Automating vessels berthing, docking and stevedorage operations: The MOSES project

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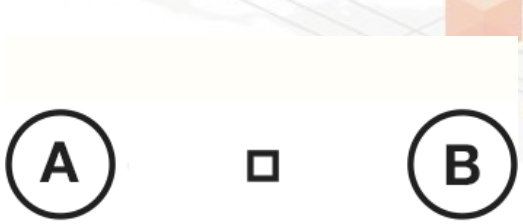
ToC

What is PI?

A conceptual vision for the future of logistics and transportation /A proposed network of interconnected physical infrastructures, to be more efficient, sustainable, and resilient.

A global logistics system that moves physical objects in standard-sized (p-containers), as efficiently as an Internet router moving digital packets across continents.



Still in the early stages of development…

Is Short Sea Shipping related to PI?

SSS: Transportation of goods by sea along the coasts and across the seas of a region, rather than by land.

Short Sea Shipping interconnectivity is a key component of the physical internet concept!

Connectivity between different logistics facilities

Seamless connectivity between different transportation modes

Reducing the number of empty or underutilized cargo spaces

Minimizing the environmental impact of freight transportation

Welcome to the MOSES project

Project Title: AutoMated Vessels and Supply Chain Optimisation for Sustainable Short Sea Shipping

The aim of MOSES H2020 project is to **enhance the Short Sea Shipping (SSS) component** of the European supply chain by **addressing the vulnerabilities** and **strains** related to the operation of large containerships.

A two-fold strategy

Promote SSS feeder services

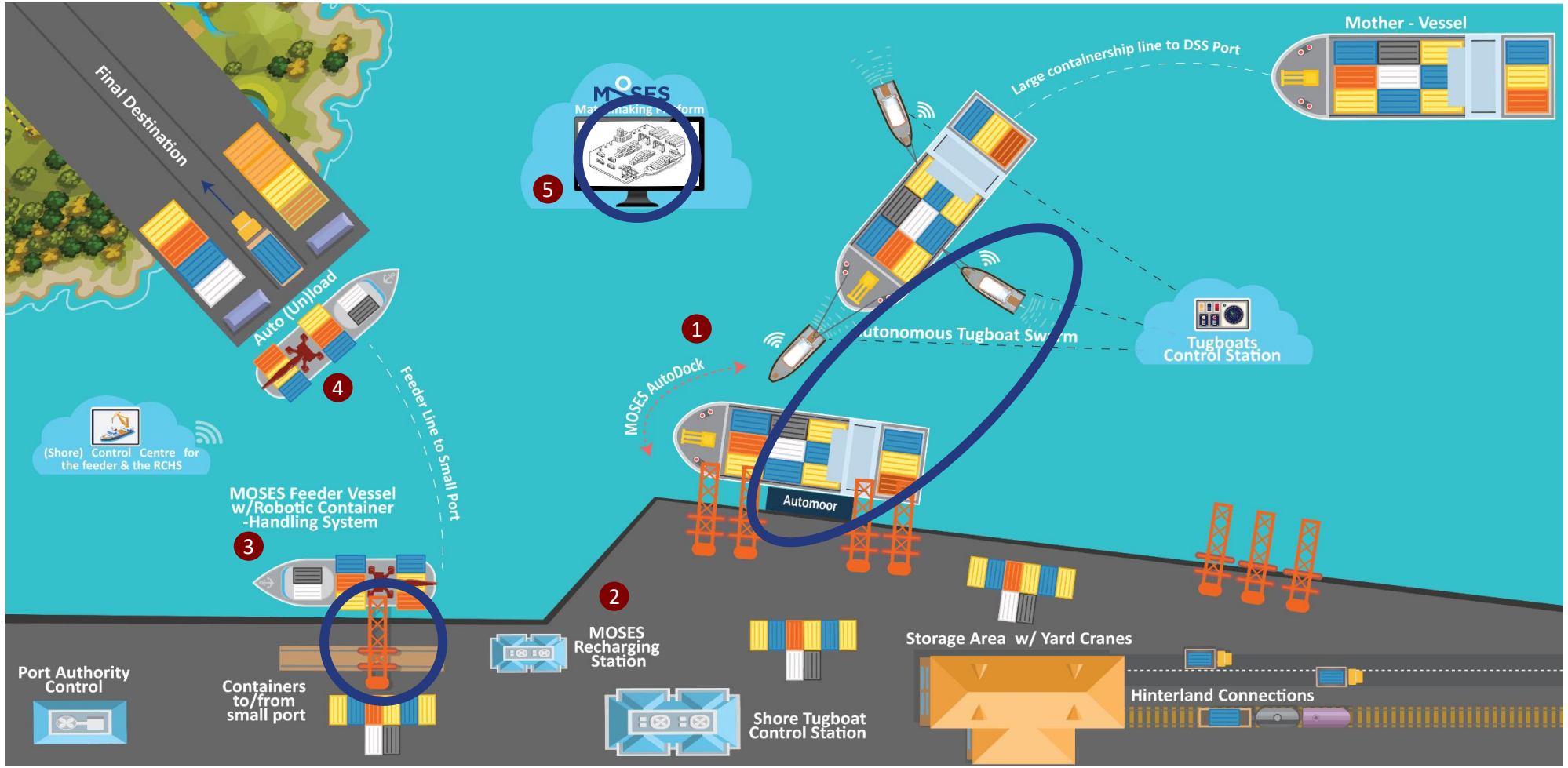
Ship design for sustainable services – no infrastructure required

