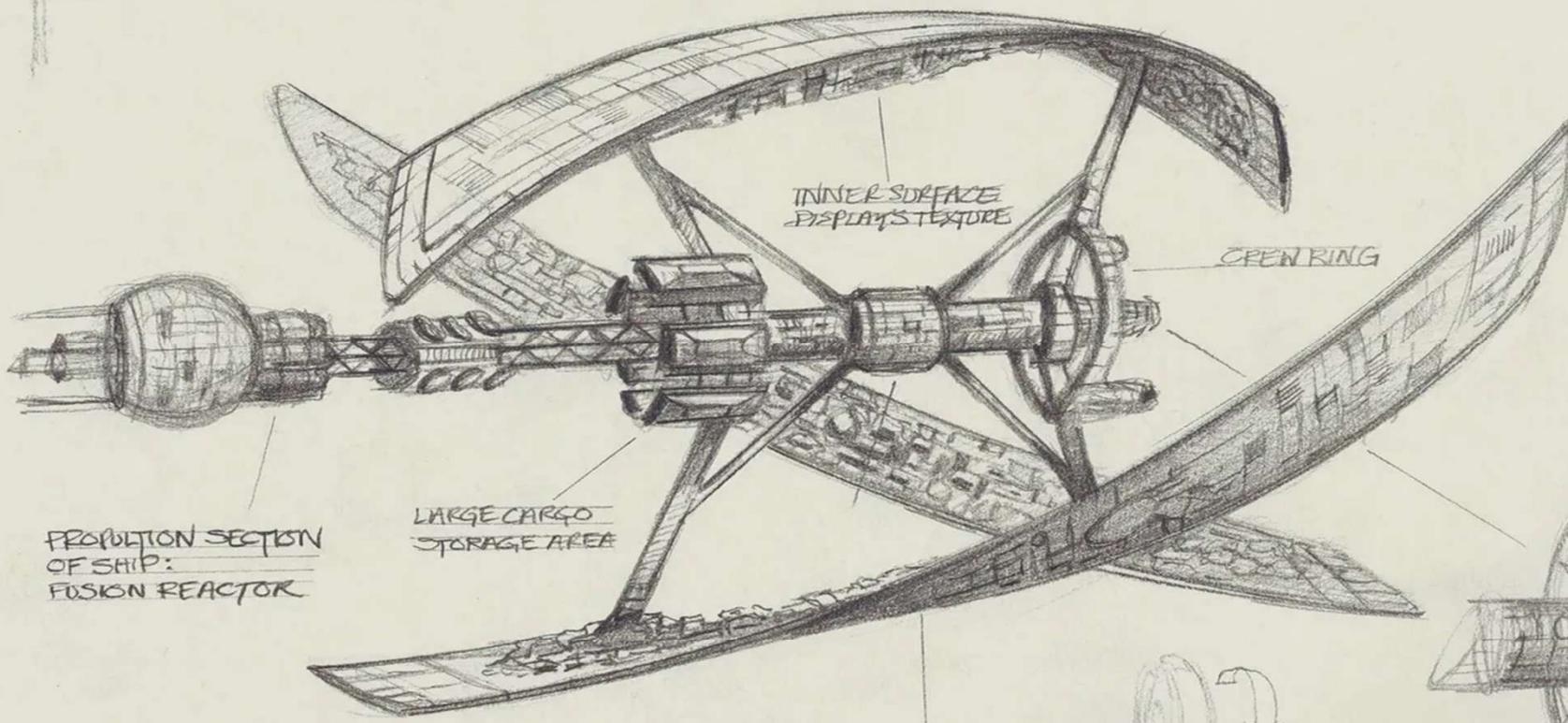
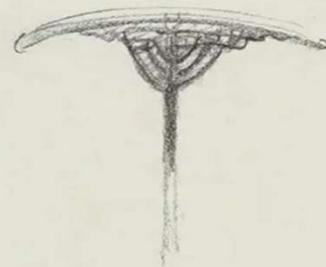


North Atlantic Coast Guard Forum Summit 2023 – The regulatory aspects of Remote and Autonomous solutions

