TRIPARTITE FORUM 2019
17-18.10.2019 / Tokyo
Automated and Connected
Ships & Shipping

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/ INTRODUCTION /

Redefining shipping as part of interconnected mobility system

- Improved logistic flow
- Increase safety and operational efficiency
- Reduce environmental footprint

"To achieve fully autonomous shipping there is a stepwise development pathway to be addressed, mainly in terms of sensorisation and integration taking into account three parallel developments regarding Connectivity / Security / Integration."

(Waterborne TP – Strategic Research Agenda)

/ INTRODUCTION /

Pathway to higher degree of automation and autonomy - European Waterborne Sector target:

- By 2030, achieving higher Degree of
  Connectivity and Automation
  + Remote control operations

- By 2050, achieving integration of
  systems and standards for data

*"The sector will aim at the largescale introduction of
resilient and secure autonomous operations in 2050."*
(Waterborne TP)

waterborne.eu

Linguee Dictionary for German, French, Spanish, and more
https://www.google.be/url?...

WATERBORNE

STRATEGIC
RESEARCH AGENDA
for the European Waterborne Sector
January 2019

SEA Europe
Shipyards' & Maritime Equipment Association
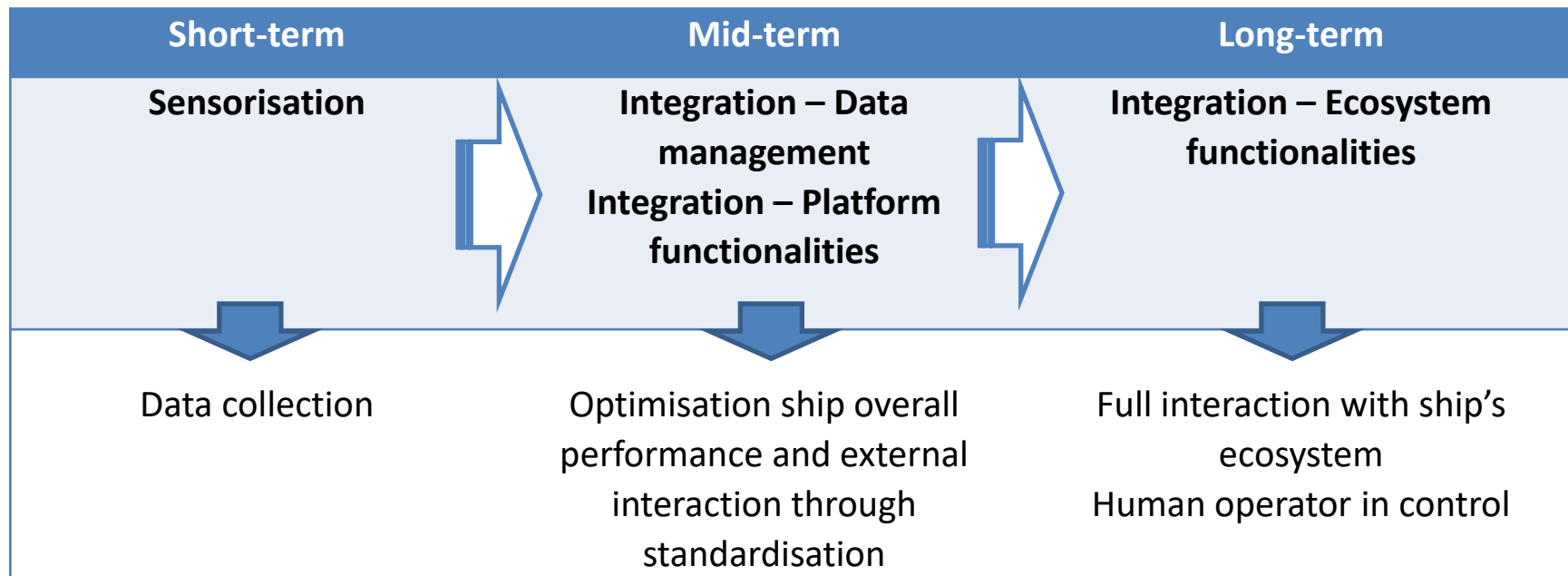
/ INTRODUCTION /

Multi-level approach

- Stepwise technical development
- Strategies: Connectivity, Security and Integration
- Regulatory framework

Courtesy: Rolls-Royce

/ TECHNICAL DEVELOPMENT PATHWAY /

Short-term	Mid-term	Long-term
Sensorisation	**Integration – Data management** **Integration – Platform functionalities**	**Integration – Ecosystem functionalities**
Data collection	Optimisation ship overall performance and external interaction through standardisation	Full interaction with ship's ecosystem Human operator in control

"Ultimately, autonomous navigation is not about trajectory but knowledge of the ship's surrounding environment (Situational awareness) and the ability to react autonomously on these surroundings."

/ PARALLEL LINE OF IMPROVEMENT (R&D) /

Definition of scenarios to increase the overall safety and security

"*Defining autonomous ship means defining the risks we accept to take"*

CONNECTIVITY
- Business model and system integration
- Stakeholder involvement

www.codekilo.org

SECURITY
- Prevention and control of cybersecurity threats - Essential to preserve the integrity and efficiency

"Need for all players to address the complexity of challenges on the topic of cybersecurity in order to succeed in the digital transition."

INTEGRATION
- Continuous and flexible integration process – Coherent framework for IPR protection

/ REGULATORY FRAMEWORK /

INTERNATIONAL (IMO)

▪ **Adaptation of legislative framework to ensure safe navigation**

"The IMO needs to properly consider the timely adaptation of the international regulatory framework able to embrace the safety aspects, the human element aspects and the technology developments all the way up to the highest levels of autonomy level in a goal-based approach."

EUROPE

▪ **Connected and automated ship & shipping enabler towards IMO**

"Enhanced ship connectivity and automation are critical to innovation and competitiveness. Important that Europe will keep its leading position in terms of the deployment of integrated automated systems and will set the standard in data exchange and communications."

/ CONCLUSION /

Beyond pure technical developments – Need to reflect on a coherent framework on:

- **How the system will be interconnected**
- **How to prevent and control of cyber security threats**
- **How to ensure IPR proof system integration overtime**
- **How humans will interact**

/ QUESTIONS /

- Any Questions?
- How would you define autonomous shipping – Human intervention?
- How to minimize the risks that affect the reliability of the digital environment?

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