REMOTE SUPERVISORY CONTROL FOR A ROBOTIC CONTAINER HANDLING SYSTEM

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MOSES

- 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.

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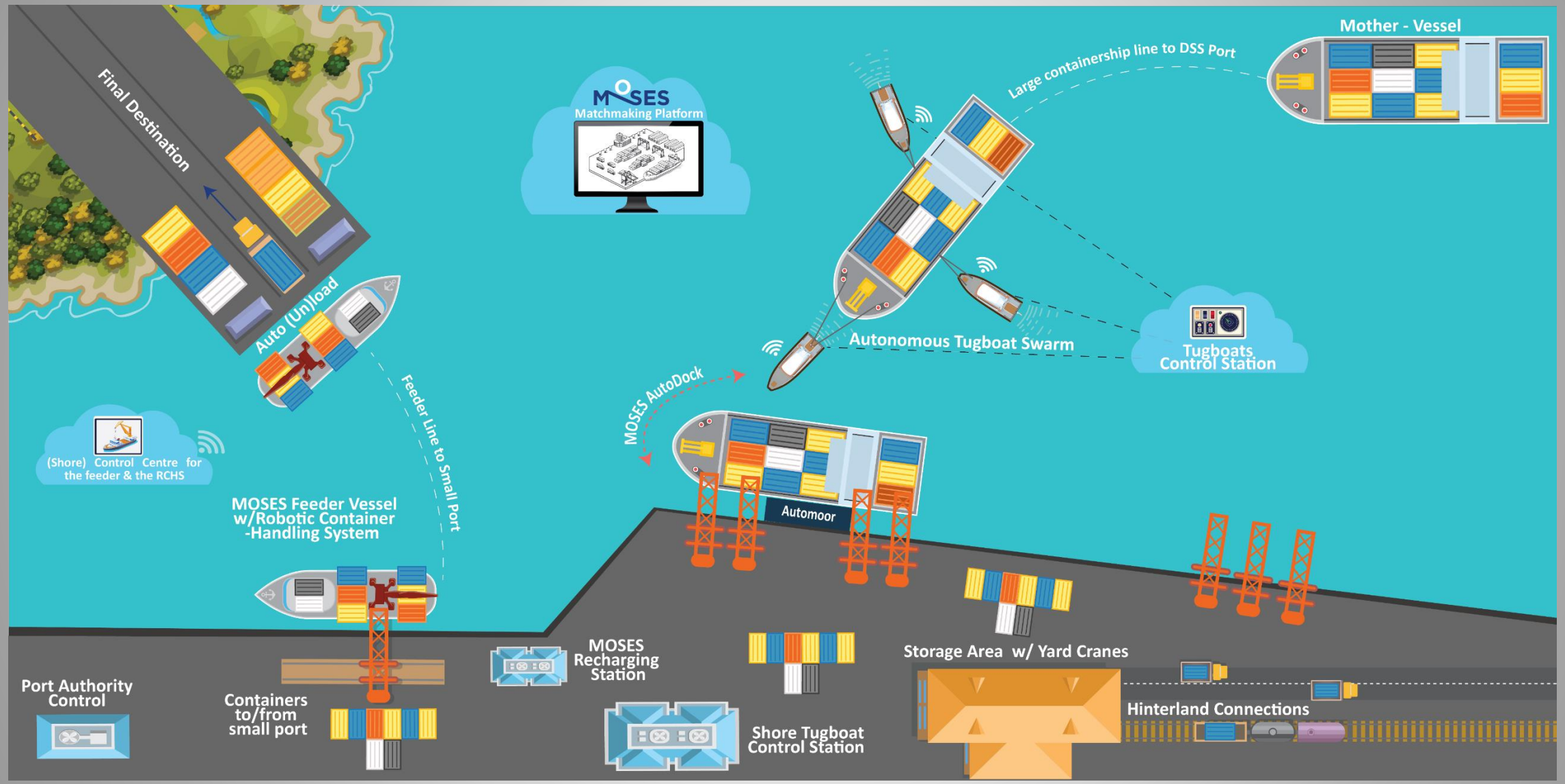


