



massterly
a Kongsberg Wilhelmsen joint venture

Benefits from automation

Pia Meling, Massterly

Executive Meeting, Gothenburg, 17th January

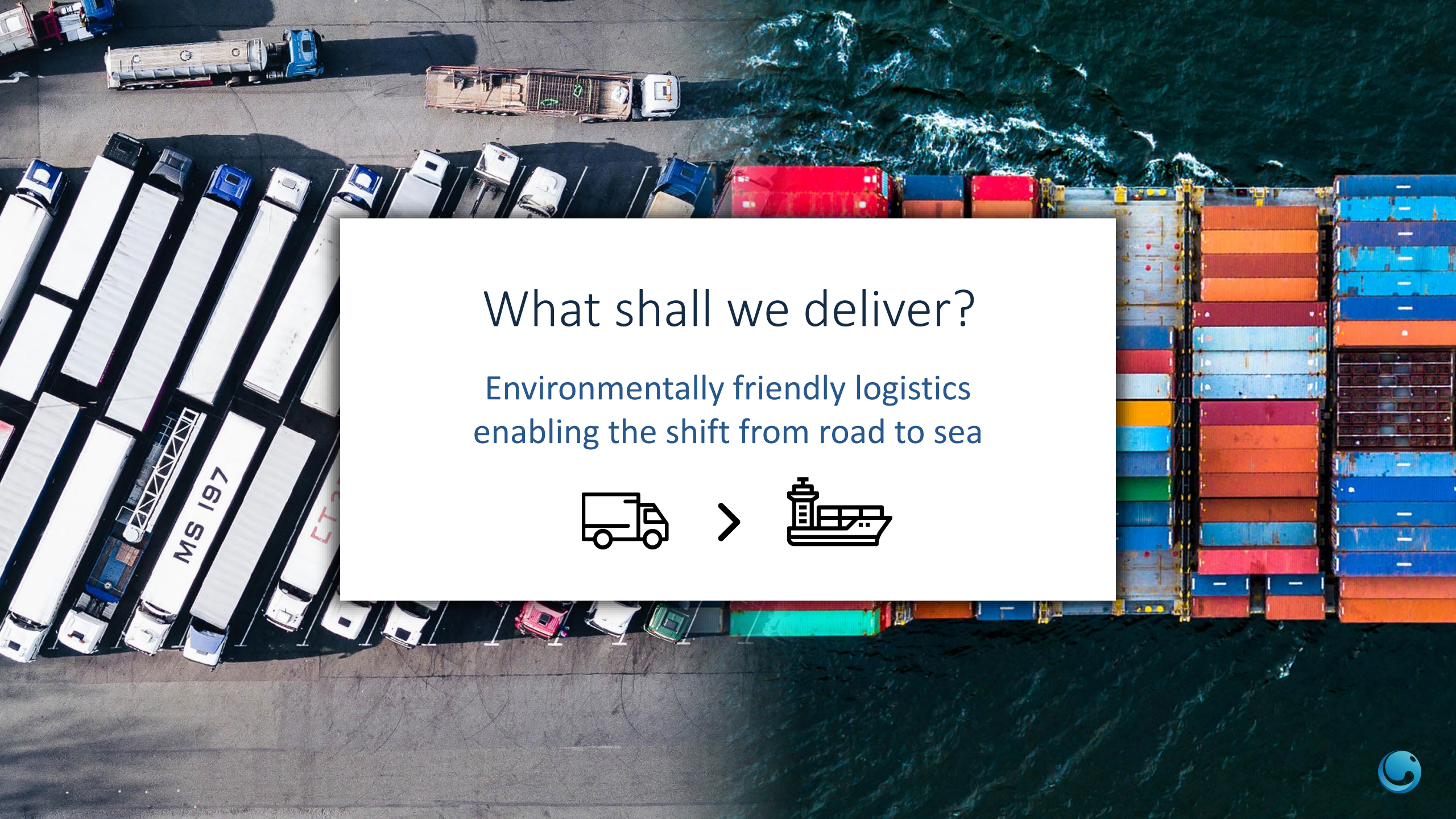










An aerial photograph of a busy port. On the left, a large number of white semi-trucks are parked in neat rows on a paved area. Some trucks have blue cabs, others white. One truck has 'MS 197' written on its side. In the center, a large cargo ship is docked at a pier. The ship's deck is covered with numerous colorful shipping containers in shades of red, blue, orange, and green. The ship is moving through the water, creating a white wake. The water is a deep blue-green color. The sky is not visible.

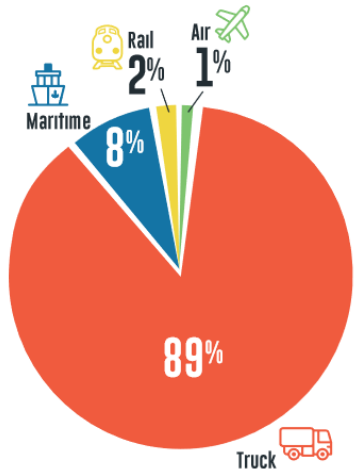
What shall we deliver?

