

The Class Approach

NFAS – Ocean Week 2018

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7th May 2018,
Trondheim

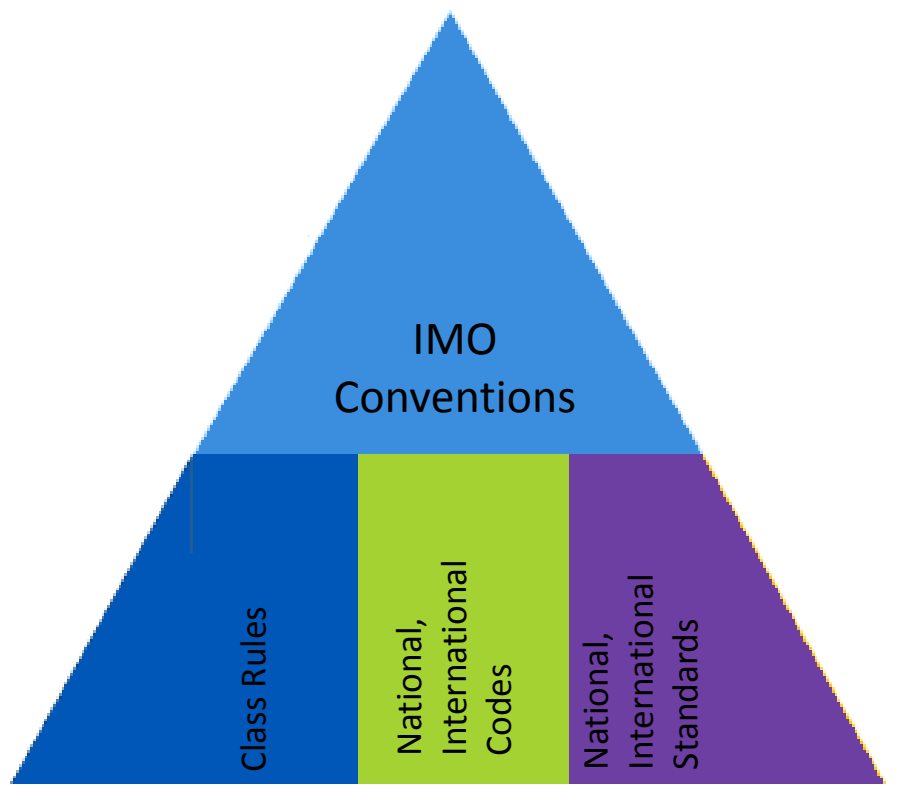


Introduction

- How do we assure manned vessels?
- How can we assure unmanned vessels?
- Using a Goal-based approach
- The challenge of Goal-based assurance
- Remembering people!
- Regulation & Challenges



How do we assure manned vessels?



- Structures
- Machinery
- Electrical
- Navigation
- Fire Safety
- Escape
- Environment
- Operation
- Equipment
- Electrical Safety