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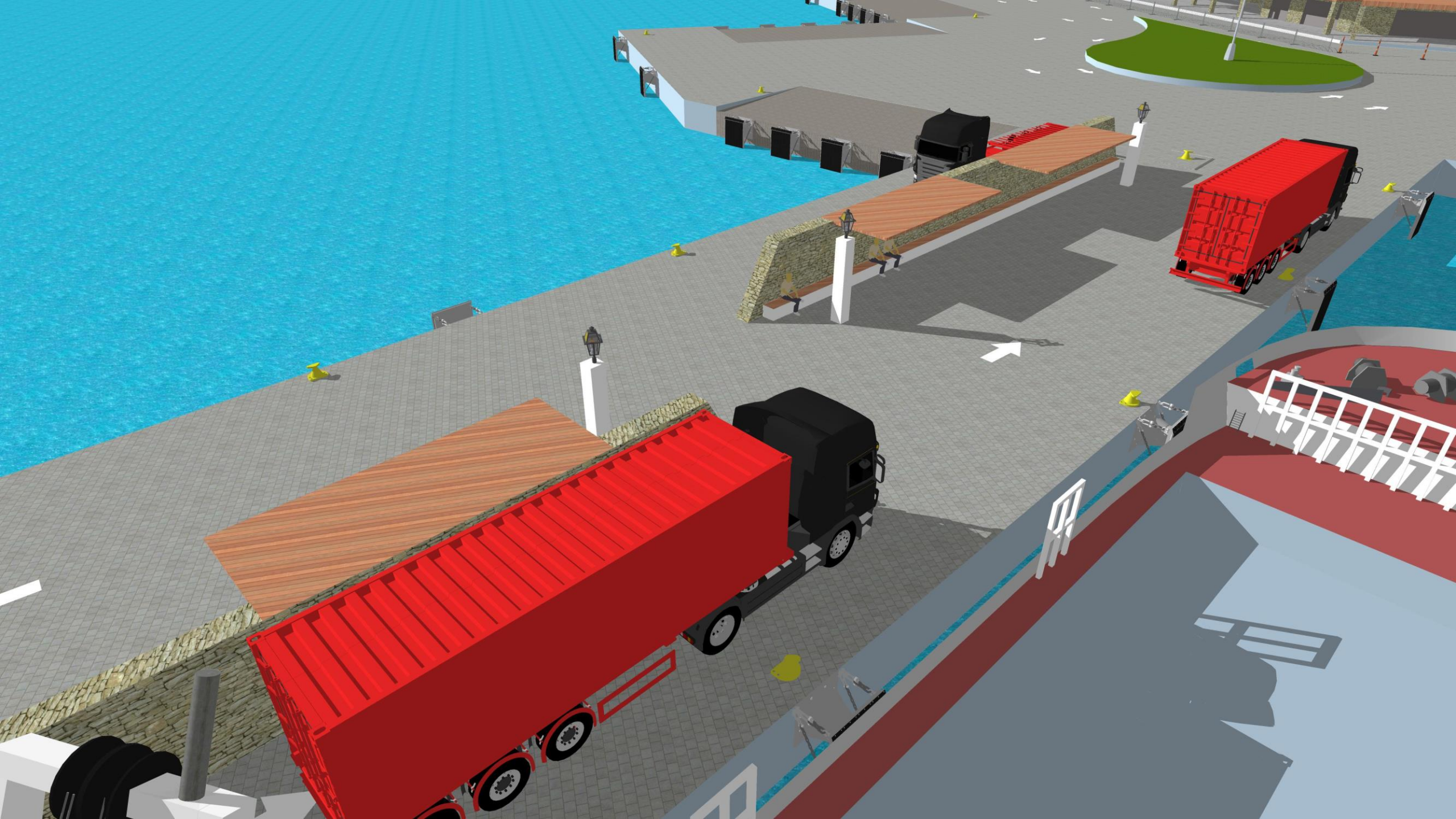

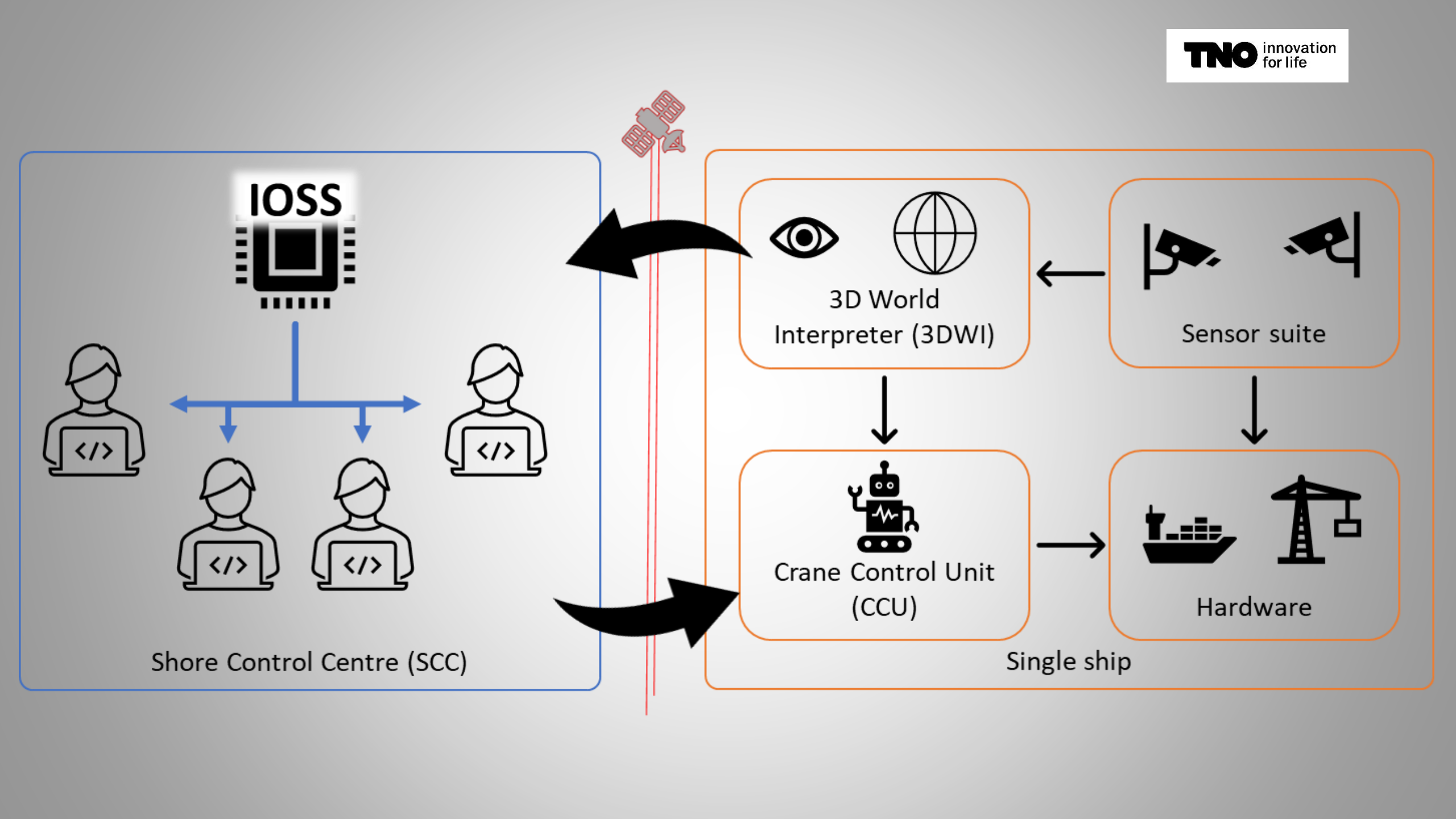
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IOSS
3D World Interpreter (3DWI)
Sensor suite
Crane Control Unit (CCU)
Hardware
Shore Control Centre (SCC)
Single ship


