

NOVIA

UNIVERSITY OF APPLIED SCIENCES

Sea4Value Future Fairway Navigation 2020 - 2022

Value creation via smart and autonomous
maritime transport

ONE SEA
Autonomous maritime ecosystem

Sea4Value Future Fairway Navigation

Joint development between industry, research and authorities

Industrial Partners



ESL Shipping



Suomen Varustamot
Rederierna i Finland
Finnish Shipowners' Association



Research Partners



UNIVERSITY
OF TURKU



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Public and authority Partners



FINNISH METEOROLOGICAL INSTITUTE



Sea4Value Future Fairway Navigation

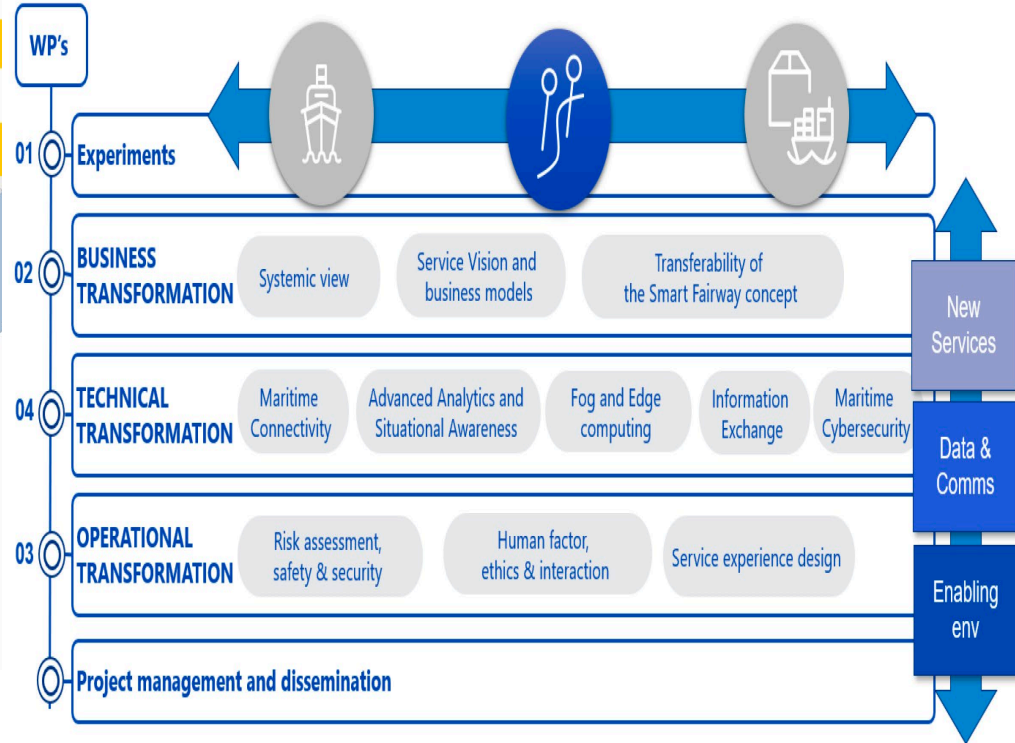
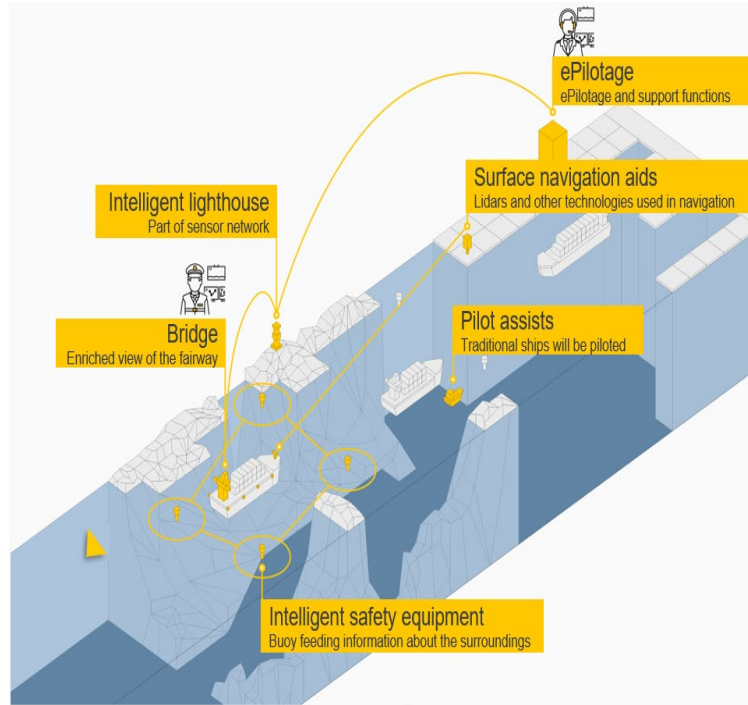
Vision

