Smart Shipping towards MASS: Dawn

2025 International MASS Seminar

1st of December 2025
Shanghai, China

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One Sea Association

In cooperation with:

Shanghai Jiao Tong University

COSCO SHIPPING 中远海运科技股份有限公司 COSCO SHIPPING TECHNOLOGY CO., LTD.

MARAUTEC 迈润智能科技

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“One Sea's vision is a safer and more sustainable maritime transport system which builds on the efficient use of advanced automation and combines human ingenuity with cutting-edge technology.”

Photo: www.seamanmemories.com

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The Maritime Autonomous Surface Ships Code

“..a goal-based MASS Code for all, not for the few..”

At its first non-mandatory stage its should be read as a guideline.

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A clear and transparent process is needed to ensure that the timeline is predictable.

- E.I.F. Non-mandatory MASS Code
- Experience building Phaze
- Approval of mandatory MASS Code
- Adoption of mandatory MASS Code
- Tacit Acceptance 18 months
- MASS Code Enter Into Force 1.1.2032
  SOLAS 4 years amendment cycle

2026	MSC 111	
	MSC 112	
2027	MSC 113	
	A 35	
2028	MSC 114	
	MSC 115	
2029	MSC 116	
	A 36	
2030	MSC 118	
2031	A 37	
2032		

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EXPERIENCE BUILDING PHASE

The framework should be robust, structured, quantifiable and verifiable.

One Sea pro-actively submitted a proposal to IMO on “Framework for an experience-building phase (EBP) for MASS" (MSC 110/5/20)

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”Operating a fleet of smaller MASS at a higher frequency has quantifiable effects on inventory management while increasing flexibility and therefore resilience in the dependent supply chains.”

Fraunhofer CML Study on the Economic Implications of Maritime Autonomous Surface Ships (MASS), 2022

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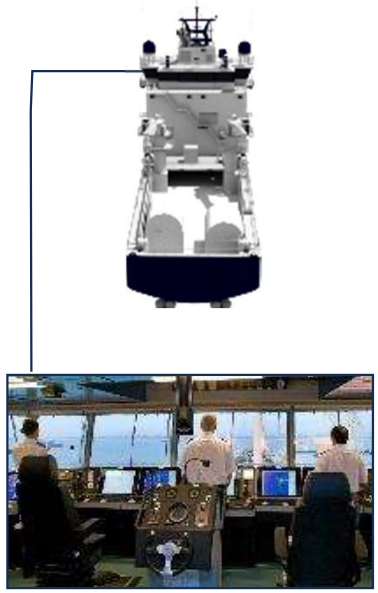
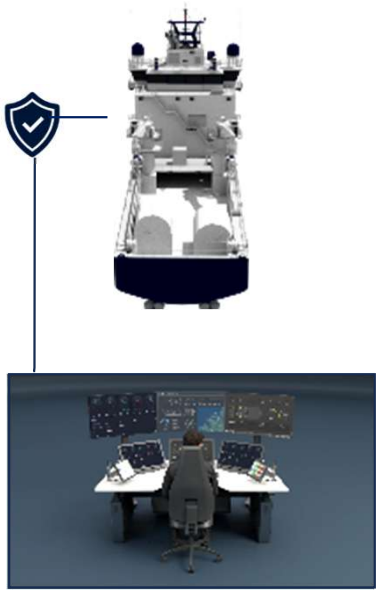
Remote & Autonomous business vision