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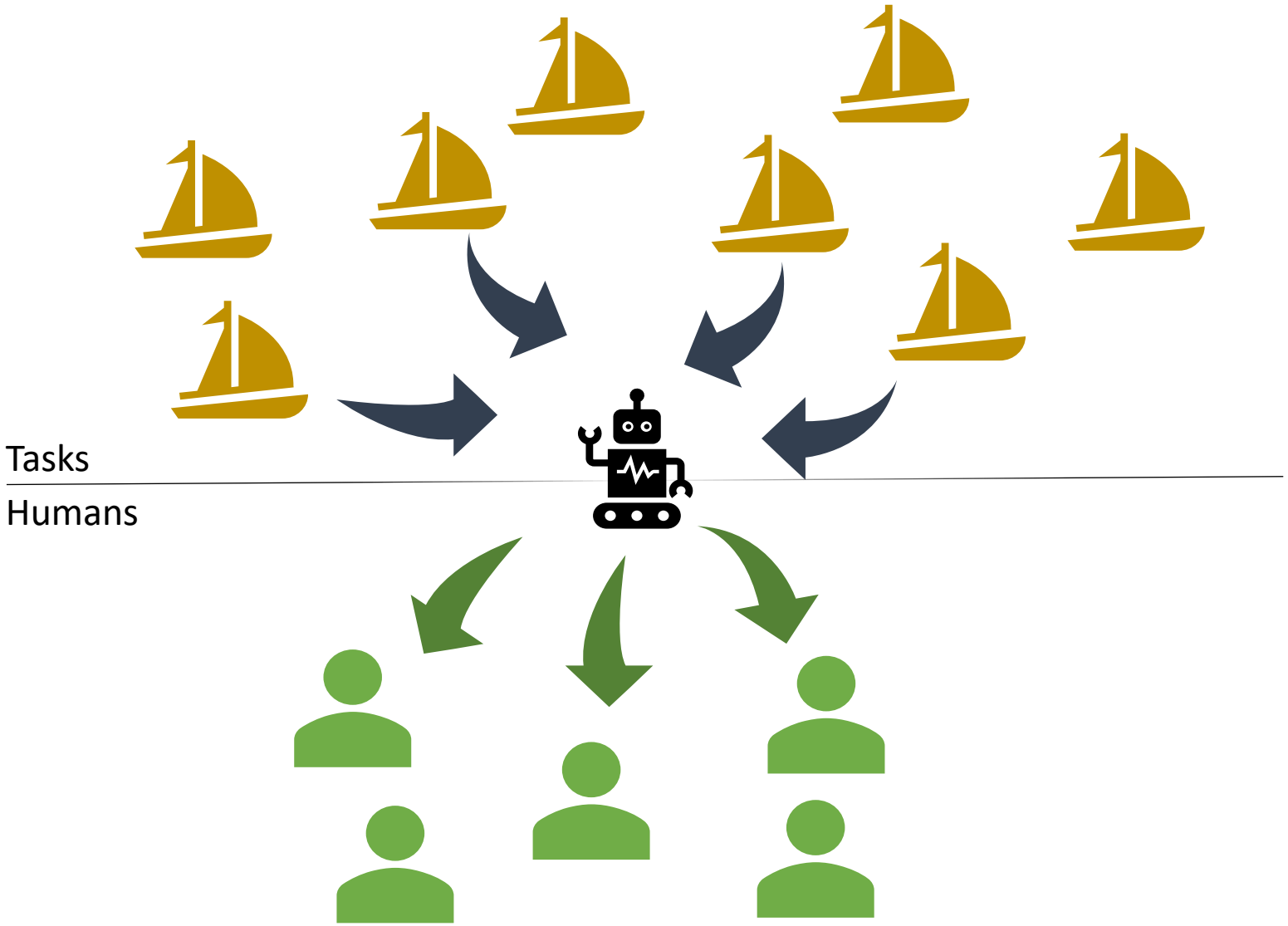
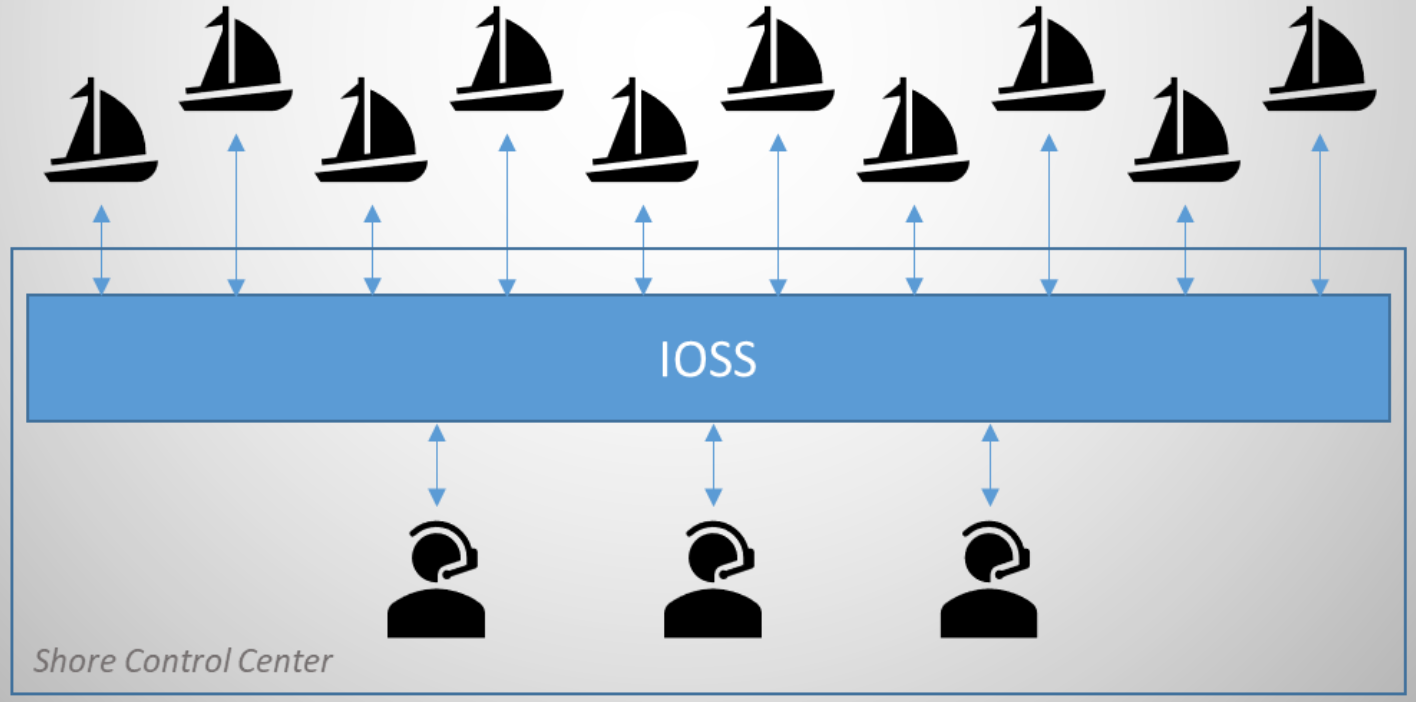
Many to many support



