



## AutoMated Vessels and Supply Chain Optimisation for Sustainable Short SEa Shipping

### D8.7 Innovation management Map

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## List of Acronyms

AI	Artificial Intelligence
AR	Augmented Reality
CEF	Connected Europe Facility
CO2	Carbon dioxide
D2.1	Deliverable number 1 belonging to WP 2
DSS	Deep Sea Shipping
EC	European Commission
ESG	Environmental Social Governance
EU	European Union
GDP	Gross Domestic Product
GHG	Green House Gas
GPS	Global Positioning System
GVA	Gross value Added
HIT	Hellenic Institute of Transport
ICT	Information Communication Technologies
IOSS	Intelligent Operator Support System
IM	Innovation Management
IMO	International Maritime Organization
IMU	Inertial Measurement Unit
IoT	Internet of Things
IP	Intellectual Property
IPR	Intellectual Property Rights
KPI	Key Performance Indicators
LNG	Liquefied Natural Gas
ML	Machine Learning
MLP	Matchmaking Logistics Platform
MO	Market Objectives
MoS	Motorways of the Sea
MTRL	Market Technical Readiness Level
RCH	Robotic Container Handling
RRF	Recovery Resilience Facility
SO	Social Objectives
SoTA	State of the Art
SSS	Short Sea Shipping
TEN-T	Trans-European Transport Network
TEU	Twenty-foot equivalent unit
TMDN	European Trademark and Design Network
TO	Technical Objectives



TRL	Technical Readiness Level
VP	Value Propositions
VPC	Value Proposition Canvas
VR	Virtual Reality
WP	Work Package

## Executive Summary

Innovation Management mapping wishes to ensure MOSES technologies are not just a new or improved technological offering but also differ significantly from the provider's previous products and give a unique value to potential end users. To ensure this aspect, CORE performed several workshops, activities, interviews and research, focusing on (1) matching end users' needs with technology providers offers via value propositions concept, (2) identifying strengths and weaknesses of MOSES technologies when compared to the State of the Art, (3) list other competitive products already in the market, patents submitted or publications and comparing them with MOSES technologies, (4) overview the short sea shipping market and identify challenges opportunities. Additionally, CORE developed a model for profit simulation focusing on an/the autonomous tugboat system since, it is the only innovation combining autonomous operation, sustainability and safety, with the highest TRL and exposed in real conditions.

Results from value propositions show port authorities gain significant value from MOSES technologies. Specifically, when adopting matchmaking platform, the time and congestion of freight movement decreases significantly. When adopting recharging station and MOSES AutoDock System, they contribute to lowering greenhouse gas emissions and mooring time as well. For small ports like Mykonos, when serving hybrid feeder vessels, apart from near zero emissions, they are able to host more cargo without enlarging their port infrastructures.

For tugboat owners' needs MOSES offers an autonomous maneuvering concept able to decrease mooring time by up to 15sec. AutoMoor replaces the traditional way of mooring the vessels with ropes and reduces human error-related accidents for maneuvering and docking. For ship owners, MOSES offers a Robotic Container-Handling System able to lock on to a container on the quayside before transferring it to the vessel without an onsite crane operator and furthermore, ensure operations safety, by scanning, without delay following automatic shut-down when a person enters the safety zone.

MOSES innovations' strengths and weaknesses are measured through ESG criteria in order to align with current financing trends. MOSES technologies strengths are (1) Promoting Digitalization, (2) Contributing to reducing greenhouse emissions, (3) Advancing skills among workforce and (4) Contributing to reducing energy consumption. MOSES innovations' weaknesses are the (1) difficulty to be recycled as a waste, (2) its low contribution to a reduced use of natural resources, (3) the number of further investments required to reach TRL-9 and (4) the missing valuable data on every dock operation time. CEF and RRF EU investments are the basic opportunities

and minimizing personnel due to autonomous operations instead of reskilling the basic threat.

On the competition level we observe two main competitors of MOSES technologies. Damen Shipyards in cooperation with autonomous system supplier Sea Machines Robotics with the Stan Tug 1004 for MOSES autonomous tugboat, and CAVOTEC's MoorMaster for AutoMoor. The MOSES matchmaking platform is facing competition from all available digital logistic port operations platforms. The rest of the MOSES technologies face no significant competitors. Regarding the entrance level there is currently no serious obstacle to entering the market.

The Profit Simulations for MOSES autonomous tugboat system was based on market research which showed that tugboat owners are willing to invest in digitalization in a growing short sea shipping industry. In Europe there are 80 tugboat owners in 26 countries<sup>1</sup> owning or operating a combined fleet of over 800 tugs. With the price of 150,924 € for autonomous tugboat system and an optimistic 12% market penetration, sales will lead to revenues of 1,207,388 € and profits of 278,63 € the first year, and gradually the fifth year the revenues will sky rock to 6,036,940 € and profits will reach 3,240,699 €.

Via Innovation Margins analyses, CORE analysed the margins between current market and technology readiness level of MOSES technologies and the ideal level to successfully commercialize them. Apart from AutoMoor high readiness to enter the market, which was documented with a high MTRL score, this analysis suggests that Recharging Station, Innovative Feeder Vessel, and Matchmaking platform need improvements via operating in real environments and the development of a full business plan. The analysis concludes by suggesting further exploitation, via IP securement and agreements with providers and customers, of autonomous tugboats and robotic cranes since the market is ready to adopt them and their innovation potential is high.

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<sup>1</sup> <https://eurotugowners.com/members/>