# autoMated vessels and supply chain Optimisation for sustainable short SEa Shipping

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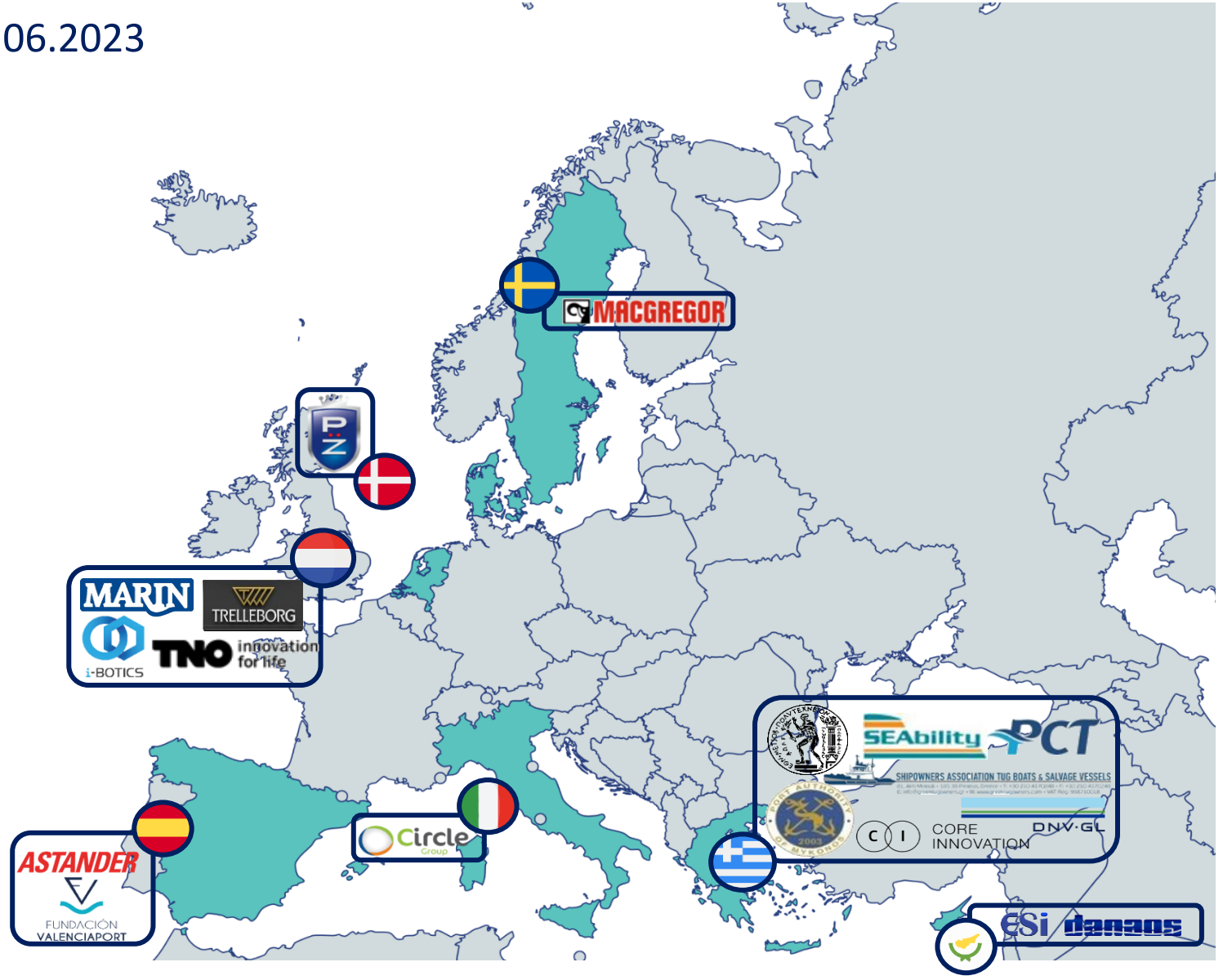
# Facts about the MOSES project