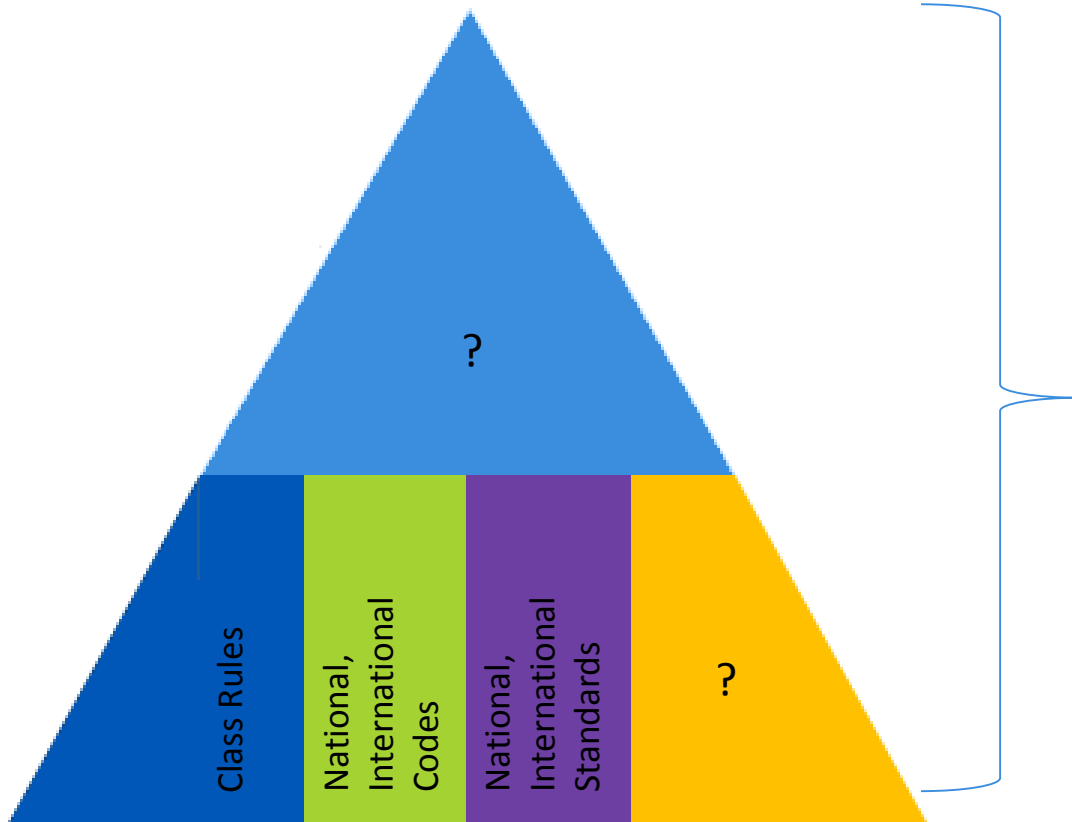


Size; No. of Crew; No. of Passengers;
Cargo
Vessel Type; Area of operation



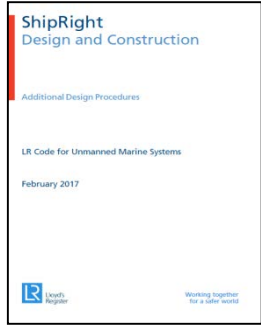
Applicability?

How can we assure Unmanned vessels?



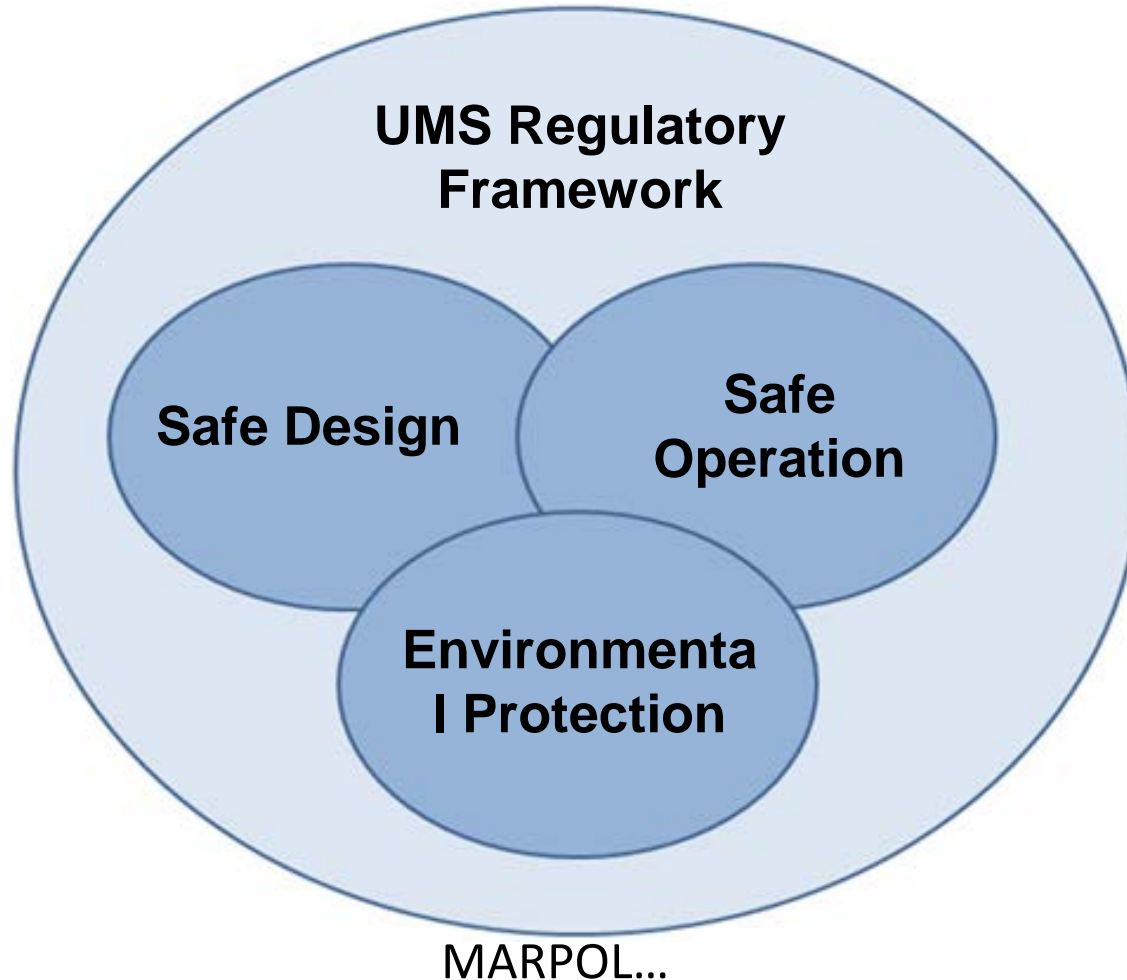
Absence of
Standards/Regulation!

