MOSES concept and innovations: Indicators of success and ambition

Nikolaos P. Ventikos, NTUA

Joint EU Smart Shipping & Logistics Platform

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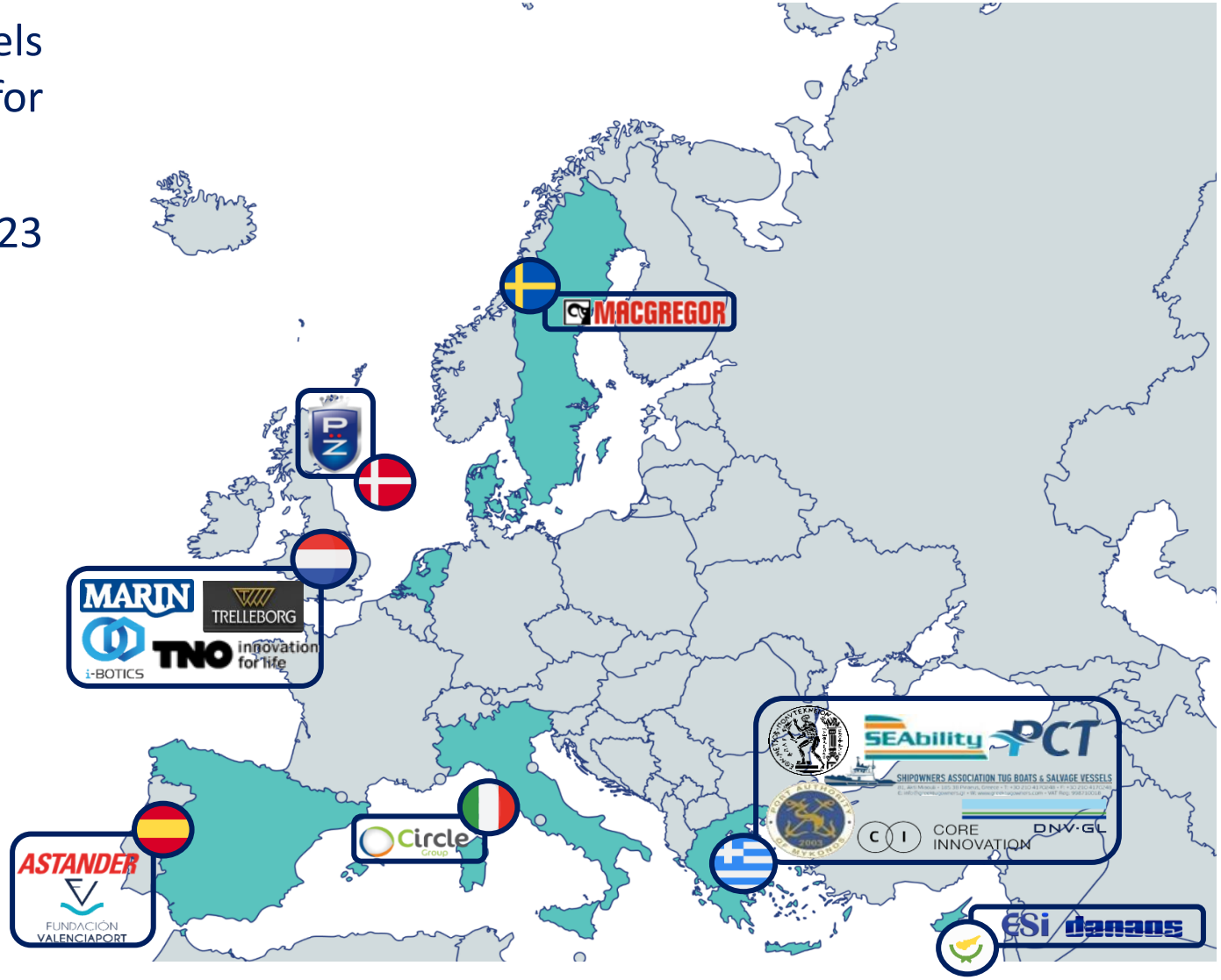
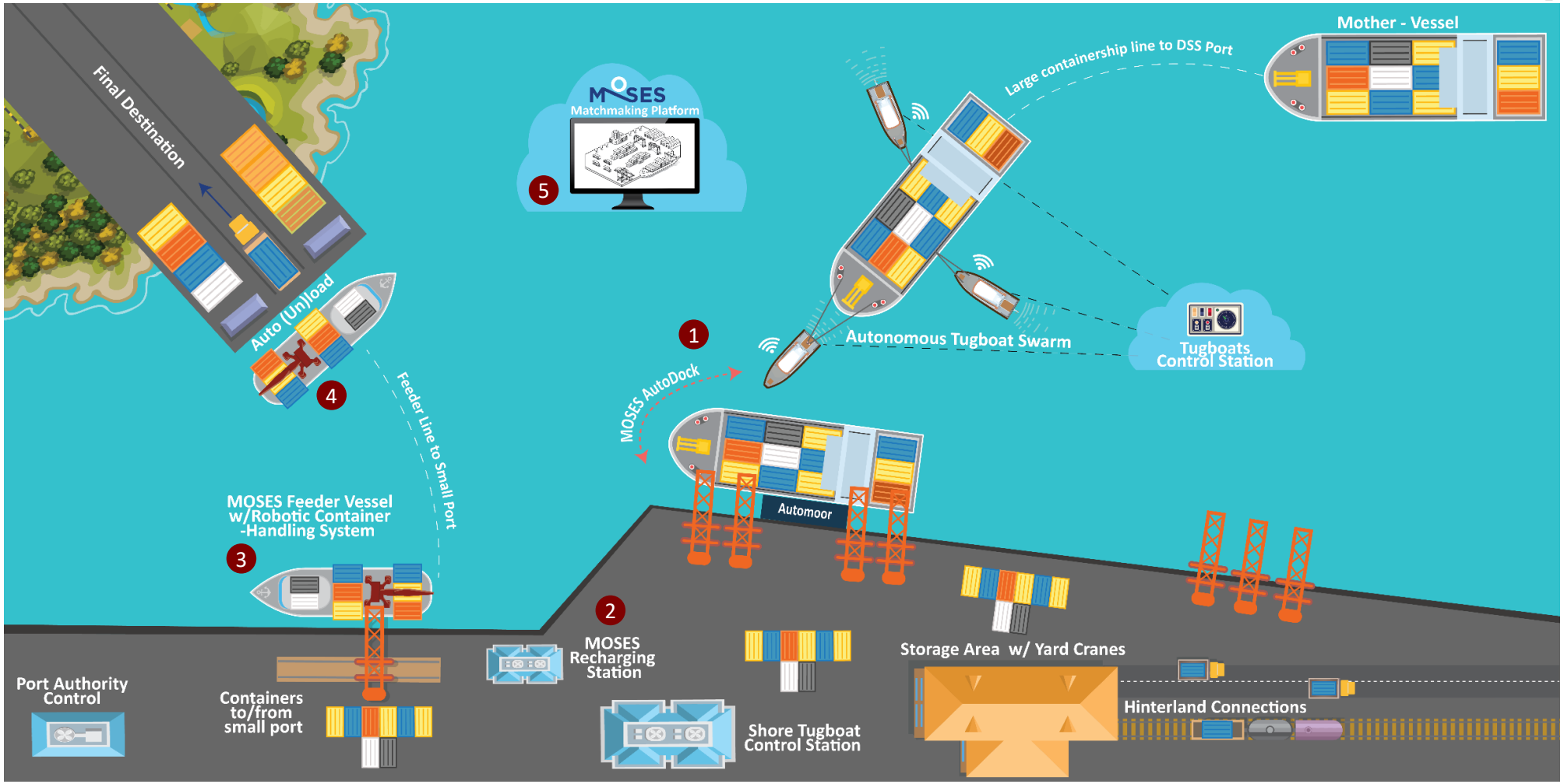
Facts about the MOSES project