Shaping the Maritime Industry

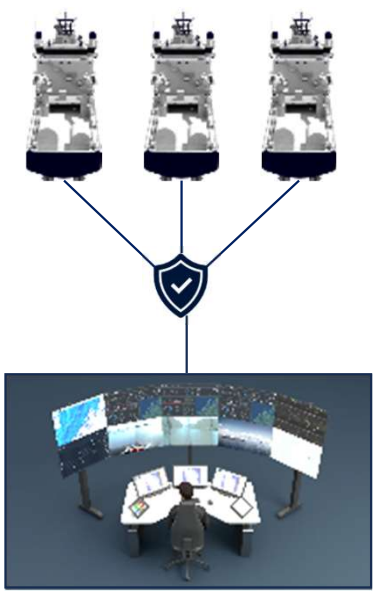
Conventional ship operation



ROWS Single vessel operation



ROWS Multi-vessel operation



ROC Fleet operation

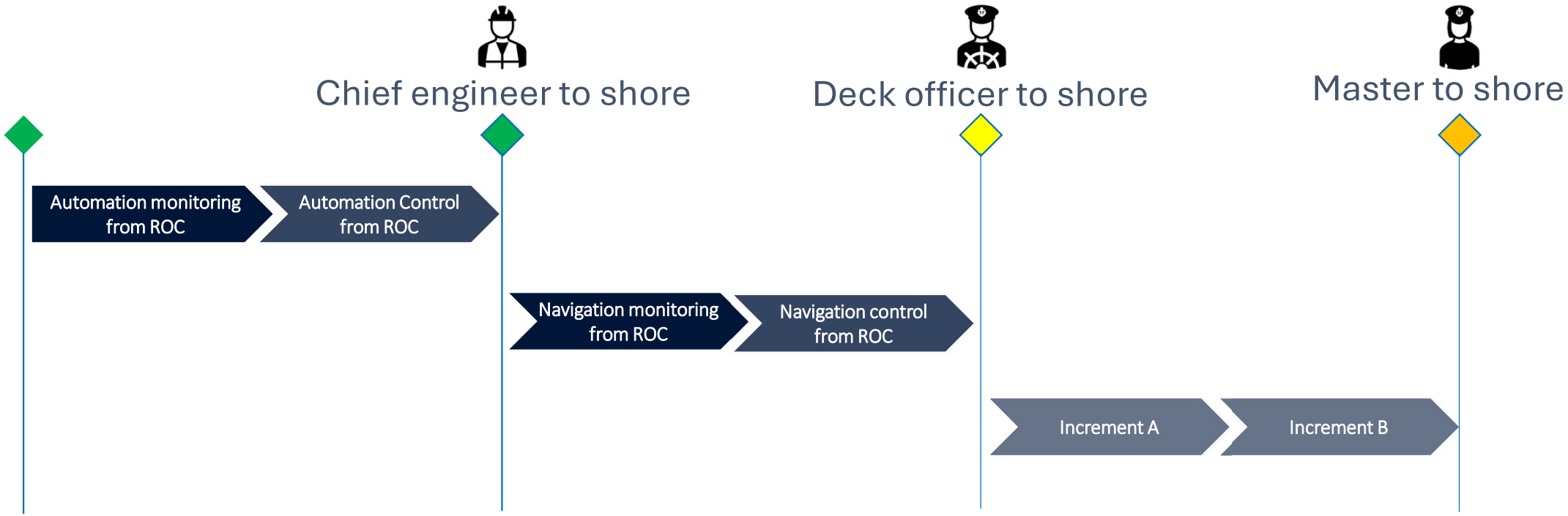
KONGSBERG

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.."

Stepwise approach with increments

ROADMAP to Remote & Autonomous operations



Master’s obligation to be onboard the MASS

One Sea submission to IMO MSC in June 2025, advocated that it should also be possible for a master to be onshore although there are persons onboard the ship (MSC 110/5/14)

agreed to keep the provision requiring a master to be physically present onboard whenever there was a crew or persons on board, having noted that one delegation expressed that further assessment may be necessary and they could submit the document on these and other related matters to MSC 111; and