Environmentally friendly logistics
enabling the shift from road to sea



Political ambitions and willingness to invest in the shift

How Freight Moves Through NYC²⁸



Source: NYCEDC

EXTRA TRAVEL TIME ⓘ



38min
PER DAY

145h
PER YEAR

Source: TOMTOM TRAFFIC INDEX 2016

New York

- Trucks move 90% of NYC fast growing freight tonnage
- Truck congestion cost NYC \$862 million in lost economic activity (2017)
- “Freight NYC” initiative: Create a hub-and-spoke marine highway barging operation
- \$100 million plan for more sustainable and resilient supply chain network by 2027

EU

- 30% of all goods transported by trucks >300 km. to be transferred to sea/rail by 2030 (50% by 2050)
- «Horizon 2020» funding earmarked to solve the Transport Challenge is €6,3 billion (2014-2020)

Norway

- Oslo drivers spend 145 hours per year in traffic jams
- Oslo: Emission-free high-speed ferries by 2024 and zero emissions in/out of port
- World heritage fjords: zero emissions tourist ships and ferries by 2026
- The state (ENOVA) has paid out support of NOK 1,3 billion to battery driven vessels since 2015





- World leader in automation
- Frontrunner in digital development
- Leading in development of autonomy
- In front on cyber security

www.kongsberg.com



- In front on vessel operation
- Major logistics operator at sea and on land
- Owns and operates 20+ terminals
- A global network - 2 200 ports in 74 countries

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What is an autonomous ship?

IMO definition – for regulatory scoping exercise:

“Maritime Autonomous Surface Ship (MASS)” is defined as a ship which, to a varying degree, can operate independently of human interaction.



Various degrees of autonomy:

- Automated processes and decision support: Seafarers are on board to operate the ship, but some operations are automated
- Remotely controlled ship with seafarers on board
- Remotely controlled ship without seafarers on board
- Fully autonomous ship: The operating system of the ship is able to make decisions and determine actions by itself



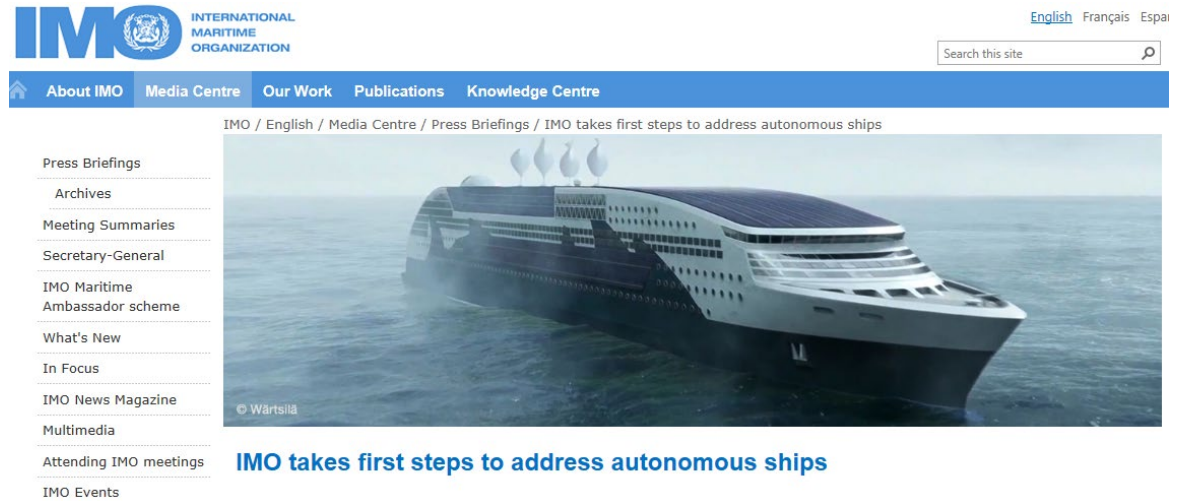


CLASS GUIDELINE

DNVGL-CG-0264

Edition September 2018

Autonomous and remotely operated ships

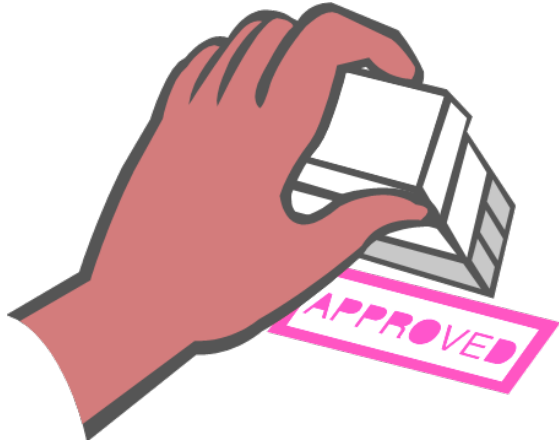


- The IMO instruments governing the safety of commercial shipping do not provide any regulations for autonomous operations, but IMO has started a scoping exercise
- National or regional regulatory bodies are free to support the introduction of novel technologies and operational concepts within their territorial waters.