- **Duration:** 01.07.2020 - 30.06.2023 (36 months) – *extension 31.12.2023 (42 months)*
- **Budget:** 8 million €
- **Consortium:** 17 Partners
- **Coordinator:** NTUA



# MOSES aims to…

Containerised cargo

Pax traffic slowed down by cargo traffic

Create sustainable feeder services from large container terminals to **small ports with no infrastructure to replace trucks on Ro-Ro ships**

# The MOSES concept

# The MOSES Use Cases

Northern Case

MOSES Open Call

Submit by 31-Aug-2023 (05:00:00 PM CEST)

SUBMIT HERE

**Western MED-Spain**

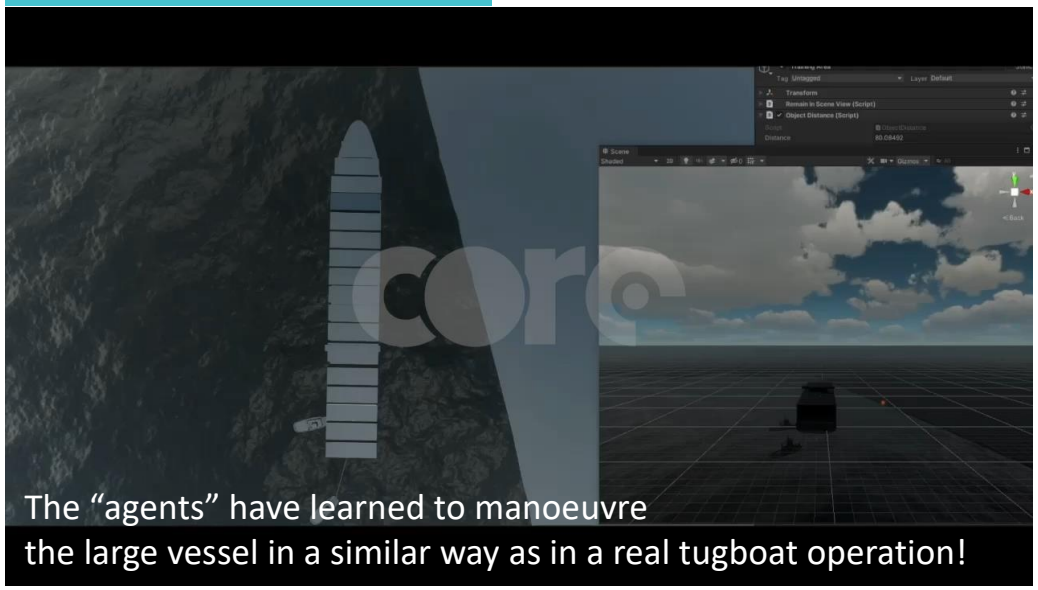
Decongest truck transport traffic in Valencia port and connect it to Sagunto and Gandia satellite ports

