

MOSES



The MOSES Innovative Feeder Vessel: Creating alternative pathways for transporting containerized cargo to the Greek islands



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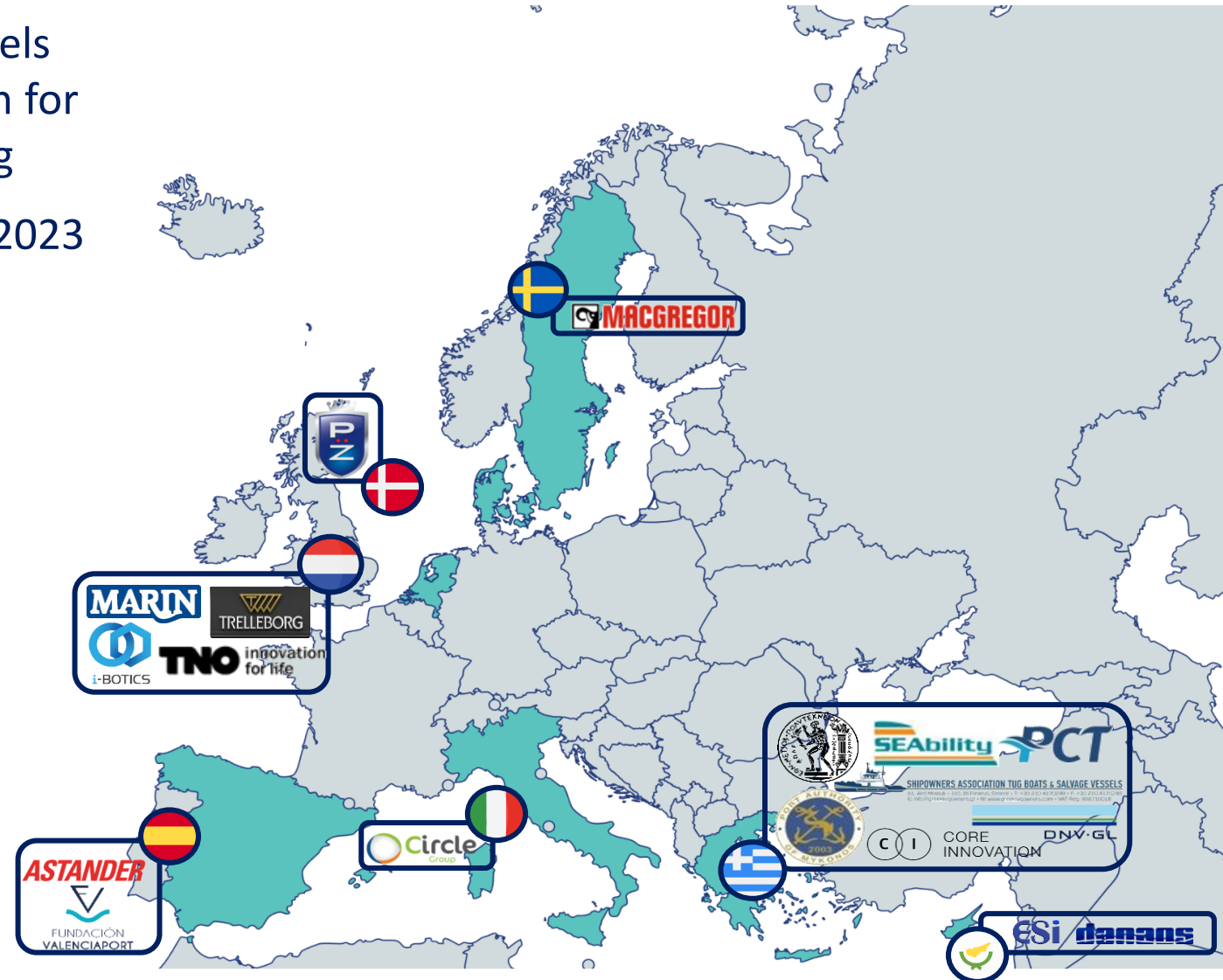


