

# North Atlantic Coast Guard Forum Summit 2023 – The regulatory aspects of Remote and Autonomous solutions

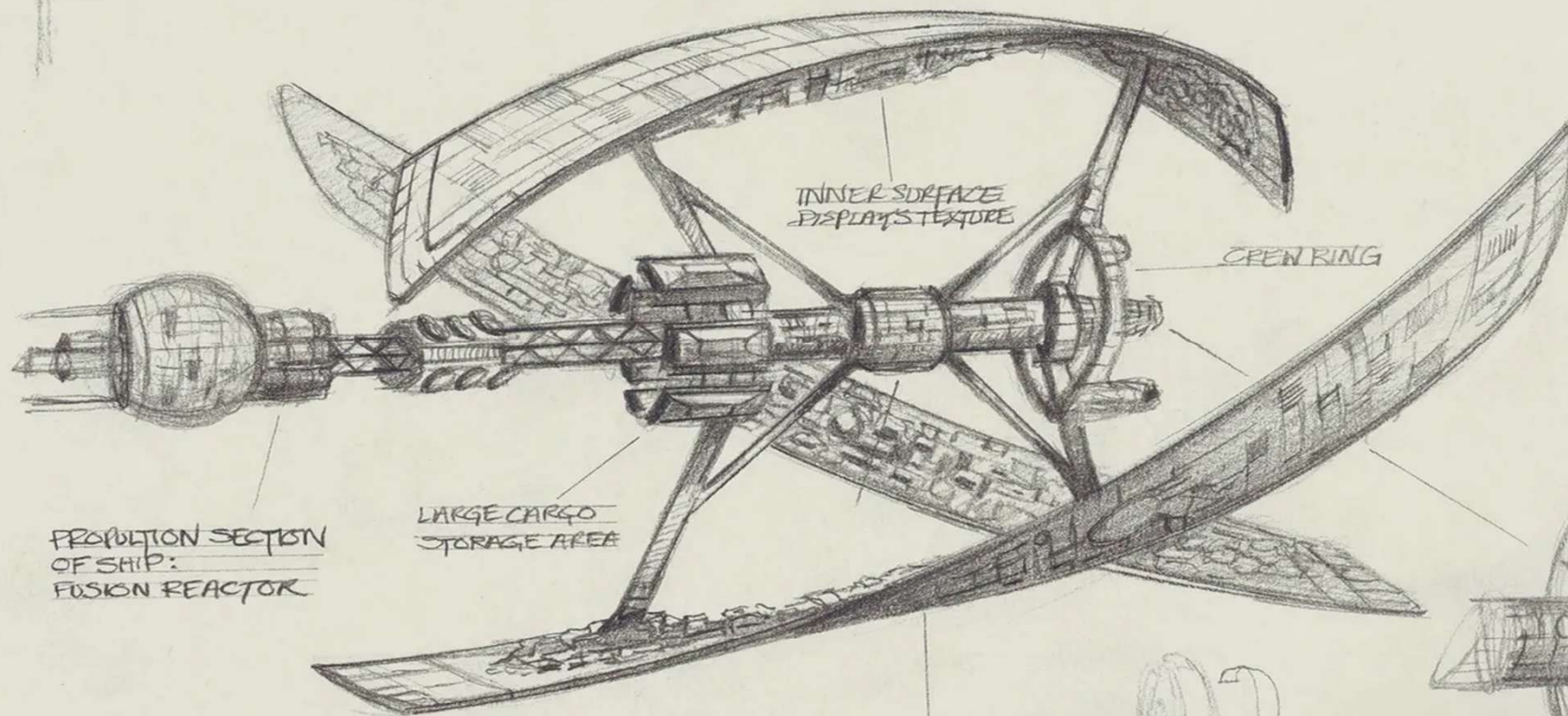
October 17 , 2023

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Director of Regulatory Affairs, One Sea Association





NOTE: 5000 PASSENGERS (1666x3)  
120 YEAR FLIGHT  
4 MONTHS REHABILITATION



PROTECTION SECTION  
OF SHIP:  
FUSION REACTOR

LARGE CARGO  
STORAGE AREA

INNER SURFACE  
DISPLAY TEXTURE

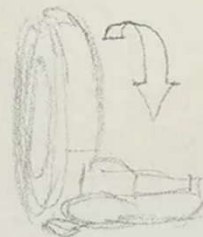
OPEN RING

PROTECTIVE  
SHIELD FOLDED  
POSITION

GUS'S  
OBSERVATION  
ROOM

SHIELD  
IN  
CLOSED  
POSITION

PROTECTIVE OUTER  
SHELL FOR EACH HABITAT



THE BRIDGE  
(NEEDS DEVELOPMENT)

EXT. THE EXCELSIOR  
BASIC CONCEPT

04/15

# The Starship AVALON





# ONE SEA



MASS Maritime  
Autonomous  
Surface  
Ships and  
underwater  
ROV's



Automated  
maritime  
commuter  
services



Short Sea  
Shipping



Ocean going  
ships





## 4.5 Million reasons for synchronised progress

- Improved efficiency and productivity
- Reduced environmental impact
- More innovations







COLLISIONS ARE  
THE GREATEST  
THREAT AT SEA

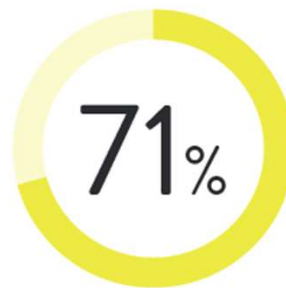
# Increased Safety

Annually, ~2.7% of the world cargo fleet is involved in major incident.

**58%**  
DUE TO  
PREVENTABLE  
HUMAN ERROR\*  
(GROUNDINGS, COLLISIONS,  
ALLISIONS, STRANDINGS)

**\$26B**  
MARINE  
INSURANCE  
CLAIMS IN  
2020

TOP CONTRIBUTING  
FACTOR IS:



loss of situational  
awareness



# Goal of technology

Support human strengths with the capabilities of technology.

