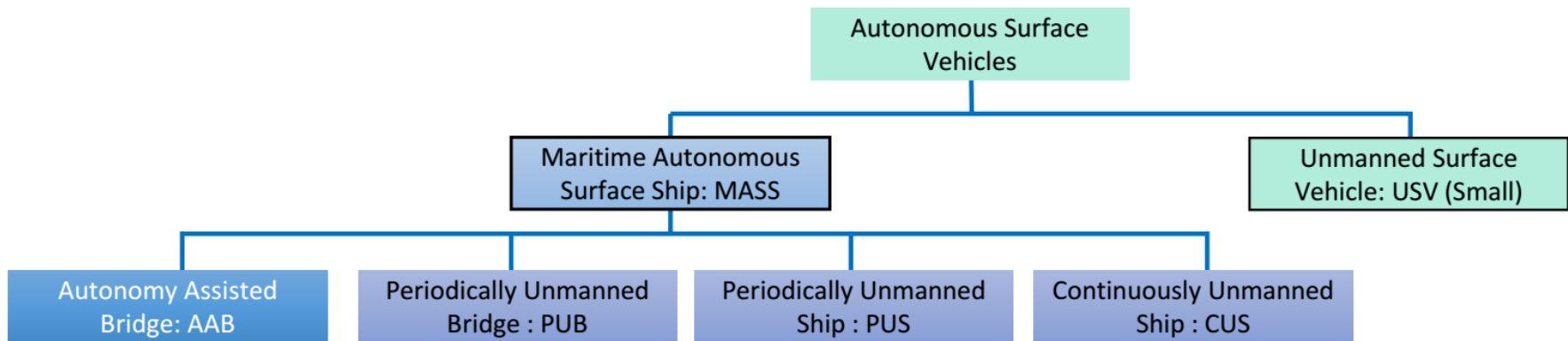
Possible **game changers** in Shipping 4.0:

- Digitalization of commercial shipping processes
- Autonomous and unmanned ships

2. Autonomous ships in the world...Why?

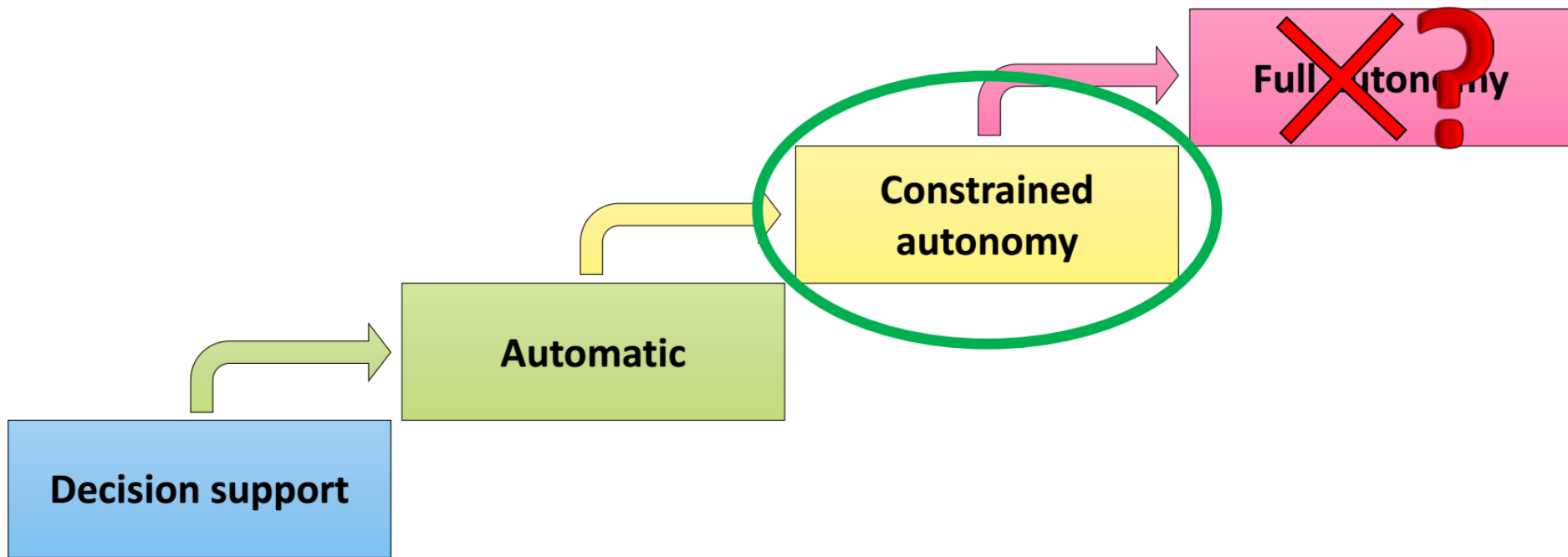


Types of autonomous ships – manning levels

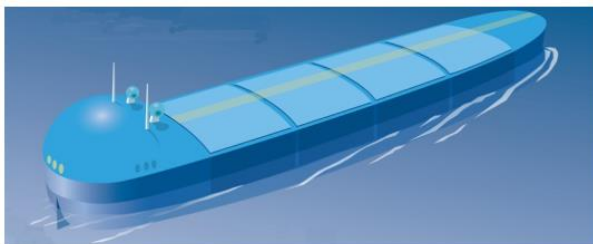


Ship type	Always on Bridge	Available on Ship	Never on Bridge
AAB	x		
PUB		x	
PUS			x
CUS			x