- Facts about the MOSES project
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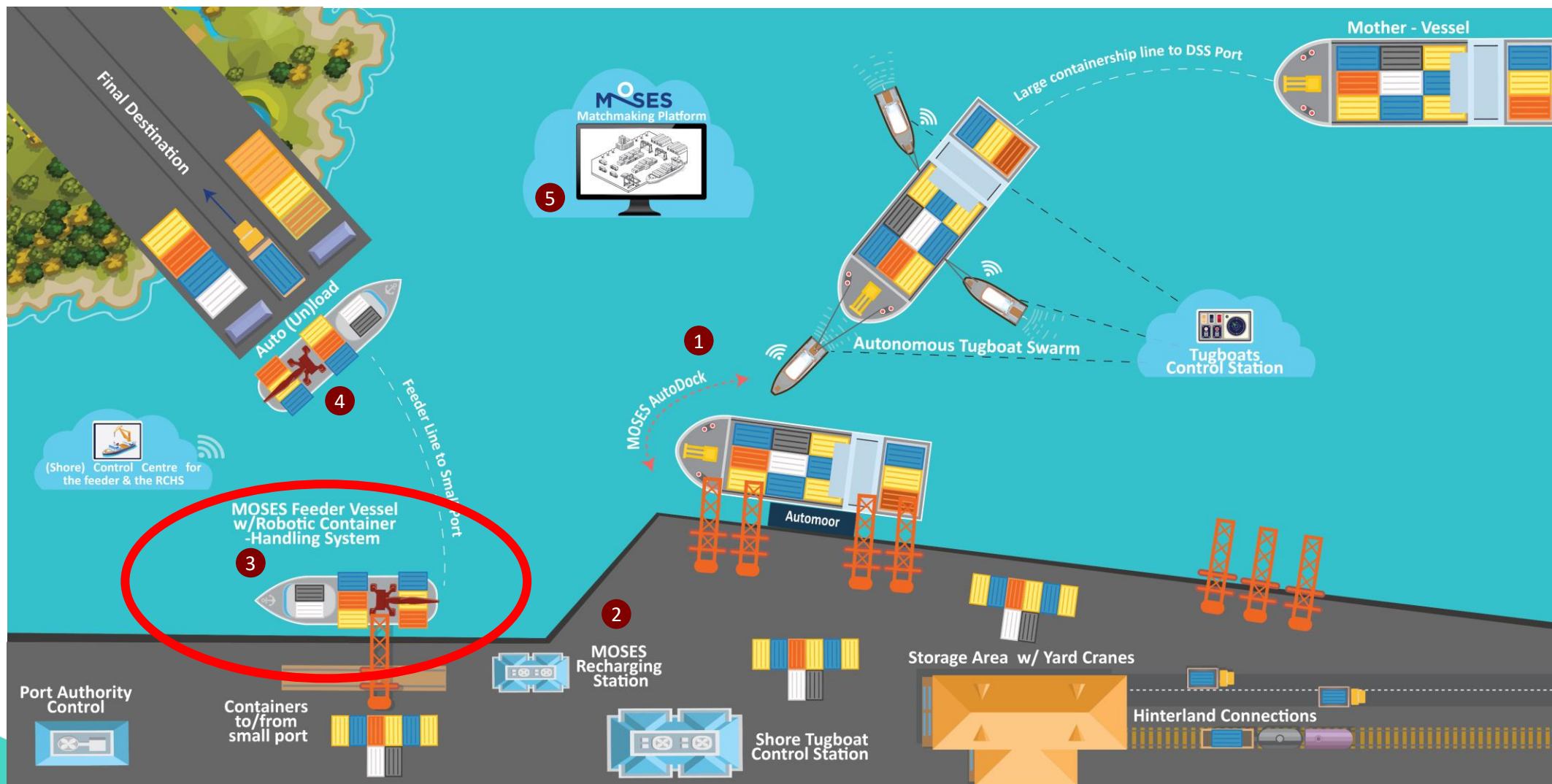


Facts about the MOSES project

- **Project Title:** AutoMated Vessels and Supply Chain Optimisation for Sustainable Short SEa Shipping
- **Duration:** 01.07.2020 - 30.06.2023 (36 months) – *to be extended 31.12.2023 (42 months)*
- **Budget:** 8 million €
- **Consortium:** 17 Partners
- **Coordinator:** NTUA



The MOSES Concept



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 ambition/main objective

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



Sustainable feeder services



Minimum decrease of end-to-end costs for container transport with feeder services



Increase of feeder traffic between large terminals and small ports



Modal shift to Short Sea Shipping in designated areas

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

The problems to be addressed and the innovative feeder's solutions



The **problems** addressed to the feeder:

- **Missing operational capacity** in small ports (no or limited infrastructure for loading/unloading cargo)
- No independency from the **availability of port services** in the large ports



What does the innovative feeder bring to the table?