Combining the strengths of humans and technology



# Human strengths

- Handling of uncertainty
- Applying knowledge and experience
- Creative problem-solving
- Human judgement



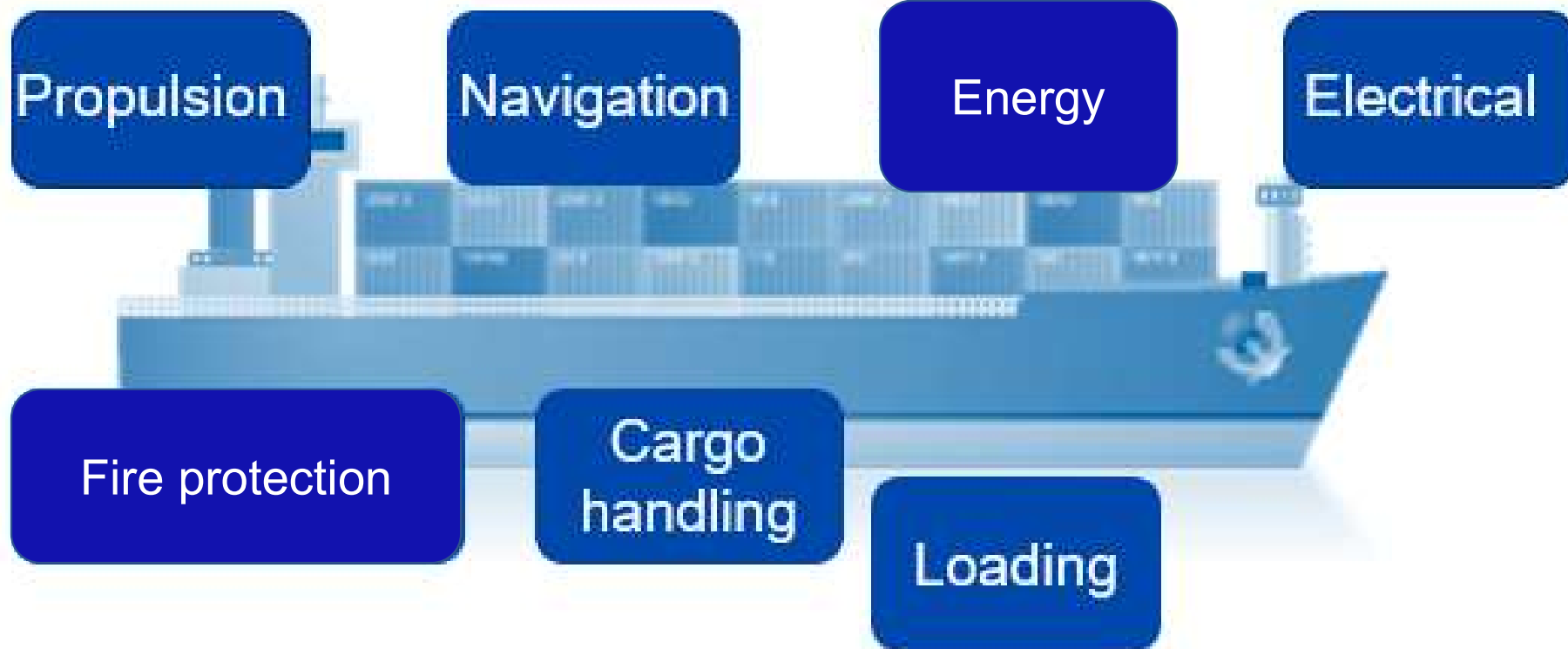


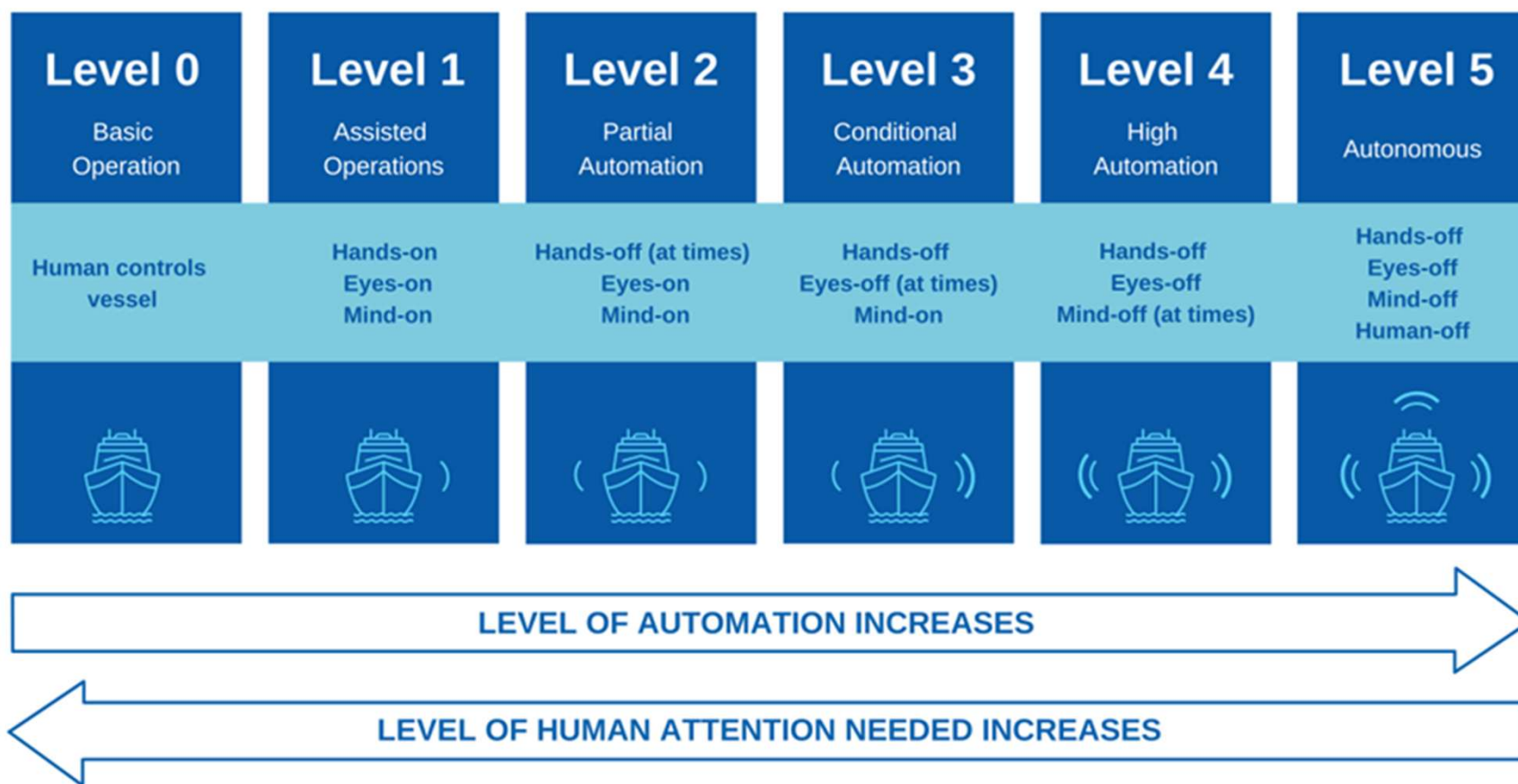
# Machine strengths

- Continuity, objectivity
- Repeatability and consistency
- Very slow and very fast occurring events
- Machine does not get tired and does not forget



## Ship systems









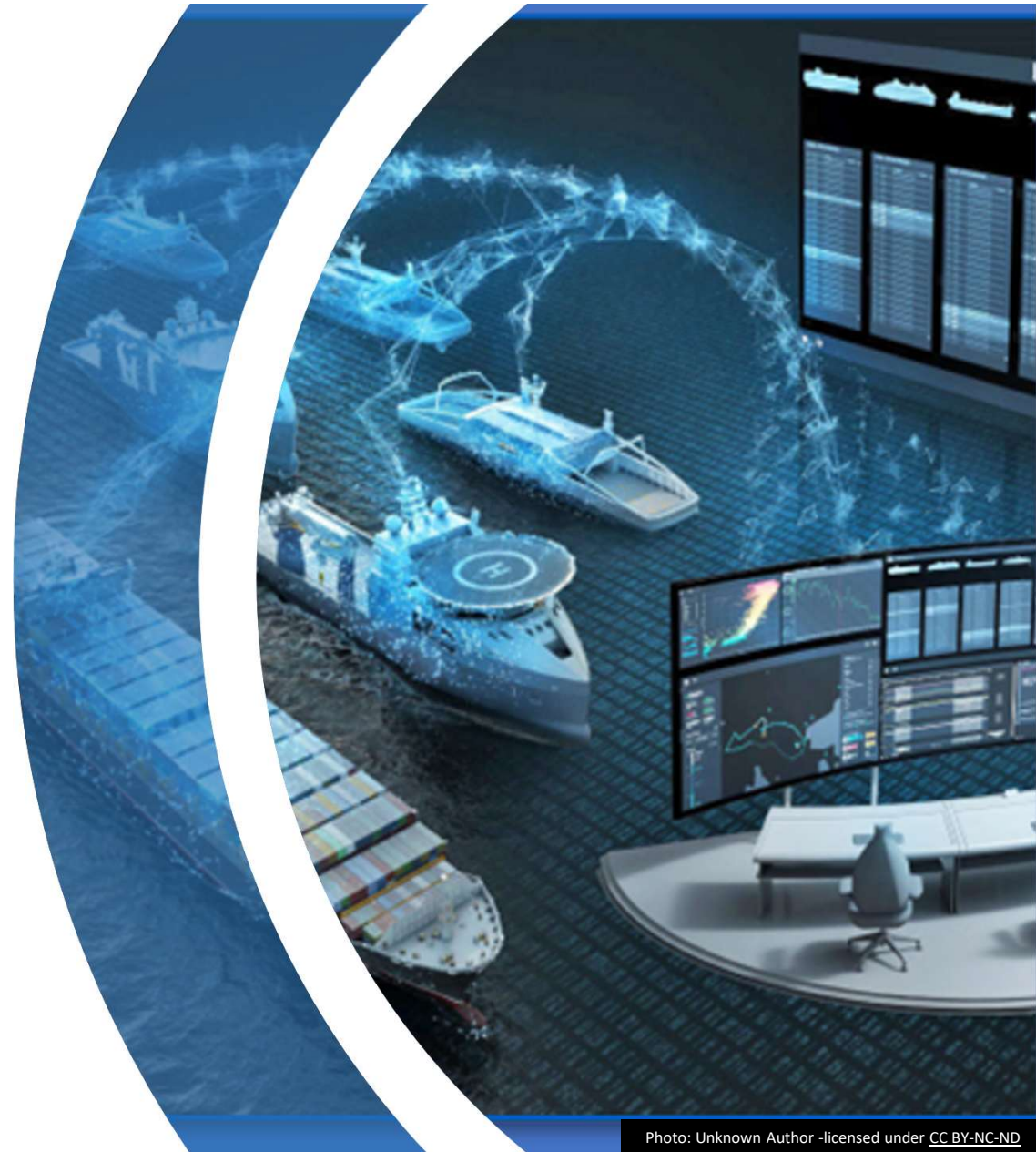
# Embracing the system-of-systems approach

- Automation level of various systems may differ
- Autonomy is a sum of automated functions
- Single fully autonomous system does not make the entire ship autonomous



# REMOTE SERVICES

**Remote Operations Centre** means a location remote from the MASS that can operate some or all aspects of the functions of the MASS







## Level of Remote Interaction

1. Monitoring  
read only information
2. Supervision  
high-level commands
3. Intervention  
detailed commands
4. Direct Control  
direct commands



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# ROC Safety

ROC Level 1 - not safety critical

ROC Level 2 - safety support

ROC Level 3 - safety critical



ISO 22237 - Data Centre

ISO 11064 - Control Centre

IEC 62443 - Cybersecurity



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# Remote Master / Operator

Bridge Resource Management principles should be adhered to and obligations and tasks executed as on-board

Should not be considered as a seafarer



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# Crewing of MASS

The number of qualified and experienced seafarers necessary

Minimum crew is the flag States sovereign right and should remain under the jurisdiction of the flag State