Logistics solution for balancing demand-supply

DSS ports efficiency

Technological solutions for improving DSS ports inefficiencies – reduce berthing time, improve safety

Let’s dive into MOSES Concept & Innovations



MOSES Innovations:

1. **MOSES AutoDock (MOSES Autonomous tugboats + AutoMoor)**
2. **MOSES Recharging Station**
3. **Innovative Feeder Vessel**
4. **Robotic container-handling system**
5. **MOSES matchmaking platform**

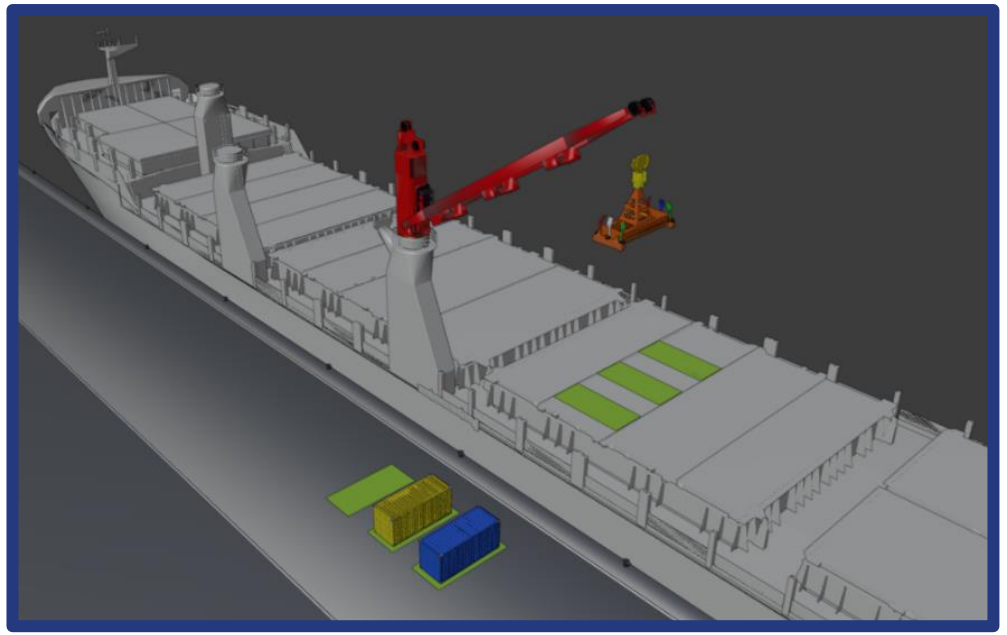
MOSES Innovative Feeder Vessel and Robotic Container-Handling System

