Autonomous container handling with ship cranes

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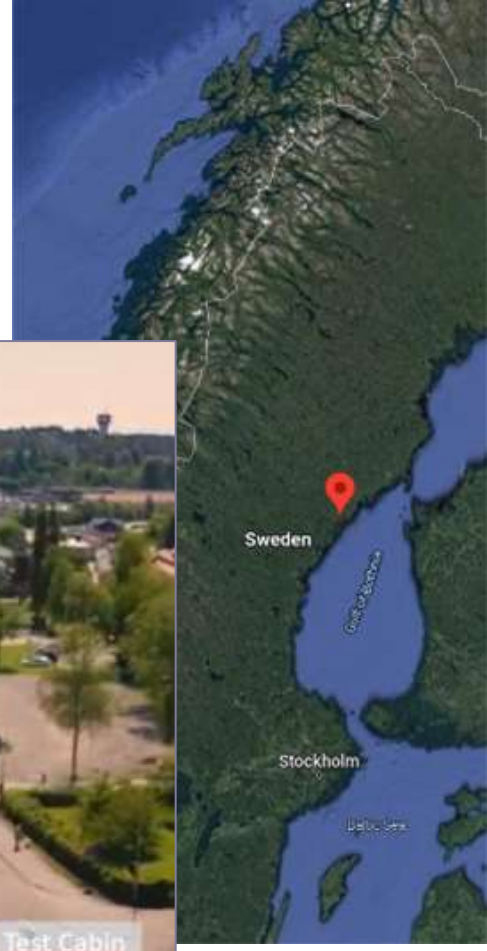
Navigating the Future of European Waters with Autonomous Innovation

7 November 2023, Rotterdam

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements N° 815012, 859992, 861678.

What we had to conquer?
What have we achieved?

- Robotic Crane NEW
- Automated Stowage planning for shortsea shipping NEW
- Digital Twin development environment



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Main mechanical components

Electric crane GLE

- Swing defeater
- Antipendulation

Spreader

- Load sensors
- Tower control

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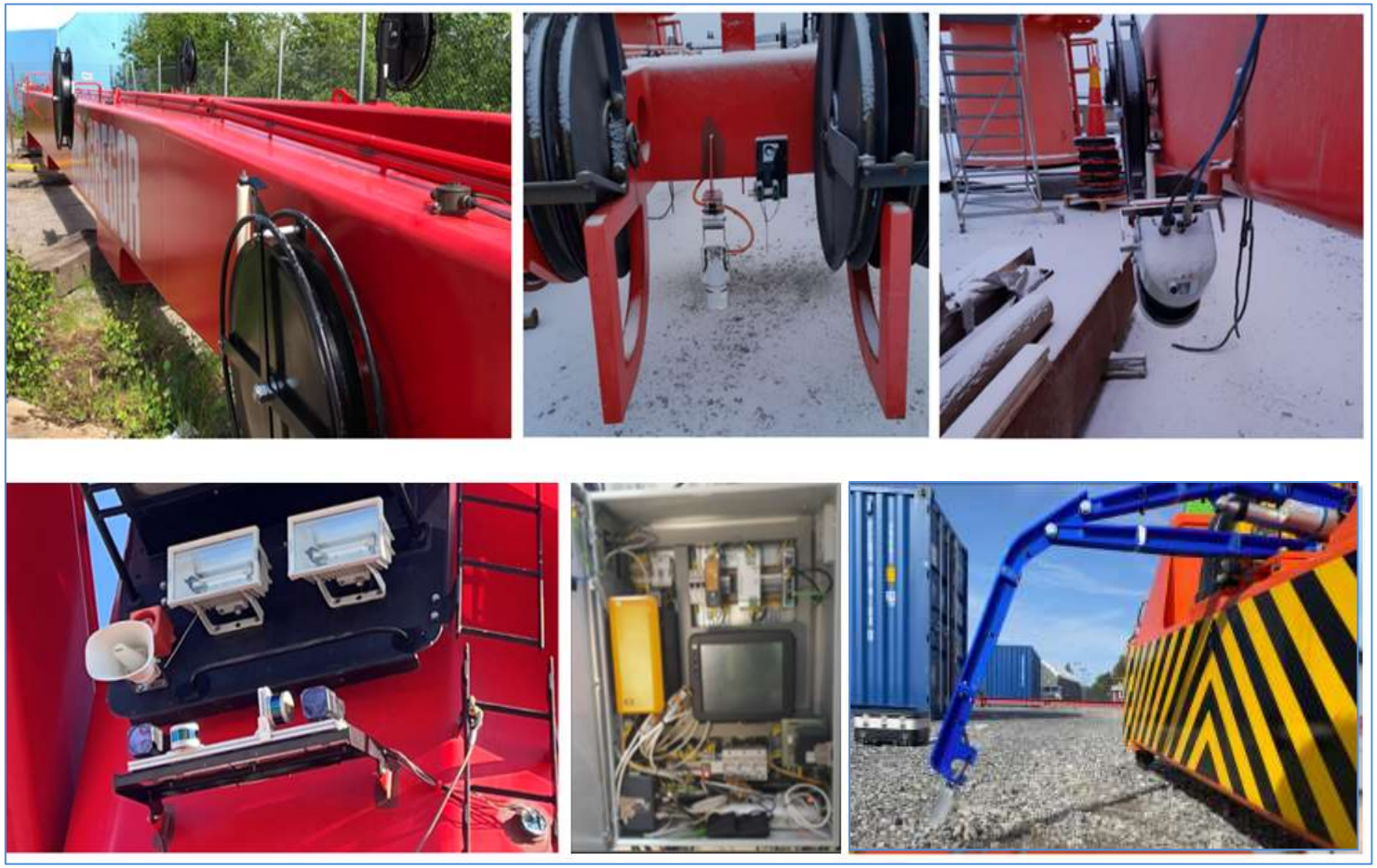
New mechanical components