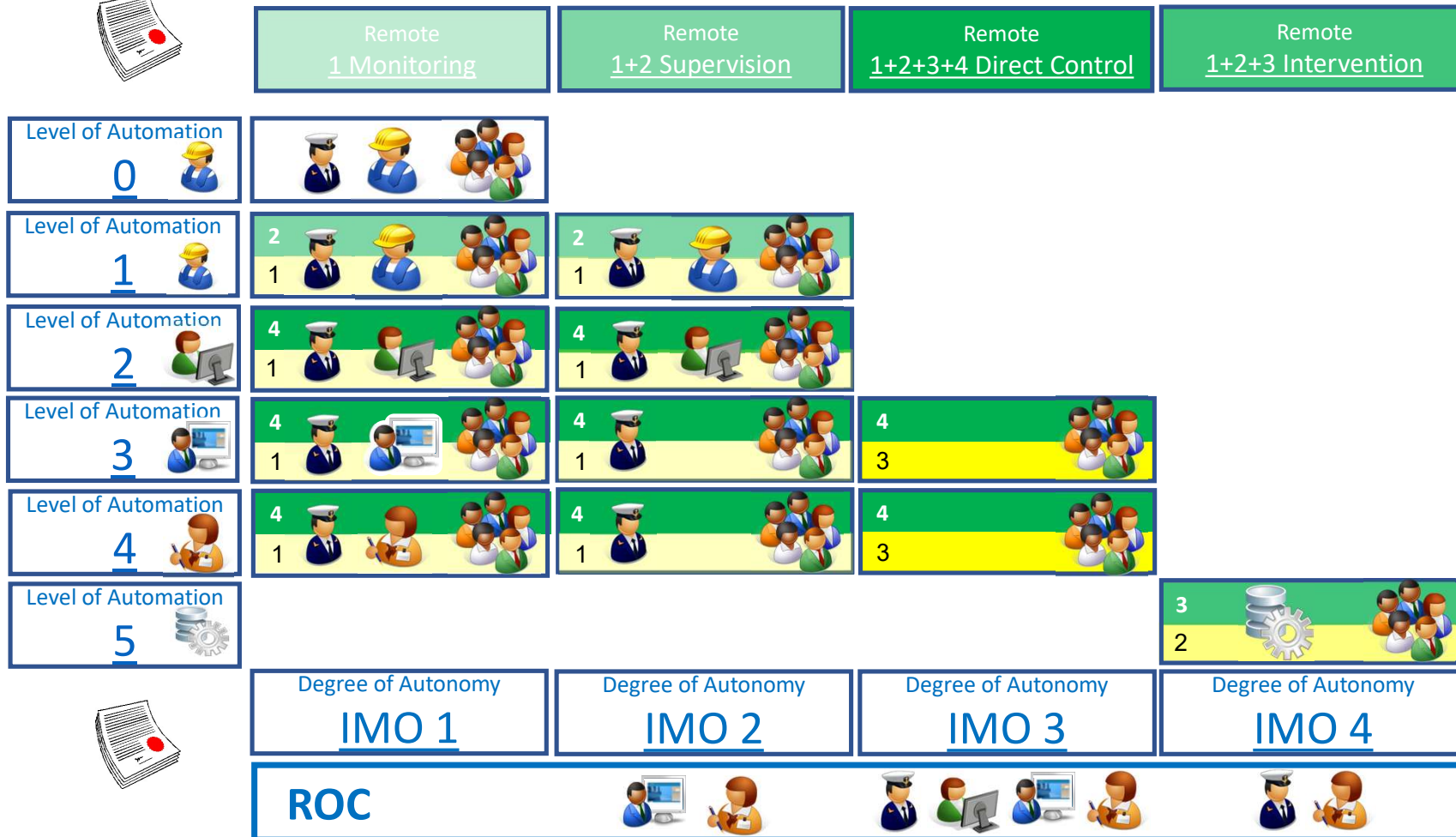
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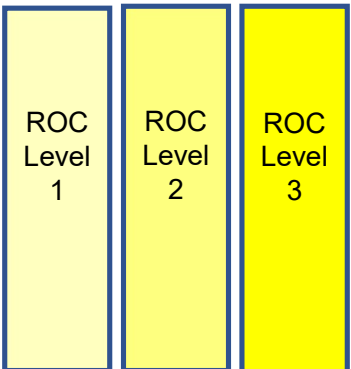
## Automation, Autonomy and Remote Services