Guiding principle: Autonomous and remote control of vessel functions to have a level of safety equivalent or better compared to conventional operations of vessels with respect to safeguarding life, property and the environment.



Massterly is clearing the road towards autonomous logistics



- Captain's role
- Manning and competence in Shore Control Centre
- Acceptance criteria for autonomous sailing
- Compliance with SOLAS
- Compliance with the ISM Code
- Compliance with the ISPS Code
- Local rules and sailing permits
- Flag state regulations
- Legal aspects in general
- Insurance

...by collaborating closely with authorities and stakeholders



Our offering: The entire value chain



Logistics

Planning and full operation from factory to dealer



Terminals

Design, specification, project management and operation



Autonomy

All hardware and software for the vessel and the shore control center



Vessel

Turn key; design, specification, site management and approvals



Operation

Vessel operation from control center, ship management, all approvals etc.



Manning

Access to all maritime and technical competence as required



Insurance

Broking and facilitation



Financing

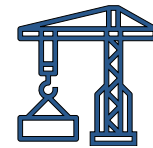
Facilitation and possible participation





Massterly offers a “Truck to Truck” solution

A



B

Competing with roads transport requires
autonomous solutions both on vessel and in ports

Major cost drivers

Unmanned vessels offer significant improvement in the two major cost drivers for short sea shipping operations – crew and port handling