- **No need of port infrastructure** (has its own container handling crane - Robotic Container-Handling System)
 - Large ports: doesn't depend on the use of the gantry cranes with high operational cost
 - Small ports: load/unload without any additional infrastructure on/from a dedicated area or directly on/from container trucks
- **Environmentally sustainable** propulsion (supported by MOSES Recharging Station)



Innovative Feeder | State of the art



ASKO



Yara Birkeland



Samskip Seashuttle

“Eastern MED-Greece” use case



Roundtrip: Piraeus – Kea – Syros – Tinos – Mykonos – Naxos – Paros (266nm)



The 6 island ports represent 87% of the total general cargo traffic of the islands around Mykonos (based on 2019 data)



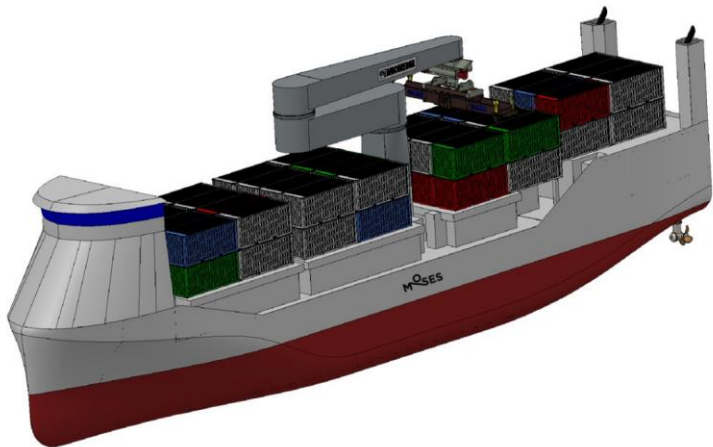
Objective:

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

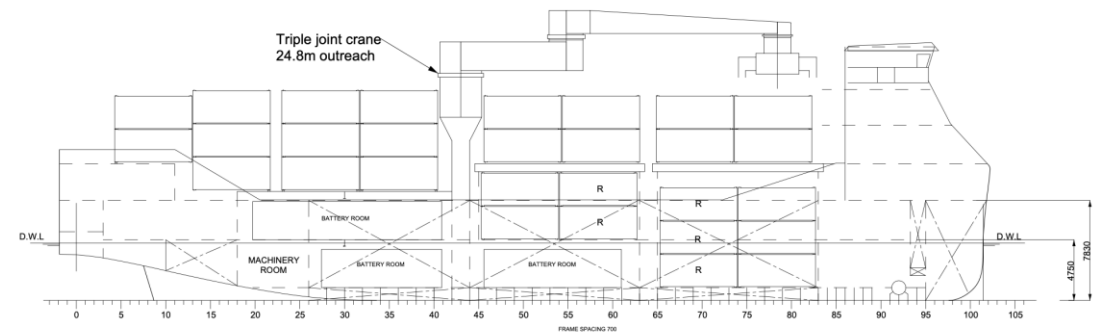
- The feeder would be competitive to existing cargo transport options if **80% of the maximum estimated demand** is captured
- At least **two weekly services** in each port
- The expected cost-effective capacity of the vessel is **90-200 TEUs**

The innovative feeder's characteristics

- **Two** Greek feeder *designs*: 1) 96 TEU, 2) 180 TEU
- Improved **energy performance**
- **Two options** were considered:
 1. **Hybrid** (the chosen one)
 2. **Full electric** (rejected, as the required battery capacity may limit the cargo space)
- Automated onboard **crane** for container (un)loading
- Azimuth thrusters for **enhanced maneuverability**
- Envisioned autonomous operation