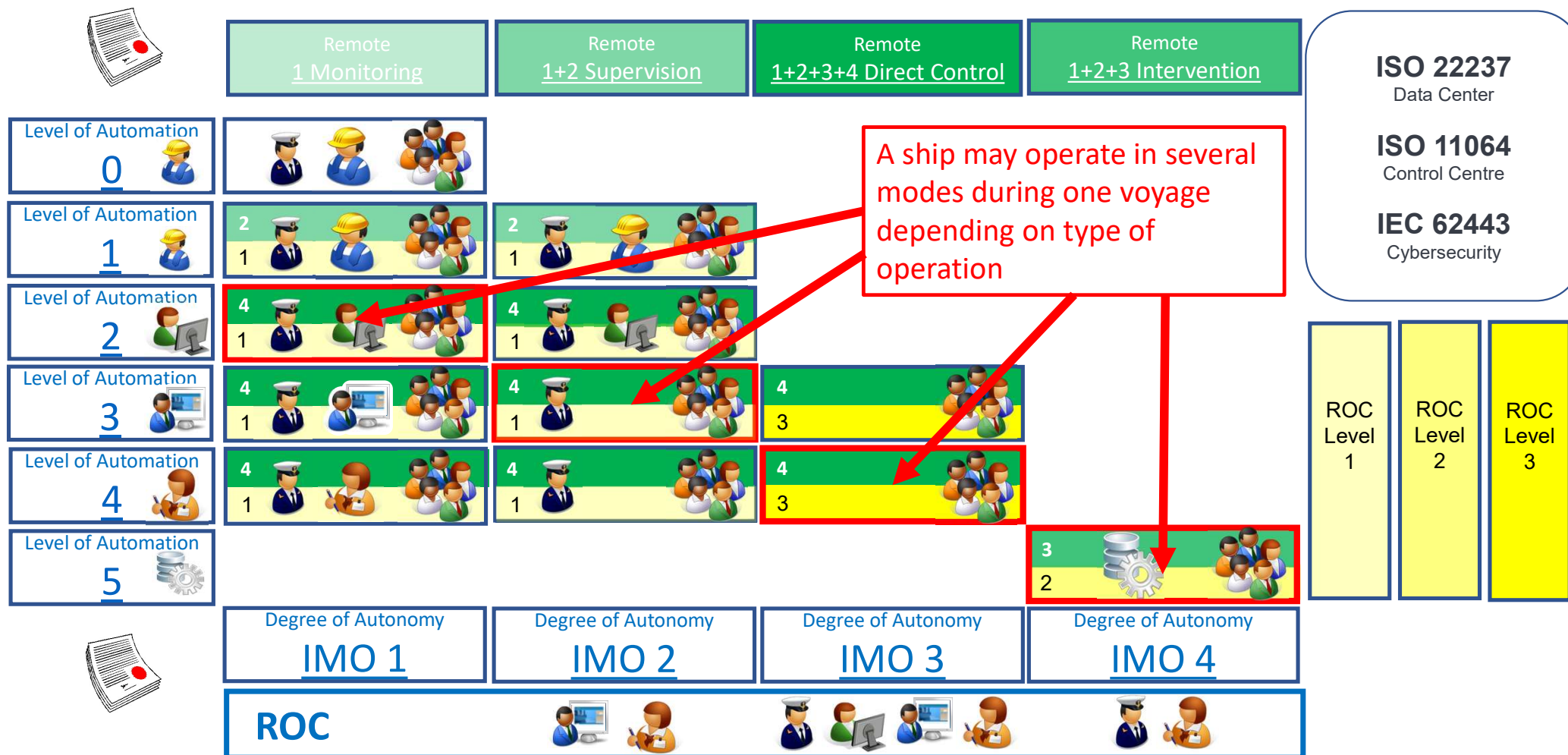
**ISO 22237**  
Data Center

**ISO 11064**  
Control Centre

**IEC 62443**  
Cybersecurity



## Automation, Autonomy and Remote Services



# UNCLOS

establishes a legal framework for  
all marine and maritime activities

A90 - Right of navigation

A91 - Nationality of ships

and set some basic requirements  
on flag States

A94 - Duties of the flag State



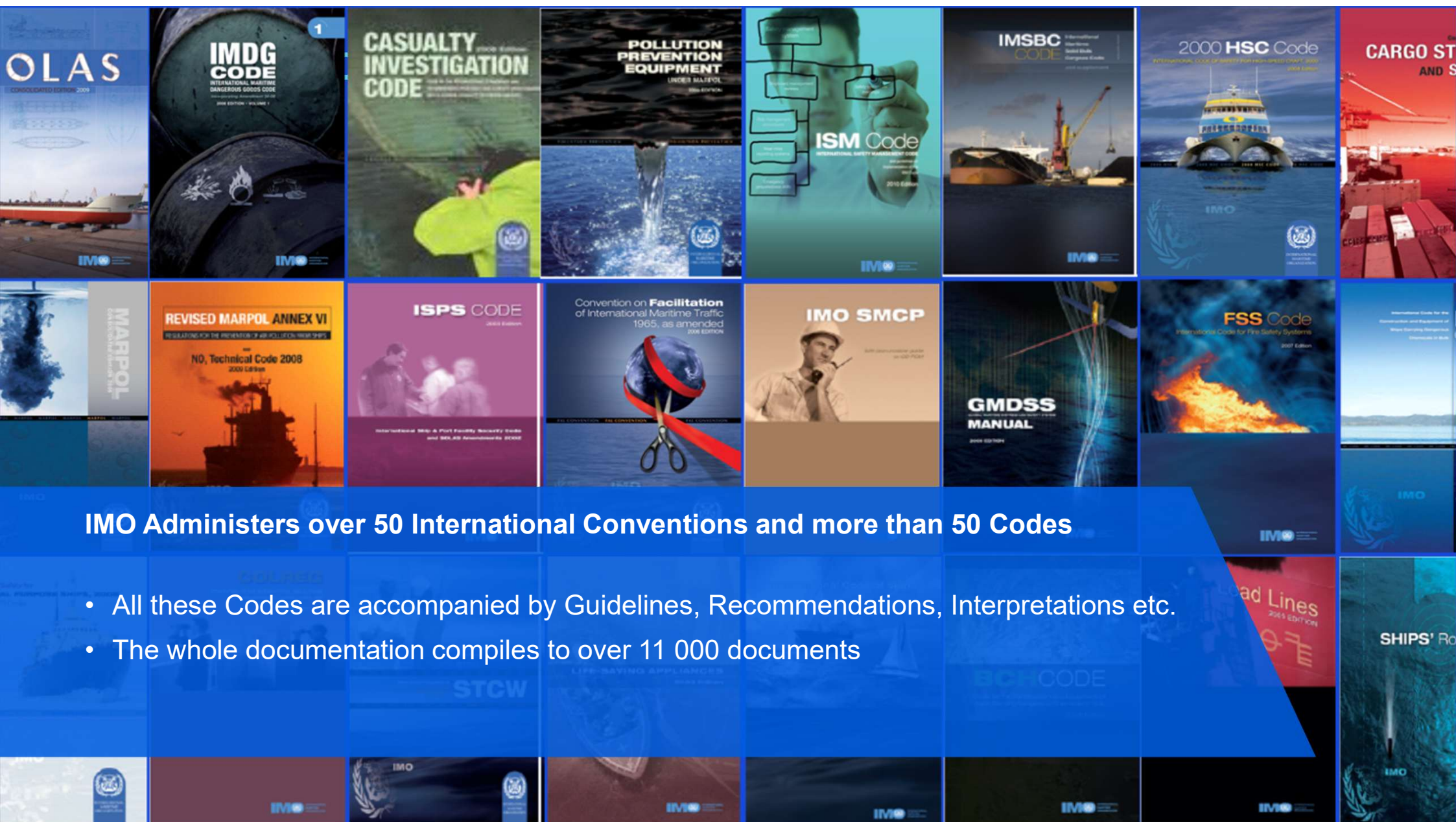




# UNCLOS and IMO

*“..in the charge of a master and officers who possess appropriate qualifications, in particular in seamanship, navigation, communications and marine engineering, and that the crew is appropriate in qualification and numbers for the type, size, machinery and equipment of the ship..”*