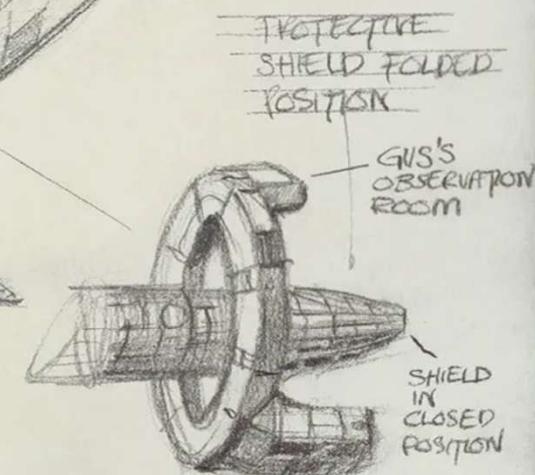
October 17, 2023

Capt. Marko Rahikainen
Director of Regulatory Affairs, One Sea Association





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



EXT. THE EXCELSIOR
BASIC CONCEPT
04/15

THE BRIDGE
(NEEDS DEVELOPMENT)

The Starship AVALON

FICTION

A glowing blue starship, possibly the Starship Avalon, is shown in space. The ship is oriented diagonally, with its front pointing towards the bottom-left and its rear towards the top-right. It has a prominent, curved hull and a large, glowing blue energy core at the front. A red, semi-transparent watermark with the word "FICTION" in large, bold, sans-serif letters is overlaid across the center of the image. The background is a dark, star-filled space.

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



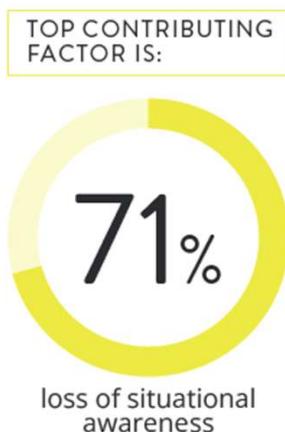
COLLISIONS ARE
THE GREATEST
THREAT AT SEA

Increased Safety

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

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

\$26B
MARINE
INSURANCE
CLAIMS IN
2020



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



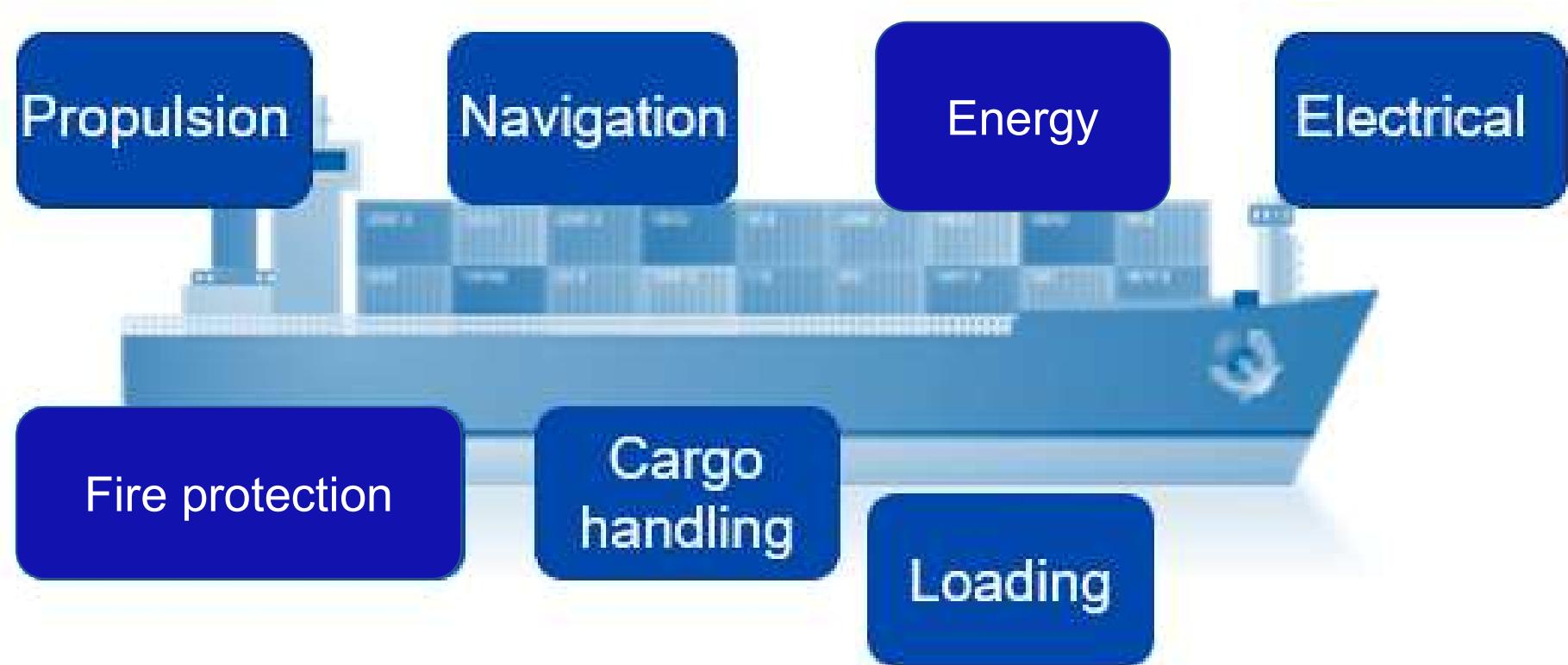
Photo: Unknown Author -licensed under [CC BY-NC-ND](#)