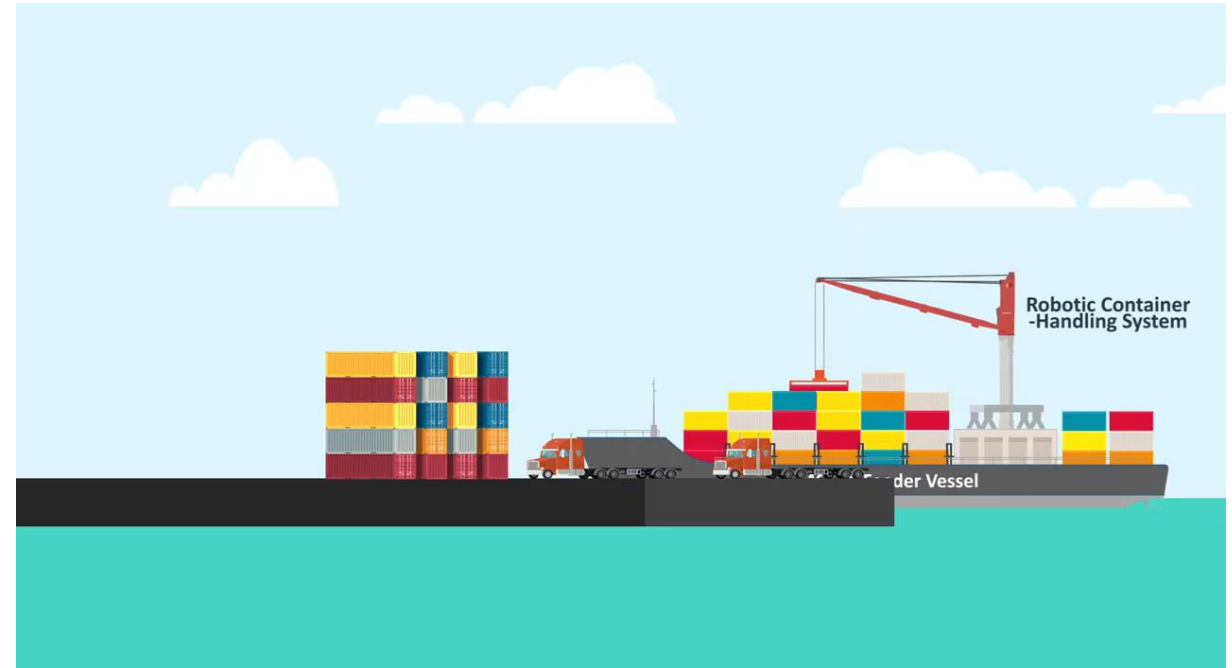


Principal dimensions	
Propulsion type	Hybrid (methanol ICE + batteries)
Capacity	96 TEU
L _{OA}	76.25 (m)
B	13.00 (m)
T	5.00 (m)
D	7.83 (m)



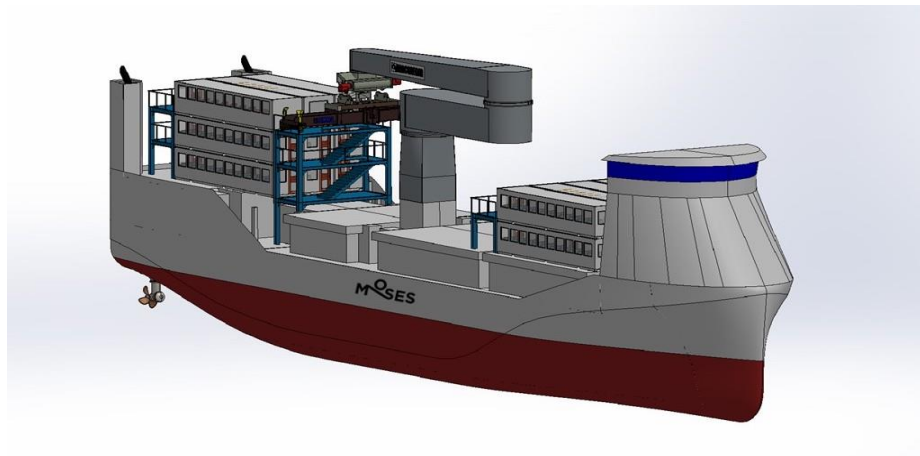
Innovative Feeder | Robotic Container-Handling System functionality

