MOSES is not just a biblical figure

Nikolaos P. Ventikos, NTUA
the total container throughput in the Mediterranean increased from 20 m TEU (2000) to 51 m TEU (2015)

More containers globally need to be transported by larger ships (economies of scale)
Larger container ships bring more cargo to terminals that needs to be transshipped to the hinterland.
This leads to congestion from heavy container truck traffic

Island ports with no infrastructure are usually serviced by trucks on Ro-Pax Ferries
Large and more container ships also lead to adverse consequences in terms of safety.
Short Sea Shipping to small ports with no cargo handling infrastructure could provide an alternative to land-based transshipment. This potential is mostly untapped, because

- existing feeders cannot be served by small ports
- there is little incentive for carriers to choose maritime transport instead of road/rail modes.
The case of a European Archipelago
MOSES will create **new pathways** in the EU container supply chain by **integrating small ports** with no infrastructure into the EU container supply chain.
MOSES wants to take container cargo directly from large container terminals...
The case of a European Archipelago

To small ports via Short Sea Shipping feeders
Current thinking on how to define autonomy

**Automation:**
The implementation of processes by automatic means – under specified conditions can function without human intervention

**Autonomous ship:**
The ship uses automation to operate without human intervention, related to one or more ship processes, for the full duration or in limited periods of the ship's operations or voyage

**Crewless ship:**
a ship with no crew on board

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**Degrees of automation and human presence**

**Degree one:** Ship with automated processes and decision support

**Degree two:** Remotely controlled ship with seafarers on board

**Degree three:** Remotely controlled ship without seafarers on board

**Degree four:** Fully autonomous ship

MSC 101/5/4 (2019)

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MSC 102/5/18 (2020)
Innovative Feeder
Concept design, feasibility for autonomous operation

AutoDock
Autonomous Tugboat swarm collaborating with automated mooring

Robotic Container Handling System
Automated infrastructure
MOSES Demonstrations

**Pilot #1: AutoDock**
Demonstration and testing of:
1. The automated control infrastructure
2. Intelligent swarm operation
3. The collaboration of the autonomous tugboats with the automated mooring system

within the mooring process of a barge

Faaborg harbour, Denmark (TUCO’s facilities)

**Pilot #2: Feeder**
Testing of propulsion, seakeeping and autonomous operation at representative operational conditions:
1. Transit
2. Port entrance/departure
3. Mooring capability

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

Pilot #3: Robotic Container Handling System

Demonstrate and evaluate operational characteristics:

1. Variability in loading and offloading operations
2. Adaptation capabilities and human intervention
3. Remote operator supervision

Stage 1: MacGregor test facilities at Örnsköldsvik, Sweden
Stage 2: TNO test facilities at Soesterberg, the Netherlands
MOSES Impact on sustainable SSS cargo transport

Autonomous Tugboat swarm collaborating with automated mooring

Safety
- Minimize human error in towing
- Reduce accident during berthing

Environment
- Reduce air emissions, tugs will use electric propulsion

Efficiency
- Reduced time to berth
- More reliable towing services
- Increase service availability
### MOSES Impact on sustainable SSS cargo transport

#### Innovative feeder with robotic container-handling system

<table>
<thead>
<tr>
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- **Safety**
  - Minimize risk in cargo handling

- **Environment**
  - Green propulsion technologies
  - Reduce total emissions/TEU
  - Reduce road congestion in port areas

- **Efficiency**
  - Delivering cargo where no infrastructure is available
MOSES Impact on sustainable SSS cargo transport

**Matchmaking platform**

**Environment**
- Promote environmentally-friendlier alternative to land-based transshipment

**Efficiency**
- Ensure viability of SSS services based on innovative feeder
- Increase freight using SSS
MOSES Impact on sustainable SSS cargo transport

Automated technologies/processes
Autonomous operation

Safety + Efficiency

Sustainable SSS feeder services to small (and remote) ports without infrastructure
The National Technical University of Athens (NTUA) coordinates

17 expert partners throughout Europe

Budget: EUR 8,1m

36 months (2020 – 2023)
Paving the way towards the future of Short Sea Shipping!

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

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