Elements of an Assurance Framework

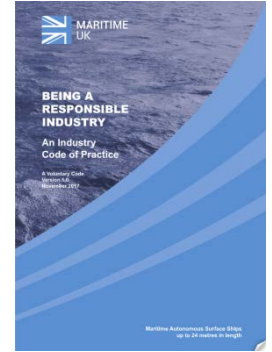


Class Societies

Safe to
Operate.....



MARPOL...

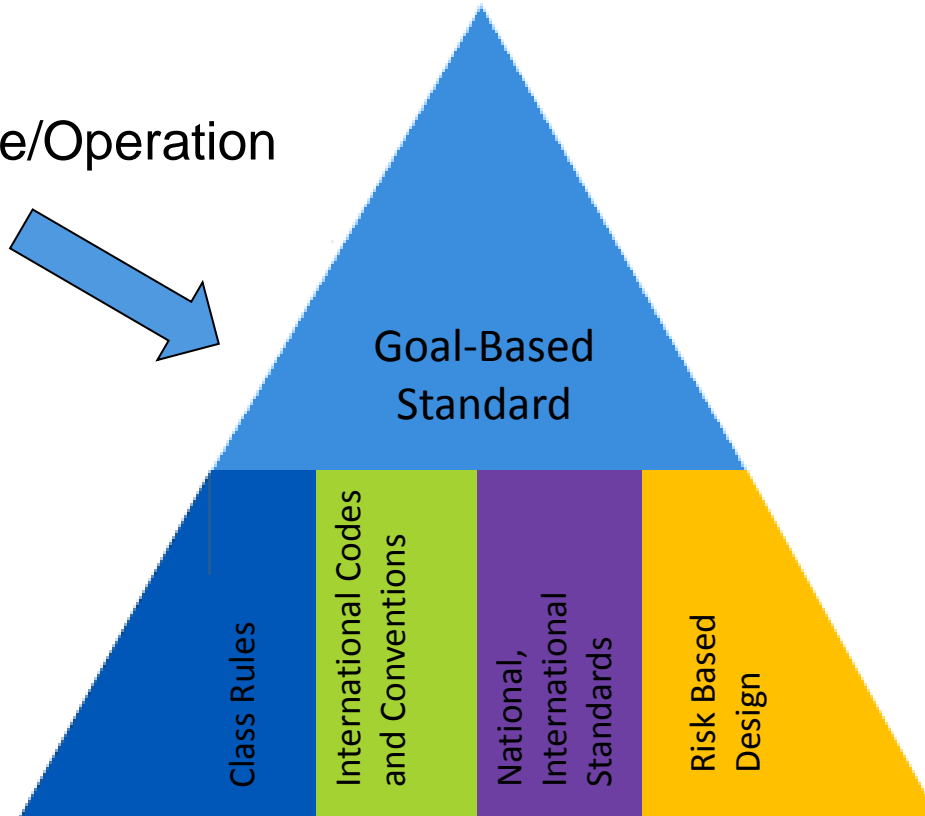
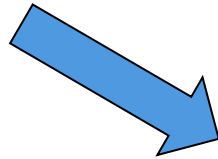


Flag States/
IMO

...and
Operated Safely.

