



Building a future maritime environment where human ingenuity
meets cutting-edge technology

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ONE
SEA

- 1. Understanding the change – what, why now, and hype vs. reality**
- 2. Building a strong base for maritime automation and autonomy**
- 3. Future maritime professionals – no dropouts, please!**
- 4. Need to navigate together – it is not only about ships**

1. Understanding the change – what, why now, and hype vs. reality

MARITIME AUTOMATION AND AUTONOMY IS NOT A NEW IDEA

“In the future, the captains will perform their duties from an onshore office building, and the vessels will be navigated with the use of computers.”

Rolf Schonknecht (1970). Ships and shipping of tomorrow.



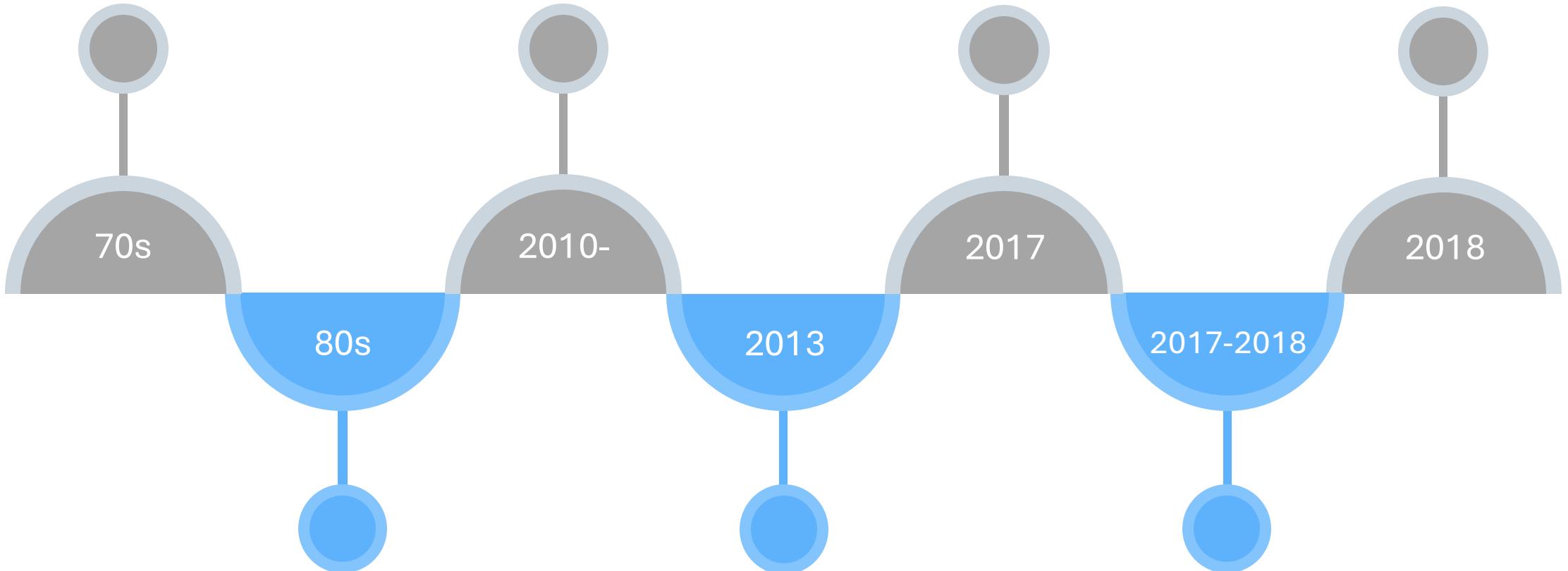
Image generated with AI

Autonomous ship,
remote control

Projects in Europe &
South Korea

Autonomous ocean
transport system (JP)

Massterly (NO)



Japanese intelligent
ship project

ReVolt
by DNV GL & NTNU

Falco & Suomelinna ferry
trials by ABB & Rolls Royce (FI)



Study: Voyage optimization can cut emissions by 7.3 pct

February 14

ABS approves Japanese autonomous shipping project

24 Jul 2023 by Riviera News

We're still waiting for self-driving cars, but autonomous boats are already here

By Nadia Leigh-Hewitson, CNN

Updated 4:27 AM EDT, Fri May 26, 2023

Look, no hands! The autonomous ship is coming closer

BT

David Hughes

Published Tue, Sep 05, 2023 · 4:24 pm

A maritime artificial intelligence (AI) application has demonstrated fuel savings and reduced greenhouse gas emissions for fleets of tankers, roro vessels, container ships and dry bulk carriers... automated situational awareness platform helped [to] ... cut 172,716-tonnes CO₂ emissions in 2023... 33% reduction in close encounters in open waters and a 40% decline in crossing events.



