“The Pathway to Competent Crew in the Future of Shipping vs. Autonomous Ships”

The Pathway to Competent Crew: Navigating the Future of Shipping

Human Expertise vs. Automation

Mr. Frantzeskos Kontos – 24th of October 2025

The Winds of Change: Shipping in the 21st Century

- The Evolution of Shipping
  - **Transition from sail to steam to diesel- electric powered and alternative fuel powered vessels**
  - **Globalization and economic growth driving massive fleet expansion**
  - **Integration of digital navigation and AI in future ships**
- The Rise of Automation and Its Impact
  - **Emergence of autonomous and remotely operated ships**
  - **Advanced sensors, AI navigation, remote monitoring and predictive maintenance**
  - **Redefinition of crew roles and maritime workforce skills. The need for "remote operator"**
- Increasing Pressure for Efficiency, Safety, and Sustainability
  - **Stricter IMO regulations on emissions and safety standards**
  - **Shift towards LNG, ESDs including WASP, and alternative fuels**
  - **Use of data analytics to optimize routes and reduce fuel consumption**
  - **Growing focus on green shipping and carbon neutrality**

Autonomous Ships: The Vision

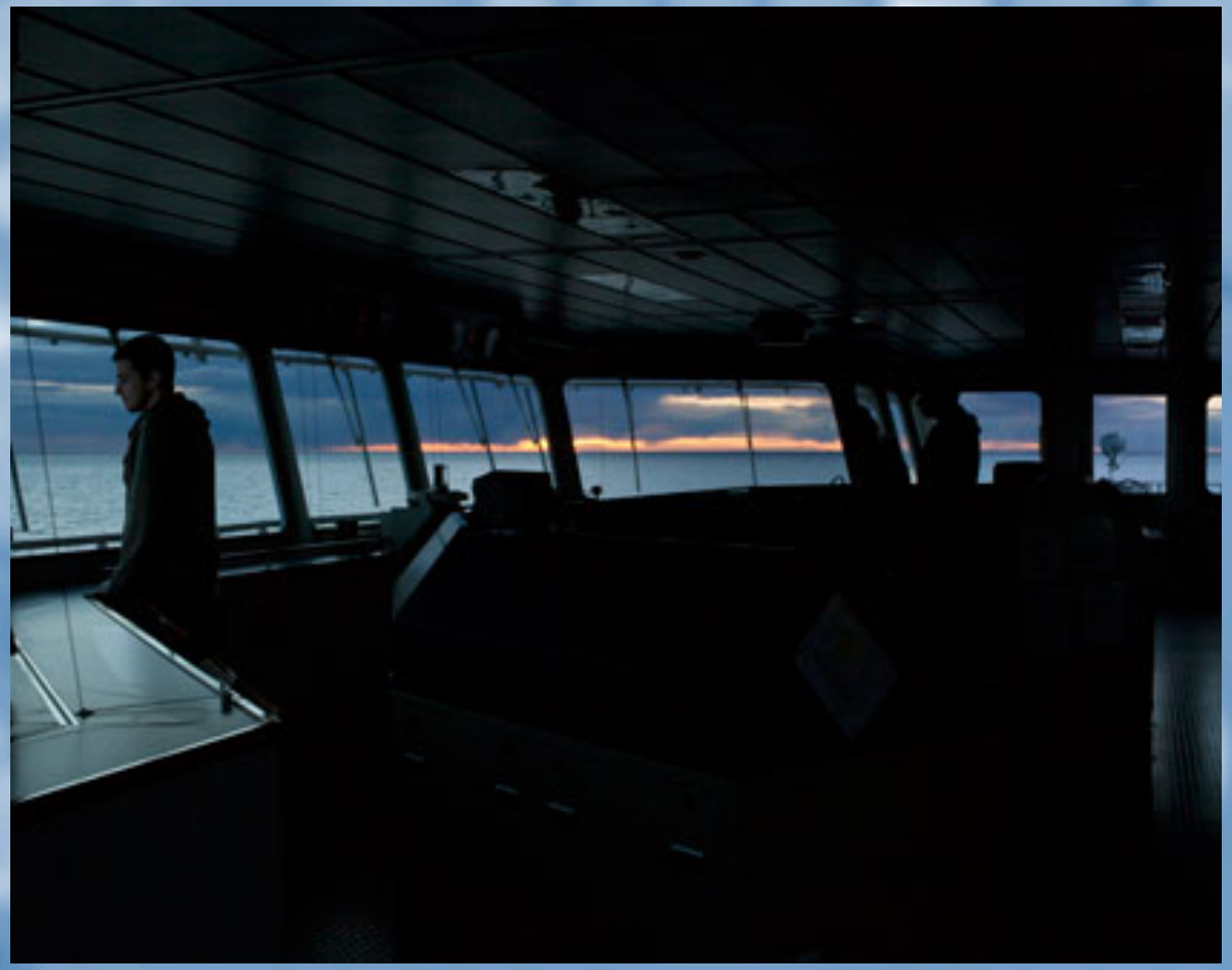
Maritime Autonomous Surface Ships (MASS) are vessels that can operate with minimal or no human intervention using AI, sensors, and control systems.