An Assurance Framework for Unmanned vessels

Concept of Use/Operation



Assurance Framework

Design Solutions

Promote good design and quality manufacturing

Not restrict design through prescription

Concept of Use / Concept of Operations

How is the vessel used?

- Roles
- Attributes
- Operating Environment
- Operating Philosophy
- Maintenance and Disposal
- Base station control

Scuffy was happy in the bath!



We can't assume we know.

Using a Goal-based approach

What is Goal-based?

“People shall be prevented from falling” is goal-based.



Finding Solutions

In prescriptive regulation the specific means of achieving compliance is mandated.

“You shall install a one metre high rail”

The advantage of using a goal-based structure is that other solutions can be used:

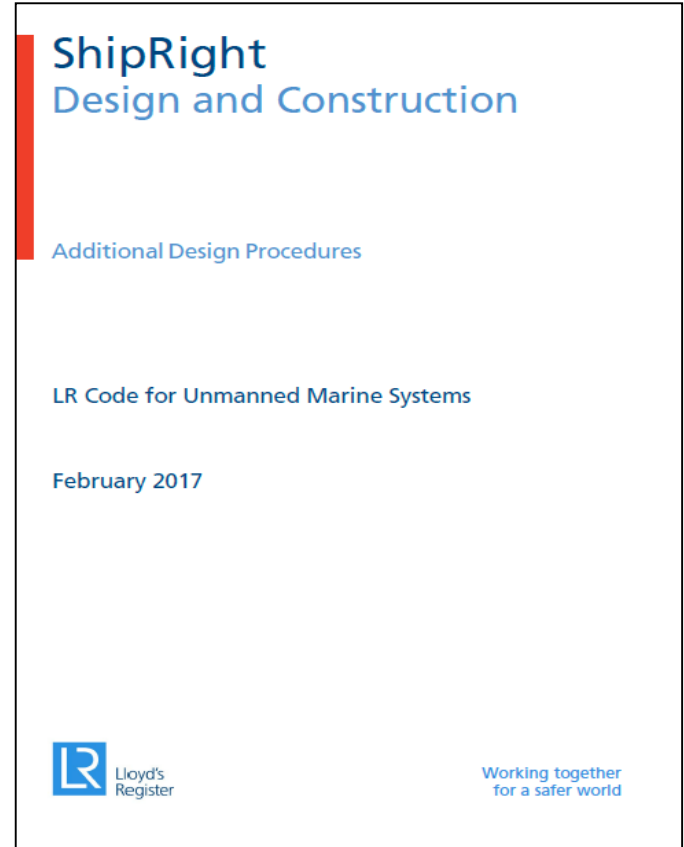
For example:

- 2 metre high fence
- Signs
- Training
- Fence 100m from the cliff edge
- Remove the cliff edge



LR Code for Unmanned Marine Systems

- Goal-Based Design Standard covering 'Safe Design'
- Chapters Topics;
 - Structures
 - Stability
 - Control Systems
 - Electrical Systems
 - Navigation Systems
 - Propulsion and Manoeuvring
 - Fire
 - Auxiliary Systems
- Applicable to all sizes UMS – particularly those <24m



Goal based structure

Tier 0 – Aim :

“The Unmanned Marine System (UMS) shall be safe, dependable , capable and resilient in all Reasonably Foreseeable Operating Conditions”

For each Chapter

- Tier 1 – Chapter Goal
- Tier 2 - Functional Objectives
- Tier 3 – Performance Requirements

Solutions, Verification activity.....