- Future Fairway Navigation program creates a model for safe, sustainable and customer-centric next level fairway navigation and decision-making environment that benefits existing fleets and lays the foundation for future autonomous vessels.

Facts

- ONE SEA ecosystem program
- Business Finland funded R&D program
- Budget 6 M€
- Duration 2/2020 - 6/2022
- Program management
- DIMECC Ltd, Seppo Tikkanen

Vision of the smart fairway services and concept for remote pilotage



1. Vision of the smart fairway services and concept for remote pilotage

Vision of the smart fairway service



Safety and risk management strategy (FSA)



Assessment of remote piloting procedures



Legal analysis



System level cyber security risks assessment for maritime solutions



Human factor effects in sociotechnical environment



2. Remote pilotage technical experimentation environment

Realtime communications



System architecture



Scenario simulations



Connectivity solution



APIs/Interfaces to existing data sources (VTS and open)



Workstation for remote pilotage



Concept of sensor environment (HW & SW)



Vessel data gathering system (or interface to already existing one)



Digital twin of ship and fairway



Ship path prediction



3. Roadmap and recommendations for future development and actions

Roadmap and recommendations



International application & potential



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Novia University

- Novia's role mainly participates in the research and development of remote pilotage operating model and technologies.
- Remote pilot simulations at Aboa Mare / Novia university in Turku, Finland
- <https://www.youtube.com/watch?v=vuW1AvhsjXg&t=461s>

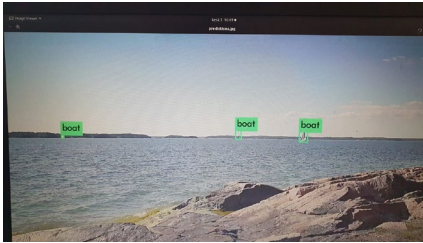
Simulator exercises



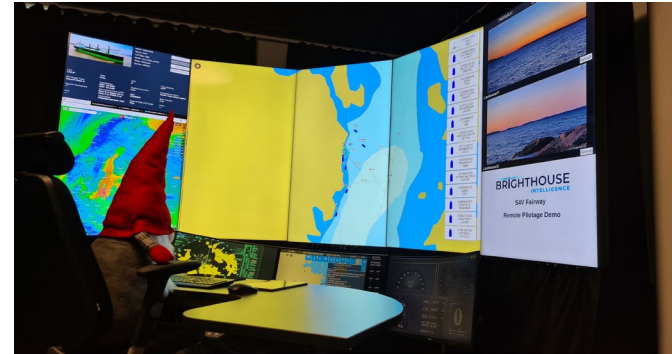
REMOTE PILOTAGE –
part of OneSea ecosystem S4VF-project
funded by Business Finland