Potential Benefits and Challenges:

- **Reduced operational costs by cutting crew requirements, improved safety through automation, potentially bigger cargo space and optimized efficiency via continuous data monitoring**
- **Challenges remain in terms of technology reliability, regulatory approval, cybersecurity concerns and public perception**

The Crew of Today: Skills and Responsibilities

- **Traditional crews include the captain, officers, engineers, and ratings, each playing a vital role in navigation, safety, and maintenance**
- **Experience, specialized training, teamwork and Interpersonal Relationships are essential for handling emergencies and ensuring smooth vessel operations**
- **Human judgment remains crucial in making real-time decisions that technology alone cannot replicate**



The Crew of Tomorrow: New Skills, New Roles

- As automation grows, crew members will need to manage semi-autonomous systems and operate in a hybrid environment rather than perform only manual operations
- Future seafarers should be “smart’ on AI, data analytics, remote monitoring, cybersecurity, and maintenance of complex digital systems. Simultaneously continuous learning and strong interpersonal interactions are needed such as communication, collaboration, leadership and cultural awareness
- Continuous learning and upskilling/reskilling will be vital to stay competent in an evolving maritime landscape
- While streamlining operations and reducing human onboard presence, MASS creates a demand for a new kind of maritime professional: the Remote Operator (RO) at a remote location (company headquarters)

Investing in Human Capital: Training for the Future

- **Modern maritime training must evolve to include simulation-based learning, virtual reality tools, and digital competence. Problem-based learning (PBL) immerses seafarers in real world maritime challenges, fostering critical thinking and self-directed learning**
- **Traditional seafaring skills and hands-on experience remains essential to complement theoretical and technological training. However, Maritime training institutions should adopt a hybrid model blending traditional seafaring skills and modern competencies to address the rapid technological development**

Investing in Human Capital: Training for the Future

- **Remote Operators (RO) need to possess supplementary competencies such as the intelligent navigation systems of autonomous ships**

- **Strong collaboration between industry, governments, and educational institutions will ensure seafarers are ready for future challenges**

The Best of Both Worlds: A Collaborative Future

- **The most realistic future involves human expertise working alongside automation rather than replacing it**
- **Human oversight ensures safety and ethical decision-making when technology faces unpredictable scenarios**
- **Technology can enhance crew performance by reducing fatigue and improving decision support**

Navigating the Challenges, Seizing the Opportunities

- The maritime sector must address ethical and social implications as automation advances. Trust emerges as a pivotal keyword in relation to safety.
- Job security and career development pathways for seafarers should be safeguarded through re-skilling initiatives
- Automation also presents opportunities for new technical, analytical, and shore-based roles within the industry. Human errors vs System errors
- Breaking down the roles of MASS operators researchers could lead to the development of detailed competency profiles or job specifications that outline the specific technical, cognitive, and interpersonal requirements for different operator roles

The Future is Now: Preparing for the Voyage Ahead

- **The transition to automated and digital shipping is already underway, requiring strategic planning and adaptability**
- **Proactive investment in human capital, infrastructure and technology will be critical for long-term success**
- **Collaboration among stakeholders is essential to navigate this transformative journey effectively**

Questions and Discussion

Thank you for your attention !

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