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

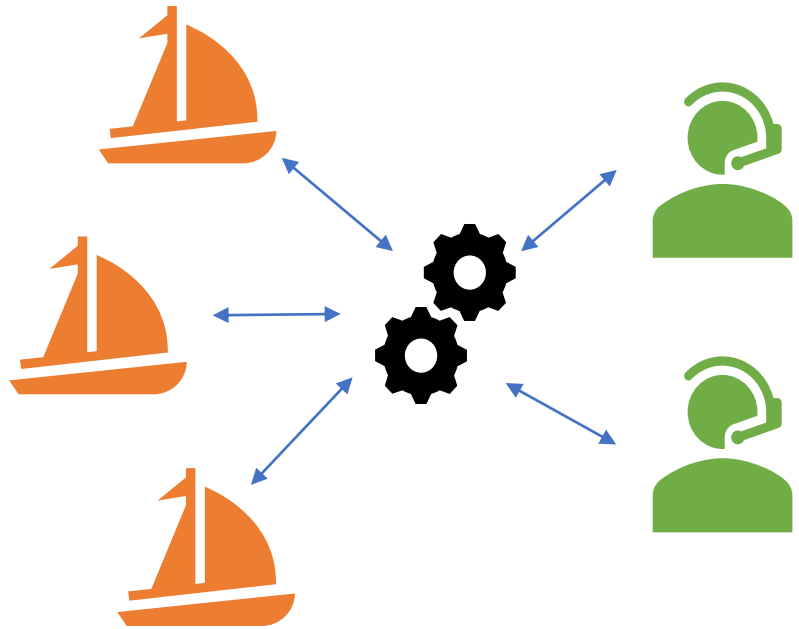
- **Progressive Disclosure Interface Design**

  Show information and offer control on different abstraction levels.