Sea4Value Future Fairway Navigation

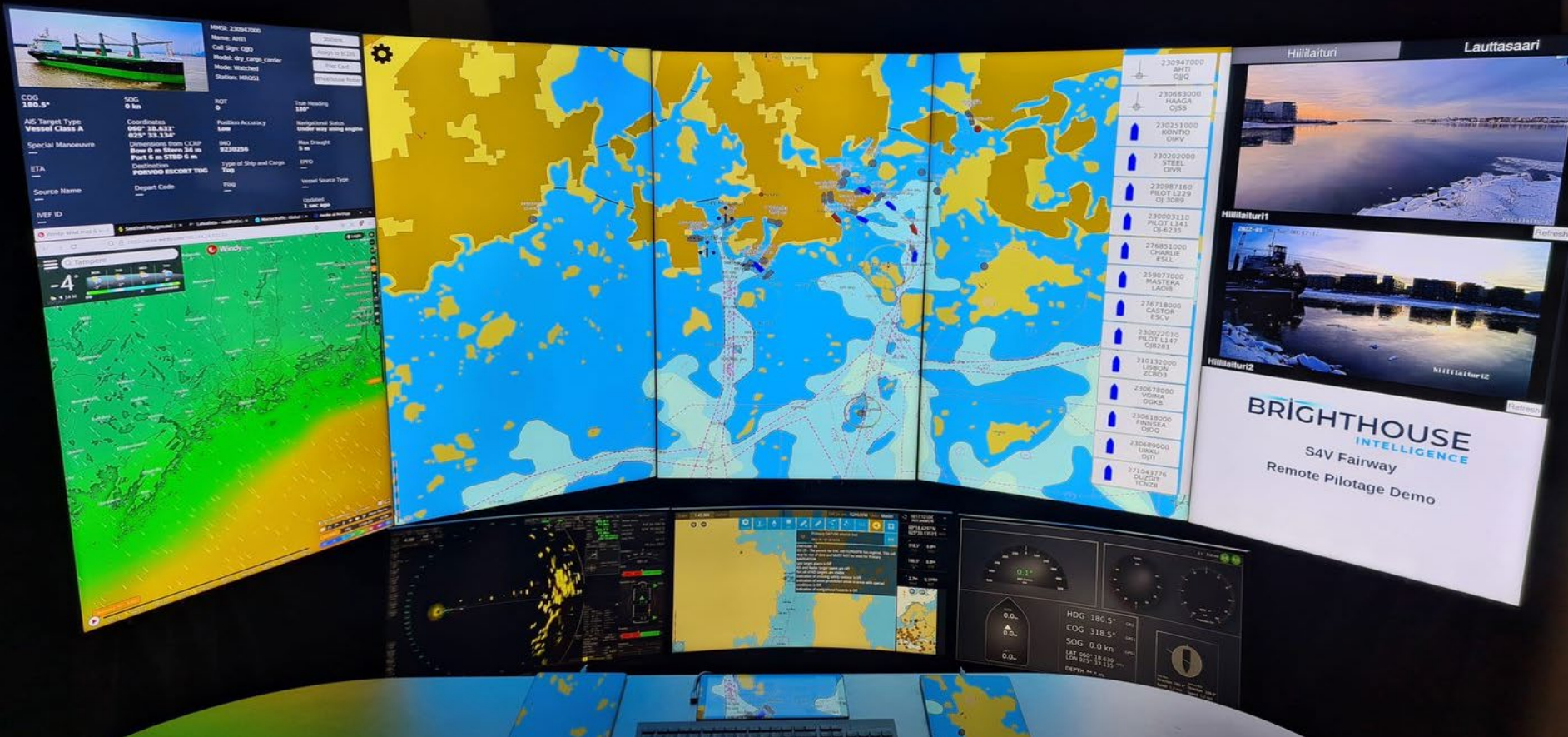
First sensor station
installed in June 2020