## IMO Administers over 50 International Conventions and more than 50 Codes

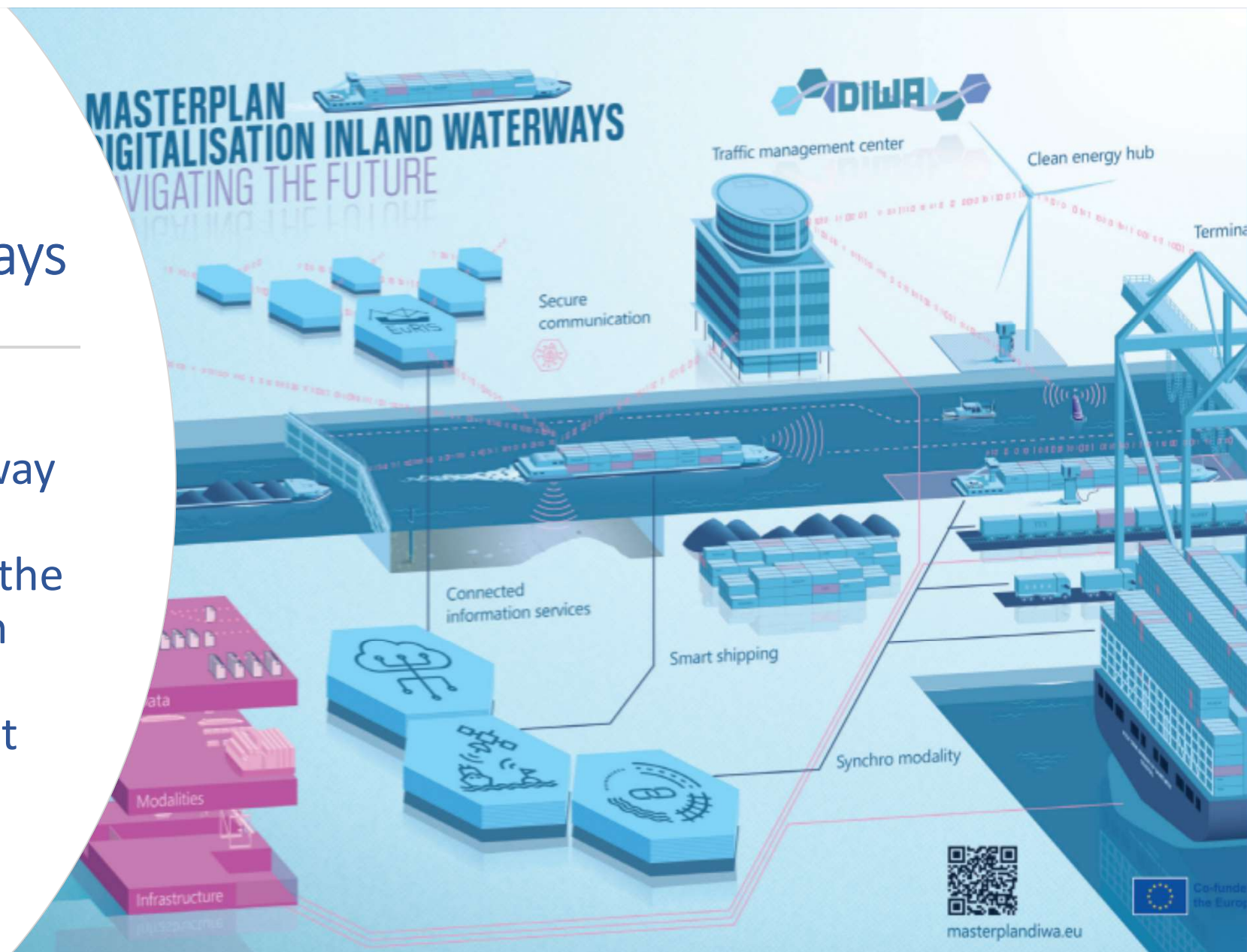
- All these Codes are accompanied by Guidelines, Recommendations, Interpretations etc.
- The whole documentation compiles to over 11 000 documents





## Inland Waterways

A treaty between basically all waterway and shipping administrations of the central and Eastern European IWT grid has been struck last year







Clear and  
**common terminology**  
is urgently needed to!

- Facilitate the discussion,
- Ensure cross modality application,
- Create a seamless transport chain.



## Risk or Enabler

The use of [automated and/or remotely controlled] security systems *should not endanger the security of any persons* or property on board or of the ship.

“...systems *shall not prevent the effective physical security....*, pose a *risk to persons*,”



## Risk or Enabler

The use of [automated and/or remotely controlled] security systems **shall be designed to ensure the safety of any persons** or property on board or of the ship.

“...systems **shall ensure the physical security ...., ensure the safety of persons,**”







# The MASS Code

Reduced regulatory uncertainty on the way towards productization of automated functions which take over tasks from officers and crew engaged in ship operation.

Technology solutions are critical for the maritime industry to address inefficiencies across the entire supply chain.





# Main principles

of the MASS Code under development should be a:

- complementarity,
- holistic,
- technology neutral instrument.







# Application of MASS

“limit the development of the non-mandatory MASS Code to cargo ships”

Minimum [500 GT] [24m] and maximum 12 passengers on international voyage

SOLAS Ch I/2 (e),(f),(g) and Ch I/3(a)(ii)







# Status of a MASS

A ship is a system of systems

A MASS ship or system  
is a SOLAS ship and  
is a ship among existing ships  
and technologies



# Role of technology

Technology doesn't relive the master of any duties or responsibilities

From a technological point of view the location of the master is irrelevant





# The role of a master

Master means the person having command of a ship

(UNCLOS art.94.4(b), STCW Ch I/1.3)



Photo: [www.seamanmemories.com](http://www.seamanmemories.com)





# The role of a master

To ensure that watchkeeping arrangements and composition are adequate for maintaining a proper lookout, safe navigational or cargo watch.