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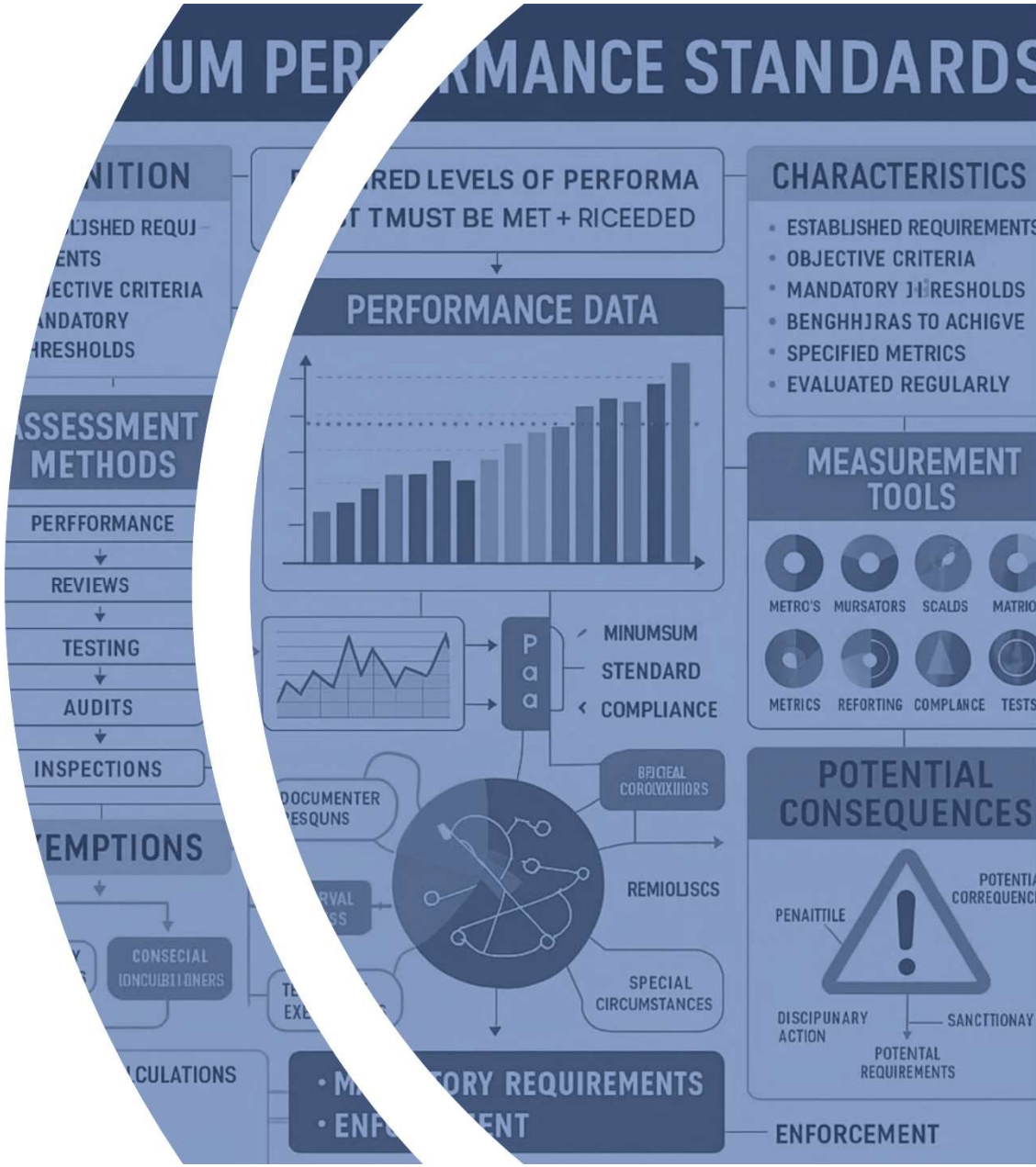
REGULATORY and STANDARDISATION BARRIERS

A ship is fundamentally a system of systems. Current type approved navigational equipment and associated minimum performance standards are designed for a totally different userneeds, and do not as such support integration to higher levels of automation