**Eastern MED-Greece**

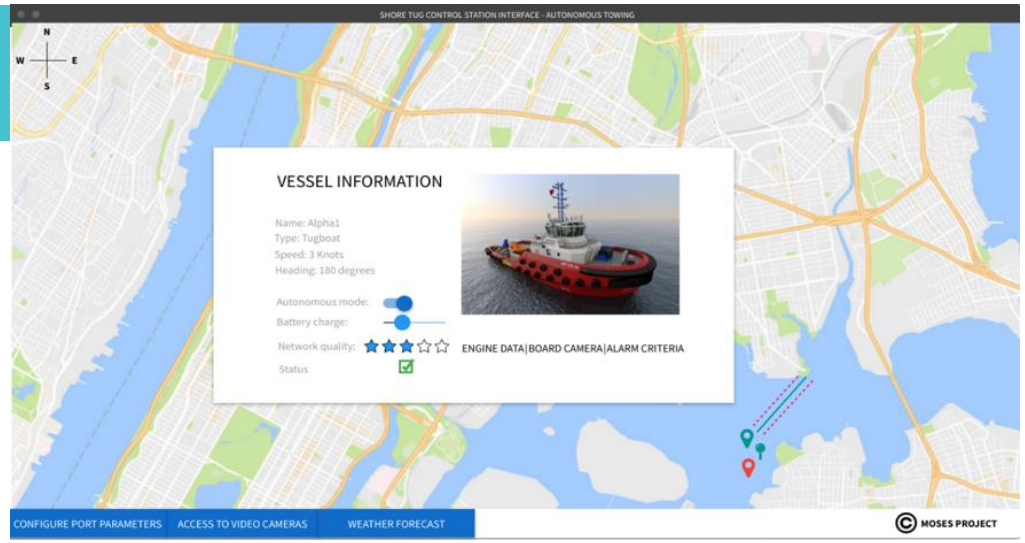
Decongest Piraeus container terminal and integrate small Greek ports into the container supply chain

# MOSES AutoDock System

## Autonomous tugboats




## Shore Tugboat Control Station




## Automated Mooring

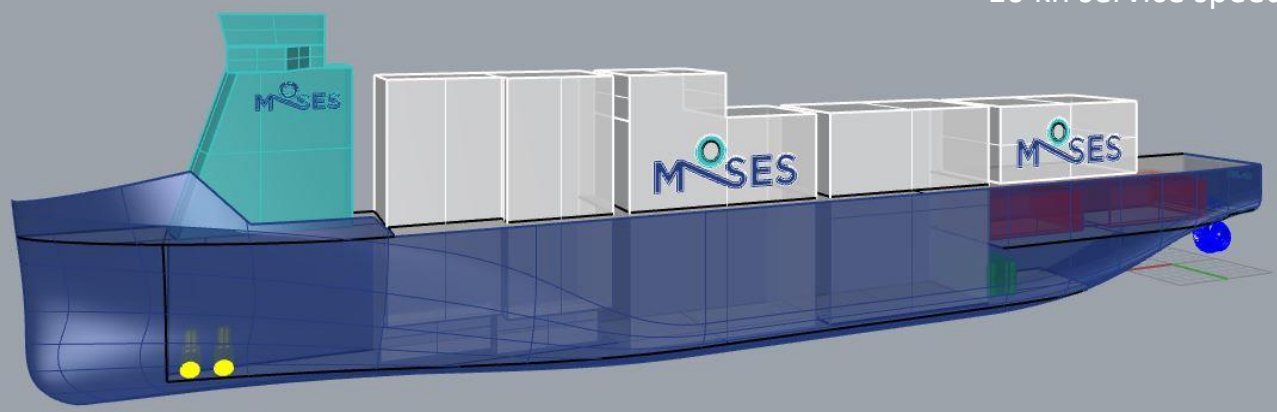
Prototype innovations:

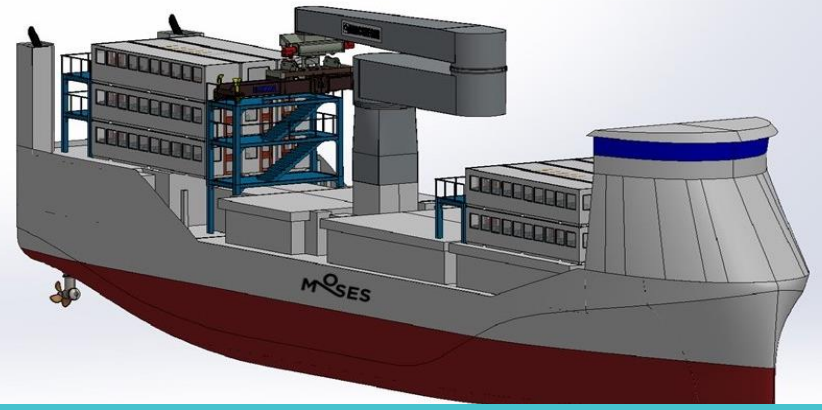
- Small-scale
- Surge motion control
- Energy harvesting
- Communication with tugboats