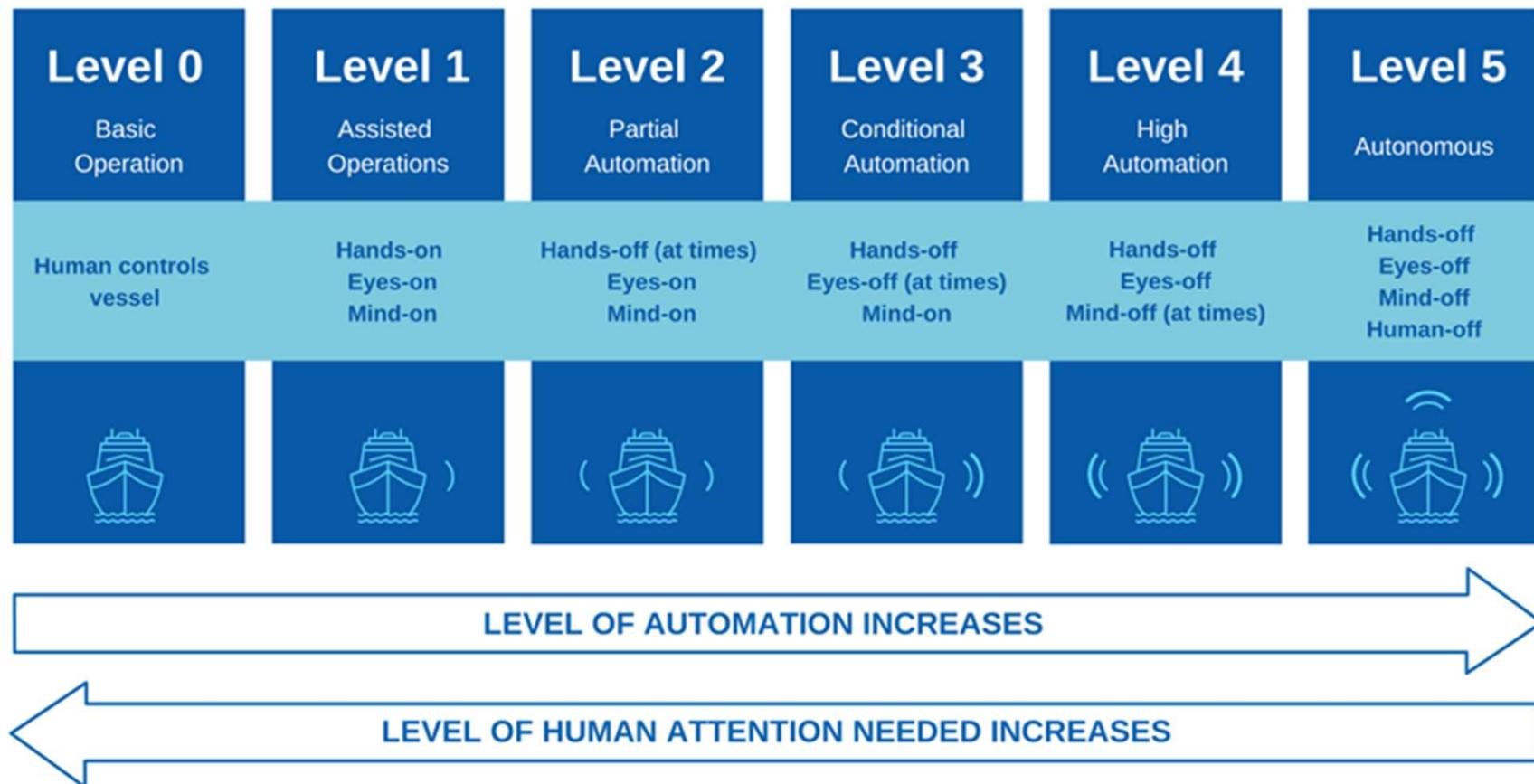
Machine strengths

- 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



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



Photo: Unknown Author -licensed under [CC BY-NC-ND](#)