- **Project Title:** Auto**M**ated Vessels and Supply Chain **O**ptimisation for Sustainable Short **SE**a **S**hipping
- **Duration:** 01.07.2020 - 30.06.2023 (36 months)
- **Budget:** 8 million €
- **Consortium:** 17 Partners



MOSES Concept and Innovations

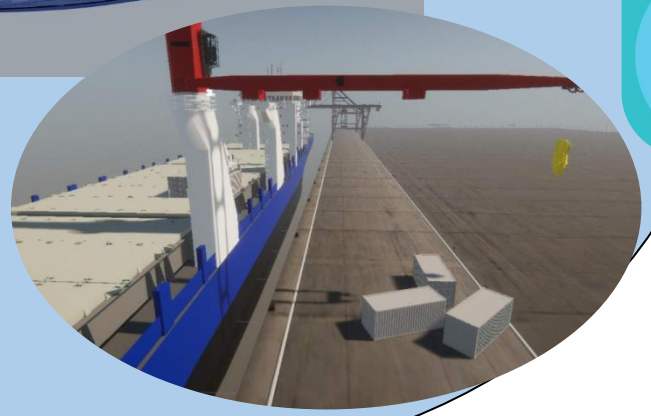


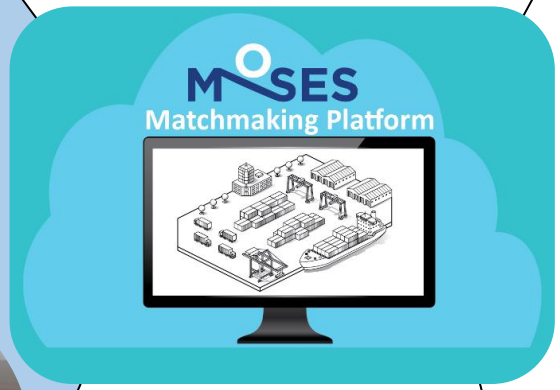
MOSES Innovations:

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

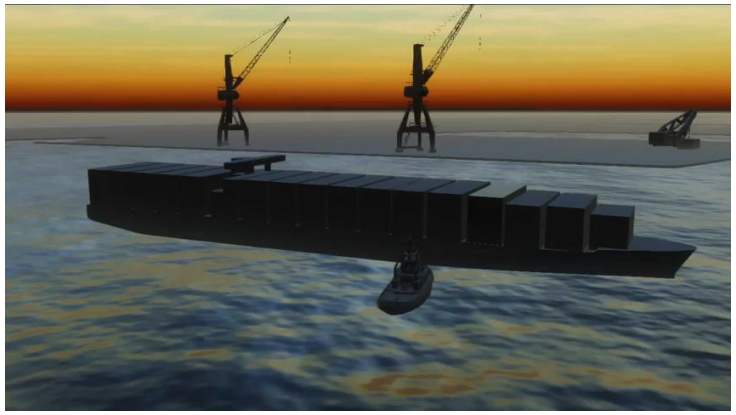
MOSES Concept and Innovations

SSS



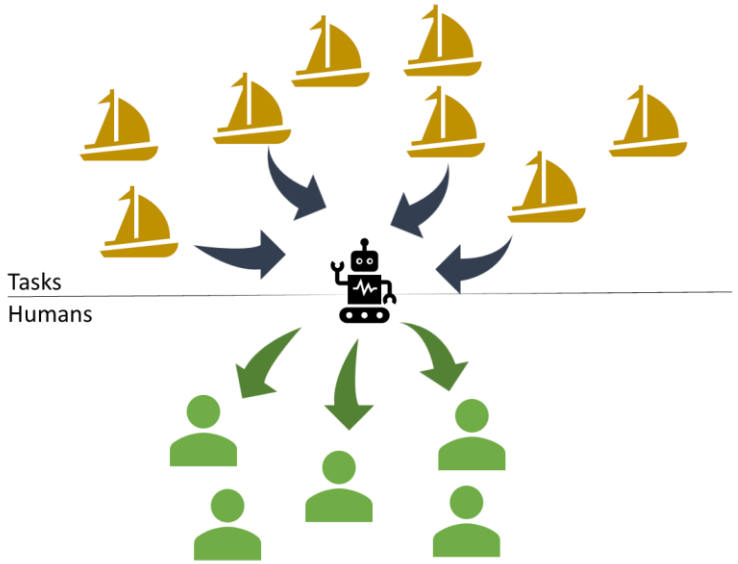


DSS



MOSES Robotic Container Handling System

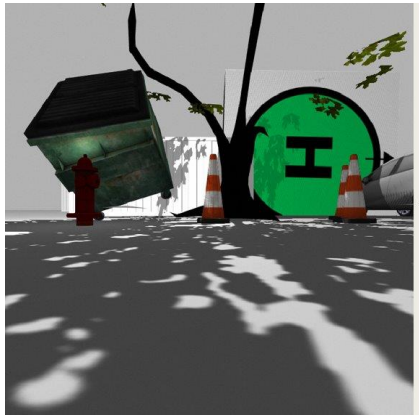
IOSS

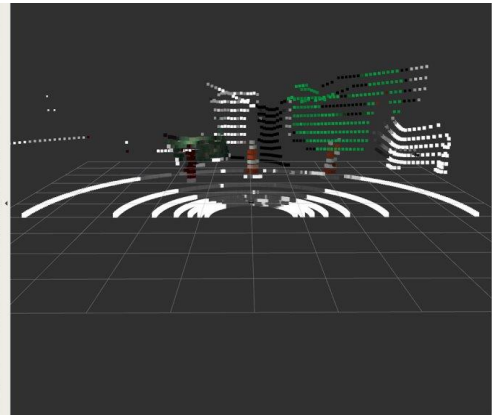


AI methods applied:

- **Dynamic Task allocation** – Breadth-first pathfinding
- **Abstract control layers** – Computing operator work load and providing a personalised overview (fleet, vessel, immersion)

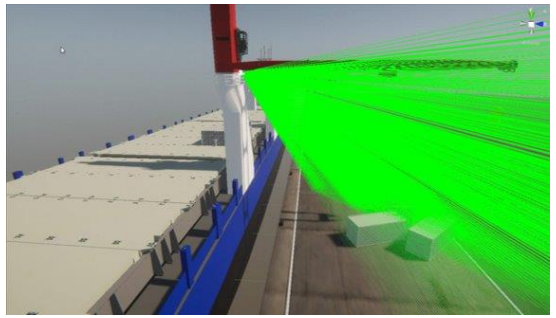
Sensor Suite



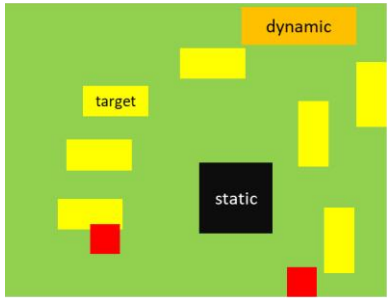


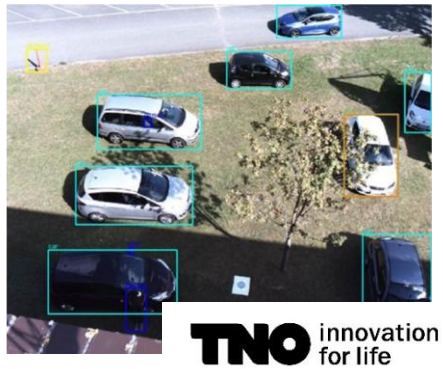
2D / 3D image fusion for scene reconstruction