# MOSES Innovative Feeder

## Greek concept I

- $L_{BP}$ = 80 m
- 180 TEU
- 10 kn service speed

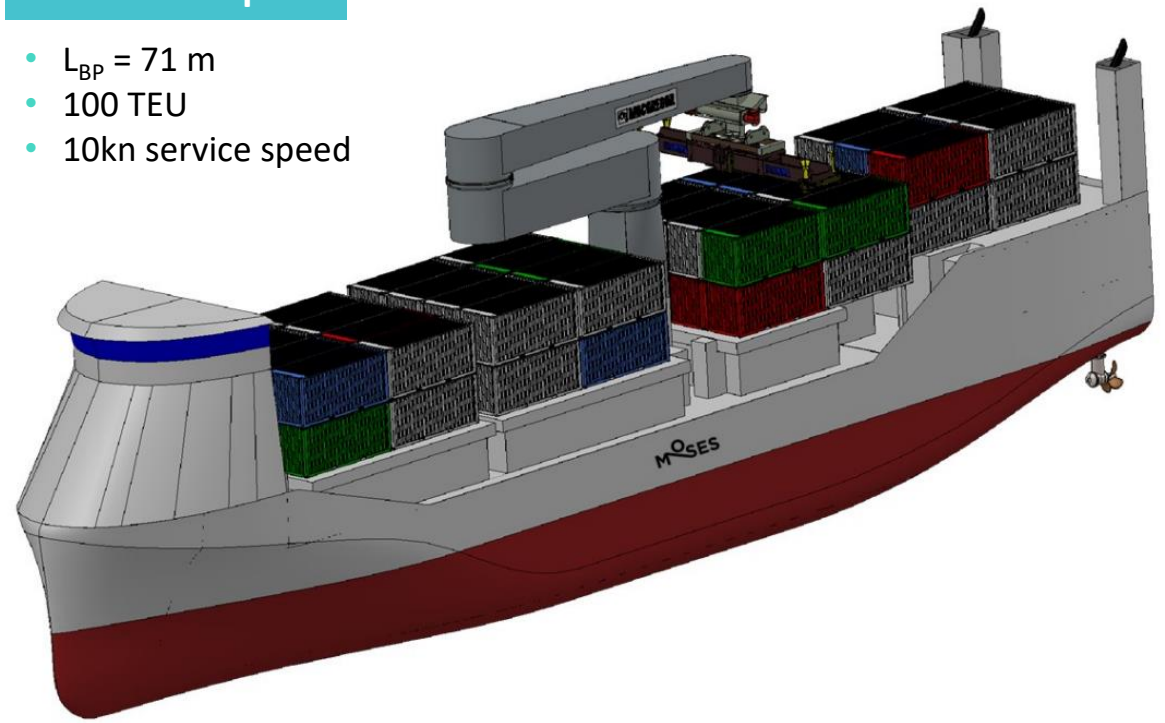



***Modular* concept design** for pax transport

## Greek concept II

- $L_{BP}$ = 71 m
- 100 TEU
- 10kn service speed




**Innovations**:

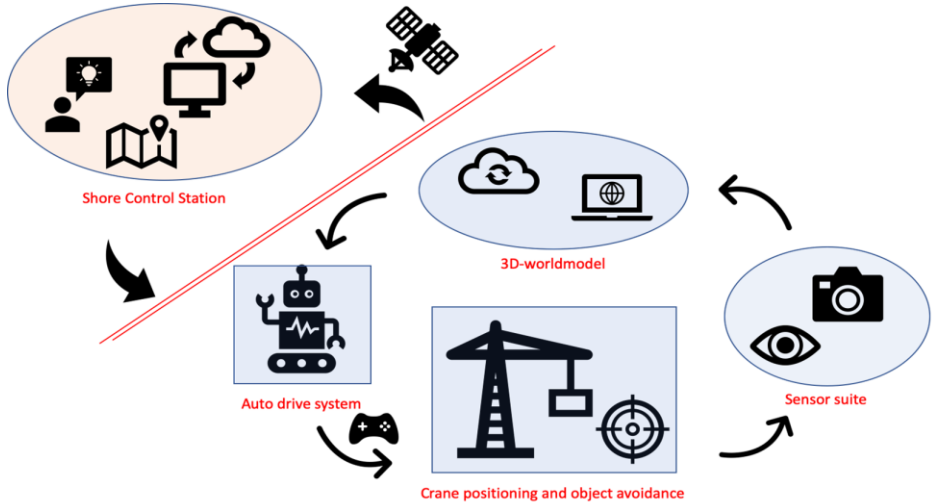
- Sustainable propulsion (Hybrid – methanol ICE + batteries, Full electric)