Crew

● Classic feeders

● Autonomous

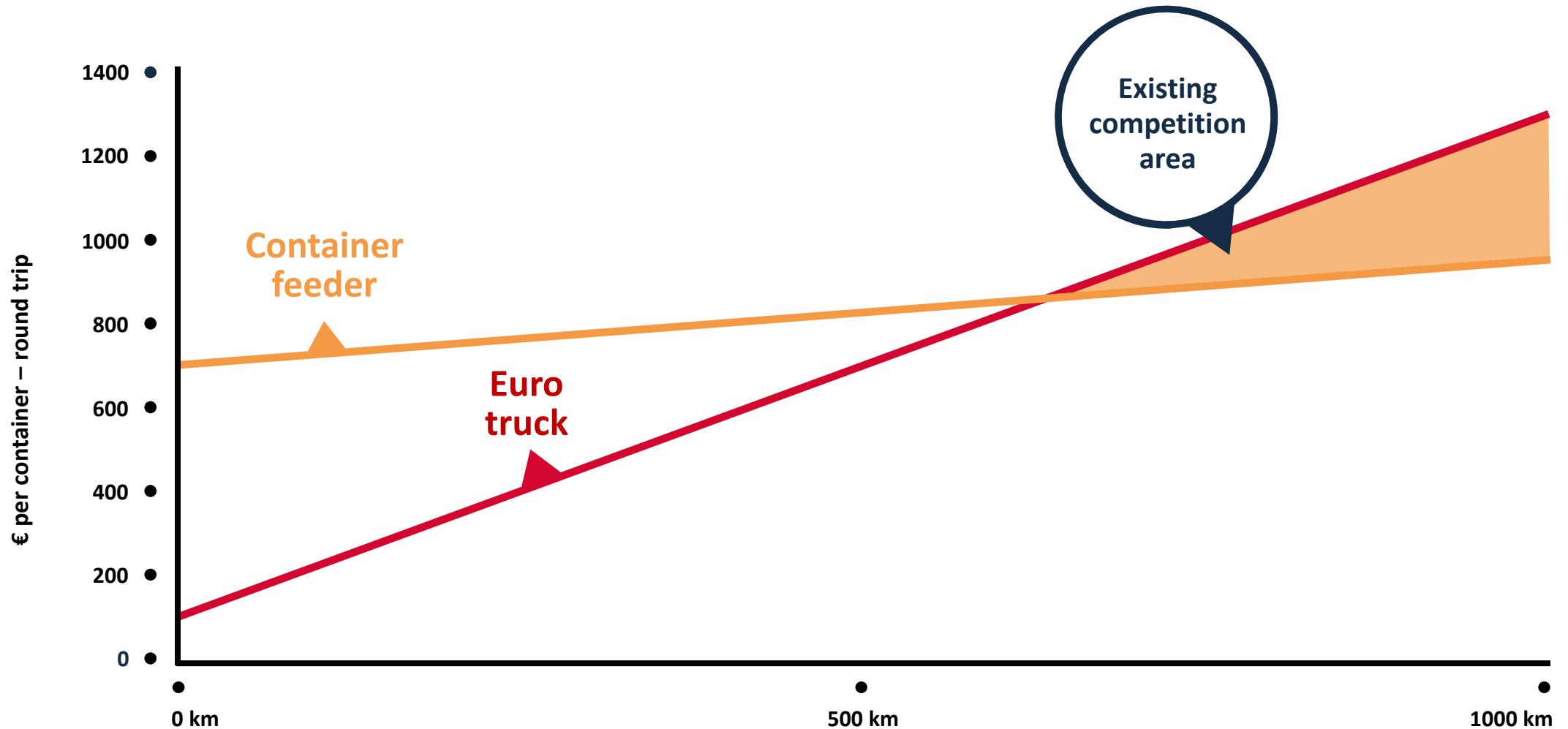


Port
Handling

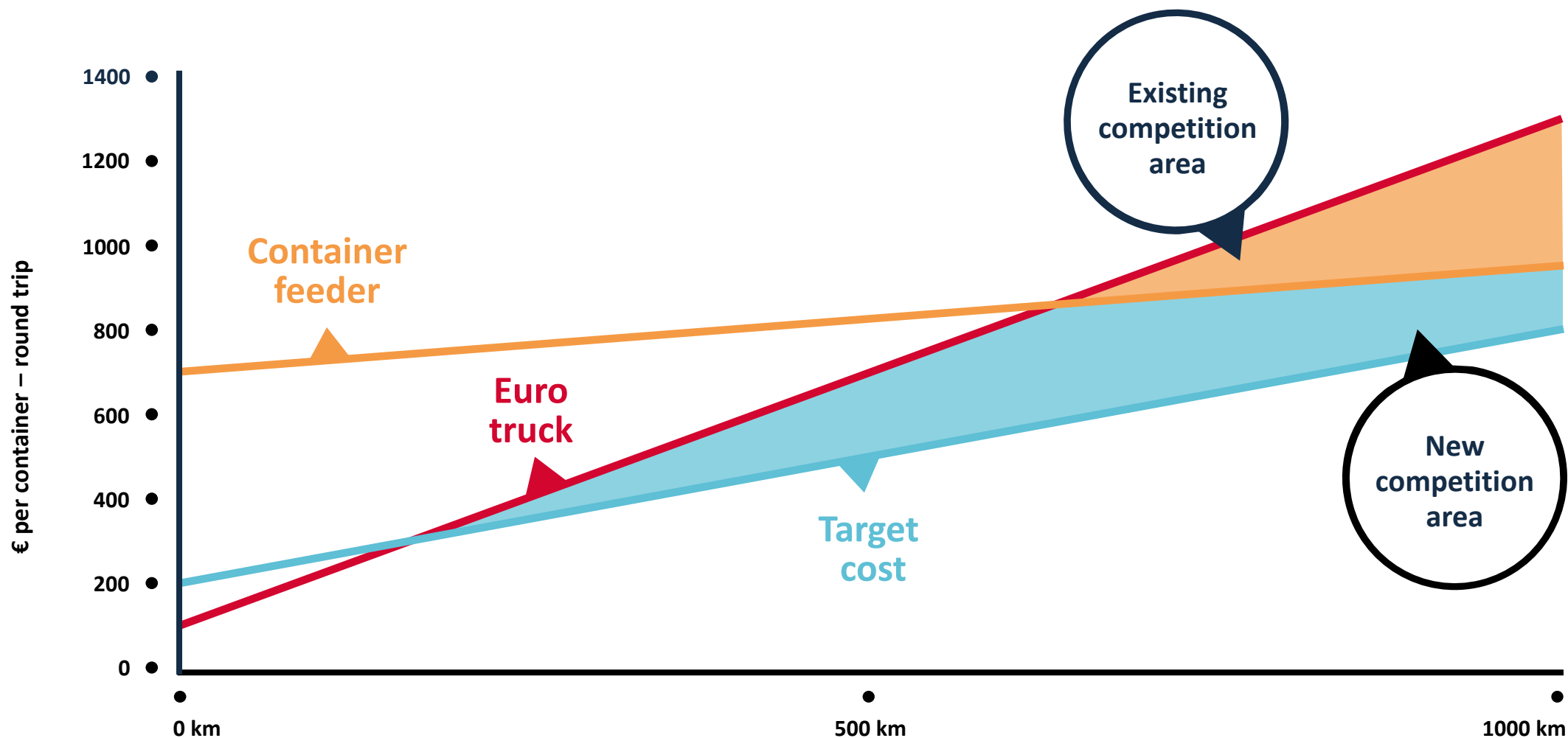
● Classic feeders

● Autonomous

Feeders are competing with trucks in 800 – 1 000 KM range



Autonomous feeder logistics will compete with road transport on significant shorter distances





Autonomy is the means, not the target

- Lower investment cost - vessels without crew accommodation and bridge
- Lower operational cost – crew on shore supporting several vessels
- Zero / low emission vessels
- Improved safety at sea and in port
- More efficient port operations
- Reduced road traffic (congestion/accidents)
- Reliability of solution compared to roads



Footprint improvement

30%

slower travel



50%

fuel saving

- Reduced speed is a key factor in making maritime transport more environmentally friendly.
- Autonomous vessels can easily adopt slow speed as there are no crew restrictions.
- Reduced exhaust emissions and lower Co2 footprint