UNCLOS art.94.3(a) and 4(b)  
STCW Convention & Codes Ch VIII

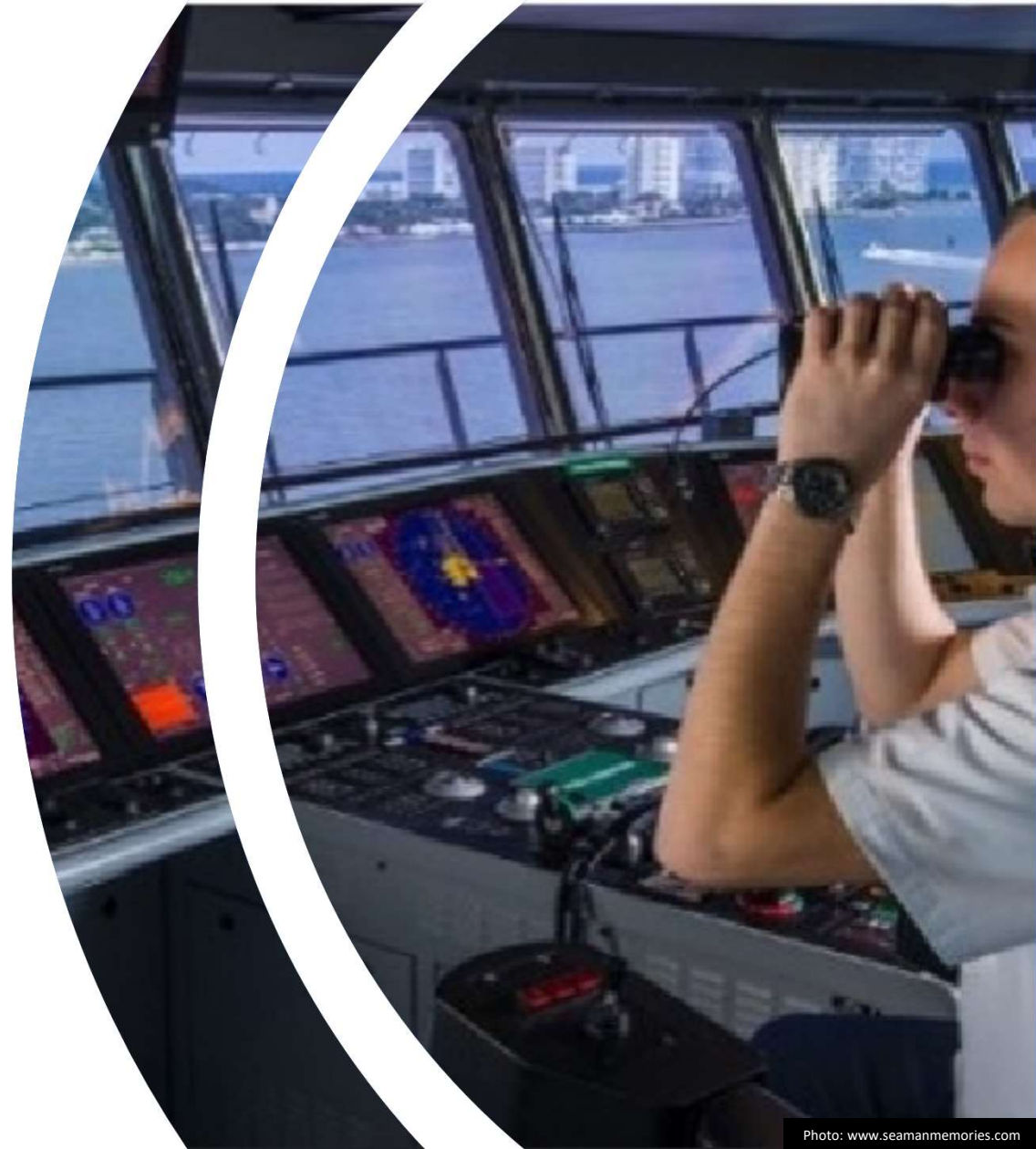


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# Masters' authority

The master of the ship takes or executes any decision which, in the master's professional judgement, is necessary

(SOLAS Ch V/34-1 and Ch XI-2/8 )



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# Masters' discretion

A task may be performed by a crewmember or a system

A task may be delegated, but the responsibility remains by the master to ensure it is properly executed



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# Marine Insurance

Marine insurance covers the loss or damage of ships, cargo, terminals, and any transport by which the property is transferred, acquired, or held between the points of origin and the final destination.



ONE  
SEA

## P&I

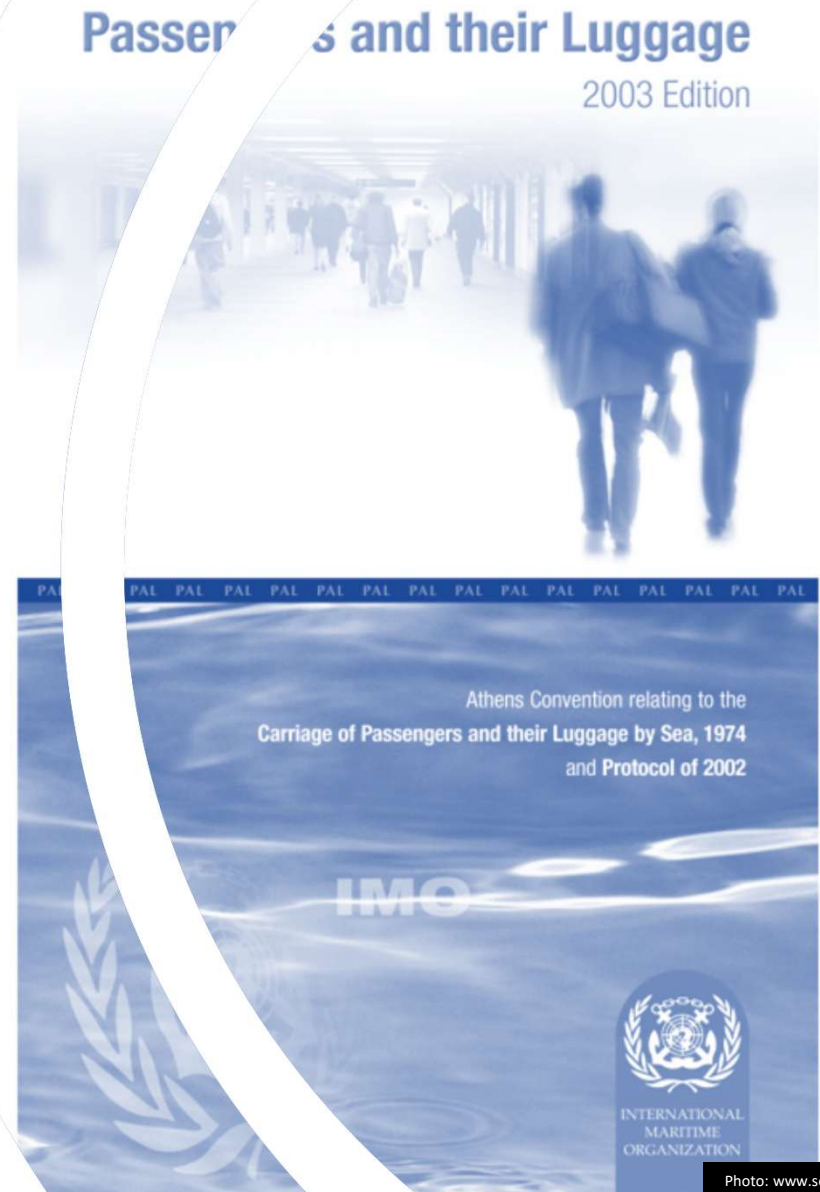
Protection and indemnity insurance, provides cover the potentially huge costs of any harm shipowners may accidentally cause to people, property and the environment.