- Azimuth thrusters for enhanced manoeuvrability
- Automated cargo-handling, *as first step towards higher autonomy*

# MOSES Robotic Cargo Handling System

## Automated Crane

- Compensation of pendulation (ship motions, weather conditions)
- Identification of container to load

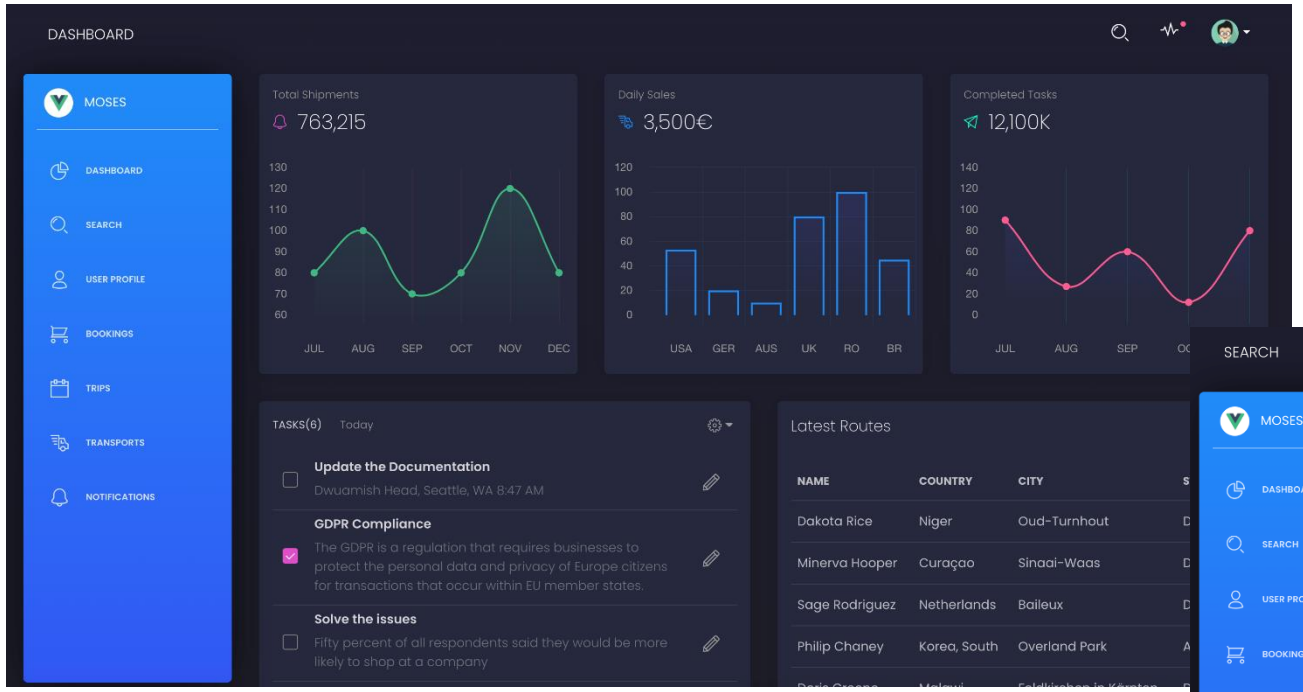
## Intelligent Operator Support System (IOSS)