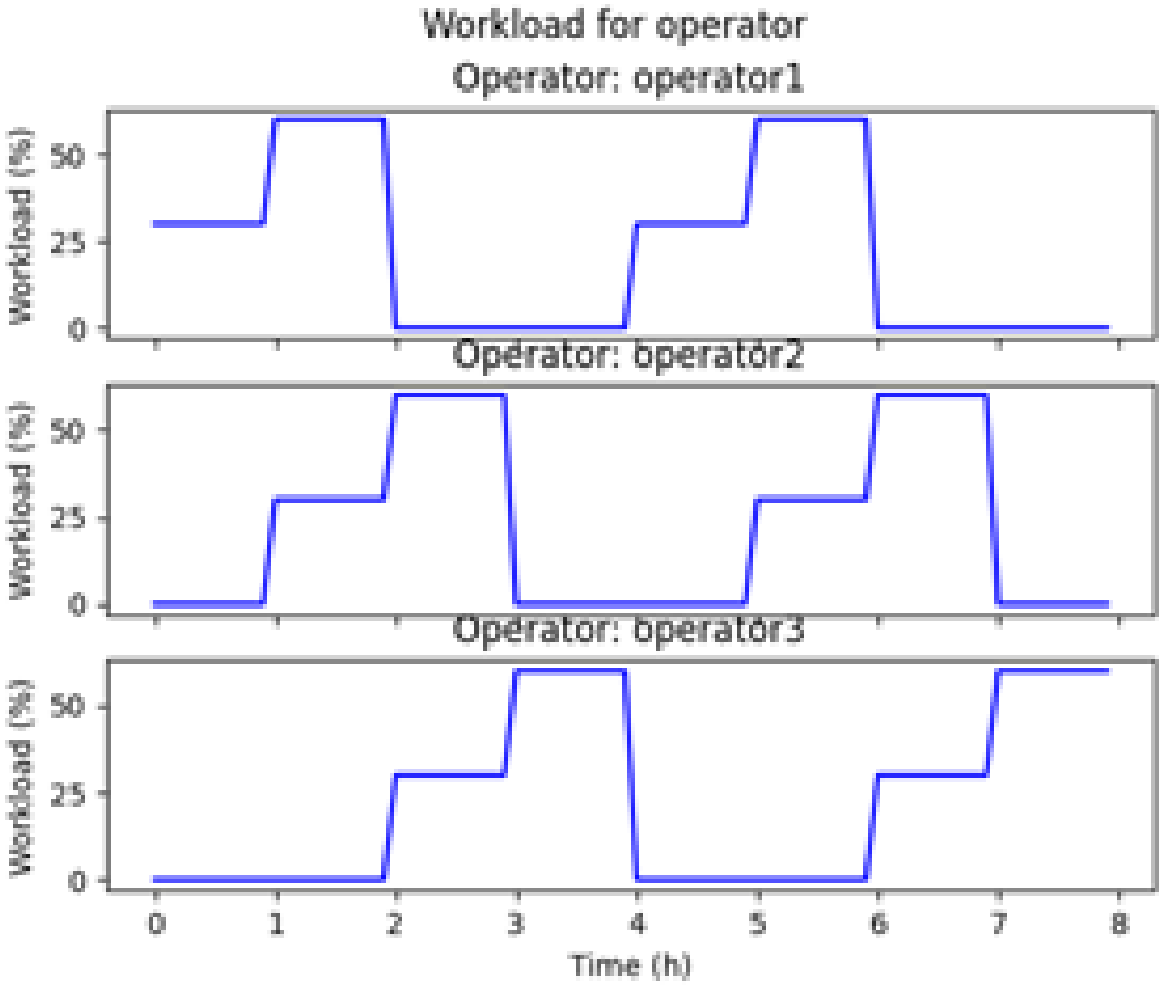
Dynamic task allocation

Purpose

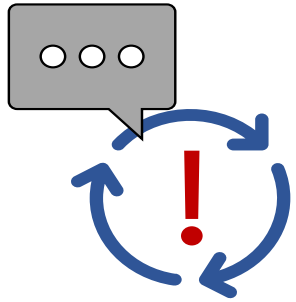
Allocating tasks over time to operators based on operator and task profiles, with real-time adjustments based on these changing profiles.