- The feeder **arrives** at a small port
- The Robotic Container- Handling System (no crane driver onboard):
 - **Unloads** TEUs directly on trucks waiting and at the port
 - **Loads** TEUs from the port
- The RCHS is remotely supported by Intelligent *Operator Support System (IOSS)*
- The feeder **continues its journey**

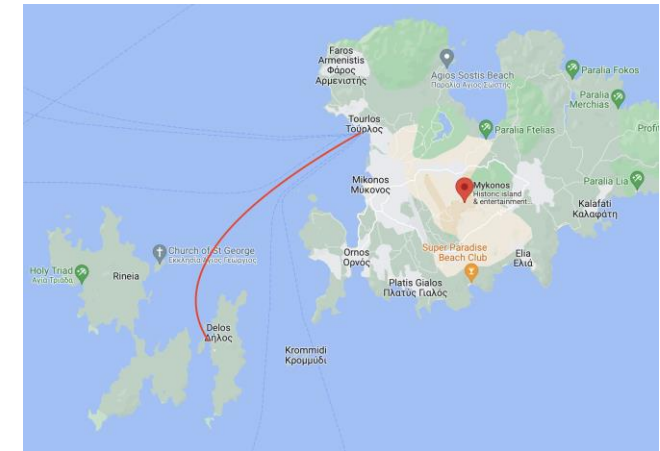


The innovative feeder's additional functionality

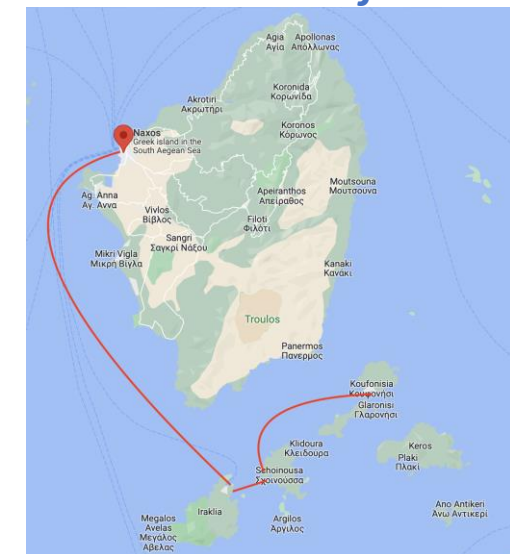
- A **feasibility study** was conducted in order to identify if unexploited time (**10 waiting hours based on trip simulations performed**) could be used for passenger transportation to other nearby islands:
 1. *Mykonos-Delos*
 2. *Naxos-Small Cyclades*
- **Modular** concept design for the accommodation of passengers



Mykonos-Delos



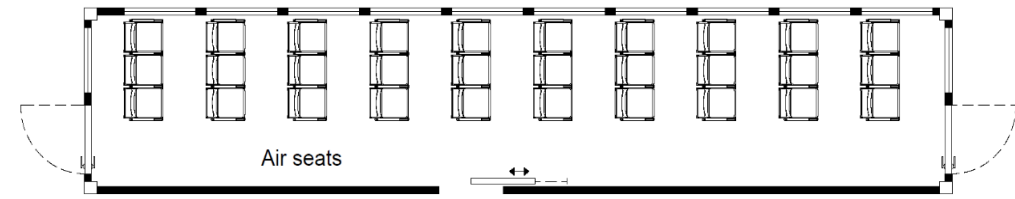
Naxos-Iraklia-Schoinousa-Koufonisia



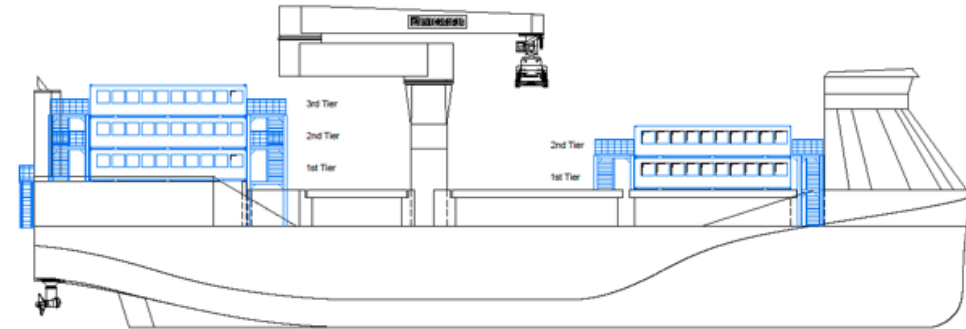
The innovative feeder's additional functionality