Crewing of MASS

The number of qualified and experienced seafarers necessary

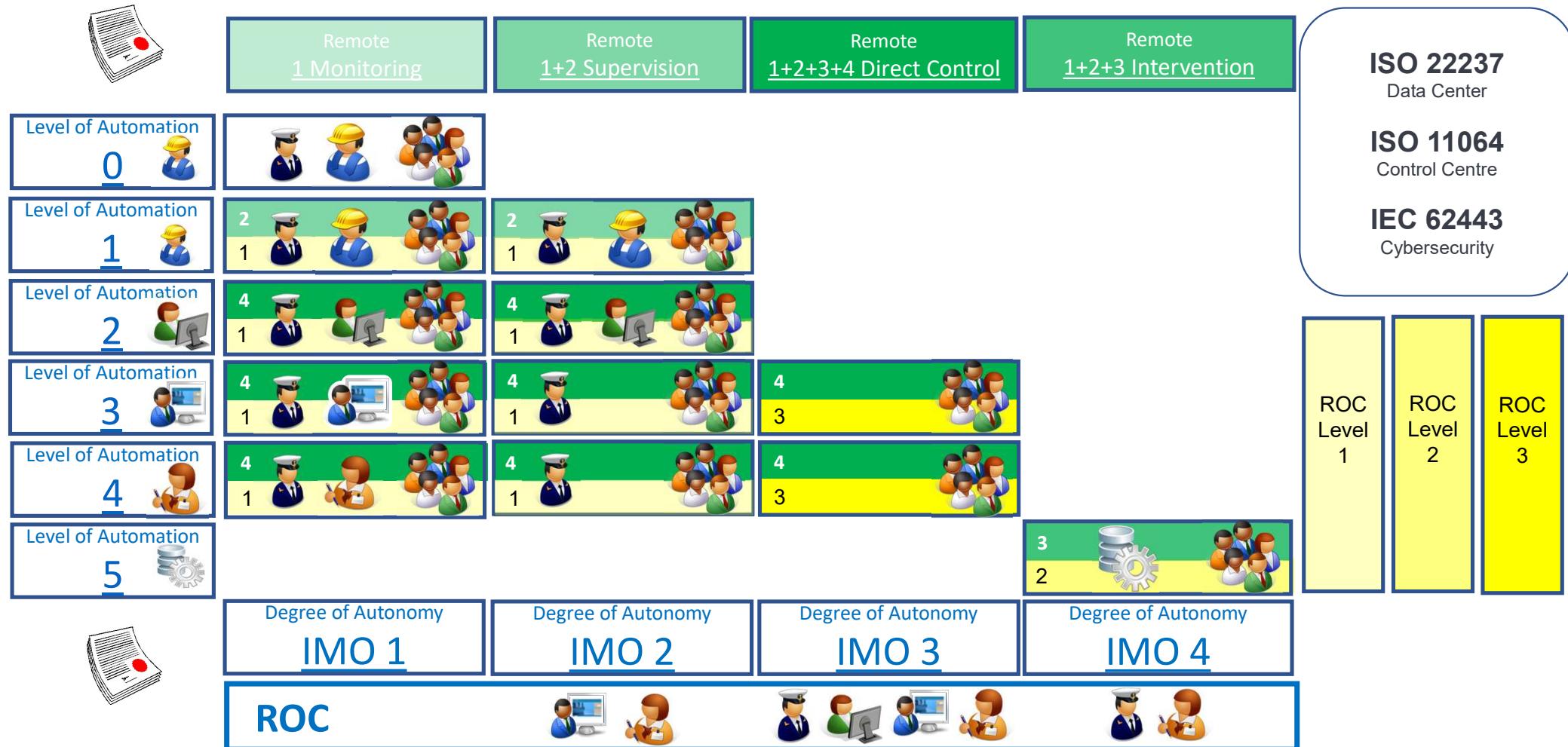
Minimum crew is the flag States sovereign right and should remain under the jurisdiction of the flag State