Sources: [MUNIN Dissemination](#)





Shortage of personnel

Seagoing professions are increasingly perceived as unattractive:

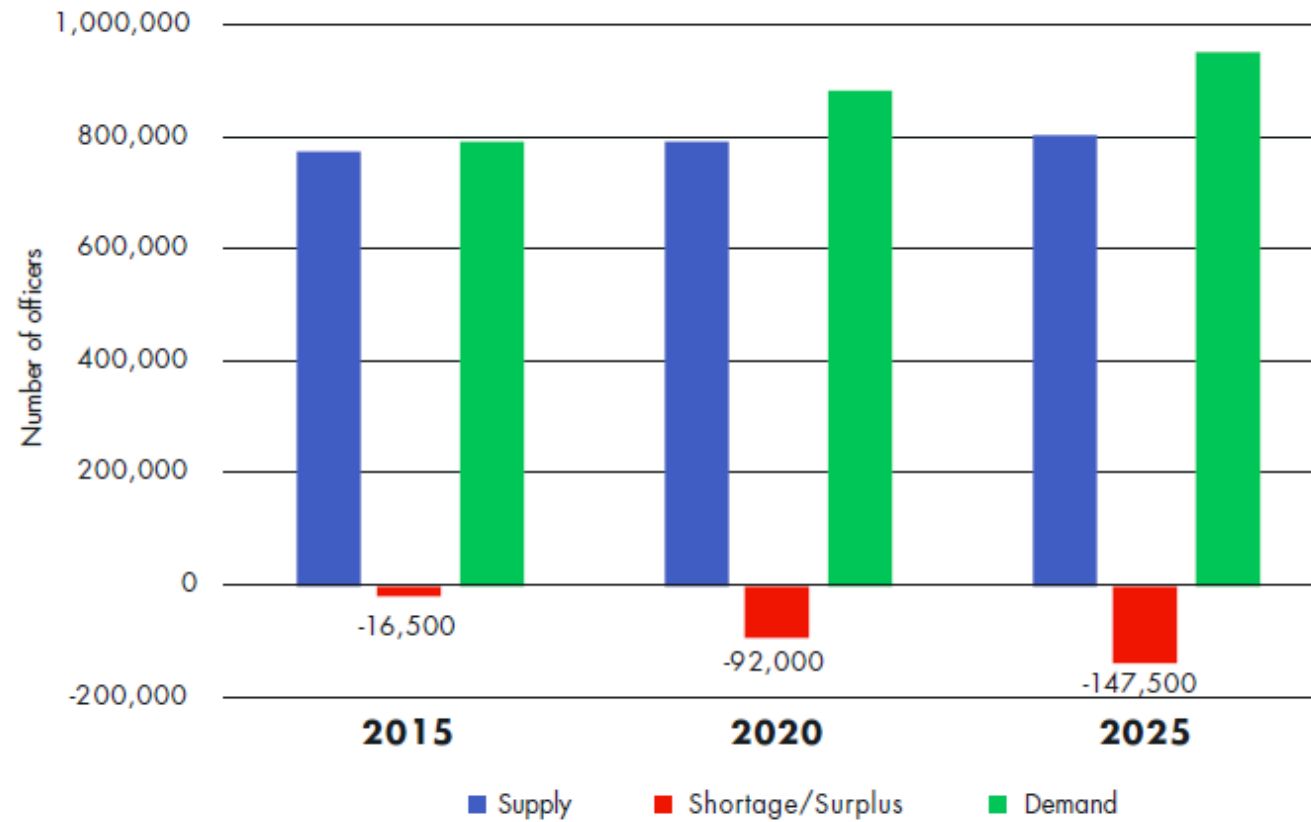
- Monotonous sea passages
- Short and busy port stays
- Long periods away from home