- Cable winch for IP-cameras NEW
- Jib top IP-camera NEW
- LIDAR used for pendulation damping
- Lidar and camera installation NEW
- CCU – Crane Control unit inside the crane house NEW
- Retractable camera arm NEW

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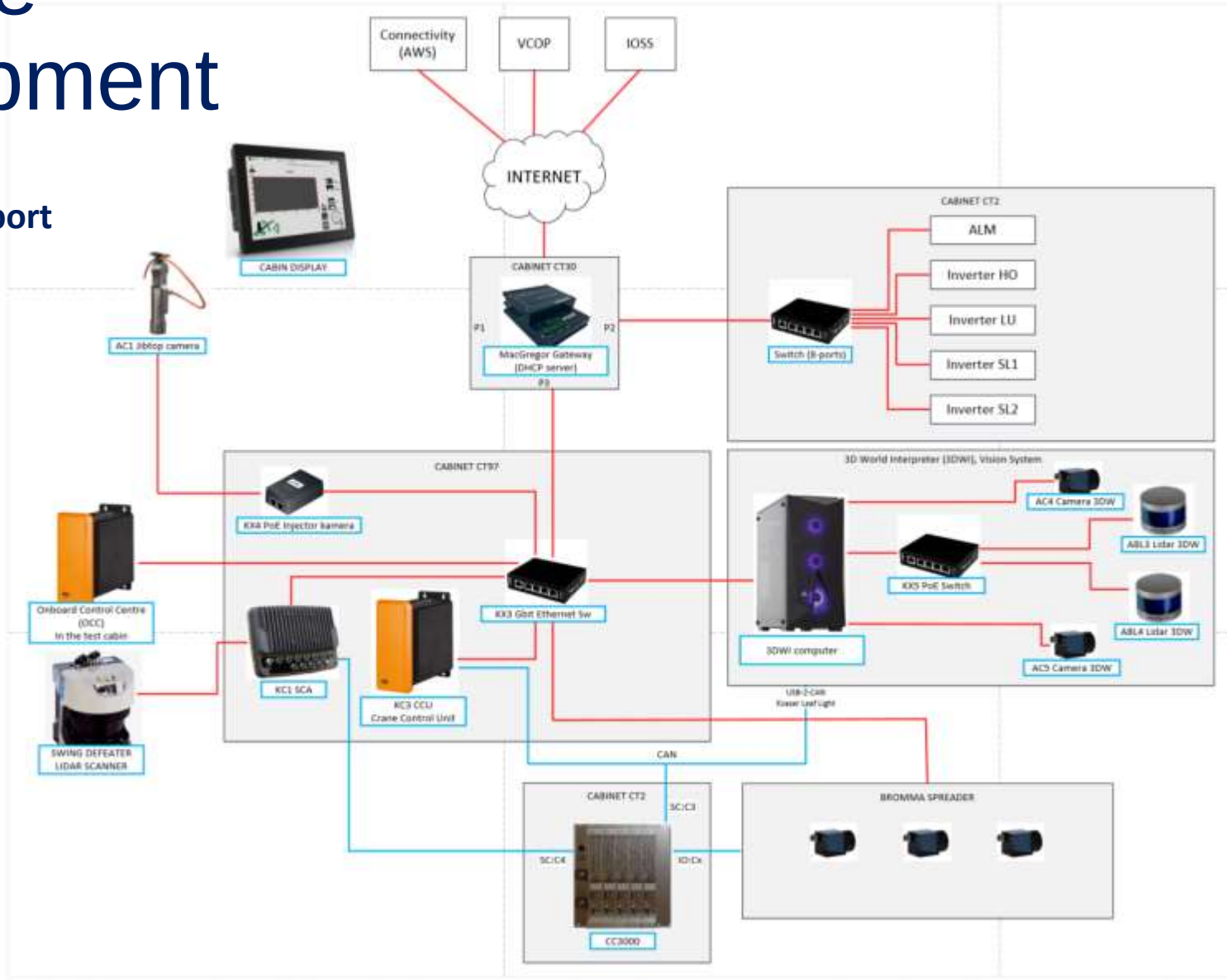
Robotic crane - SW development

