

INLAND AUTOMATED VESSELS TECHNOLOGY

Scope

Development of **remote-controlled and autonomous vessel technologies for inland waterway operations**, focusing on the Port of Antwerp area and River Scheldt connections.

Goal

Validate remote operation and autonomous navigation capabilities while ensuring secure connectivity and AI-powered safety enhancement in challenging port environments.

Benefits

- **Safety:** AI-driven object detection using YOLO architecture with radar-image fusion
- **Operational:** Remote operation center integrating GNSS, cameras, and radar information
- **Technical:** Advanced path planning algorithms accommodating non-linear vessel dynamics
- **Innovation:** VR experiences and large-screen simulator demonstrations for stakeholder engagement

Results

- ☒ Comprehensive remote operation center with secure communication systems
- ☒ AI-powered object detection and distance estimation through radar correlation
- ☒ Advanced simulation environments for algorithm development and validation
- ☒ Successful demonstration in June 2024 with stakeholder engagement activities

Upscaling

- **Technical:** AI and sensor fusion technologies ready for broader maritime implementation
- **Regulatory:** Requires comprehensive framework development for autonomous operations
- **Strategic:** Integration with broader port automation provides synergy opportunities
- **Transfer:** Collaborative approaches between developers, operators, and research institutions crucial

Lessons Learned

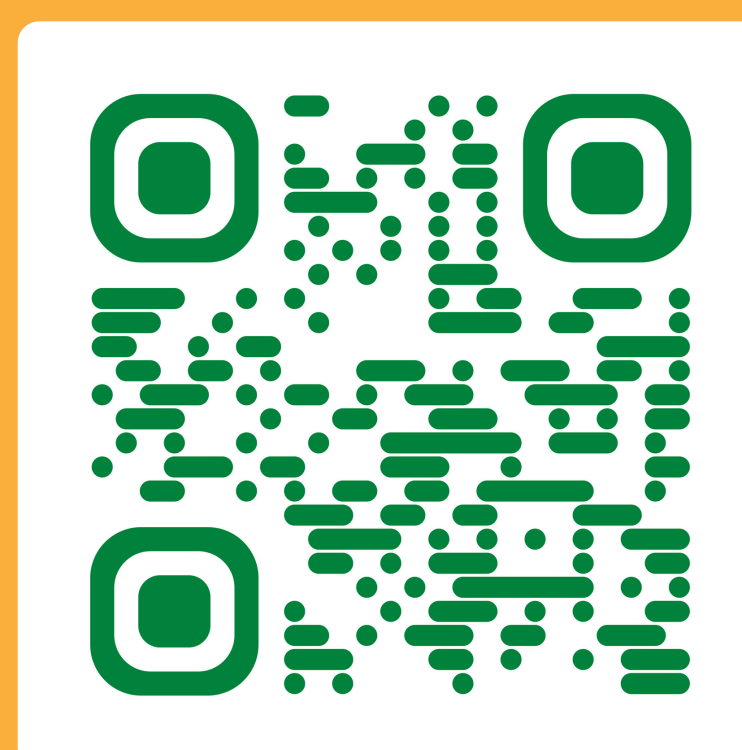
- AI-powered object detection and sensor fusion demonstrate **significant maritime safety potential**
- **Simulation environments essential** for algorithm development while reducing operational risks
- **Current regulatory frameworks** don't fully support autonomous vessel operations
- **Collaboration with regulatory authorities** essential for implementation



Port of
Antwerp
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