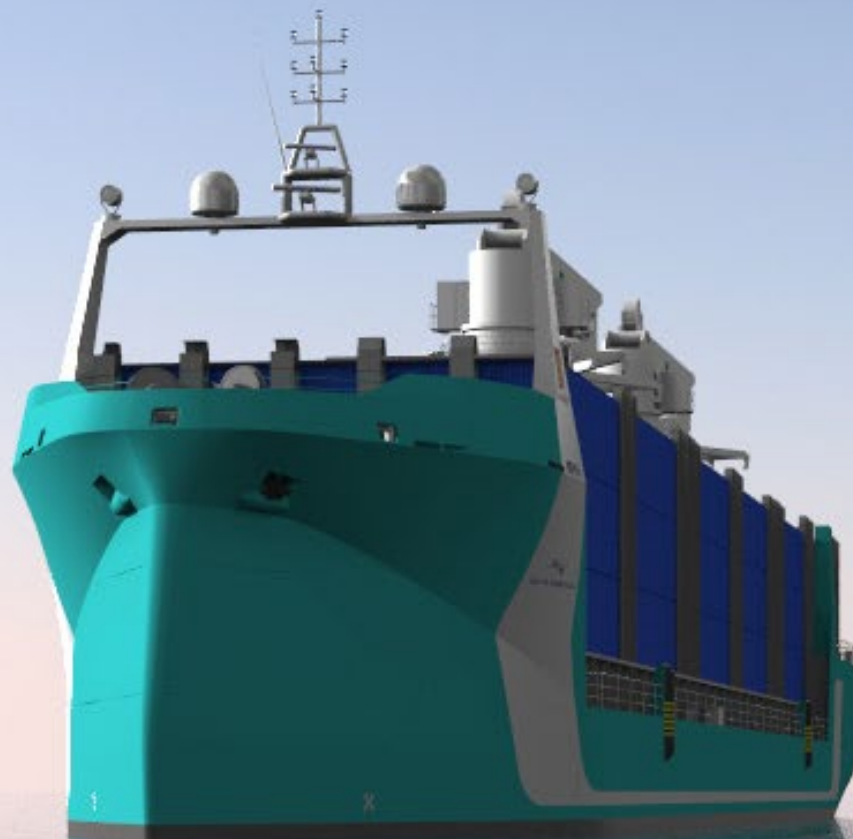
Autonomous vessels allow mariners to control and monitor vessels from ashore and enjoy their social life



Estimated global shortage of ~150.000 seafarers by 2025

Basic forecast for the future supply-demand balance for officers





Yara Birkeland

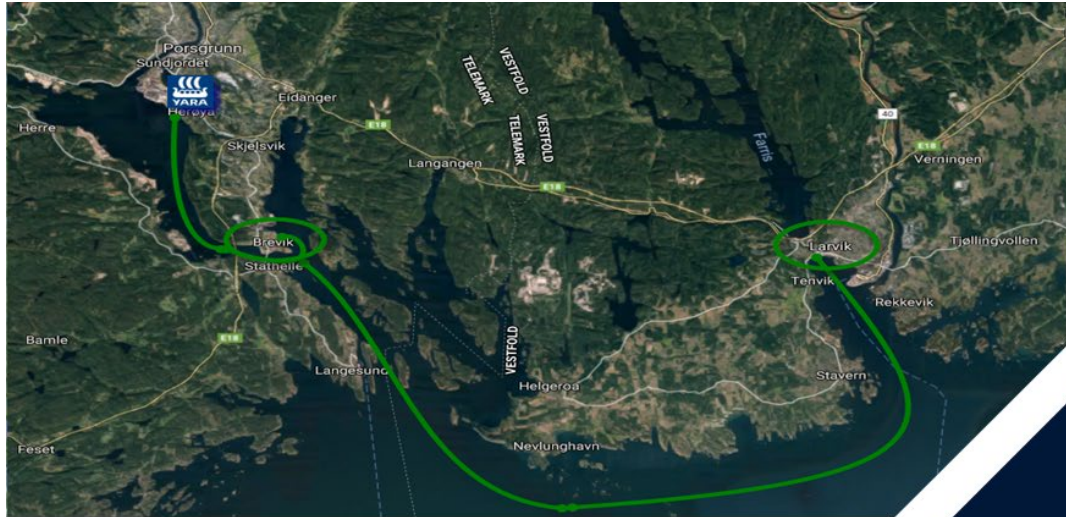
- a fully electric, autonomous 120 TEU feeder vessel



- Sailing between Herøya and Brevik/Larvik
- Replacing 25K-40K truckloads/year
- Length: 80 m
- Width: 15 m
- Dwt: 3,200 mt
- Service speed: 8 knots
- Battery capacity: 6 MWh
- Delivery (Vard Brevik): Q1 2020
- Fully autonomous: 2021/22



Yara Birkeland - Sailing area and port infrastructure



Sail within 12 nm.