(A.1047(27))

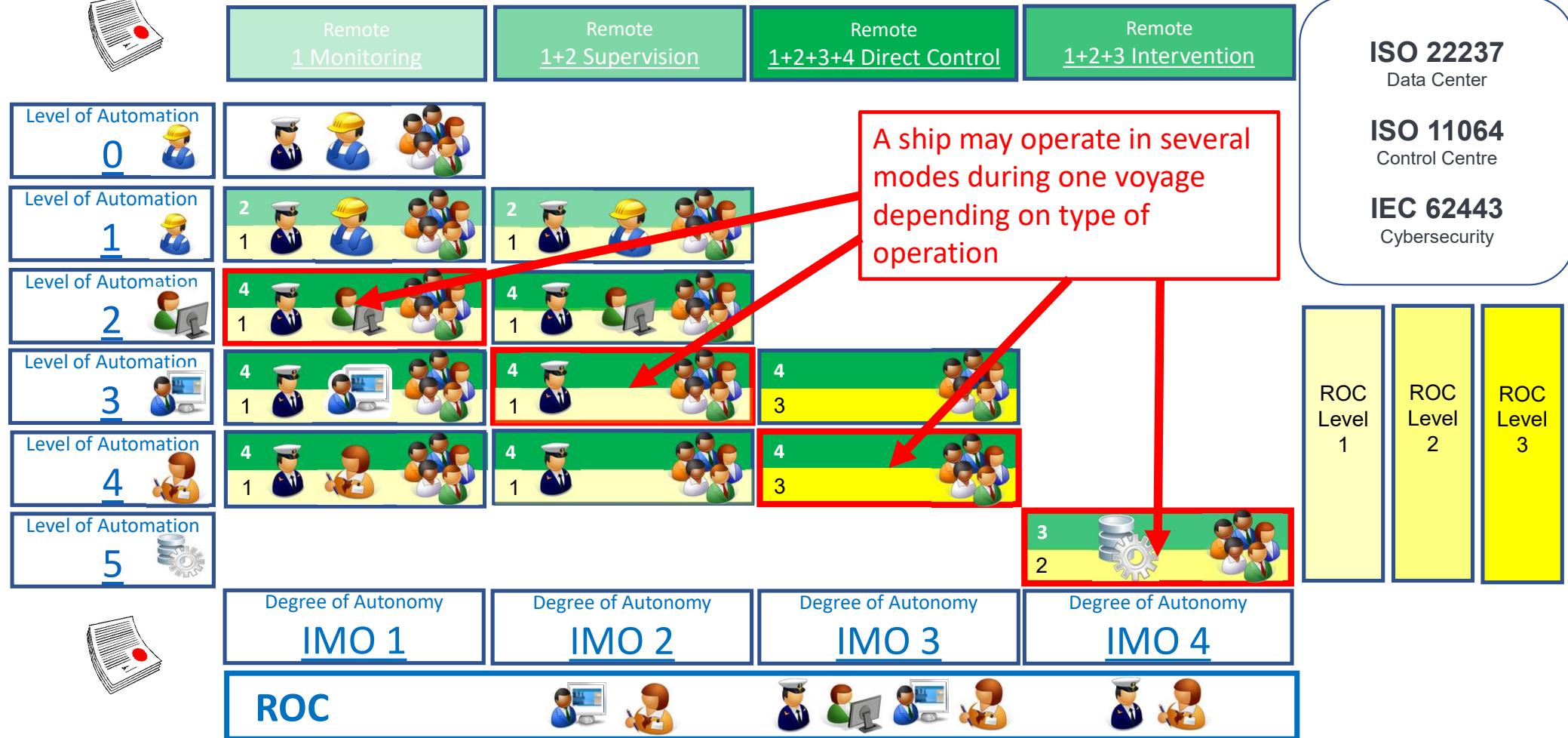
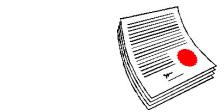