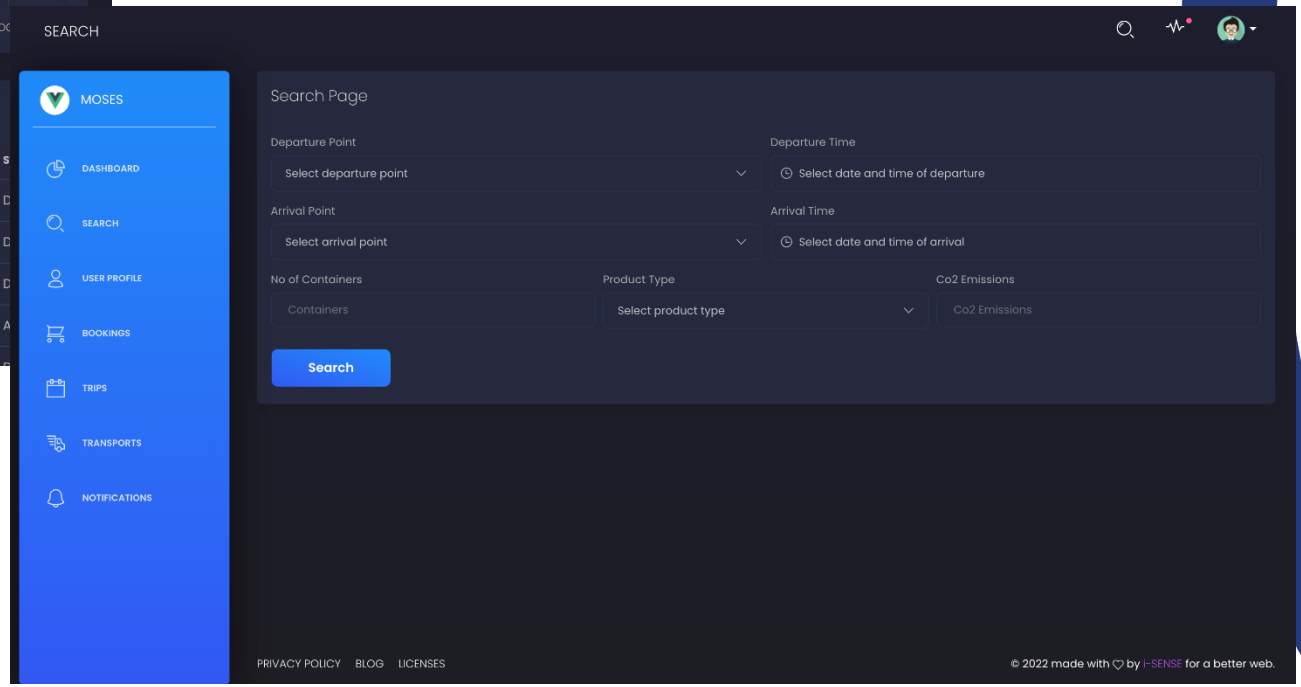



- Enabling local situation awareness – anomaly detection
- Robot self awareness in problem detection
- Control Intelligence
- Dynamic task allocation (One-to-many)
- Risk assessment for problem solving

# MOSES Matchmaking Platform

**The platform will implement horizontal collaboration among logistics stakeholders and will match demand and supply of cargo volumes**



