

VESSEL TRAFFIC OPTIMISATION

Scope

Advanced Decision Support System for **optimizing lock operations and vessel scheduling** to minimize waiting times and reduce turnaround times in port environments.

Goal

Support planners and operators in optimizing lock design, operational procedures, maintenance scheduling, and new vessel accommodation while maximizing throughput.

Benefits

- **Optimization:** Simulated Annealing algorithms adapted for complex lock scheduling challenges
- **Strategic:** Extends beyond scheduling to design evaluation, procedure assessment, and capacity planning
- **Performance:** Algorithms achieve near-theoretical optimal performance levels
- **Transparency:** Impartial algorithm design supporting collaborative multi-stakeholder decision-making

Results

-  Advanced DSS with Simulated Annealing optimization achieving superior performance vs. human scheduling
-  Comprehensive data processing for historical, real-time, and predictive modeling
-  Extensive testing with PoAB datasets for algorithm calibration
-  Stakeholder engagement across nautical departments, IT, traffic controllers, and pilots

Upscaling

- **Performance:** Demonstrates capabilities to significantly outperform human scheduling
- **Technical:** Test dataset development provides valuable resources for ongoing activities
- **Strategic:** Success requires transparency and user understanding rather than black box operation
- **Transfer:** Methodology applicable to other complex maritime infrastructure optimization

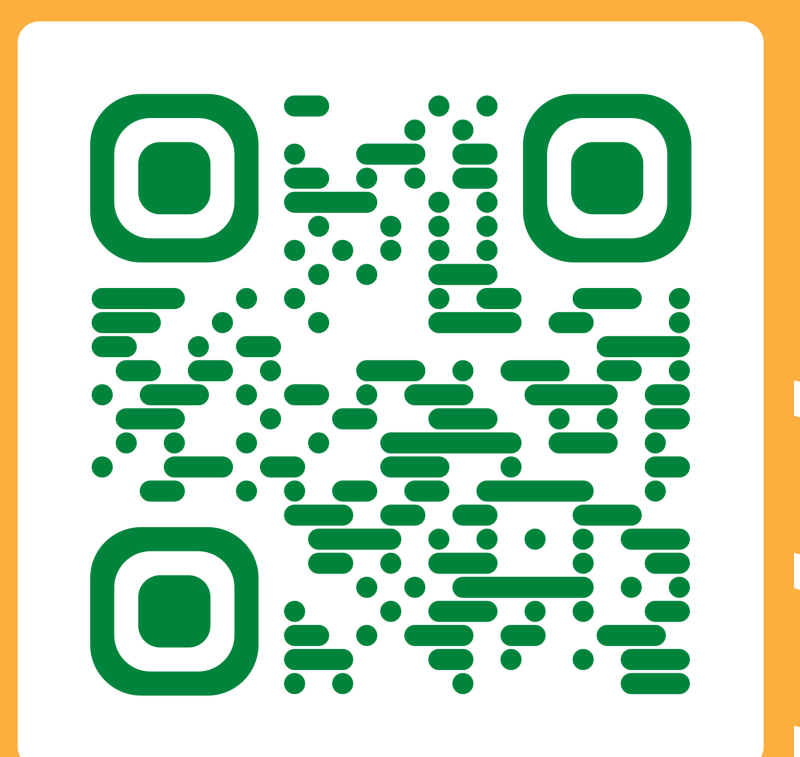
Lessons Learned

- Data collection proves significantly **more labor-intensive** than typically anticipated
- Simulated Annealing **highly adaptable** for new conditions without complete redevelopment
- Comprehensive **stakeholder involvement** from initiation essential for successful deployment
- **Algorithm transparency** and user participation build trust vs. black box approaches



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PIONEERS



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