# Athens Convention

The Convention establishes a regime of liability for damage suffered by passengers carried on a seagoing vessel

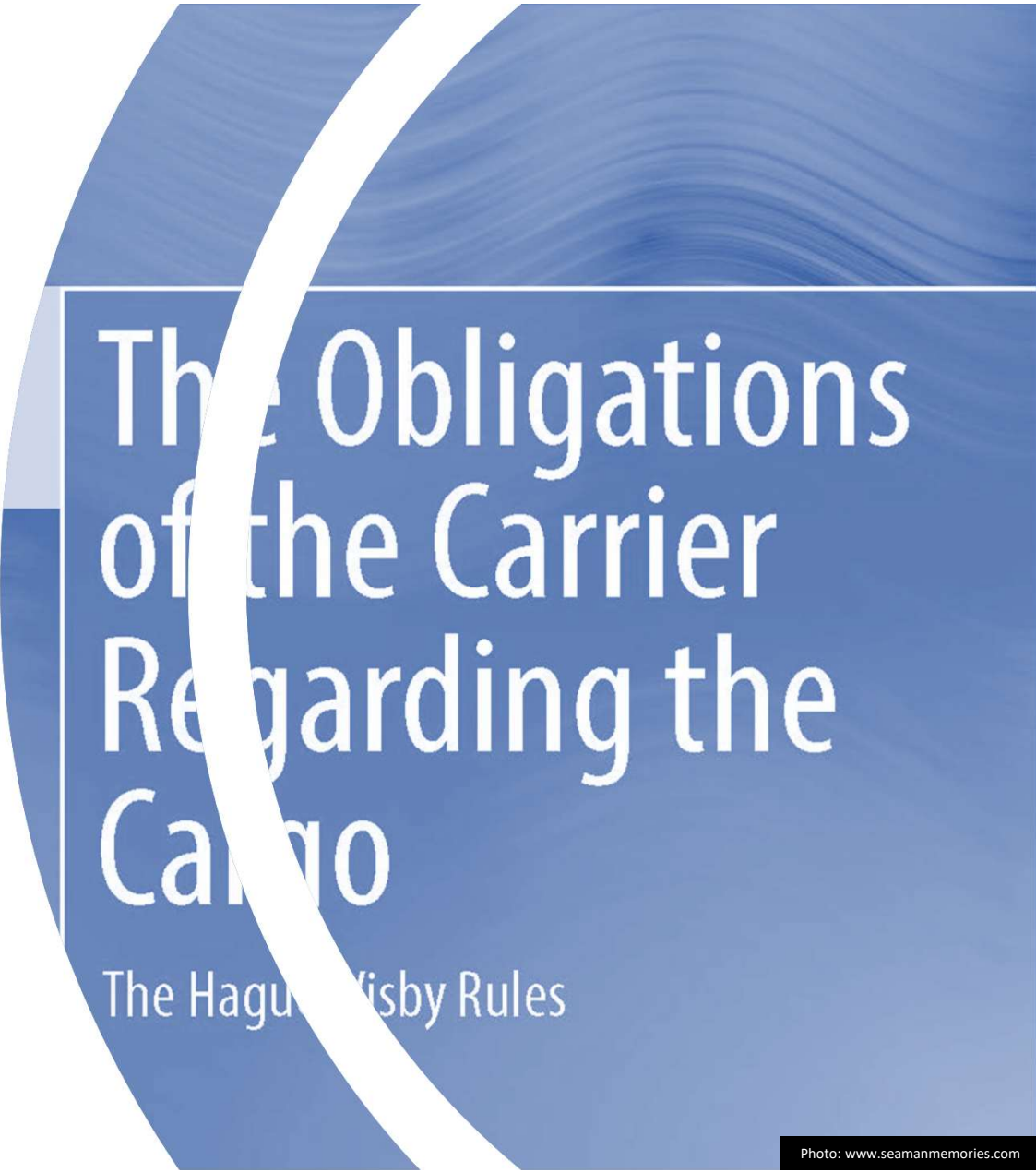
while the provisions on the transport of goods are based on the Hague-Visby Rules of 1968.





# The Hague/Hague Visby Rules

General liability under the Hague-Visby Rules for error and negligence with a reversed burden of proof shall constitute the general rule for all damages.



The Obligations  
of the Carrier  
Regarding the  
Cargo

The Hague Visby Rules



# Permit to operate

Bi-lateral or multilateral agreements should be the first step to establish international remote or autonomous maritime transport





There is a  
**lack of focus**  
in the discussions in the role of a  
regulator

- IMO is the regulator ensuring SAFETY
- The industry is the developer and solution manufacturer