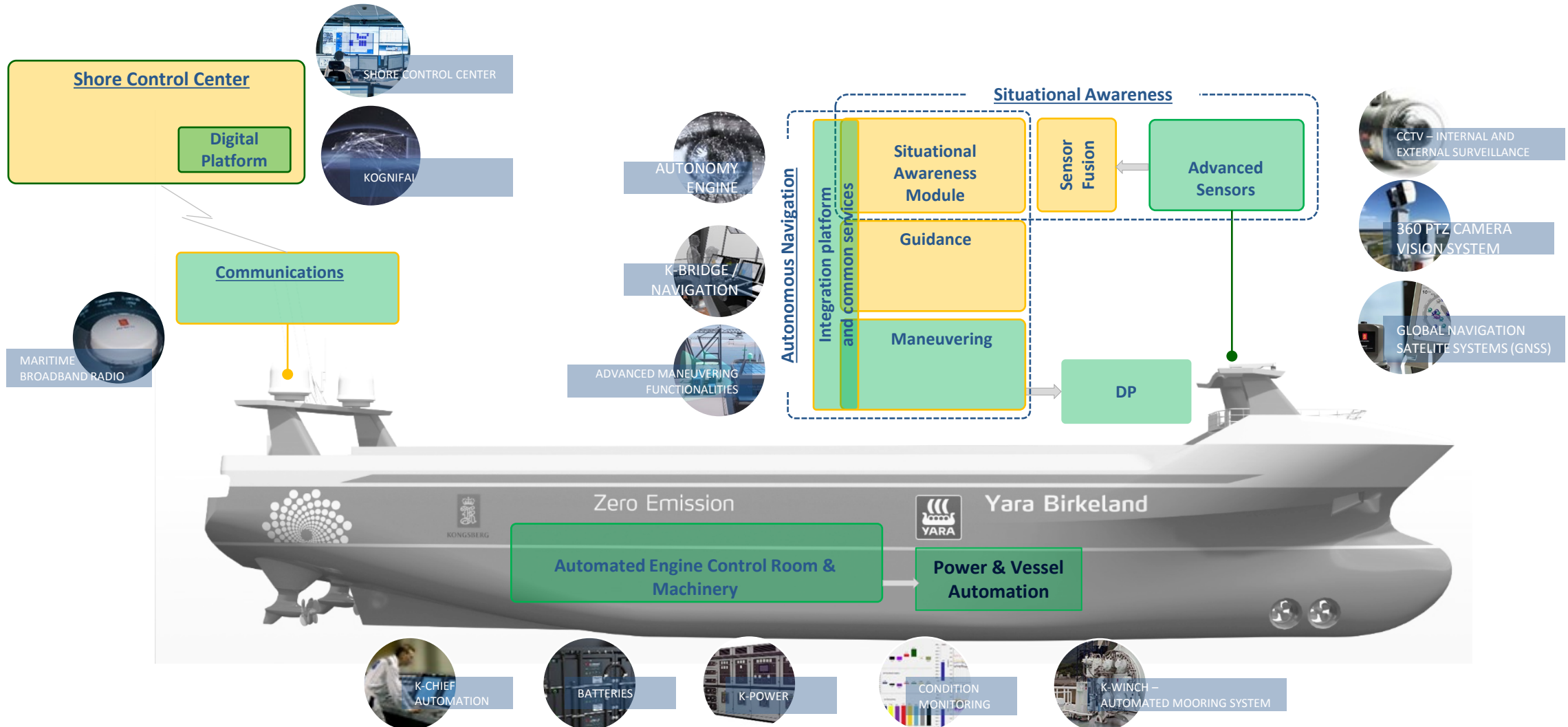
- Herøya-Brevik: 7nm
- Herøya-Larvik: 30nm

Every step from fertilizer production to discharge port will be automated, with fully electric solutions

- Self driving straddle carriers
- Automated loading and discharging
- Automatic mooring system
- Charging at Herøya (2,5 MW); connecting and disconnecting automatically