2D / 3D detection and pose estimation of containers

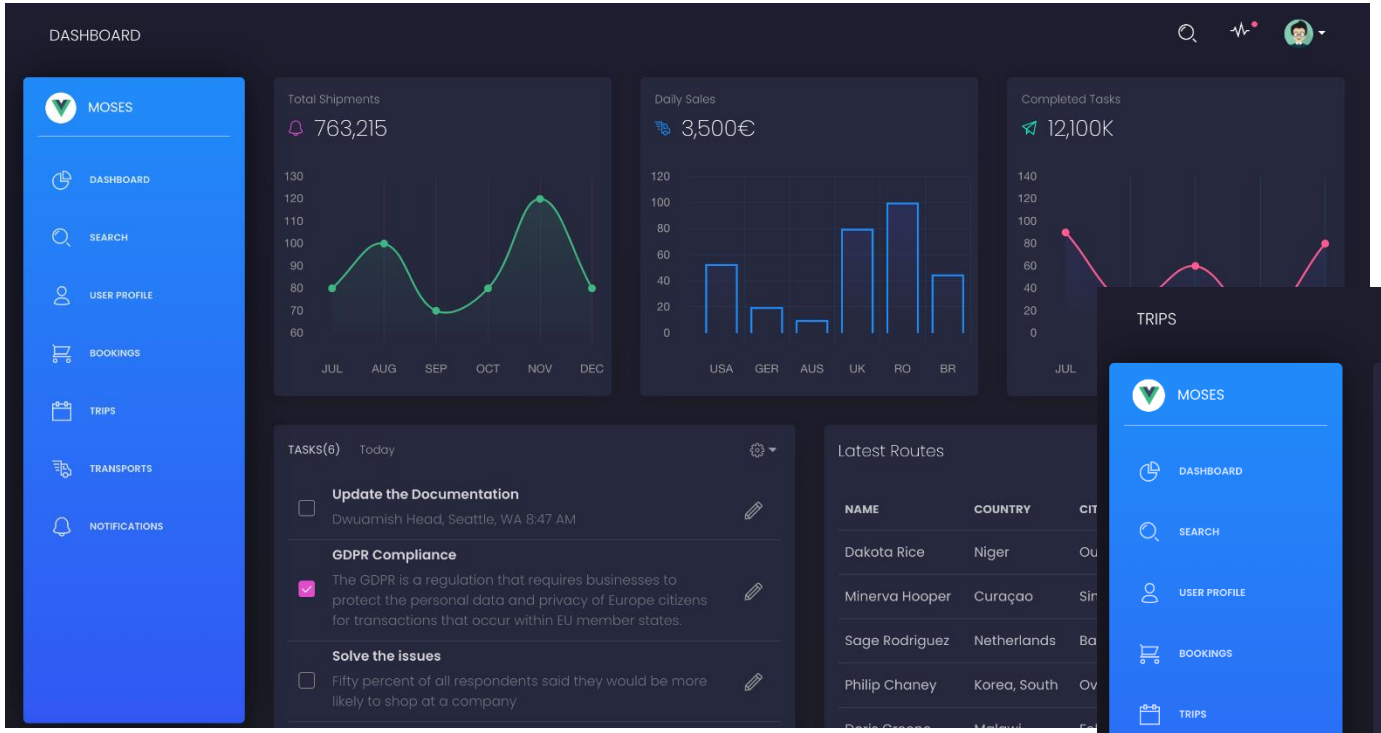