- **Specially designed FEUs** handled by the feeder's crane (weight estimation performed):
 1. Accommodation FEU with aircraft seats
 2. Bar FEU that will cover the needs for refreshments
 3. Lounge, W.C. & Galley FEU
- **Three** different accommodation **options**:
 1. 201 pax (bow passenger area)
 2. 194 pax (stern passenger area)
 3. 395 pax (combined)

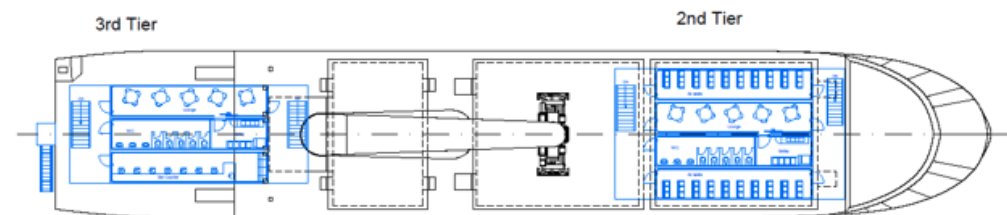
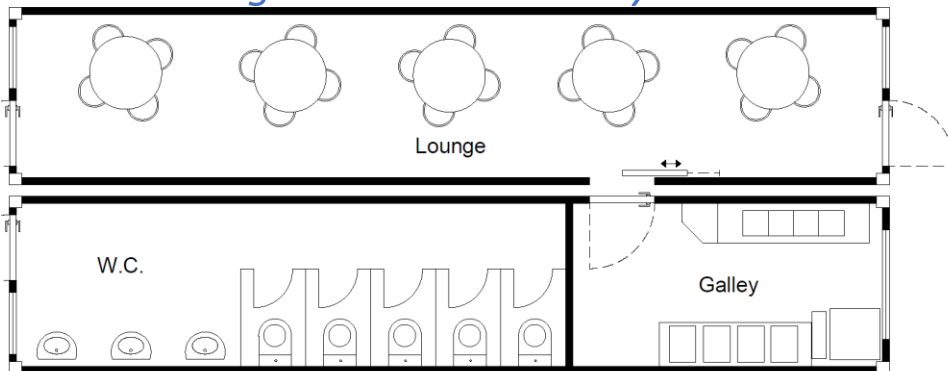
The accommodation FEU



The combined accommodation solution



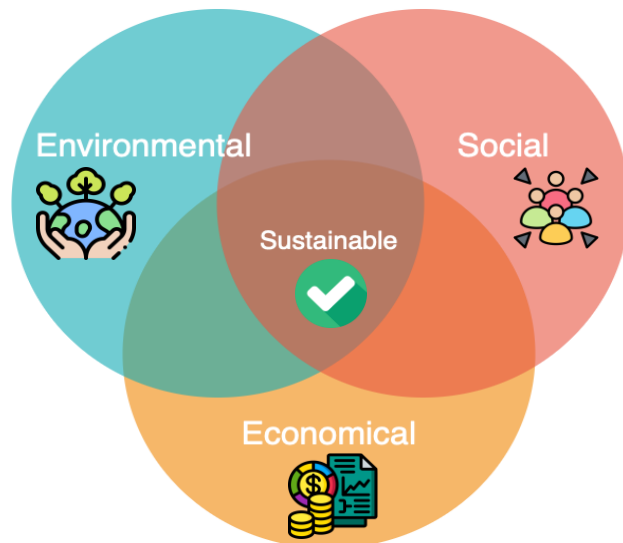
Lounge and W.C. & Galley FEU



Impact on freight transport sustainability



- Reduced environmental footprint
- Modernization of waterborne transport
- ***Increase containerized cargo flows to the Greek islands***
- Improved efficiency and delivery times compared to the current conditions (*mainly trucks on Ro-Ro*)



