Paving the way for the future of Short Sea Shipping: The MOSES project

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Paving the way for the future of SSS: The MOSES project

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EU container supply chain

• 74% imports/exports – 37% exchanges
• DSS vs. SSS/IWT
• Road accidents / congestion / emissions
• Need for modal shift
• TEN-T network

European Core Network Corridors and ro-ro shipping routes
(Source: European maritime space, Kurt Bodewig, European Commission, 2020)
Current status

• Major container terminals (Hubs)
• Large containerships

• Shipping to hinterland
  ➢ Land-based transportation (rail, road)
  ➢ Short Sea Shipping
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- Environment
  - Emissions reduction
  - Decarbonization
  - Energy efficiency
  - Air pollution minimization
  - Protection of marine environment

- Operational efficiency
  - Digitalization
  - Automation
  - Reporting framework
  - Communication optimization

EU ITS

Environmental Impact Assessment

Alternative Fuel Infrastructure

IMO Regulations

EU Directives

Regulatory/legal framework

European Green Deal

Environmental Impact Assessment

IMO Regulations

EU Directives

EMSW

eFTI

Ship Reporting Formalities
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**Shortcomings**
- Navigational/topological restrictions of SSS ports
- Limited container handling infrastructure
- Lack of 24/7 port services and available space
- Backhaul traffic challenge
- High cost and unreliability of SSS
- Reluctancy of port communities to invest

**Market opportunities**
- Decongestion of hub ports
- Reduction of environmental impact
- Improvement of supply chain efficiency
- Increased route availability

**SSS Adoption**
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MOSES contribution towards SSS enhancement and promotion

• Reduction of total time to berth
• Applicability to ports with no infrastructure
• Increased awareness about SSS routes
• Strong communication support
• Minimization of empty returns
• Improved cost-effectiveness
• Modal shift from road to SSS
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MOSES innovations

- Automated maneuvering and docking system
- Innovative ship design for sustainable SSS services
- Autonomous container (un)loading infrastructure
- Automated shore-based power system
- Collaborative/matching tool for freight flows management
Innovative Feeder Vessel and Robotic Container-Handling System

- Autonomous navigation (partially)
- Low cargo capacity
- Enhanced maneuverability
- Reduced environmental footprint (near-zero emission operation, cold ironing, recharging station)
- Automated container (un)loading (onboard crane)
- Lower loading time and operating costs
- Compatibility with MOSES AutoDock system
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AutoDock System

- AutoMoor Unit
- Autonomous Tugboats
- AI algorithm
- Training in virtual environment
- Operational scenarios
- Decrease in maneuvering time
- Decrease in docking time
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MOSES Matchmaking Logistics Platform

- Horizontal collaboration among logistics stakeholders, matching demand and supply of cargo volumes
- Clear mapping of B2B processes within the entire supply chain
- Demand maximization and enhancement of SSS route usage
- Modal shift off the road to intermodal rail and waterways
- Cargo flow consolidation (at container level)
- Changing freight flows handling and increase of partial cargo loads cost-effectiveness
- Optimization of distribution routes and improvement of empty container management
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MOSES Business cases

- Current system – Potential demand – Cost analysis and cost effectiveness – Technical and operational limitations
- Viability of SSS container feeder lines

BC #1 (Western MED – Spain)

BC #2 (Eastern MED – Greece)
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• MOSES Transferability Business Case for North Europe
  • Open call process and dedicated budget
  • State-of-the-art criteria
    • Underperforming SSS route for domestic traffic competing with other modes
    • TEN-T corridor (besides MED, Orient/East-MED)
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MOSES Pilot demonstrations

Pilot 1: AutoDock
- Autonomous tugboat swarm
- Automated mooring system
- Autonomous maneuvering and docking process

Pilot 2: Feeder
- Autonomous feeder operation
- Seakeeping and energy performance

Pilot 3: Robotic CHS
- Autonomous container handling
- Remote control
- Intervention options
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MOSES impact

- Strengthening of SSS mode
- Decongestion of road and/or city infrastructure
- Reduction of CO$_2$ and air pollutant emissions
- Enhancement of TEN-T network performance
- Sustainability for freight transport
- Increased safety of port processes
- Modernization for waterborne transport
- Competitiveness of European ports and shipping companies
Thank you!

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