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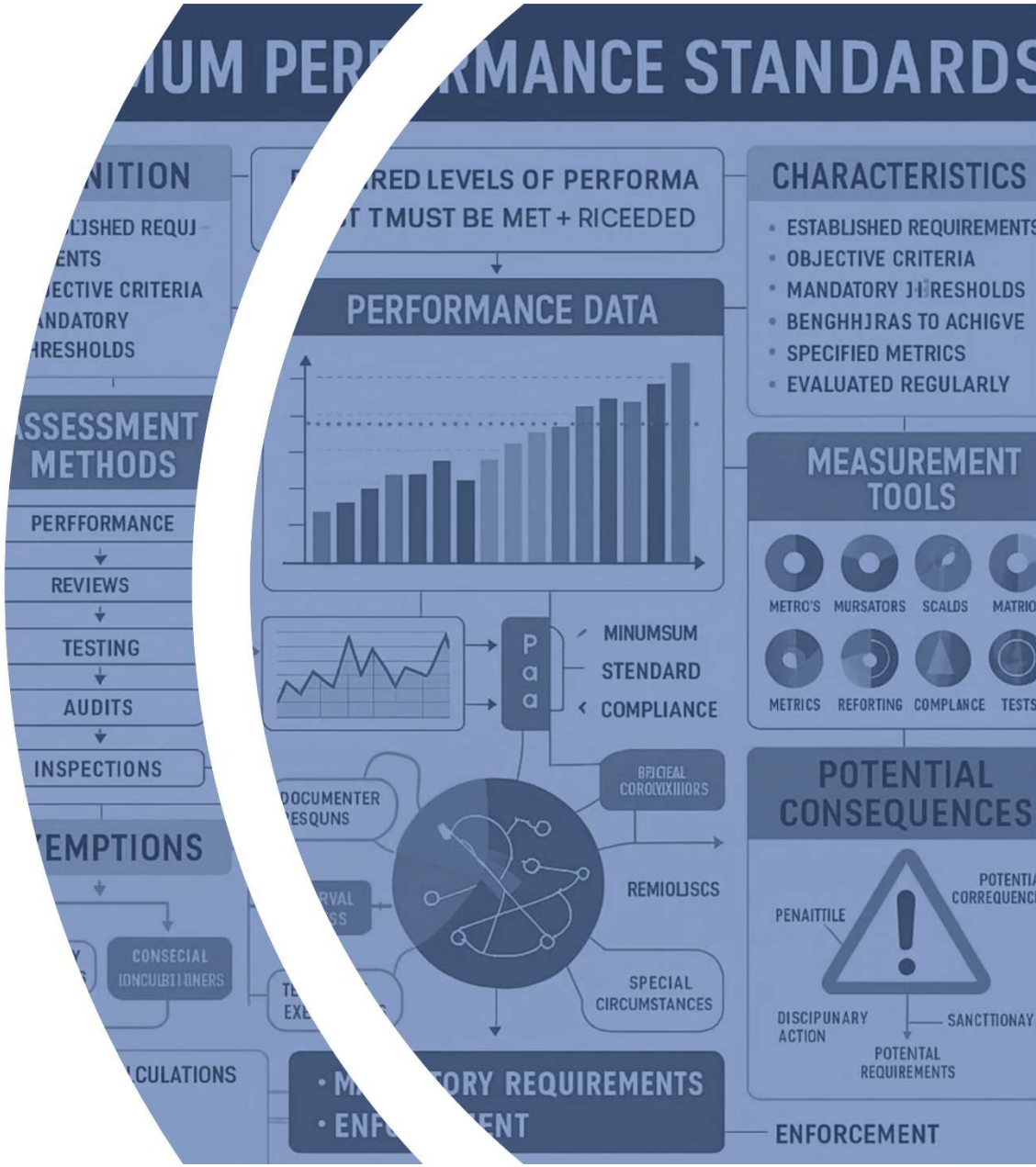
MINIMUM PERFORMANCE STANDARDS

Bridge equipment is currently designed and developed to produce separate observations and information to support a human. This information may not as such, support the functioning of a highly integrated systems, at least not within the context of the type approval.



