MOSES Project Overview

This project has received funding from the European Union’s horizon 2020 research and innovation programme under grant agreement No. 861678.
MOSES Facts

- **Project Title:** AutoMated Vessels and Supply Chain Optimisation for Sustainable Short Sea Shipping
- **Call identifier:** H2020-MG-2.6-2019
- **Topic:** “Moving freight by Water: Sustainable infrastructure and Innovative Vessels”
- **Duration:** 01.07.2020 - 30.06.2023 (36 months)
- **Funding scheme:** RIA – Research and Innovation Action
- **EU contribution:** EUR 8 122 150
- **Coordinated by:** National Technical University of Athens (NTUA), Greece

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MOSES Consortium

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
The aim of MOSES 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

**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
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 Objectives

**Technical**
- Design innovative, hybrid electric feeder vessel outfitted with a robotic container-handling system
- Develop an automated manoeuvring and docking system for DSS ports
- Develop and promote a logistics matchmaking platform to boost SSS

**Societal**
- Reduce the environmental footprint for SSS and ports
- Improve efficiency and end-to-end delivery times of SSS mode
- Promote smart port development with minimal investment
- Develop concrete business cases

**Market**
- Improve efficiency and end-to-end delivery times of SSS mode
MOSES Business Cases (1/2)

BC #1 (Western MED-Spain)
Containers are trans-shipped from Valencia port using land-based transportation modalities

<table>
<thead>
<tr>
<th>Port</th>
<th>TEUs/year</th>
<th>Pax/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valencia</td>
<td>4.5 m</td>
<td>950 k</td>
</tr>
<tr>
<td>Sagunto</td>
<td>48.5 k</td>
<td>50</td>
</tr>
<tr>
<td>Gandia</td>
<td>7</td>
<td>35 k</td>
</tr>
</tbody>
</table>

BC #2 (Eastern MED-Greece)
Cargo from Piraeus to the Aegean islands is picked up by truck, delivered to warehouses and then loaded on another truck that off-loads it on RoRo ferries that serve the islands from Attica ports

<table>
<thead>
<tr>
<th>Port</th>
<th>TEUs/year</th>
<th>Pax/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piraeus Container Terminal</td>
<td>4.5 m</td>
<td>-</td>
</tr>
<tr>
<td>Mykonos</td>
<td>20 k</td>
<td>1.2 m</td>
</tr>
</tbody>
</table>
MOSES Business Cases (2/2)

MOSES Transferability Business Case for North Europe

Open call and dedicated reserved budget in the first project year.

State of the art criteria
- Underperforming SSS route for **domestic traffic competing with other modes**
- TEN-T corridor (besides MED, Orient/East-MED)
MOSES Pilot Demonstrations

**Pilot 1: AutoDock**

**SCOPE:** Intelligent cooperation of autonomous tugboat swarm to manoeuvre a large containership and dock it by collaborating with an automated mooring system.

**METHOD:** 2x TUCO’s Pro:Zero workboats will be equipped with MOSES autonomy package. The workboats will cooperate to maneuver a floating vessel to the dock. TRELLEBORG will fabricate and install on the dock a 1-off small-scale automated mooring unit prototype, outfitted with MOSES intelligence to collaborate with the workboats.

*Faaborg harbour, Denmark (TUCO’s facilities)*

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**Pilot 2: Feeder**

**SCOPE:** Seakeeping and energy performance. Capability to be used for automated mooring.

**METHOD:** A scaled ship model will be fabricated for 1 vessel design (out of the 3 evaluated in MOSES) and tested in seakeeping and manoeuvring basins.

*MARIN’s Seakeeping and Manoeuvring Basin (SMB), Netherlands*

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**Pilot 3: Robotic CHS**

**SCOPE:** Autonomous container handling capability and shared control between human operator and system.

**METHOD:** A full-scale, operational MacGregor GLE Crane, outfitted with sensor package, will be controlled by an operator at the MOSES Shore Control Station (SCS) to handle a container. The demo will be implemented with the SCS onsite and at a remote location.

*MacGregor test facility, Örnsköldsvik, Sweden*
MOSES upcoming outcomes

**conceptual designs** for the innovative feeder vessel / robotic system and a **roadmap** to fully autonomous operation, designed on concrete business cases.

**beta version** of a matchmaking logistics platform.

**working architecture and interface** for Autonomous Tugboat Swarms that cooperate with a **prototype** of an Automated Mooring system.

**a concept design** of a recharging station for automated vessels.

Technologies that will enhance the role of SSS and small ports.

Pilot Demos

viable exploitation paths
MOSES impact

- Decongestion of road and/or city infrastructure
- Reduction of CO₂ and air pollutant emissions of intra-European freight transport
- Enhancement of the performance of the CEF TEN-T network

Sustainability increase freight fed from intercontinental European ports using waterborne transport

- Modernization and increase of the reliability and competitiveness of Intra European Waterborne transport
- Demonstrate that the deployment of solutions can increase the quality of freight moved by SSS by at least 10% by 2039 compared to 2010 baseline data

Additional impact of MOSES project is on

- The creation of new business opportunities for industry and SMEs in the EU
- European policies for manufacturing and automation

- Safety of port processes
- Competitiveness of European ports and shipping companies
Thank you for your attention!

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

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