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Automation, Autonomy and Remote Services



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..”



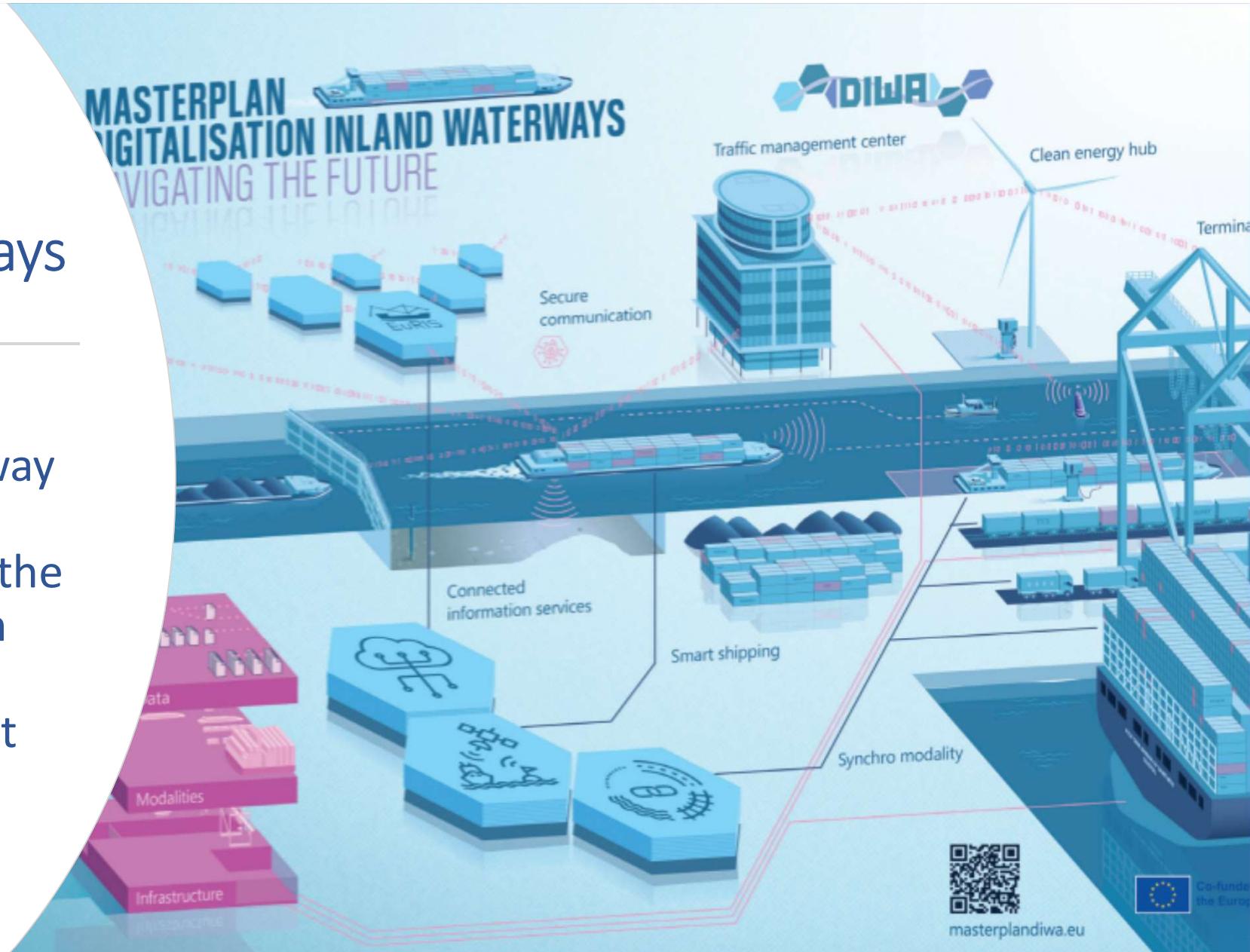


IMO Administers over 50 International Conventions and more than 50 Codes

- 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 relieve the master of any duties or responsibilities

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



Photo: Unknown Author -licensed under [CC BY-NC-ND](#)

The role of a master