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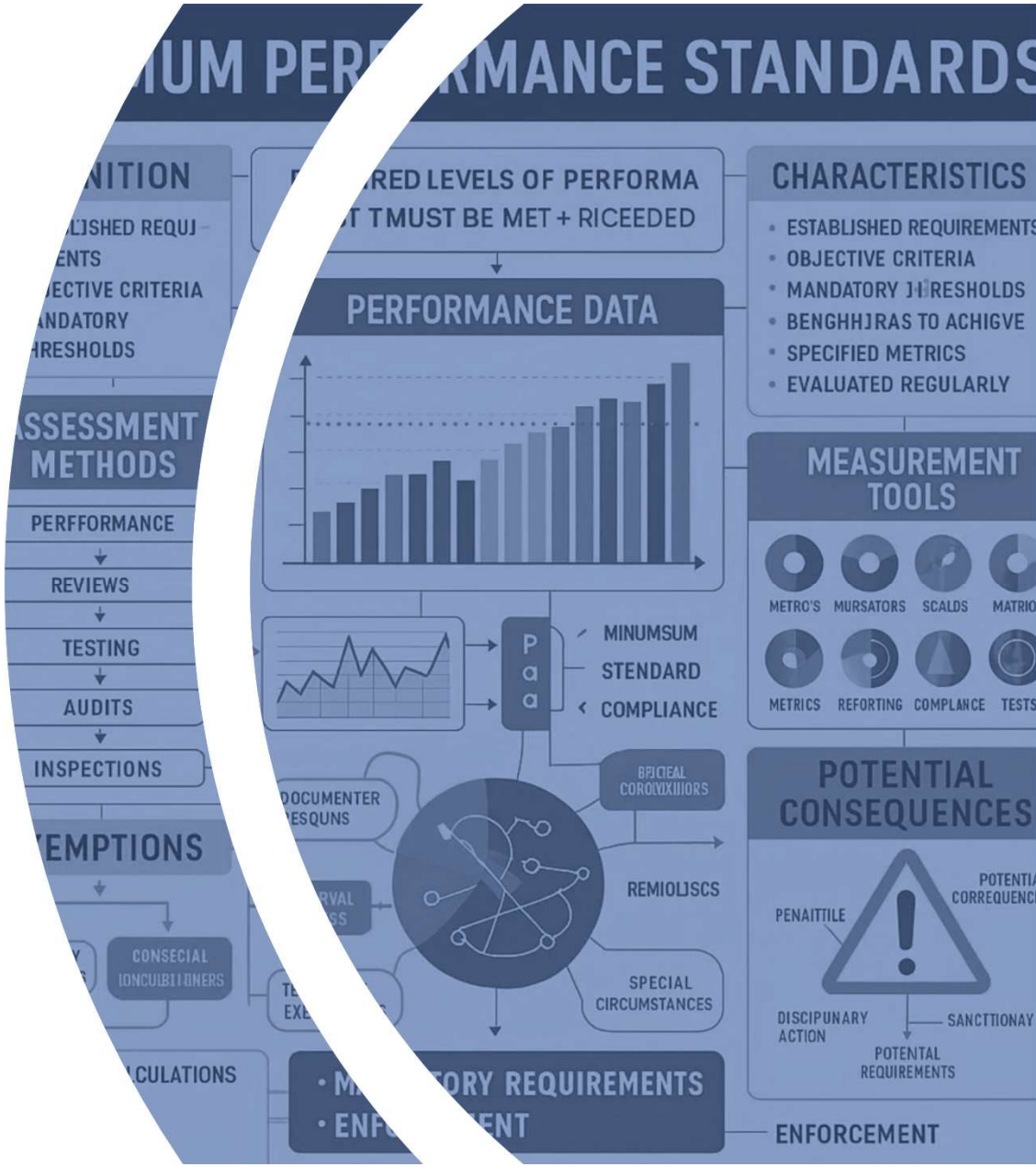
ASSURANCE, VERIFICATION and VALIDATION

Common minimum standards and verification procedures along with agreed parameters are needed to ensure that automation and autonomy software is meeting its objectives.