Operational autonomy levels



Completely unmanned gives largest benefits!



No accommodation
Less power
More cargo



No crew
No crew related costs

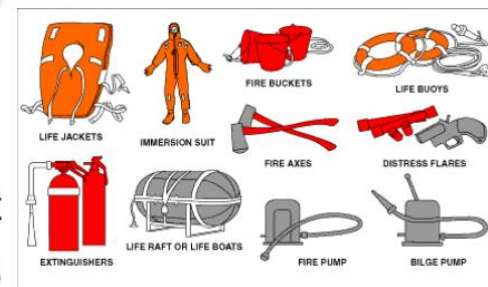


NCE Maritime Clean Tech & NCL

Enables completely new
ship concepts



No safety equipment
New constructions



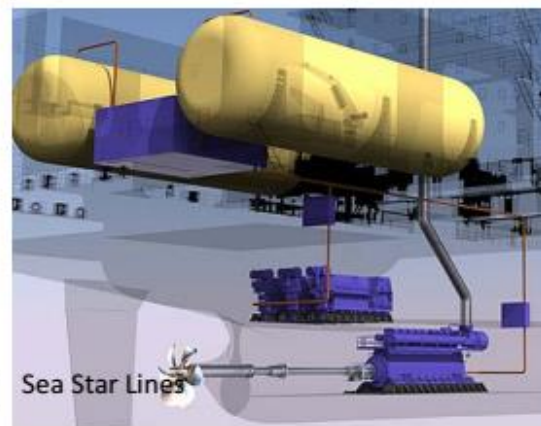
No maintenance on board



Redundancy

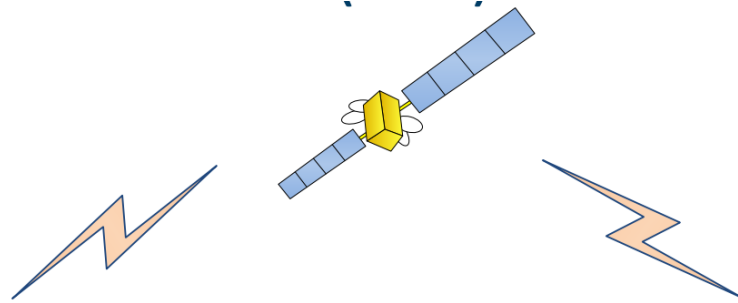


Minimize systems onboard

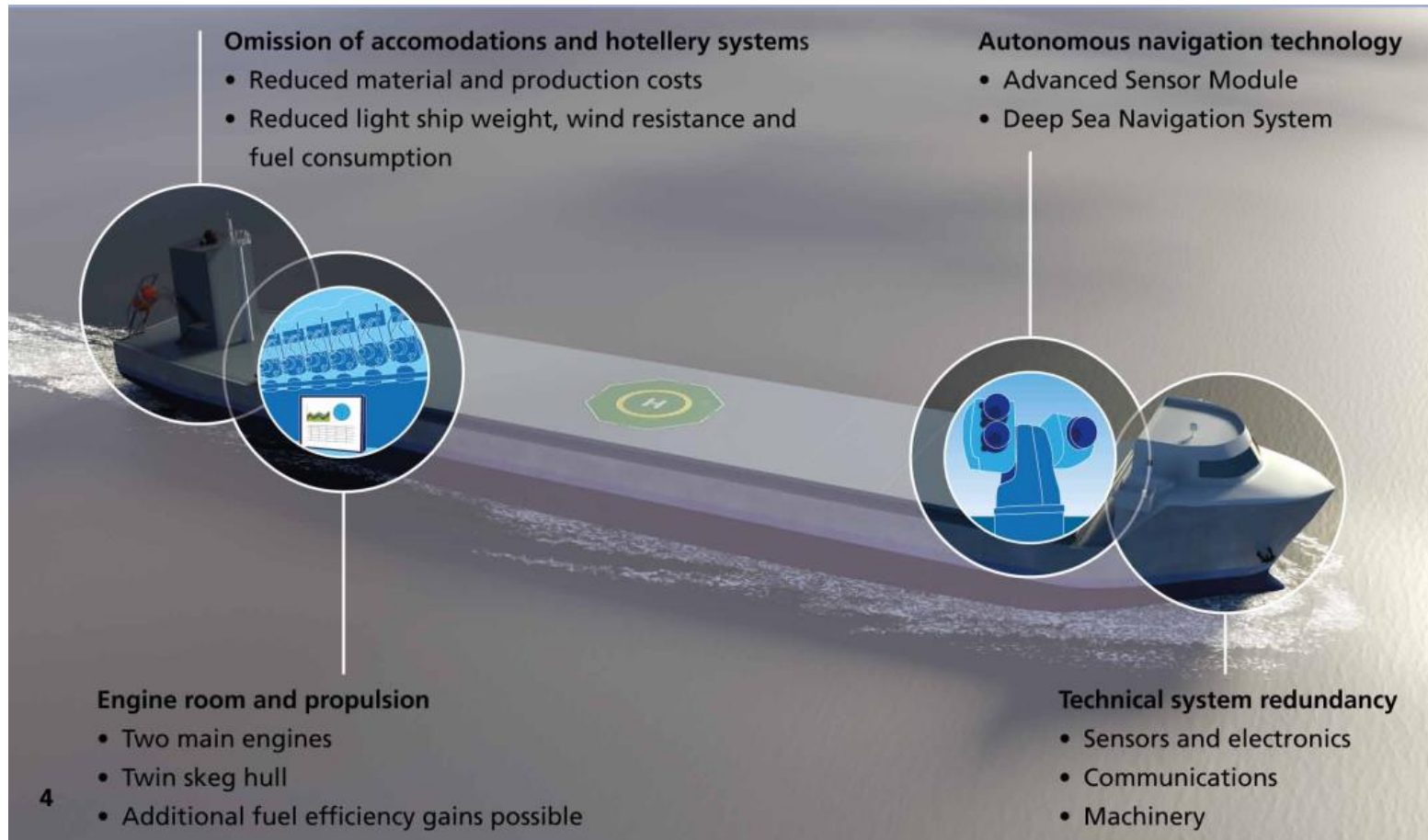


No heavy fuel oil

A shore Control Centre (SCC) is normally needed



Why not unmanned ships?



3. Cost-benefit

- No hotel
- No crew
- Improved efficiency
- Less off-hire
- New business model



- Dual propulsion, no HFO
- Shore Control Centre
- Longer dockings
- Costlier instruments
- Existing business model

Legal and liability issues



- UNCLOS
- SOLAS



- Contracts

Easier to do this in national waters.

- Insurance
- Liability



4. Implications for International Maritime law

- Maritime conventions are largely premised on a human presence on board (design of ship as a safe work space, control of the navigation of the ship, provision of notices, log book entries, reporting, pilotage services, responding to distress)

Maritime Safety

- Operations (SOLAS)
- Design, construction, equipping (SOLAS, Load Lines Convention)

Crew training, certification and work conditions (STCW)

- Expectation
- Sufficient manning
- Flexibility
- Watch requirement
- Redundancies



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Rules of the road (COLREGS)

Environment protection

Maritime security



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MARITIME SAFETY COMMITTEE
100th session
Agenda item 5

MSC 100/5/X
28 September 2018
Original: ENGLISH