Master means the person having command of a ship

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



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



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)



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



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.



P&I

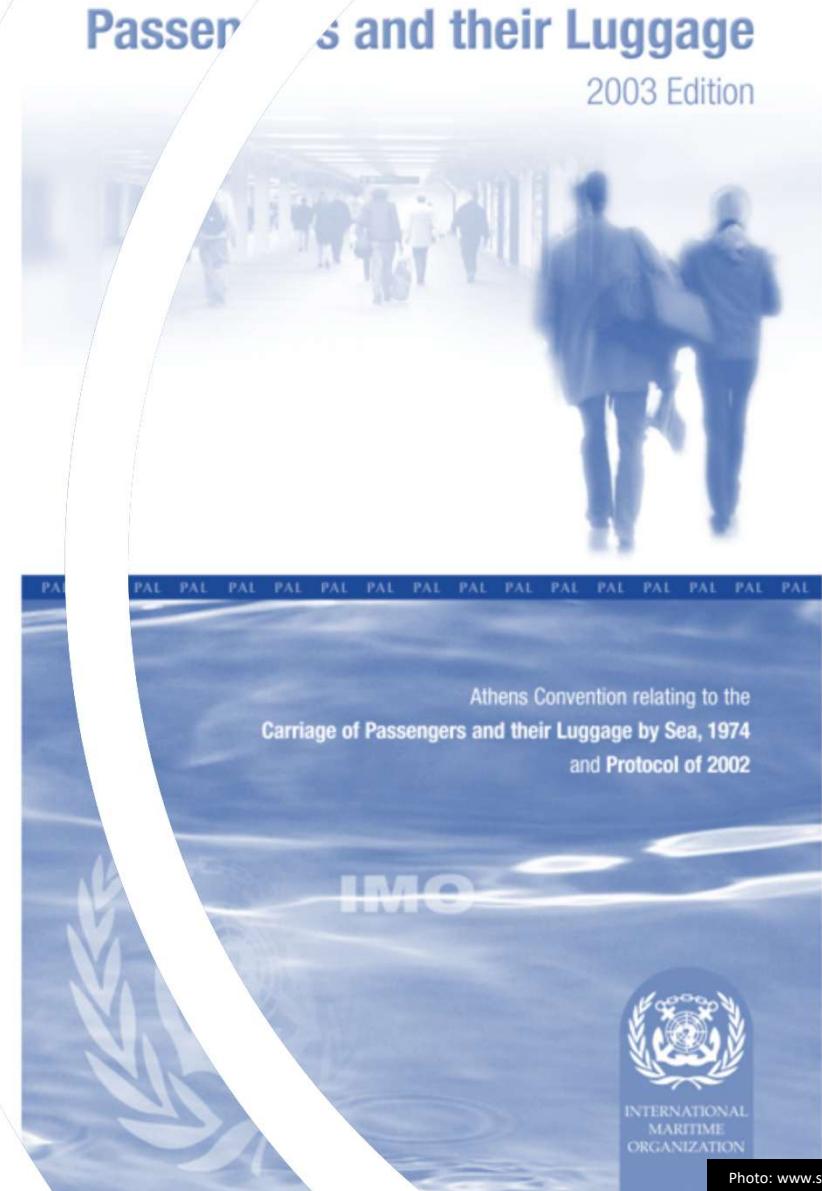
Protection and indemnity insurance, provides cover the potentially huge costs of any harm shipowners may accidentally cause to people, property and the environment.