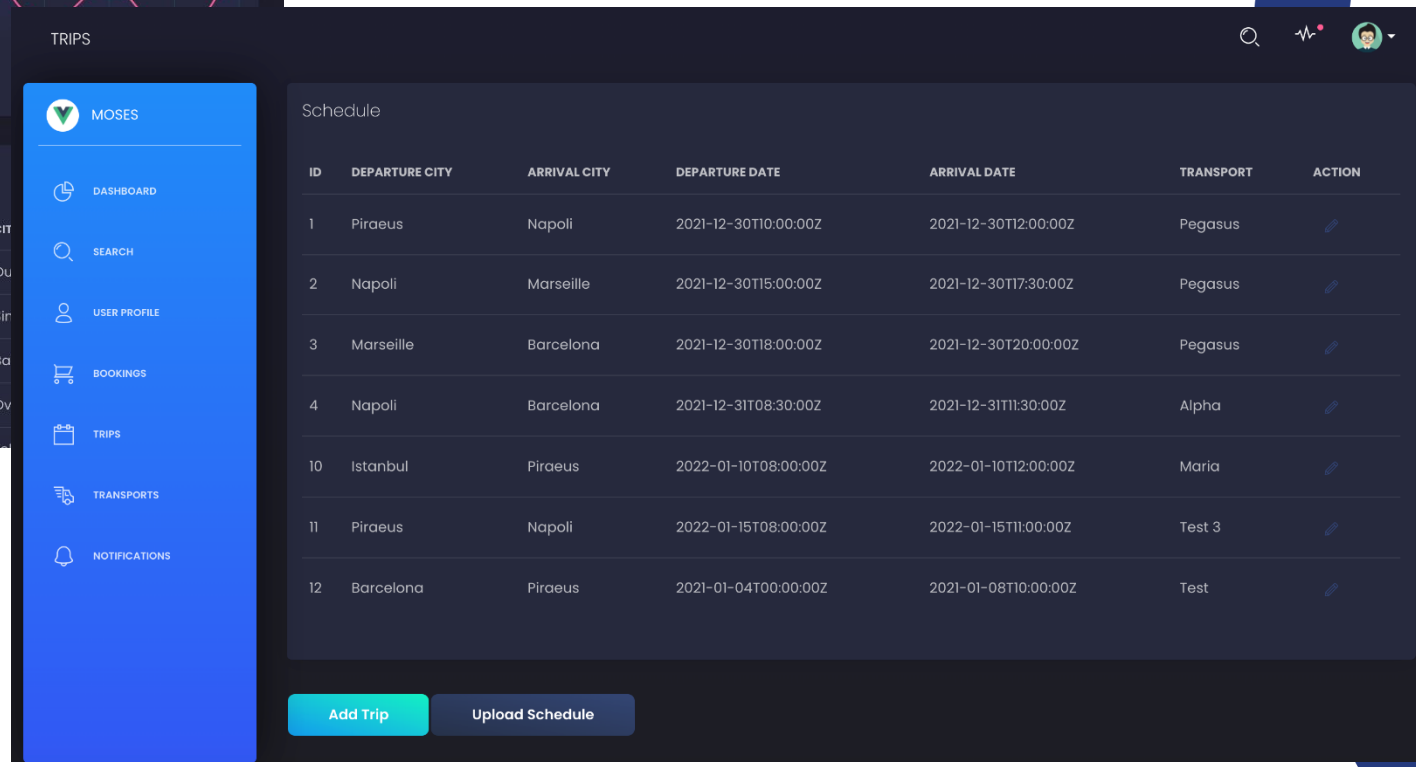
2D / 3D detection of red alerts during crane operation