LR Code for UMS – Navigation Example

Tier 1– Goal

“The navigation system shall be designed with a level of integrity sufficient to enable the UMS to be operated and maintained safely as an when required within its design or imposed limitation in all Reasonably Foreseeable Operating Conditions”

Tier 2 – Functional Objective

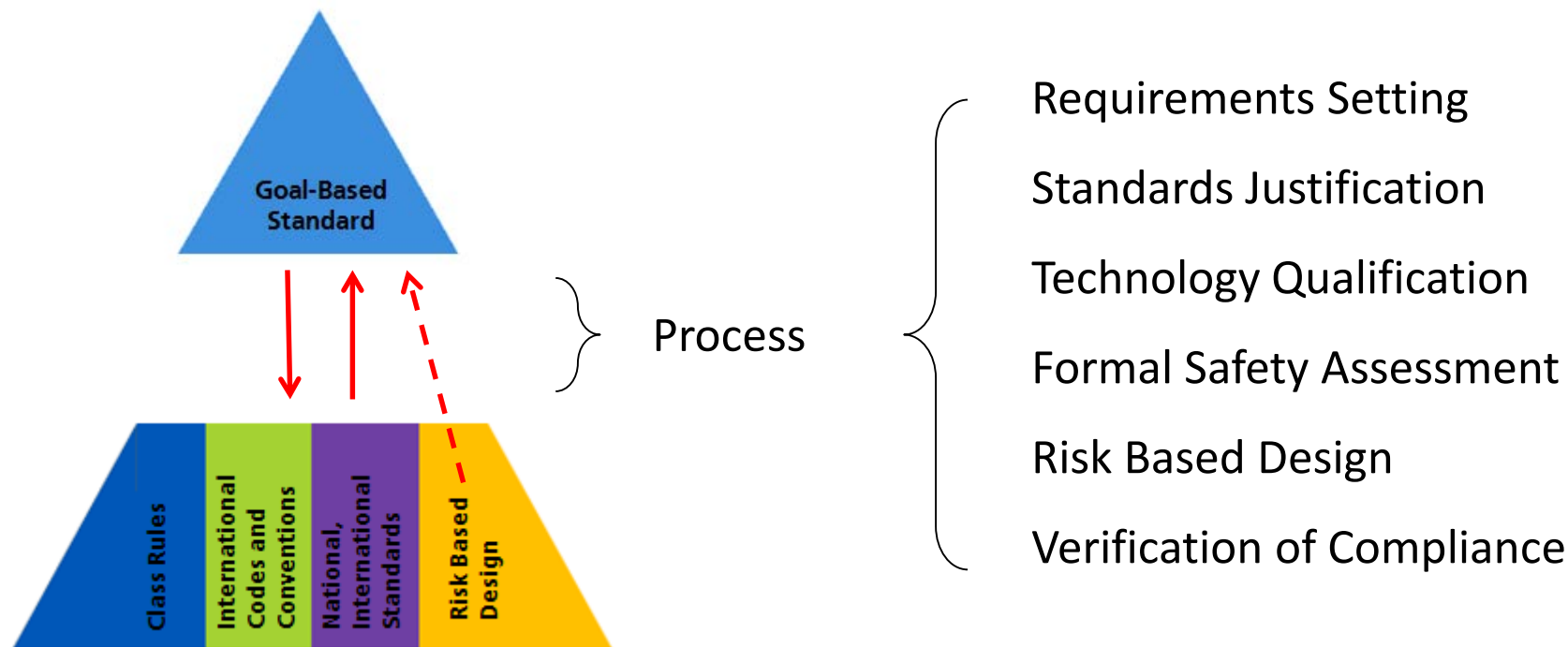
“The UMS shall be able to communicate its limitations and navigational intentions to other vessels.”

Tier 3 – Performance Requirement

"The UMS shall have a means to display its manoeuvring limitations."

Solutions, Verification activity.....

The challenge of Goal-based Assurance



Asking the right question becomes more important than knowing the correct answer.

Where do people fit?

- Periodically Manned - at Sea
 - Confined Waters Transit
 - Passengers/Non-Executive Crew
 - Repositioning
 - Launch/Recovery/Berthing
 - Mixed Manning
- Occasionally Manned - at Sea/in Port
 - Data Collection
 - Emergency Recovery
 - Maintenance/Survey/Trials
 - Cargo Operations
 - Rescue Operations
- Land-Based Control Stations
- Land-Based Third Party Sites



Maritime Safety Rules?