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DIGITAL INTERFACES

The user interfaces and data process requirements/parameters are designed to present information to the human eye and ear, which is not the same as when such a system would be designed for machine reading, learning, AI based processing or sensor fusion

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DIGITAL INTERFACES

To enable the development of situational awareness systems Application Programming Interfaces (API) need to be addressed and harmonized throughout the whole value chain.

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ISO/TC 8 "Ships and marine technology

As the ISO/TC 8 has a broader scope of marine technology; it has decided to establish a dedicated sub-committee on automated and autonomous marine technologies.

Image generated with AI

ISO/TC 8/SC 26 "Smart shipping"

The Sub-committee has commenced consideration on items such as:

- Software:
- Networks:
- Verification and test methods

Along with operational and functional aspects of MASS.

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TECHNICAL COMMITTEE 80
Maritime navigation and radiocommunication equipment and systems

An Ad Hoc Group for MASS is established to:

"To start the preparation of standards that IEC TC80 can produce to contribute to MASS"

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IHO Maritime Autonomous Surface Ships (MASS) Navigation Project Team (PT)

The Project Team met in Mokpo, Korea on 10 - 12 November 2025 and considered implications on the S-100 information.

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Joint Industry Working Group – Safe Digital Transformation

Two key modules:

1. Digitalization Module:

Facilitating discussions on the secure implementation of ship-shore communication, data governance frameworks, cybersecurity measures, and the promotion of interoperability.

2. MASS Module:

Addressing topics such as design, regulatory frameworks, cybersecurity protocols, and harmonization of international standards for autonomous maritime operations.

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IALA MASS workshop 2-3 October 2023,

FUTURE SCENARIOS REGARDING THE DEVELOPMENT AND EVOLUTION OF MASS

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SHARED UNDERSTANDING OF CORE CONCEPTS

It is time to **clarify the difference between core concepts** and eliminate the happy mixed use of terms.

IMO INTERNATIONAL MARITIME ORGANIZATION ISO IEC IALA

Not forgetting other Non-Governmental Organizations at IMO

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COMMON TERMINOLOGY

A common terminology is urgently needed to ensure the **efficient creation** of new regulations and support the development of automation **across different transport modes**.