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

Report of the Correspondence Group

Submitted by Finland

SUMMARY

Executive summary: This document reports on the outcome ~~of the~~ of the Correspondence Group on ~~a regulatory scoping exercise for the use of~~ Maritime Autonomous Surface Ships (MASS) established at MSC 99

Strategic direction: 2

Output: 2.7

Action to be taken: Paragraph **8**

Related documents: MSC 99/22, MSC 99/WP.9;

Introduction



ITALIAN COAST GUARD HEADQUARTERS



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Appendix 1

Template for the regulatory scoping exercise

Instrument: [Name of instrument]

Provision	First step				Second step	
	Degree of autonomy	MASS application (.A, .B, .C, D)	Clarify, Amend or Gap (For option C only)	Comments/Remarks (explain analysis conducted in determining "MASS application)	Possible The most appropriate way of addressing MASS operations (.I, .II, .III, .IV)	Comments/Remarks (taking into account, inter alia, human element, technology and operational factors)
	.1					
	.2					
	.3					
	.4					
	.1					
	.2					
	.3					
	.4					

References:

Degrees of autonomy:

- .1 Ship with automated processes and decision support
- .2 Remotely controlled ship with seafarers on board
- .3 Remotely controlled ship without seafarers on board
- .4 Fully autonomous ship

MASS application:

- .1 A apply to MASS and ~~preclude~~ prevent MASS operations; or
- .2 B apply to MASS and do not ~~preclude~~ prevent MASS operations and require no actions; or
- .3 C apply to MASS and do not ~~preclude~~ 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.

The most appropriate way of addressing MASS operations:

- .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

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