2. Building a strong base for maritime automation and autonomy

BUILDING BLOCKS OF A SOLID FOUNDATION

- Common terminology
- Shared understanding
- Human-centric development



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**.

EMBRACING SYSTEM THINKING

A ship is a system of systems. Instead of seeing a ship as one big entity, it should be seen as a **collection of systems** that together produce a desired outcome.



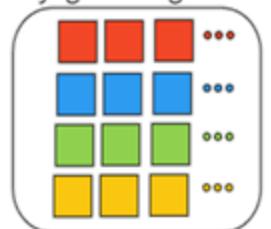
Navigation

Machinery and technical systems

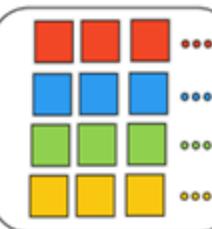
Deck Operations

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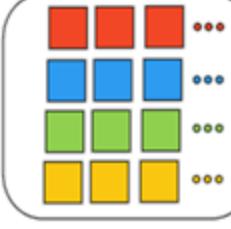
Voyage Management



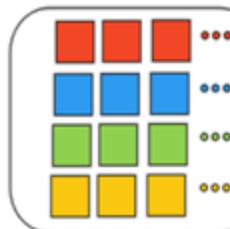
Communication



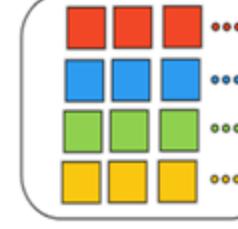
Power generation



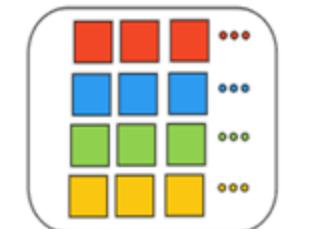
Electrical systems