MOSES Matchmaking platform

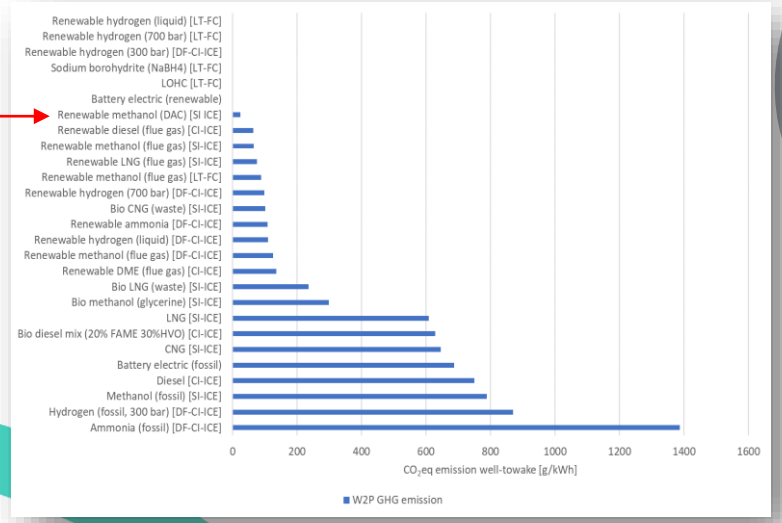




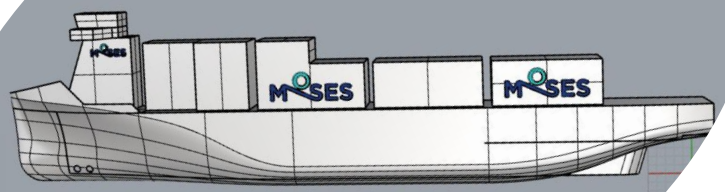
Success Indicators (Innovative Feeder and RCHS)

Emissions compared to alternative land-based transportation modes ↓ **40%**

- (near) zero emissions operation - hybrid with methanol ICE and batteries (10% lower OPEX compared to green alternatives)
- onboard battery systems and shore power connections while berthed at port



Environment



Replacement of Ro-Ro traffic used to transport containers on trailer trucks **>15%**

Initial estimation: Feeder will be competitive if > 40% of existing Ro-Ro traffic is captured

Success Indicators (Innovative Feeder and RCHS)

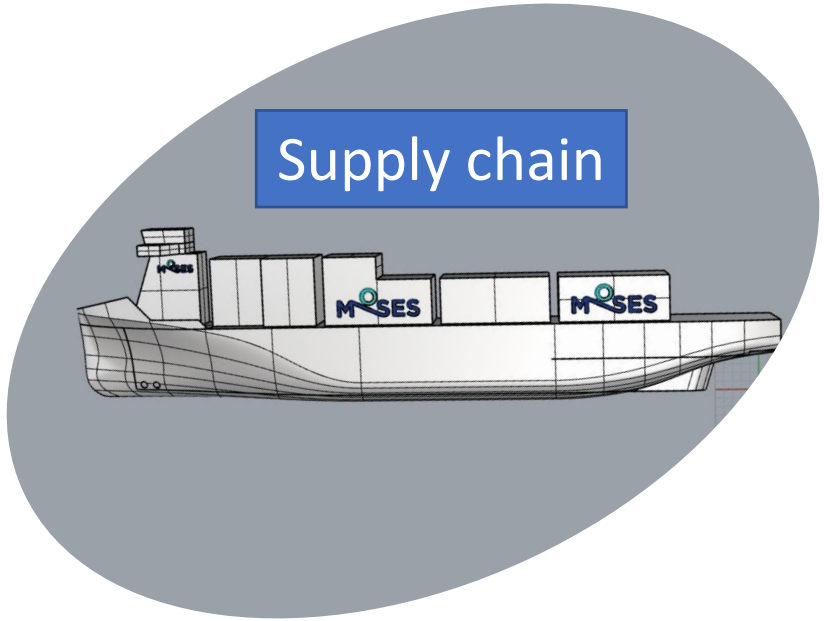
Dependence from port infrastructure ↓ **100%**

- Independent from **port cargo handling** → Onboard crane
- Partly independent from **port mooring services** → (un)loading operations without using mooring lines (DP with azimuth thrusters)

EU ports able to host container feeder vessels ↑ **10%**

Initial estimates:

- 14 ports near EU core ports
- 6 small ports in the Aegean archipelago



End-to-end costs for container transport (captive and DSS feeder traffic) ↓ **5%**

Greek case (80% demand)

- -3.5% cost / cargo unit,
- 13-14% higher end-to-end costs due to the higher price of energy carrier (methanol)

Spanish case (3 truck haulages / day to hinterland)

- Valencia to Sagunto: -3.7% / cargo unit
- Valencia to Gandia: - 10.6% / cargo unit
- -10.8% costs - no need for port tugboats