Dynamic task allocation

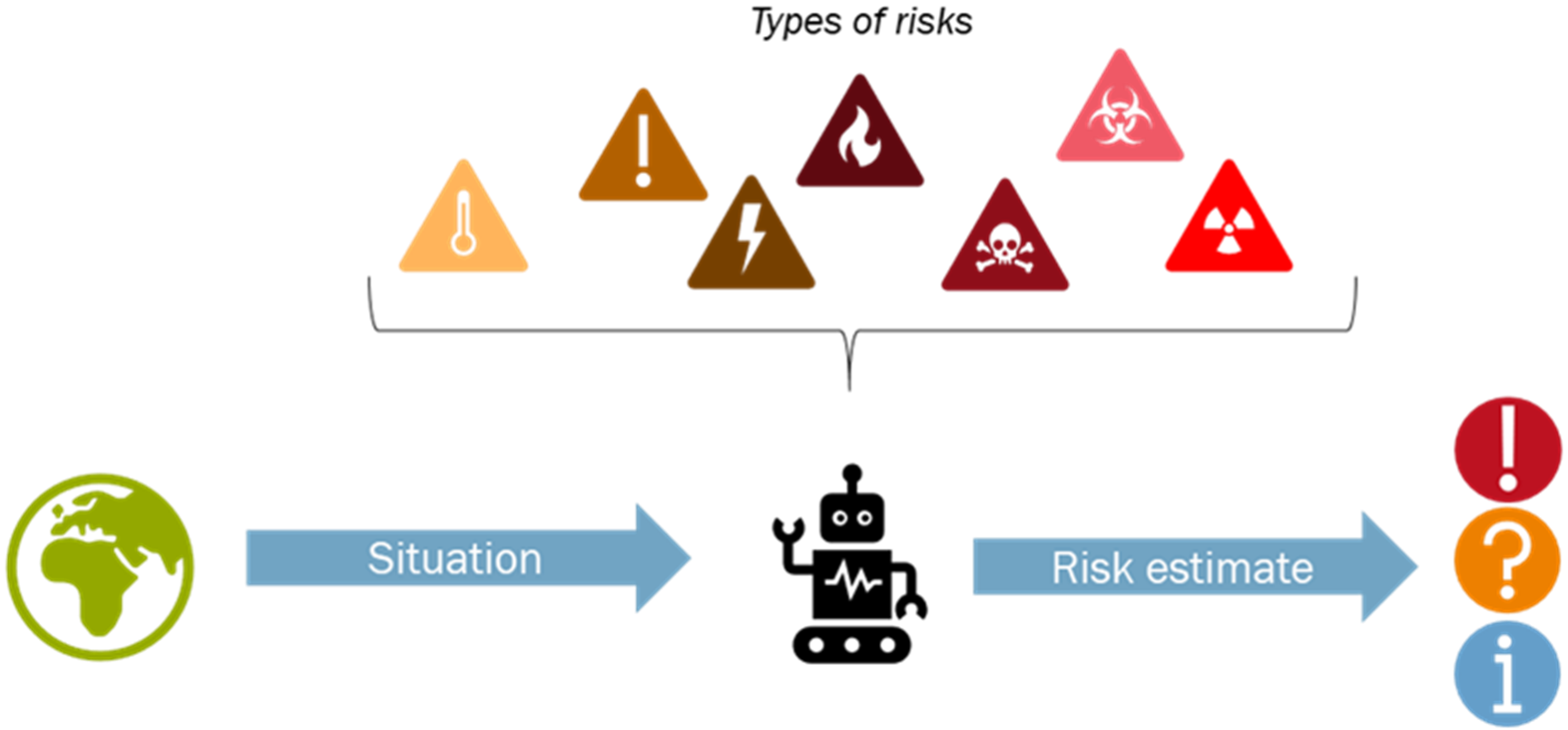


Continuous Risk Assessment

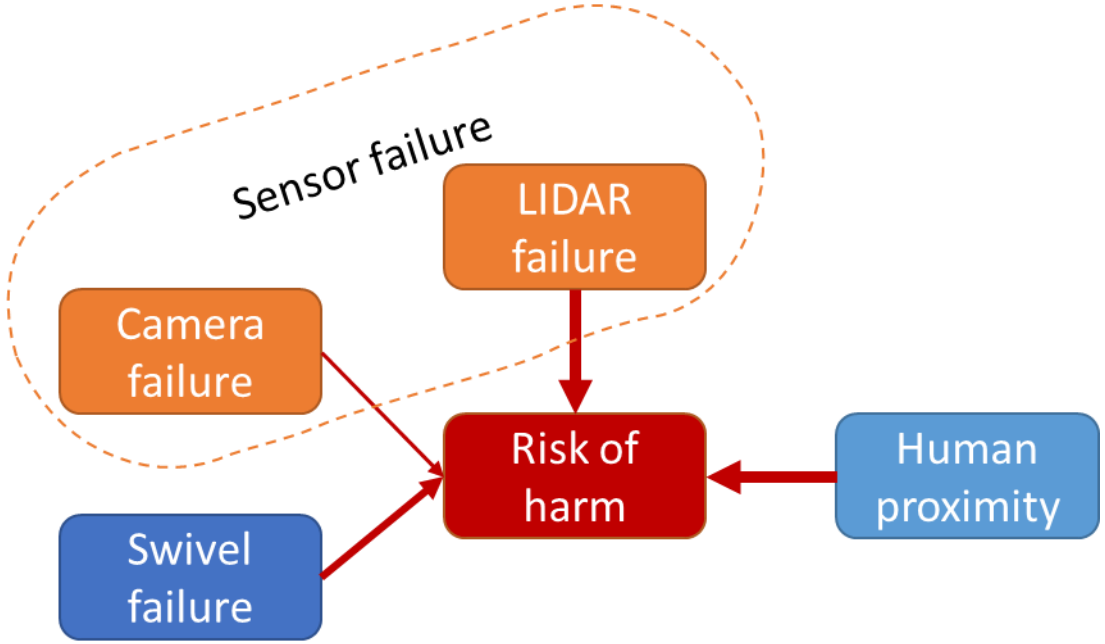


Purpose

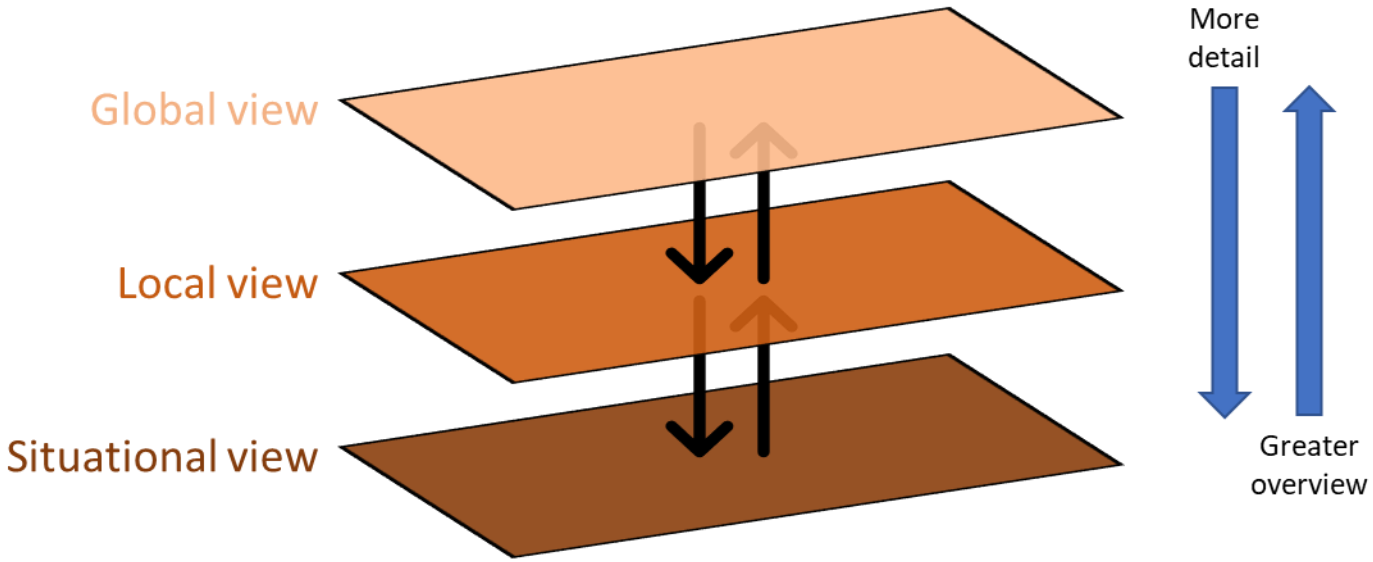
Proactively bringing the operator into the loop with all relevant information for just-in-time awareness



