As part of Horizon 2020, the EU Commission has launched a series of research and innovation projects to contribute to more automation and autonomy in short sea logistics.

MOSES aim: 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.

Two-fold strategy:
1. SSS feeder service
2. DSS ports efficiency: Technological solutions for reducing DSS ports inefficiencies – reduce berthing time, improve safety

MOSES website: https://moses-h2020.eu/

MOSES project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 861678.
Many to many support

Tasks
Humans
IOSS: Intelligent Operator Support System

“A system that supports remote operators in their supervision and control of autonomous cranes loading and offloading containers in parallel.”
Main IOSS functionalities

• Dynamic task allocation
  Assign vessels to operators based on user and task profile.

• Continuous Risk Assessment
  Assess in real-time potential risks and warn, inform, explain and help solve them

• Progressive Disclosure Interface Design
  Show information and offer control on different abstraction levels.
Purpose

Allocating tasks over time to operators based on operator and task profiles, with real-time adjustments based on these changing profiles.
Dynamic task allocation
Continuous Risk Assessment

Purpose

Proactively bringing the operator into the loop with all relevant information for just-in-time awareness.

Types of risks

- Temperature
- Fire
- Biohazard
- Radiation

Situation → Risk estimate
Continuous Risk Assessment

- Sensor failure
  - LIDAR failure
    - Camera failure
    - Swivel failure
  - Human proximity
    - Risk of harm
Progressive Disclosure Interface Design

Provide situation awareness on three levels of abstraction

• *fleet level*
• *vessel level*
• *Quay level (immersive view)*

interaction design pattern
Progressive Disclosure Interface Design
Video demo
Progressive Disclosure Interface Design

“Quay” Immersive view

Purpose

*The operator is immersed in a real-time reality, namely the situation on the quay*
Progressive Disclosure Interface Design

“Quay” Immersive view

Operator immersive view local quay situation
PILOTS

Pilot 1: AutoDock
Intelligent cooperation of autonomous tugboat swarm to manoeuvre a large floating vessel and dock it by collaborating with an automated mooring system.

Pilot 2: Feeder
Seakeeping and energy performance capabilities. Capability to be used for automated mooring.

Pilot 3: Robotic CHS
Autonomous container handling capability and shared control between human operator and system.
Thanks for the attention

For more information please contact Hans.vandenbroek@tno.nl