- ✓ to reduce or eliminate harmful emissions by designing environmentally friendly vessels
- ✓ to design a highly autonomous feeder vessel

⇩

MOSES Innovative Feeder Vessel

- low cargo capacity (ranging from approx. 90 – 680 TEU)
- environmentally sustainable engine configuration (onboard battery systems and shore power connections for the required power while berthed)
- superstructures positioned at the fore and mid ships
- enhanced maneuverability (compatible with MOSES AutoDock system)
- automated onboard crane



MOSES Robotic Container-Handling System

- safe container loading and offloading operations to small local ports, with no additional terminal infrastructure
- a system of systems!! (e.g. crane software, a sensor suite (object detection algorithms), shore control center remotely monitor and supervise the crane's operation)

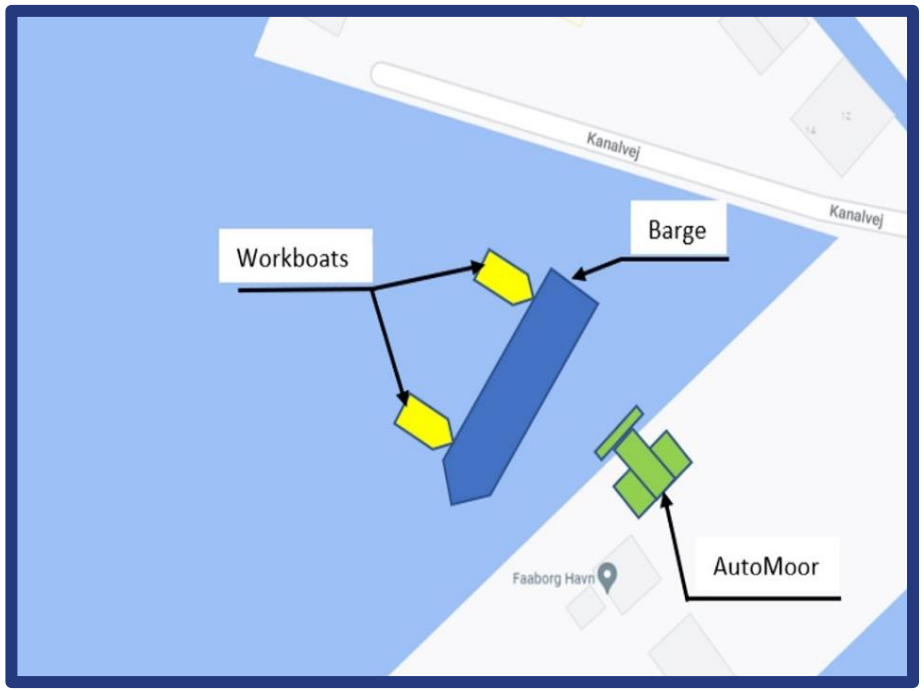
MOSES AutoDock

Intelligent system of autonomous tugboats operating in a swarm configuration at various levels of autonomy and MOSES AutoMoor, supported by the MOSES Shore Tugboat Control Station (STCS) for automating **maneuvering & docking**.

Autonomous tugboats operation: architecture includes sensors that provide situational awareness to AI algorithms that control steering and propulsion.

Mooring system: vacuum-based system for hands-free mooring.

MOSES STCS: a communication hub & a central platform for supervisory control of the process.