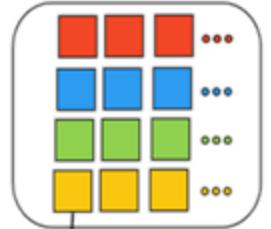
Cargo operations



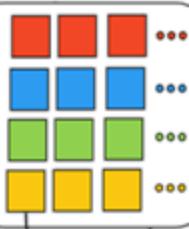
Mooring and anchoring



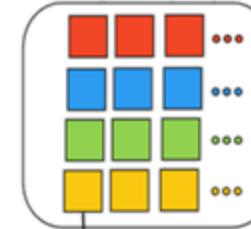
Situation Awareness



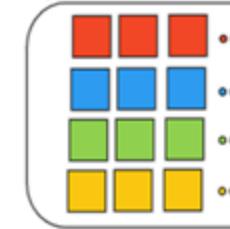
Ship Control



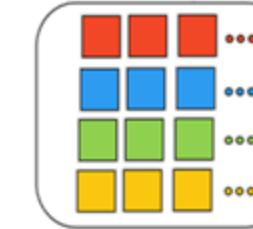
Steering and propulsion



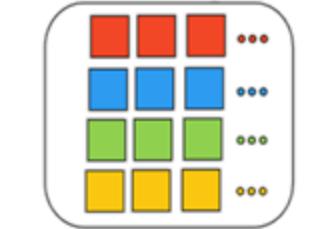
System monitoring



Other deck operations



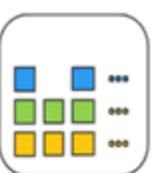
Lock and Bridge operations



Electronic Lookout



Collision Avoidance



Auto Docking



Industry's need for regulation of automated functions

- goals, functional and performance requirements

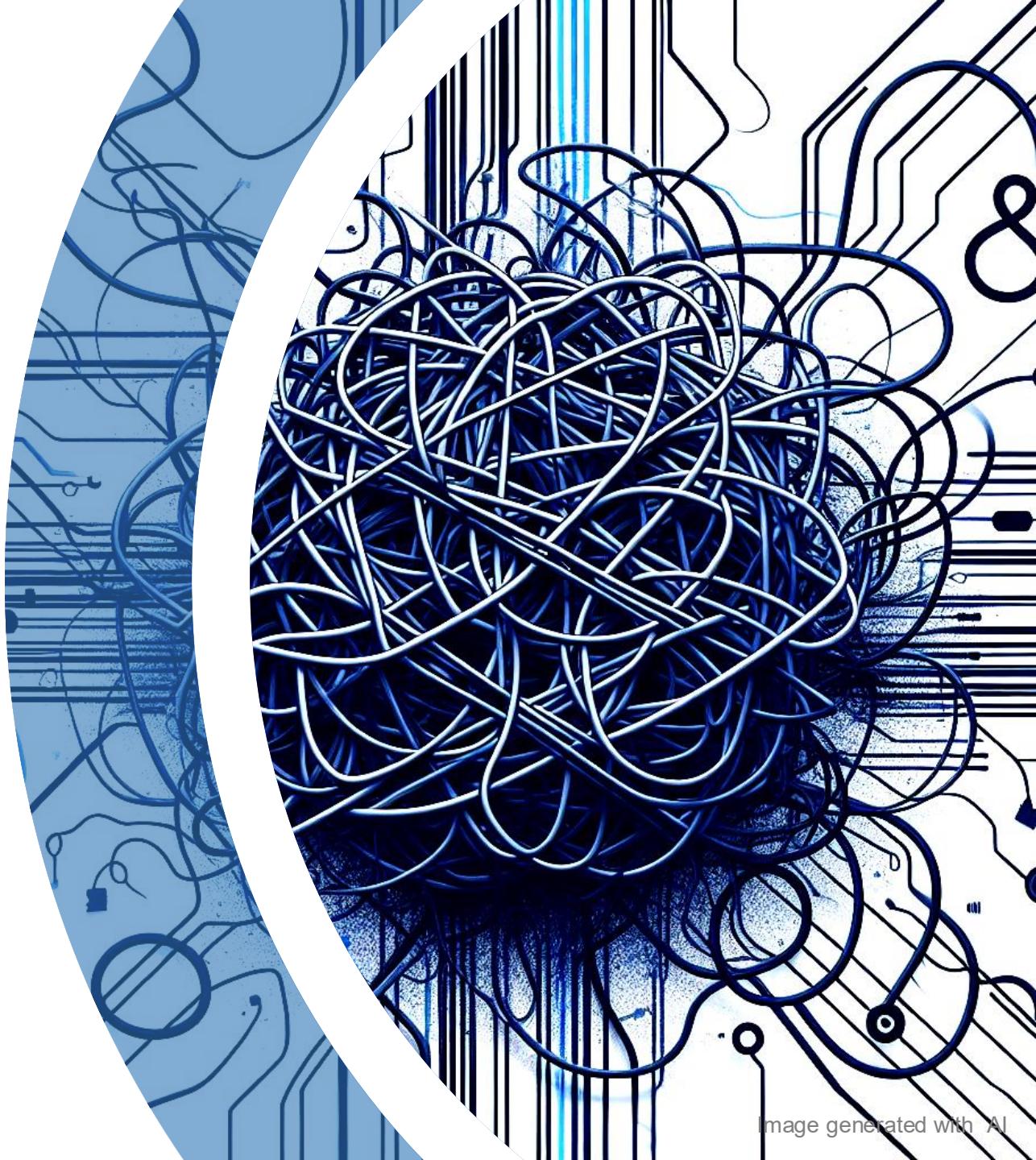


- The automation level of various systems may differ.
- Autonomy is a sum of automated functions.
- **A single fully autonomous system does not make the entire ship autonomous.**