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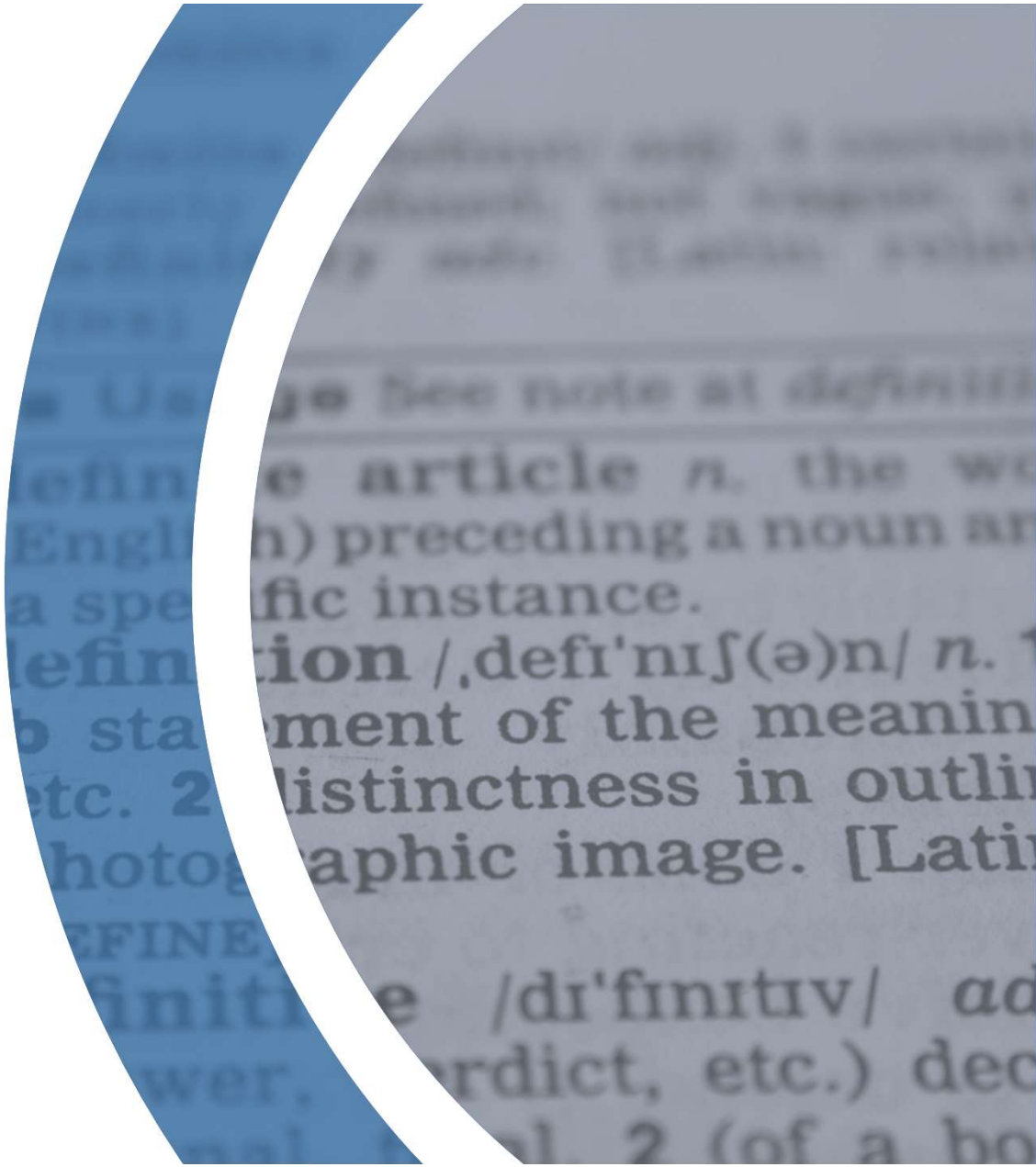
COMMON TERMINOLOGY

Commonly agreed-upon terms and definitions form the basis of clear communication, productive dialogue, and efficient creation of regulatory frameworks.



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SHARED UNDERSTANDING OF CORE CONCEPTS

We need to clarify the fundamental **concepts of automation and autonomy** and avoid using terms in a wild and free manner.

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Basic Operations	Assisted Operations	Partial Automation	Conditional Automation	High Automation	Autonomous
Human controls vessel	Hands-on Eyes-on Mind-on	Hands-off (at times) Eyes-on Mind-on	Hands-off Eyes-off (at times) Mind-on	Hands-off Eyes-off Mind-off (at times)	Hands-off Eyes-off Mind-off Human-off