Continuous Risk Assessment



Progressive Disclosure Interface Design



interaction design pattern
Johnson, J., Roberts, T. L., Verplank, W., Smith, D. C., Irby, C. H., Beard, M. and Mackey, K. 1989. The xerox star: A retrospective. Computer, 22(9), 11-26.

Provide situation awareness on three levels of abstraction

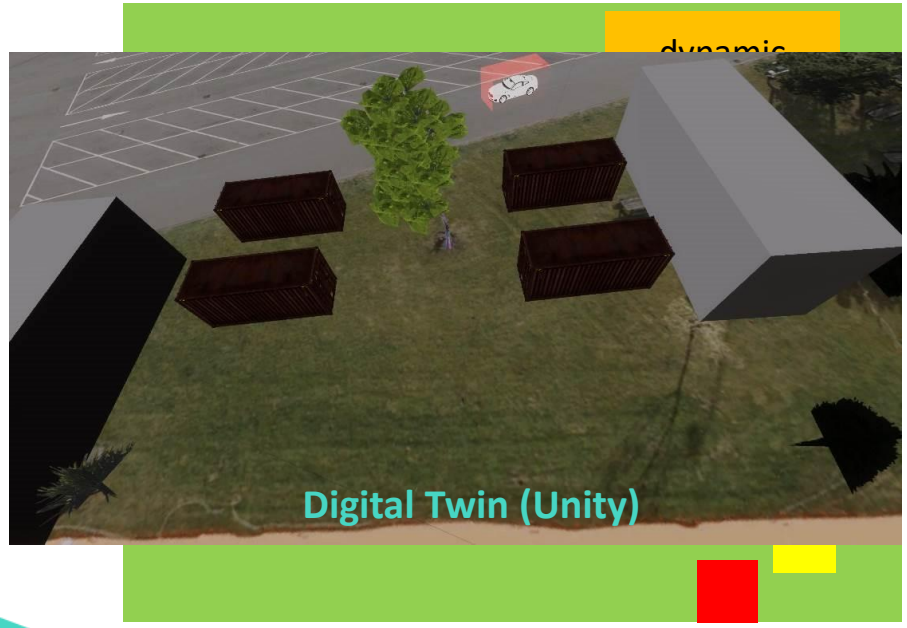
- *fleet level*
- *vessel level*
- *Quay level (immersive view)*

Progressive Disclosure Interface Design

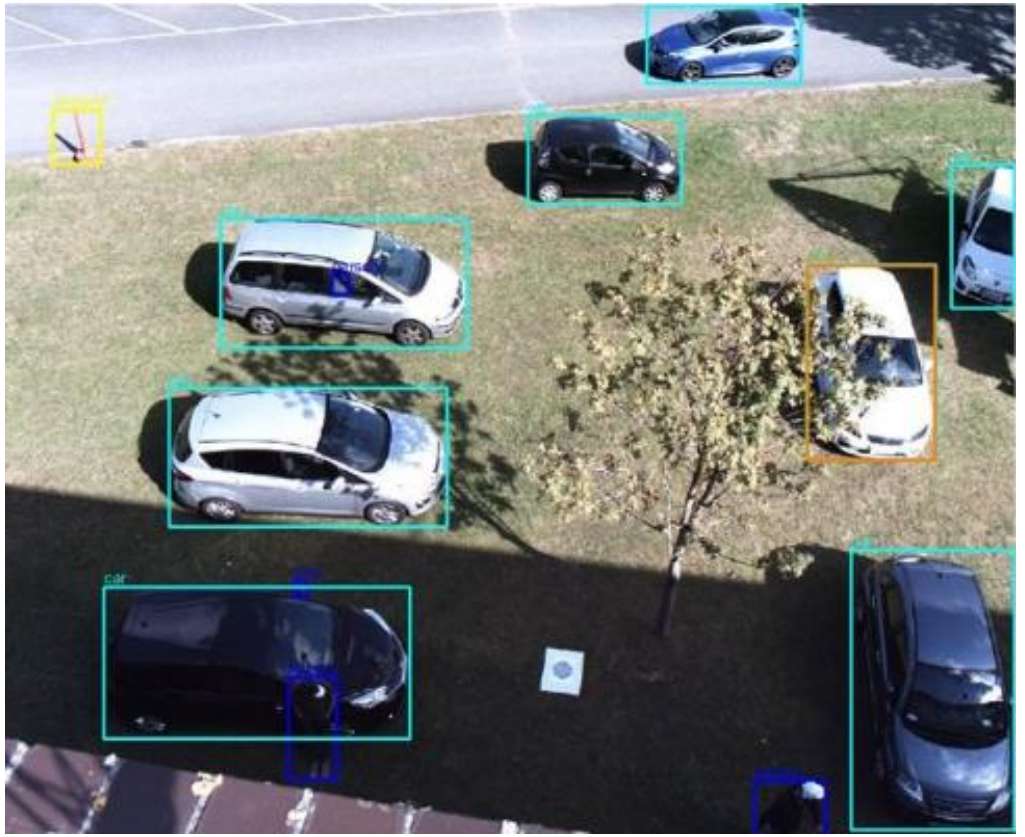
“Quay” Immersive view

Purpose

The operator is immersed in a real-time reality, namely the situation on the quay