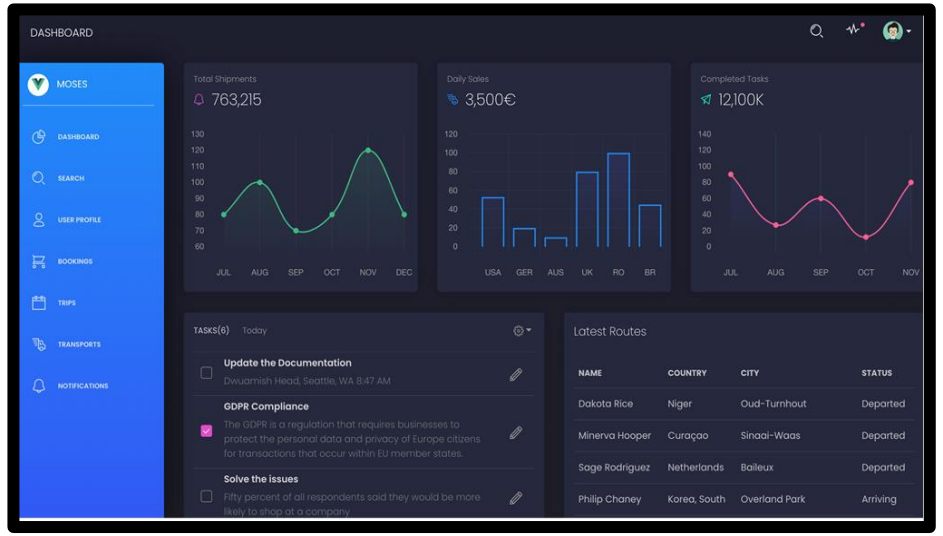


MOSES Matchmaking Logistics Platform

- ✓ to offer match-making services
- ✓ to support digital and horizontal collaboration
- ✓ to maximize Short Sea Shipping (SSS) demand and balance backhaul traffic

⇩

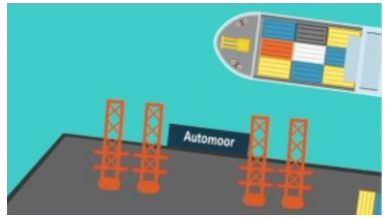
MOSES Matchmaking logistics platform



- a cloud-based digital collaboration and matchmaking tool
- matches demand and supply of cargo volumes –*data analytics*
- handles freight flows, increase the cost-effectiveness of partial cargo loads and boost last-mile/just-in-time connections among the transport modes
- supports cargo consolidation & improves the management of empty containers
- enables multimodal transport routes containing at least an SSS leg

How MOSES is connected to the PI concept?

AutoDock

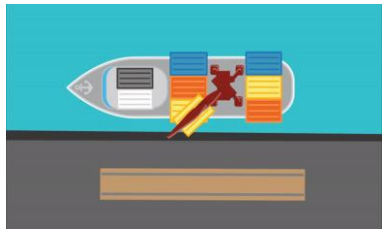


Improve the efficiency and sustainability of maritime transportation.

Improve safety, and increase efficiency in port operations.

Reduce the time and costs associated with manual tug boat operations and the risk of accidents & improve safety

Innovative Feeder Vessel and RCHS



Work faster and more accurately than human operators, leading to increased productivity + maximise terminal utilization.

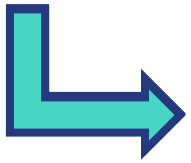
Improve the flow of goods through ports: reduce the time required for ships to load and unload cargo.

Matchmaking Logistics Platform

Optimize the use of transportation infrastructure and assets, reduce congestion and emissions, and improve the overall efficiency of the logistics network + intro of on-demand logistics services.

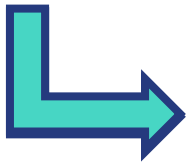
It is time to conclude! Isn’t it?

Short sea shipping can play a significant role in the deployment of the physical internet



efficient and cost-effective mode of transportation for goods between nearby ports

Integrating short sea shipping with other modes of transport



seamless and interconnected logistics network

MOSES innovative and automated components along with the use of the Logistics Matchmaking Platform