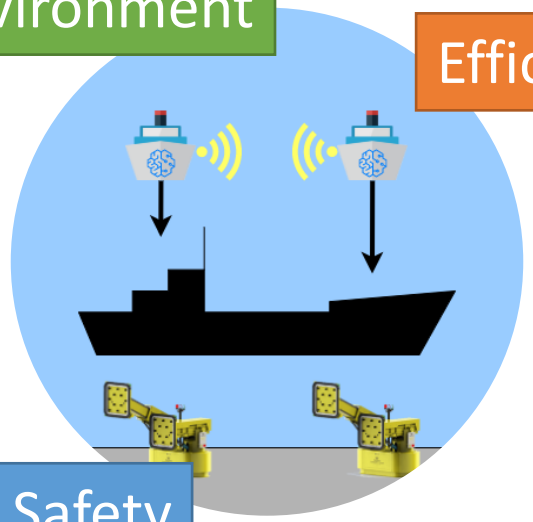
Success Indicators (AutoDock)

Air pollutants/emissions in port areas ↓ **25 – 30%**

Autonomous tugboats envisioned as hybrid or fully battery electric – **emission reduction potential will be evaluated**

Environment

Efficiency



Safety

Human error-related accidents for manoeuvring and docking ↓

- Accidents related to miscommunication between tugboats and the pilot on the vessel
- Accidents during the docking process that impact the health and safety of port personnel and vessel crew

Manoeuvring and docking time (compared to pilots and human operated tugboats) ↓ **>20%**

AI navigation algorithms will **minimise the necessary number of manoeuvres**

Port services availability ↑ **100%**

- Reduced manning on the tugboats and from port-side
- Reduction of human-error related accidents

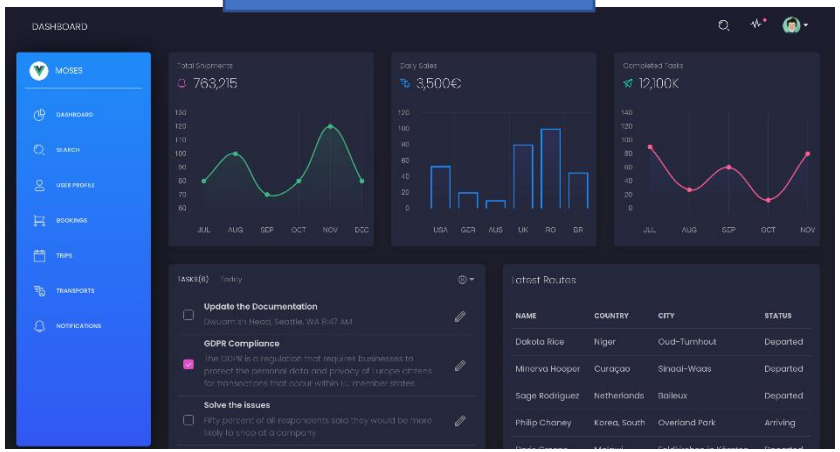
Success Indicators (Matchmaking Platform)

Modal-split in favour of SSS

>10%

- Historical data → **in 18% of road transport cases there is an alternative route with SSS**

Supply chain



Logistics costs for (im-) exporters of container cargo destined to small ports

Horizontal collaboration among shippers and freight forwarders to:

- identify **groupage opportunities**, shared container loads
- match opposite routes to **minimise empty container runs**

Road traffic around hub ports from container-hauling trucks

Groupage and shared container loads → reduction of traffic for:

- execution of the freight transport orders
- commuting for administrative tasks (e.g. exchange of paper documents)

Logistics stakeholders in the platform

>10 @ M36

The **National Logistics Council of Greece** has shown interest in the platform and the benefits for its members

MOSES ambition

Significantly **enhance the SSS component** of the European container supply chain

Create sustainable feeder services from large container terminals to **small ports with no infrastructure**

MOSES ambition: The ultimate objective is to avoid…

Decongest road and/or city infrastructure

Reduce the CO2 and air pollutant emissions of intra-European freight transport

www. moses-h2020.eu

MOSES project2020

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MOSES Project

Thank you for your attention!

Nikolaos P. Ventikos, NTUA

niven@deslab.ntua.gr

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