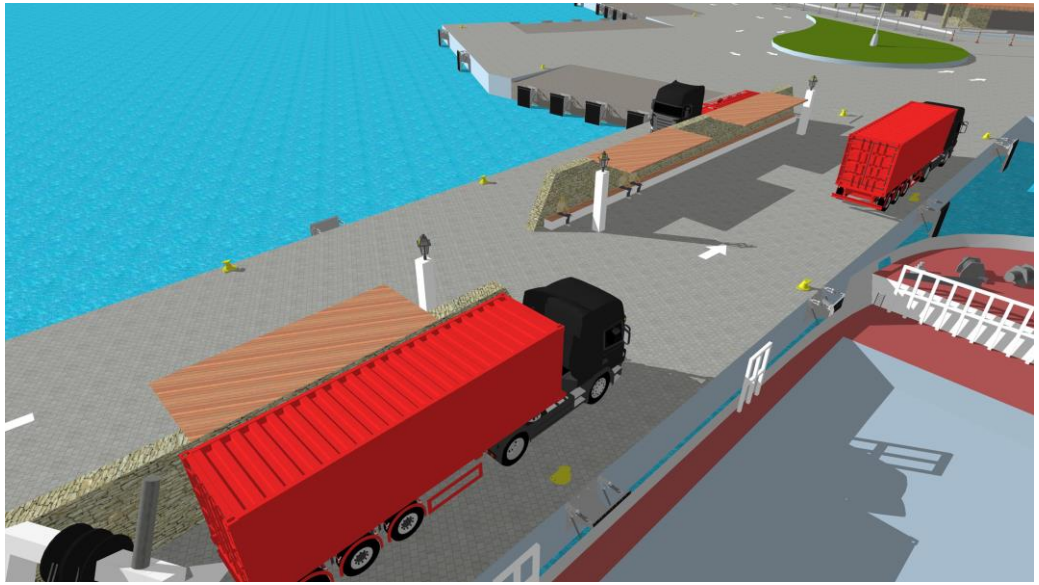
Operator situation awareness

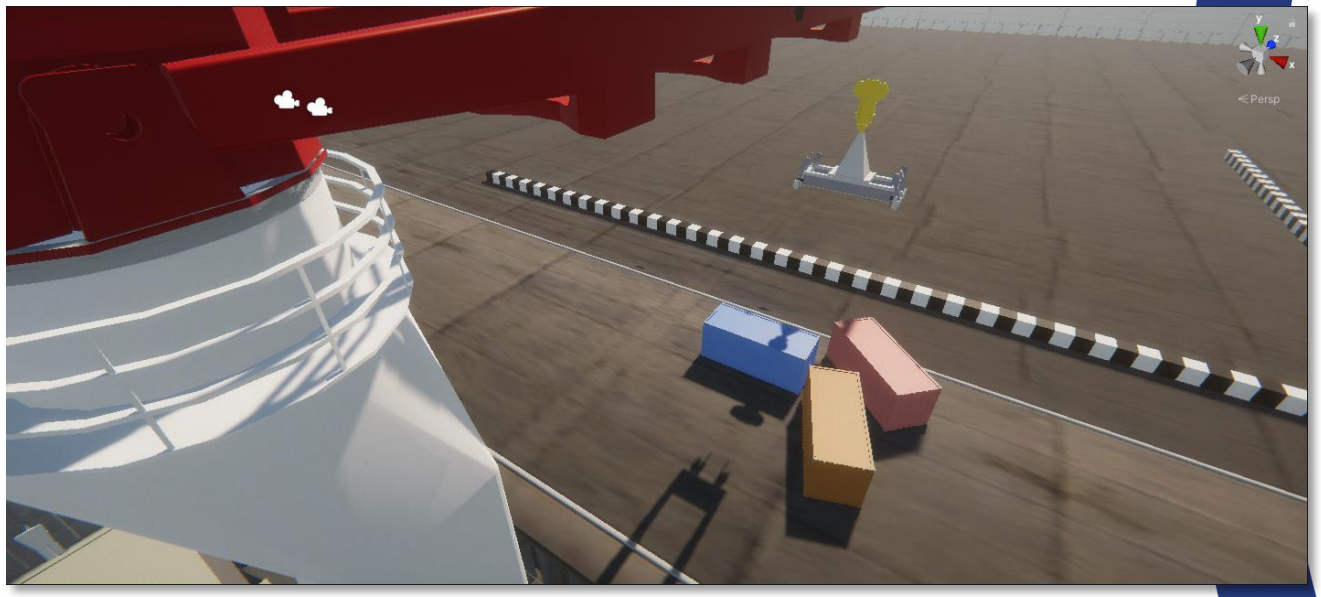


“Local quay situation”

Progressive Disclosure Interface Design

“Quay” Immersive view





Operator immersive view local quay situation

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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.

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Thanks for the attention
For more information please contact
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