Athens Convention

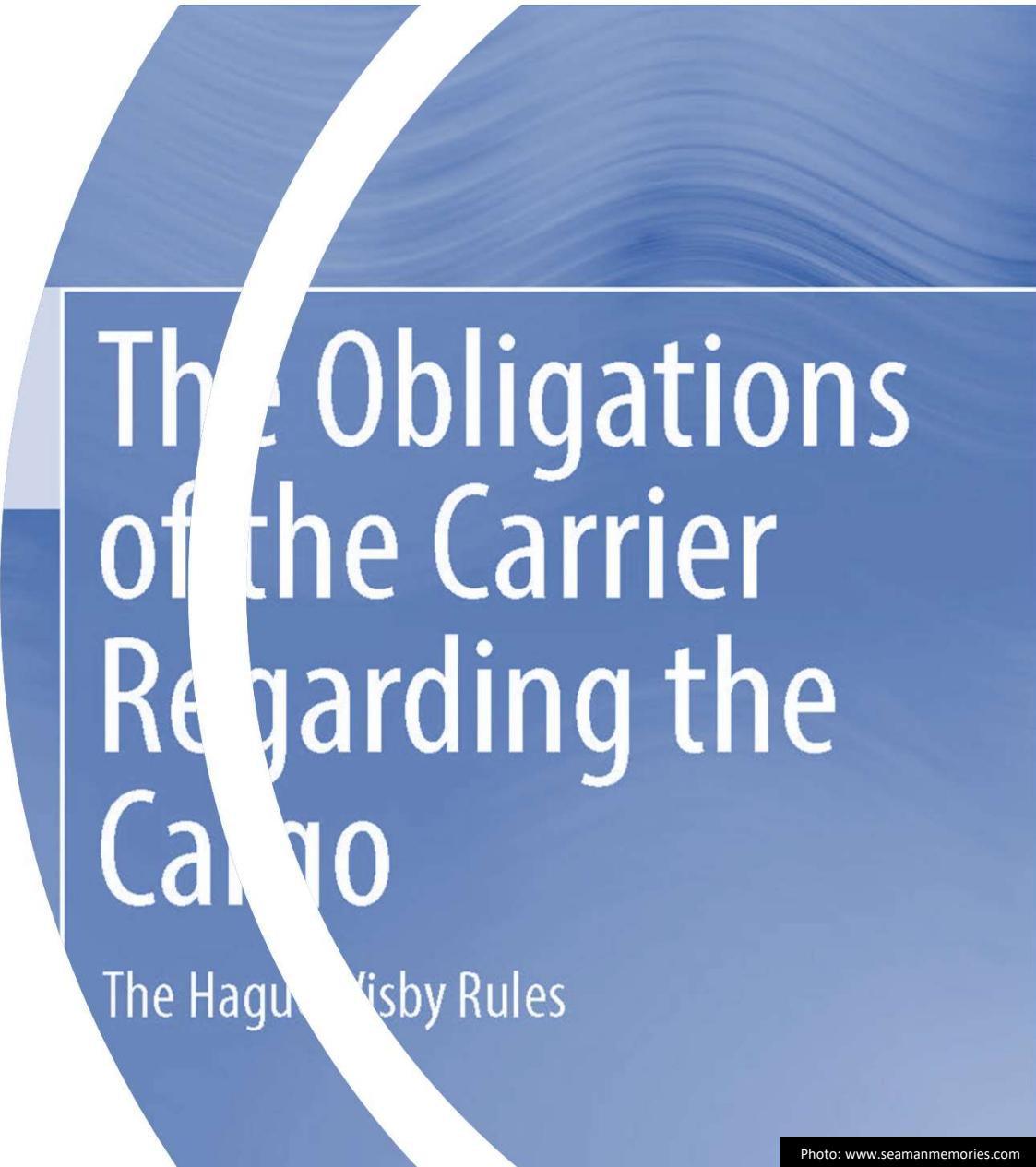
The Convention establishes a regime of liability for damage suffered by passengers carried on a seagoing vessel

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.



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