Remote pilotage center concept,
December 2021

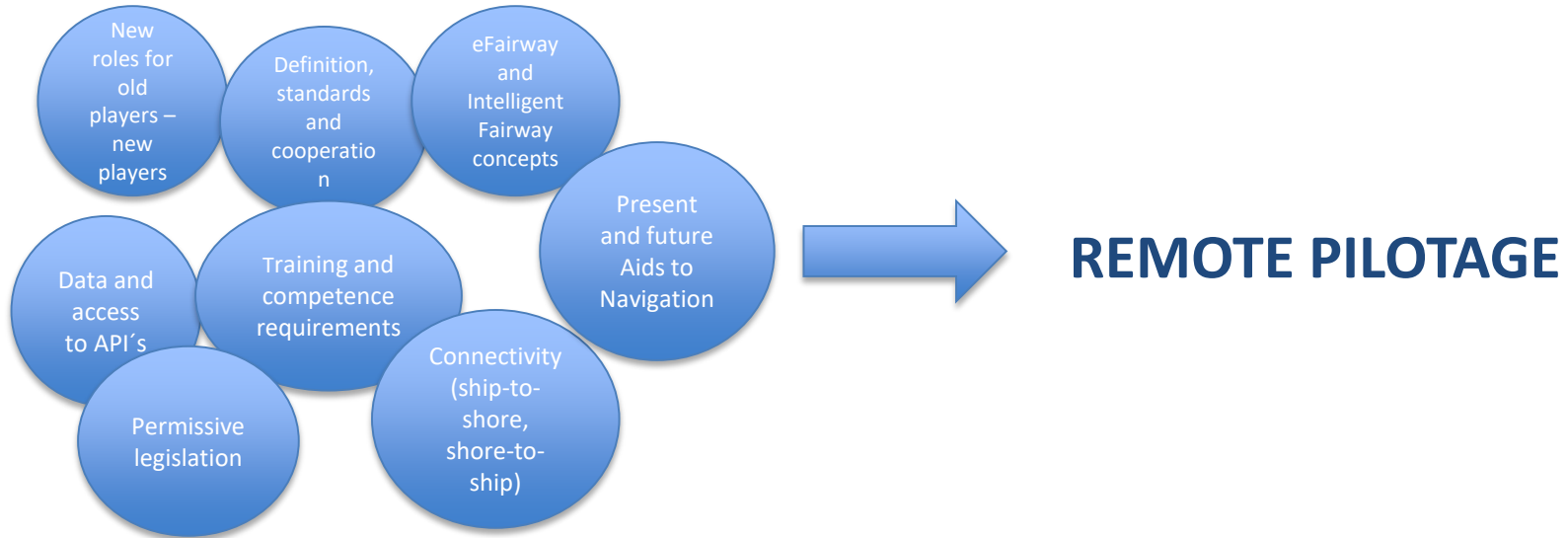


Spring 2022: Remote pilotage concept demonstration at Kokkola fairway in Bay of Bothnia



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Examples of required enables



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Remote pilotage needs?

- Information needs of a remote pilot or the captain of remotely piloted vessel?
 - What information must be transferred from the vessel and to the vessel?
 - What information is provided by the *intelligent* fairway?
- Competence?
 - What skills/training are required from the remote pilot?
 - What skills/training are required from the captain/bridge team?
- Standardized communication for remote pilotage?

Framework for remote pilotage

- Compulsory training requirements for the remote pilot and for the captain receiving remote pilotage
 - Standard operation procedures
 - Use of technology and its limitations
 - Verbal communication and data exchange
- Defining and selecting suitable fairways
- Technology requirements
 - Remote pilotage workstation
 - Data from the vessel
 - “Intelligent fairway”
 - Connectivity

WP 2 Business transformation

Key outcomes

- Ecosystem analysis
- Smart Fairway Service vision
- New business model drafts for the partners
- Analysis report on legal challenges
- Experts' evaluation of the Fairways service concept's international potential

WP3 Technical transformation

Key outcomes

- Reliable communication infrastructure and connectivity solutions for real-time remote pilotage.
- Design and implementation of sensor solutions (hardware, data integration and computing power) to enable Remotely Operated Pilotage Services
- Information sharing for improved situational awareness
- Development of HIDS and NIDS solutions for each sensor subsystem and common solution to follow overall the Remote Pilotage Services cyber security status
- Ecosystem-level open APIs that benefit all partners and externals
- Common interoperable, communication and distributed compute platforms

WP4 Operational transformation

Key Outcomes

- Increased acceptability and desirability of the work processes
- Guidelines for safe, reliable, desirable, and ethical design of work processes and tools
- Seminars and co-creation workshops with external stakeholder groups
- Training tools and work processes for implementing new AI technologies.

PRELIMINARY RESULTS FROM THE S4VF PROJECT

- Information and control systems at ROC
 - The current bridge systems mainly transferred to the remote operations centers
 - User interfaces of the existing system not optimized for humans
- Replacement of the sensory perception
 - Importance of sensory perception?
 - AR technology & other new ways to improve Situational Awareness.
- Importance in learning to operate in a new environment.
 - Working environment is changing and humans need to be adapted to that.
 - Technology should support human performance (user centric design) hence research is needed to ensure that this happens.

Zusammenfassung

Sea4Value – Fairway-Projekt produziert intelligentes Fairway-Service-Konzept und demonstriert Fernlotsenfahrt

- Weitere Entwicklungen und Investitionen werden erforderlich sein, um die Ergebnisse zu konkretisieren und zu integrieren