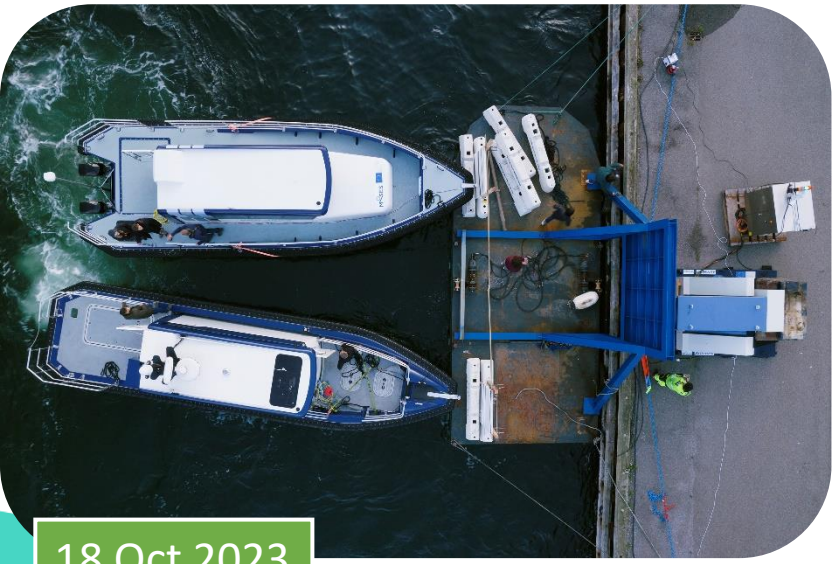




AI-based optimization of distribution routes and improvement of empty container management

# Pilot Demonstrations – Proof of Concepts

**Pilot demonstration #1**

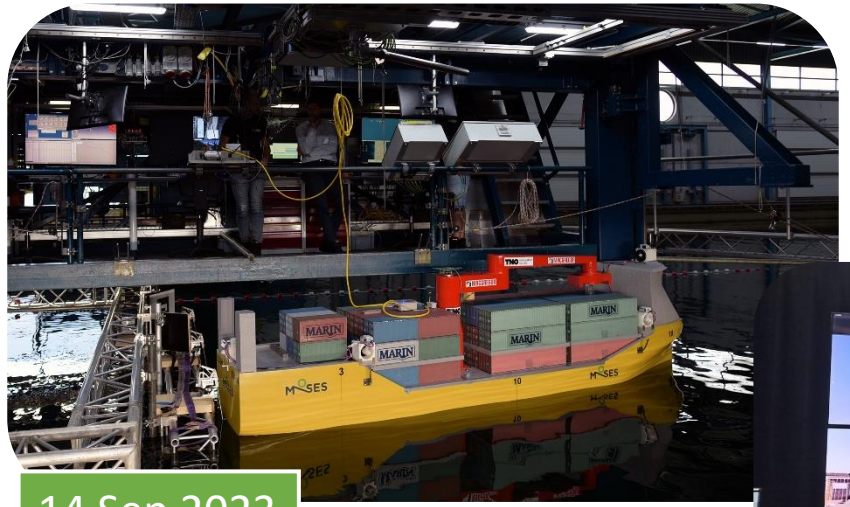
- Autonomous “tugboat swarm” and automated docking
- Denmark