Health & Safety Regulations?


National Law?

Considering the Human Element within the System

- The human interface cannot be ignored.
- Design considerations should include:
 - Is the role of people in the system **feasible and safe**?
 - Are the human-machine interfaces **usable**?
 - Will the required level of human performance be **sustainable**?
- The Owner should consider the human element throughout the lifecycle.



Regulation & Challenges



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UK Ship Register signs its first unmanned vessel

Published: 13/11/2017

The UK Ship Register has signed its first ever unmanned vessel to the flag, showing how it is adapting to the maritime industry.

ASV's C-Worker 7 will be used for work such as subsea positioning, surveying and environmental monitoring, used under direct control, semi-manned or completely unmanned.


Although such autonomous vessels are now being introduced to many fleets in both commercial and military sectors across the world, they are still relatively new in the maritime sector.

Doug Barrow, Director UK Ship Register said: "By supporting emerging technologies such as autonomous systems, we are helping to keep the UK at the forefront of the global maritime industry."

"The UK Flag is growing, as we have invested in resources to meet the demands of that growth. We have the support of the UK Government, and the wider UK maritime industries to continue our expansion."

"Vince Dobbin, Sales and Marketing Director of ASV Global said, "We are delighted to have achieved the signing of a semi-autonomous vessel for maritime operations. The MCA has been critical in enabling ASV to reach this milestone recognising the prominence of unmanned systems in the maritime environment".

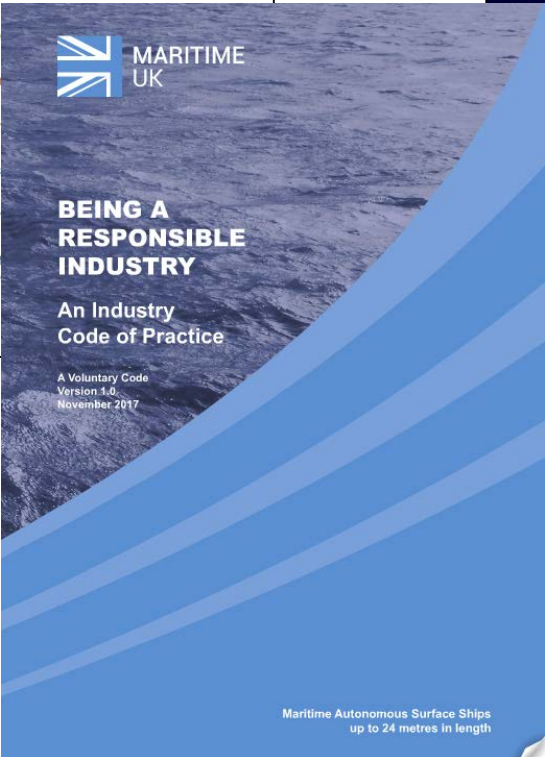
ASV has designed and built more than 80 vessels which are now deployed all over the world in the service of the gas, scientific and defence sectors.



BEING A RESPONSIBLE INDUSTRY

An Industry Code of Practice

A Voluntary Code
Version 1.0
November 2017



Maritime Autonomous Surface Ships
up to 24 metres in length



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First Unmanned Vessel Joins UK Ship Register



Image Courtesy: ASV

The UK Ship Register has signed its first-ever unmanned vessel to the flag.

As explained, the move shows how the register "is adapting to the changes of the maritime industry."

ASVs C-Worker 7 will be used for work such as subsea positioning, surveying and environmental monitoring. It can be used under direct control, semi-manned or completely unmanned.

Although such autonomous vessels are now being introduced to many fleets in both commercial and military sectors across the world, they are still relatively new in the maritime sector, according to the UK Maritime and Coastguard Agency (MCA).

"By supporting emerging technologies such as autonomous systems, we are helping to keep the UK at the forefront of the global maritime industry."

Maritime Autonomy – What's next?

- Technology Growth
 - Artificial Intelligence
 - Situational Awareness & Sensors
 - Security & Cyber Security
 - Ship Design Impacts
 - Reliability & Redundancy
- Regulatory Changes
- Future of the Seafarer
- Legal Challenges
 - Responsibility
 - Insurance Models
- Public acceptance



Thank you

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