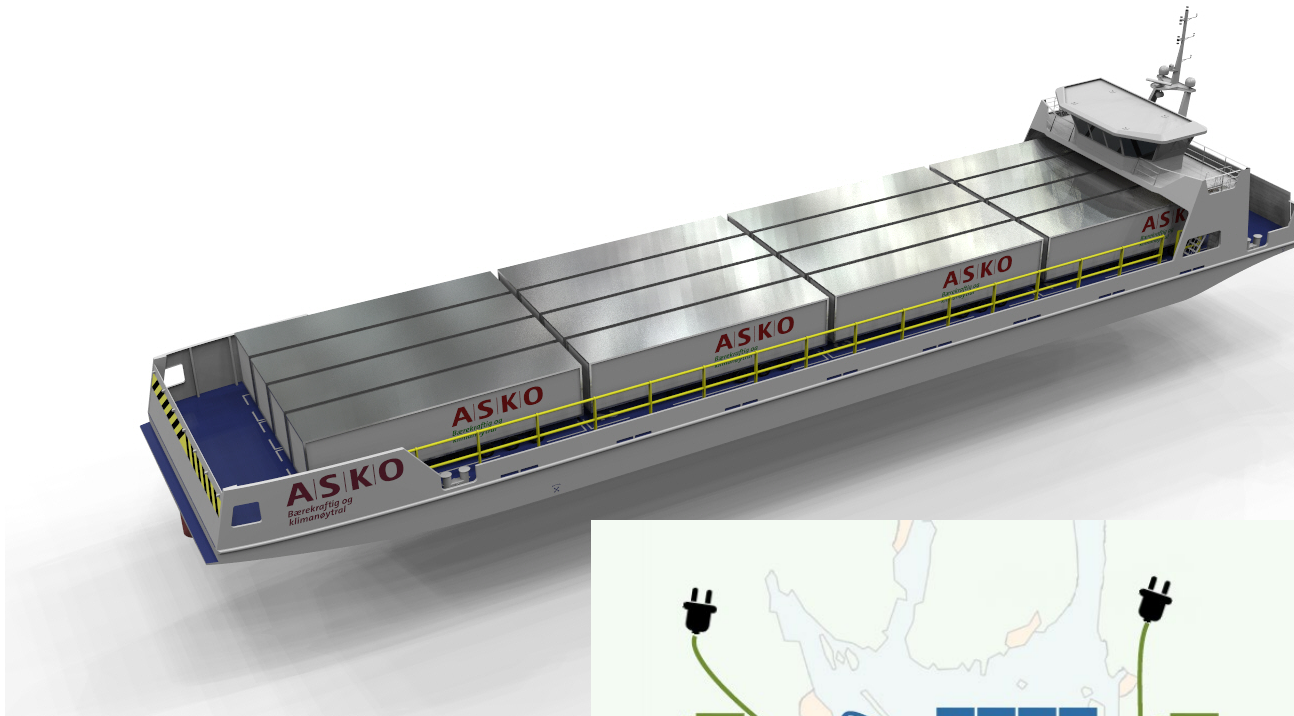


The technology behind a fully autonomous vessel



ASKO project:

- fully electric autonomous RoRo feeders for 16 trailers



- Sailing between Moss, Holmestrand and Langøya (NOAH)
- Replacing 1 million truck-kms/year
- Length: 66 m
- Width: 15 m
- Service speed: 8 knots
- Battery capacity: 1,7 MWh
- Target delivery: 2020
- Fully autonomous: 2021/22



Seashuttle Project:

- autonomous container vessel driven by hydrogen fuel cells
- trading between Oslo fjord, Swedish west coast and Poland



- Awarded € 6 Million in support from Norwegian government (PILOT-E program)
- Project lead: Samskip – Europe's largest multimodal operator
- Partners : Massterly, HYON (hydrogen integrator) and FlowChange (consultants)
- Aim to develop emission free container vessels that also can compete on cost compared to existing truck-ferry options



Remotely-operated Fireboats for Ports

- enable more aggressive on-water firefighting while reducing risk and improving personnel safety (Robert Allan & Kongsberg partnership)



Autonomy is already available for conventional vessels

- Auto Docking and Adaptive Transit / Collision Avoidance



RoPax ferries in the Oslo Fjord;

- 36,000 crossings/year
- Saves fuel on every docking
- Less contact damages
- Reduced risk of collisions in crossings

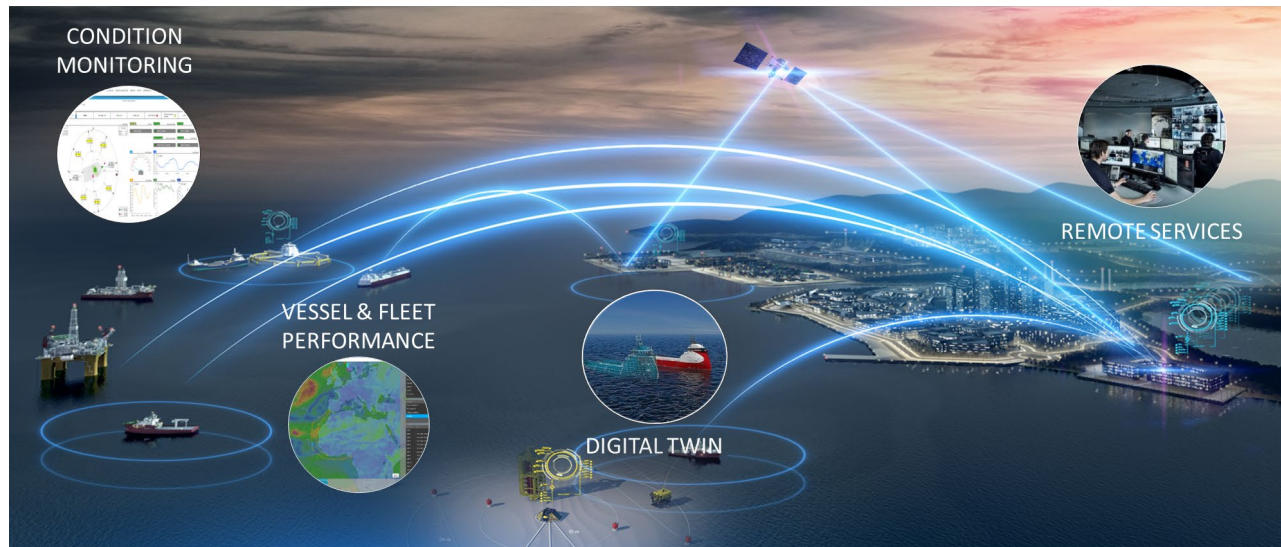


The Shore Control Centre

- now under construction at Wilhelmsen Ship Management at Lysaker



- 24/7 manned monitoring and control
- Remote control capabilities
- Digital twin and full simulator available
- Redundant and secure communication



Will also serve conventional vessels:

- Performance monitoring
- Condition based maintenance
- B0: Periodically unmanned bridge
- Extended E0; “Chief on shore”





Welcome to the
future



massterly

a Kongsberg Wilhelmsen joint venture

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