Decongest Piraeus port

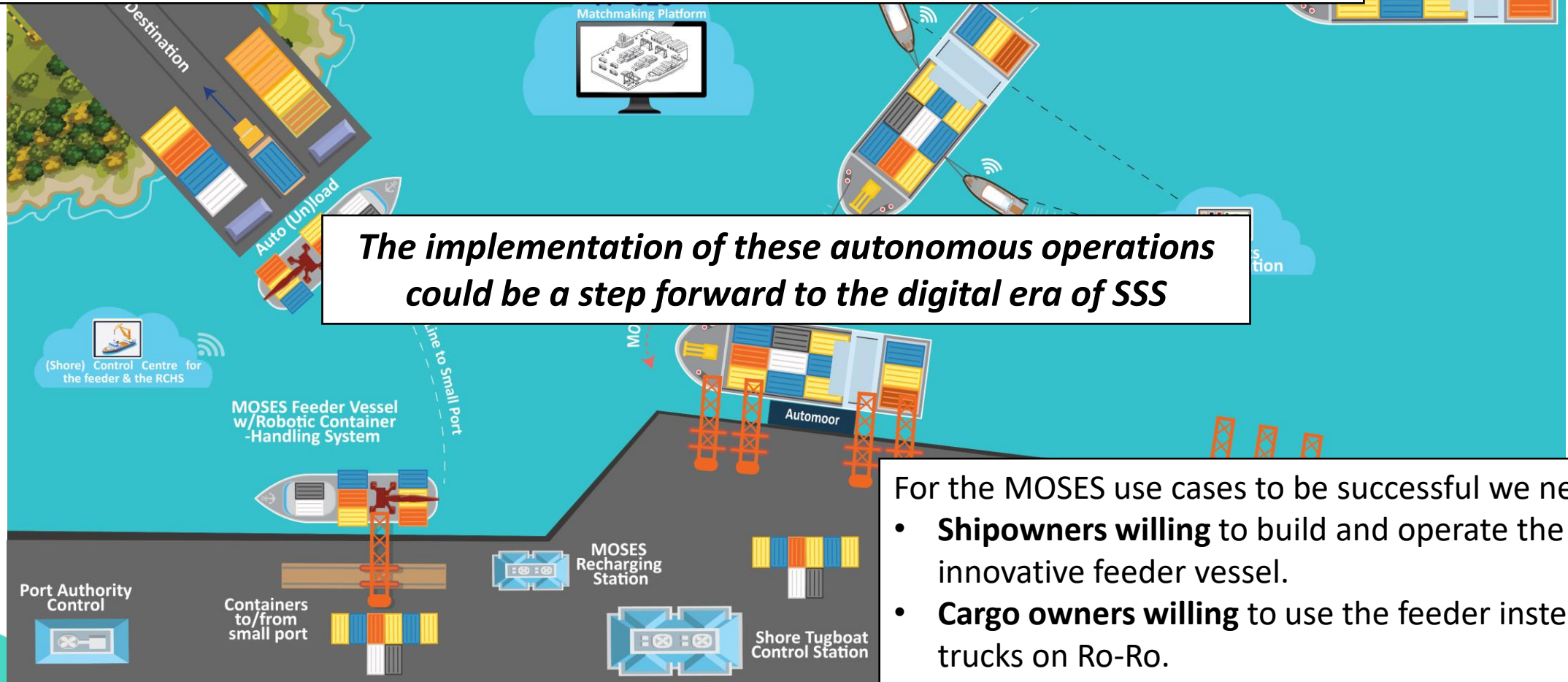


Reduce the CO₂ and air pollutant emissions of intra-European freight transport



MOSES experience and key take-aways

- Competitiveness depends on the **container transport demand captured** by the feeder.
- The hybrid power solution is estimated to have **10% lower operating costs** compared to fully electric.



The implementation of these autonomous operations could be a step forward to the digital era of SSS

- For the MOSES use cases to be successful we need:
- **Shipowners willing** to build and operate the innovative feeder vessel.
 - **Cargo owners willing** to use the feeder instead of trucks on Ro-Ro.



MOSES

Thank you for your attention!

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

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MOSES project2020



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MOSES Project



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