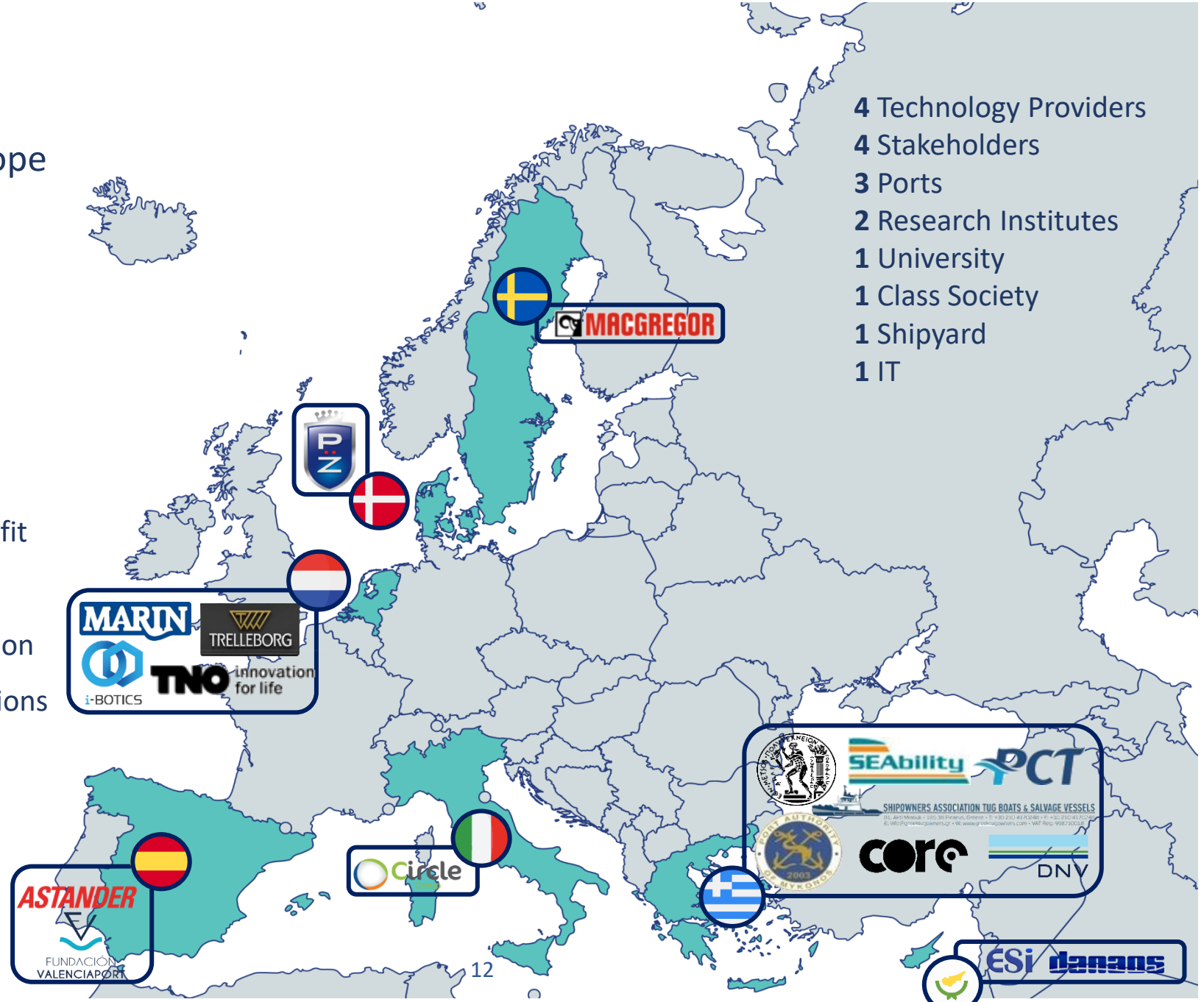
reduce congestion on roads and highways, lower carbon emissions, improve overall transport efficiency → providing a reliable and environmentally-friendly mode of transportation for goods

MOSES Team

17 Partners across Europe

Expertise in:

- Naval design
- Maritime Logistics
- Risk, Safety, Environmental Assessment
- Sustainability and Cost-benefit Analysis
- Autonomous System operation
- Port Infrastructure & operations
- Business Modelling
- Innovation Management



4 Technology Providers
4 Stakeholders
3 Ports
2 Research Institutes
1 University
1 Class Society
1 Shipyard
1 IT

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MOSES Project

Thank you for your attention!

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