- **IOSS NEW**
  - Intelligent Operator Support System
- **VCOP NEW**
  - (un)loading sequence
- **3DWI NEW**
  - Vision system
- **Spreader Control NEW**
  - Lock on Target
  - OCR Reading
- **Crane Control**
  - OCC FEATURES ADDED
  - CCU NEW
  - CC3000 FEATURES ADDED



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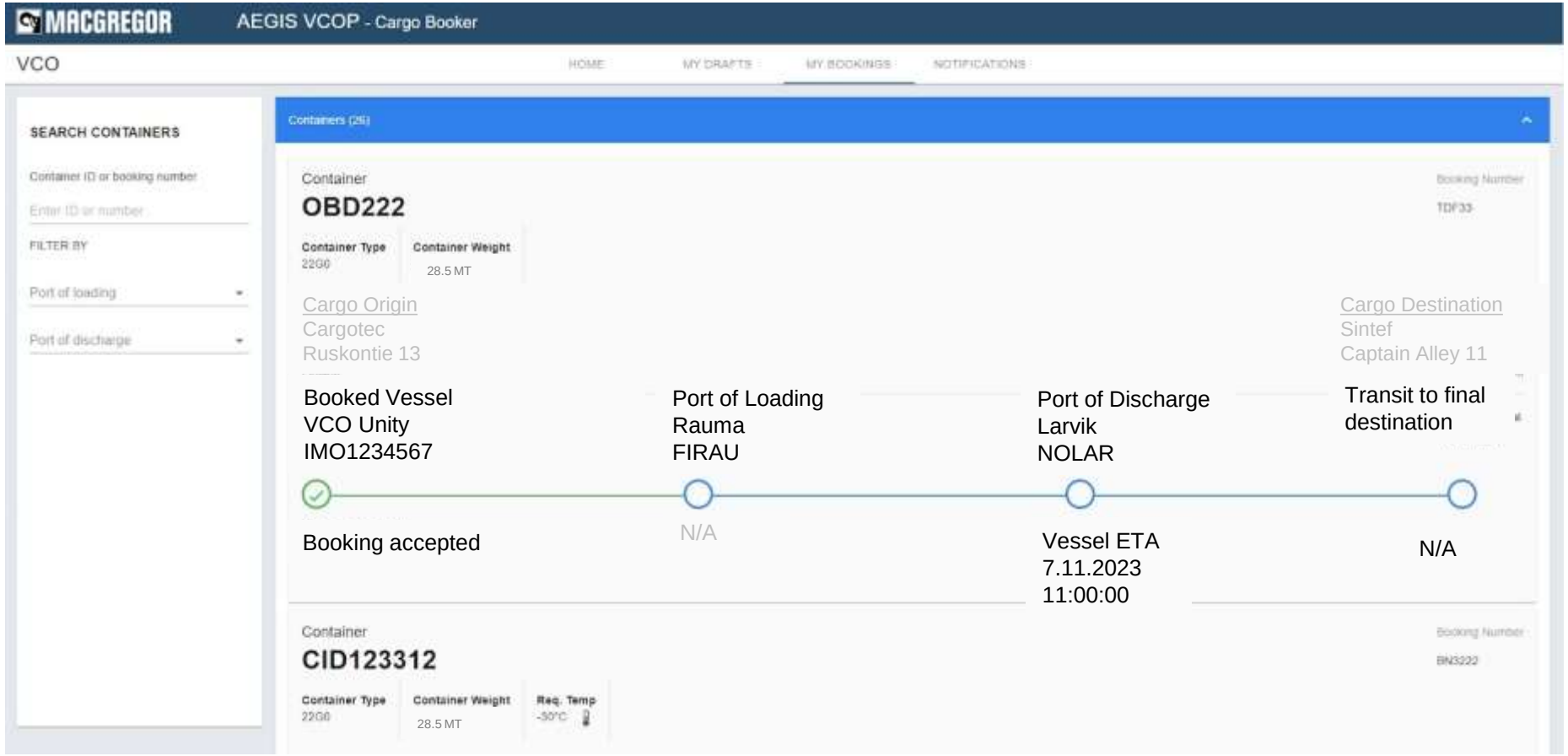
Voyage and Container Optimization Platfrom (VCOP) NEW



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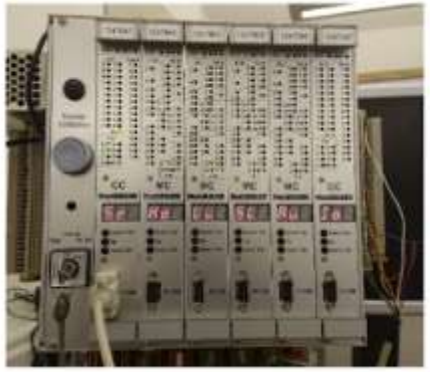
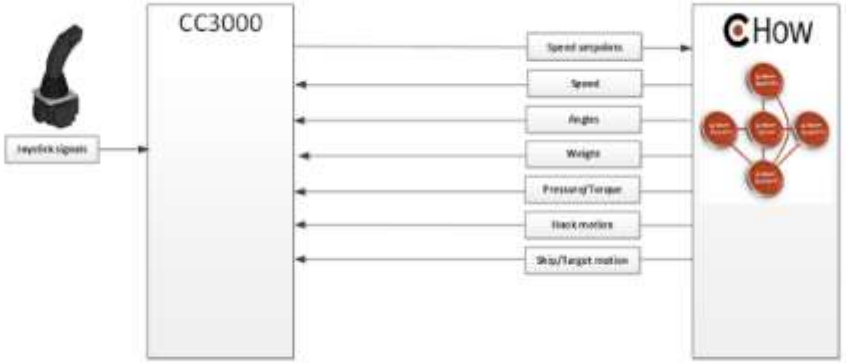
Digital twin development environment





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Lessons learned & way forward

- Consortium member integration as early as possible
- Digital twin design environment
- Pre-project S-o-A componets were fully utilized as planned

- Accuracy improvement (stacking of containers)
  - Optimal crane type
  - Vessel motion control
- Robust operation
  - Climate proofed sensors
- Autonomy vs. Semi-autonomy

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Thank you

Rotterdam Ahoy

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