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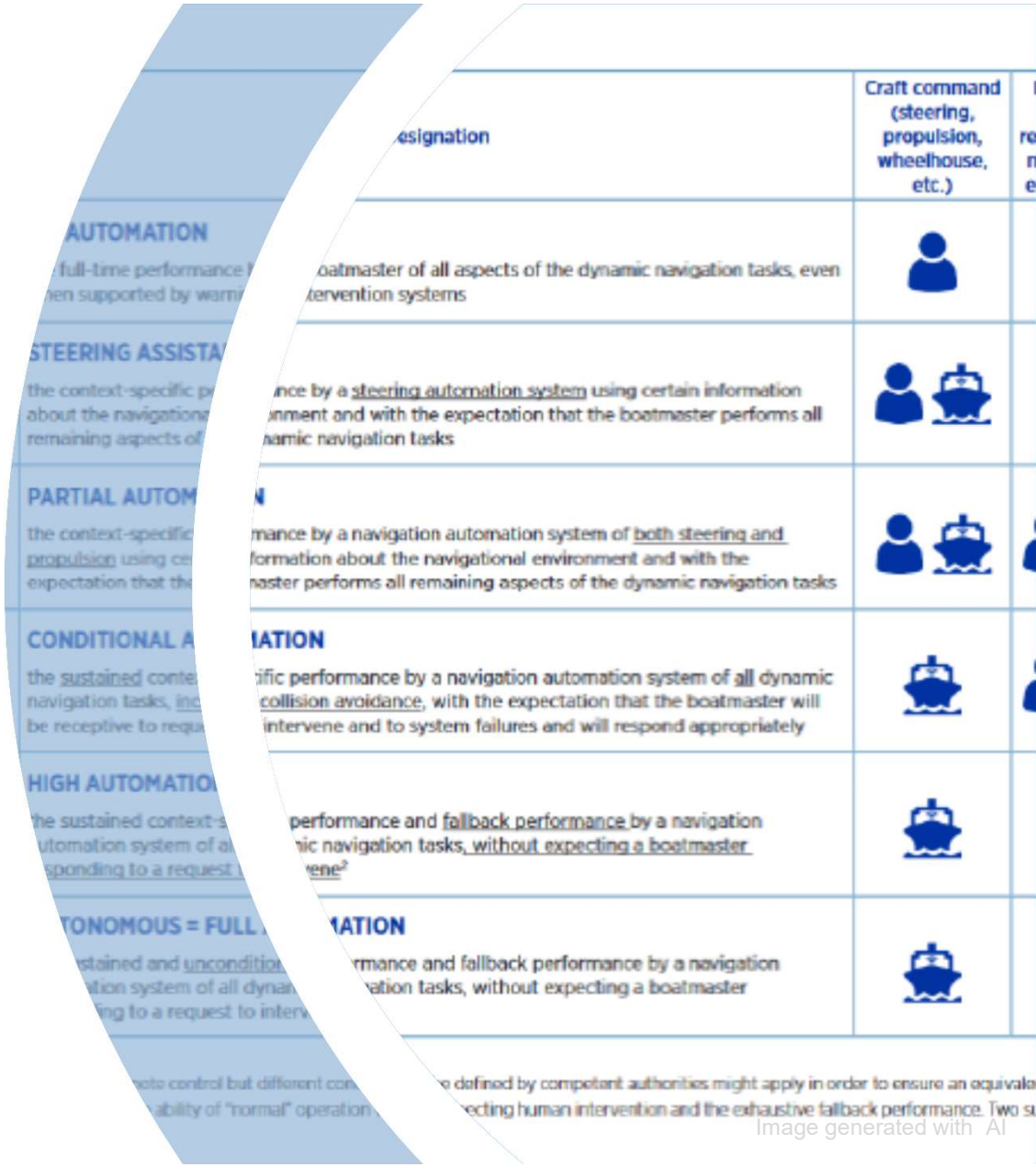

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4.5 MILLION REASONS FOR SYNCHRONISED PROGRESS

Improved efficiency and productivity

Reduced environmental impact

More innovations

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“One Sea's mission is to unite a diverse community of stakeholders to form an ecosystem to address challenges and to drive the transition towards higher utilisation of digitalisation, evolving automation, and connectivity capabilities.

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