18 Oct 2023

**Pilot demonstration #2**

- Dock-to-dock, fully autonomous operation of the MOSES feeder
- Netherlands




14 Sep 2023

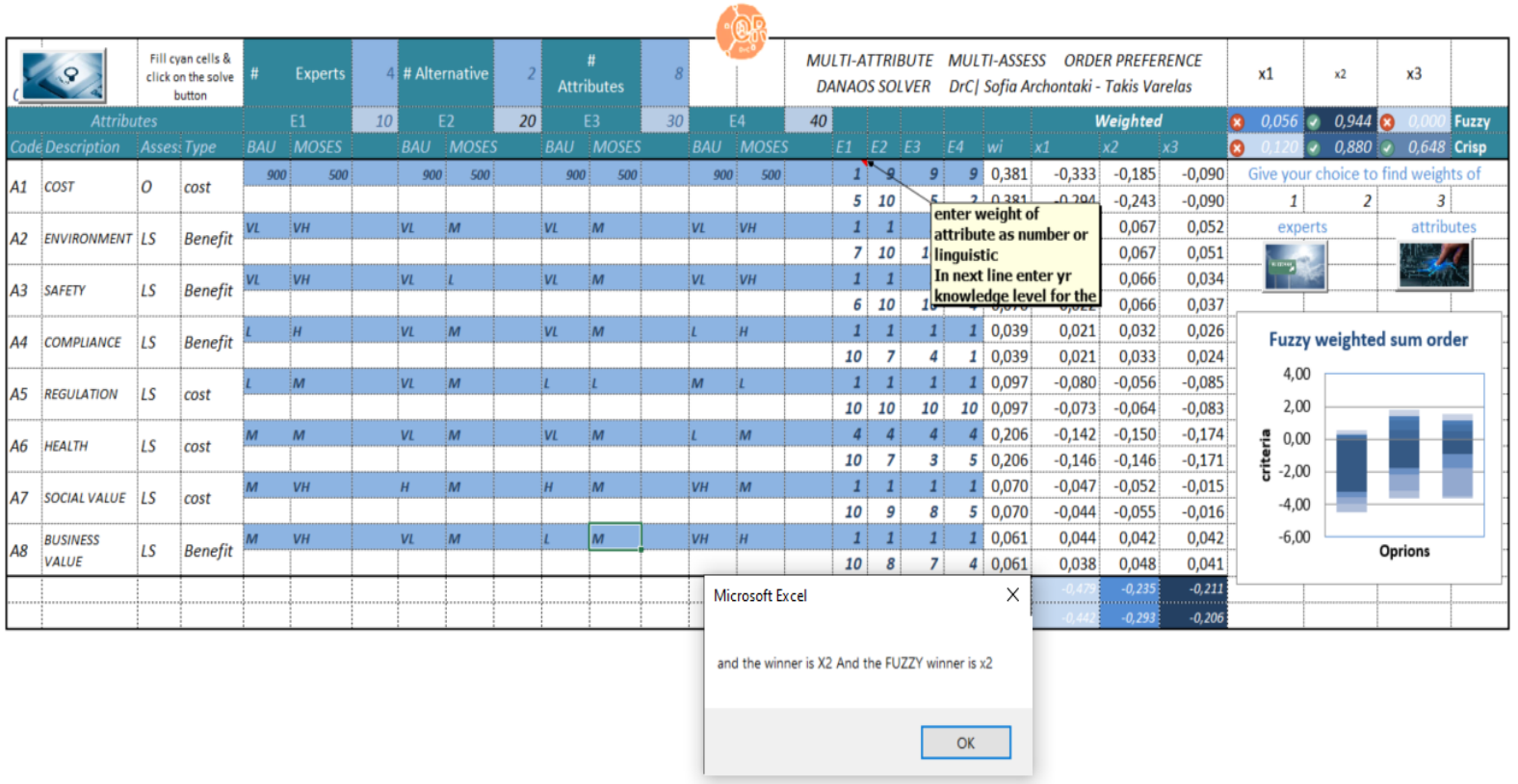
**Pilot demonstration #3**

- Autonomous operation of the Robotic Container-Handling System and remote monitoring with the IOSS
- Sweden, Netherlands

28 Sep 2023

# Pilot Demonstration results

- The pilot demonstration results will provide input to the ***sustainability framework*** developed by MOSES
- The objective is to evaluate the ***sustainability and added value to SSS of the MOSES Innovations,*** *based on specific criteria (incl. cost, environment, safety etc.)*



# MOSES Exploitation Workshops

## SAVE THE DATE

Exploitation workshop on

MOSES

AutoDock System

01 December 2023

10.00-12.00 CET

Online, via Zoom platform

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# Thank you for your attention!

*If you have any questions or require further information, please contact me:*

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**National and Technical University of Athens - NTUA**

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