MIXING APPLES WITH PEARS

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



Level 0

Basic Operations

Level 1

Assisted Operations

Level 2

Partial Automation

Level 3

Conditional Automation

Level 4

High Automation

Level 5

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

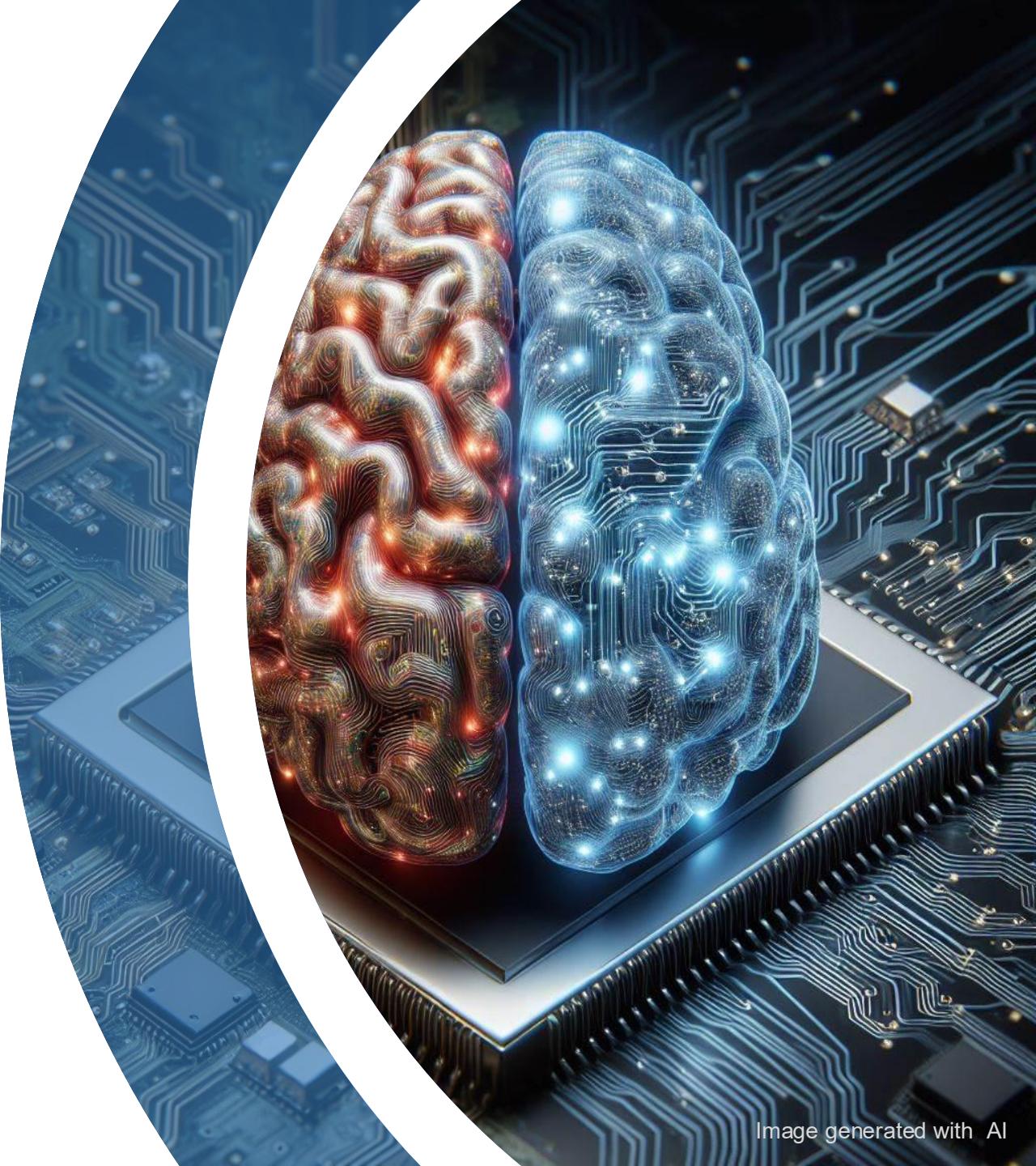




3. Future maritime professionals – no dropouts, please!

HUMAN-CENTRIC DEVELOPMENT

The current aim is to enhance human strengths with the strengths of technology while compensating for human weaknesses.



NO DROPOUTS, PLEASE!

We should create a future where current seafarers and other maritime professionals are able to maintain their expertise and professional pride.



IMPACT OF EVOLVING TECHNOLOGIES ON MARITIME CAREERS

- Previous, current, and new skills converge
- Cultural change progresses
- Change management becomes critical
- Emergence of new professions



4. Need to navigate together – it is not only about ships

MARITIME TRANSPORT CHAIN

We have 4.5 million reasons to ensure the **synchronised development** of ship and port automation.

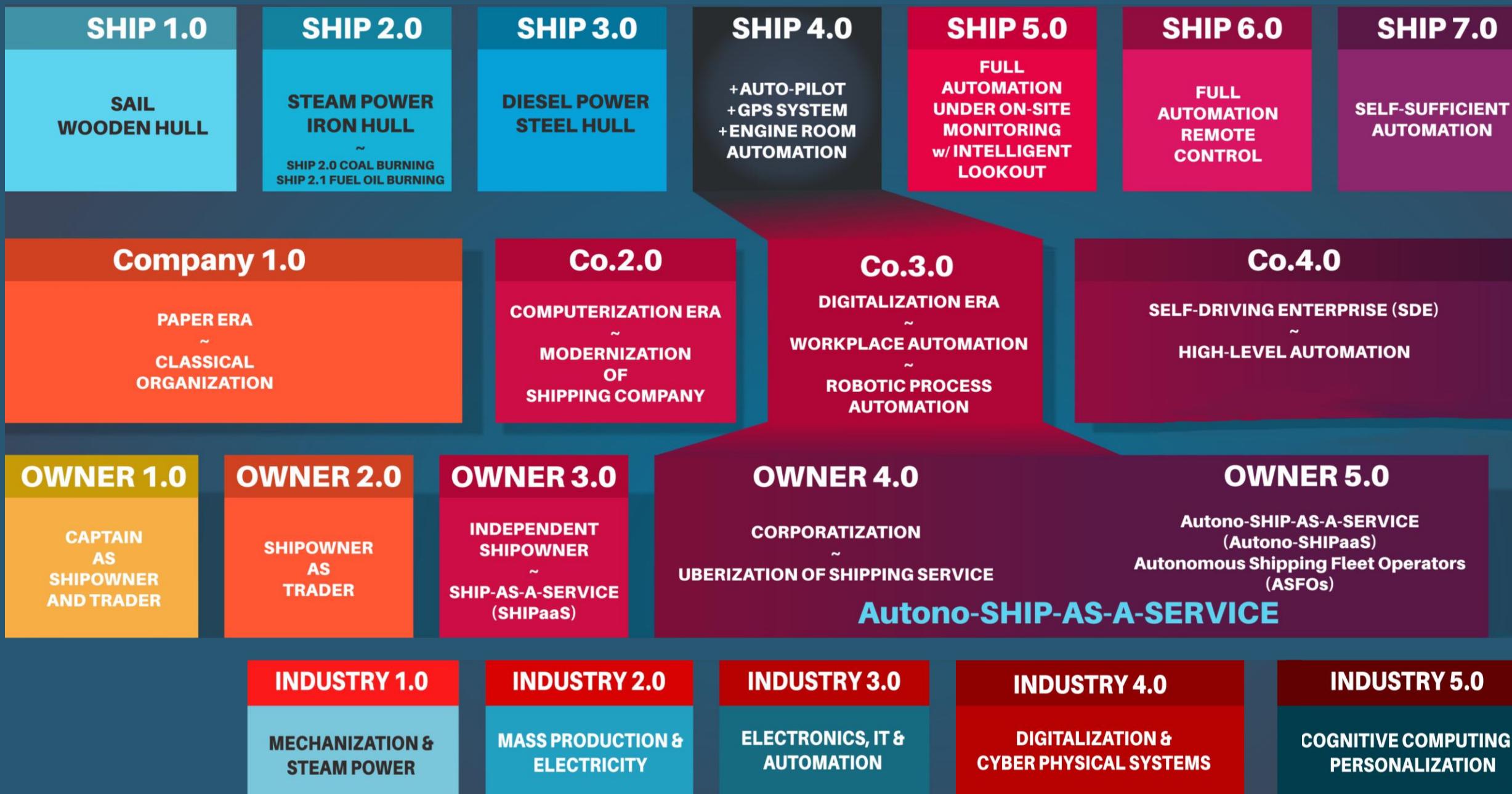


”Operating a fleet of smaller MASS at a higher frequency has quantifiable effects on inventory management while increasing flexibility and therefore resilience in the dependent supply chains.”



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







In summary...

The evolving technology creates transformation

- from manual to automated
- from digital to intelligent
- from operations to monitoring
- from traditional and existing to "something new"



**Yet, the fundamental need remains.
Cargo still needs to be transported
from point A to point B...**

- safely and efficiently,
- in compliance with regulations and agreements,
- by providing support to professionals onboard and onshore
- through jointly developed reliable technology.



Fully leveraging the opportunities offered by technology requires...

- extensive collaboration,
- enabling legislation,
- sustainable development.





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**ONE
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