INNOVATIVE TECHNOLOGY MEETS GOOD SEAMANSHIP

FRAUNHOFER INNOVATION PLATFORM SMART SHIPPING

@Novia University of Applied Science

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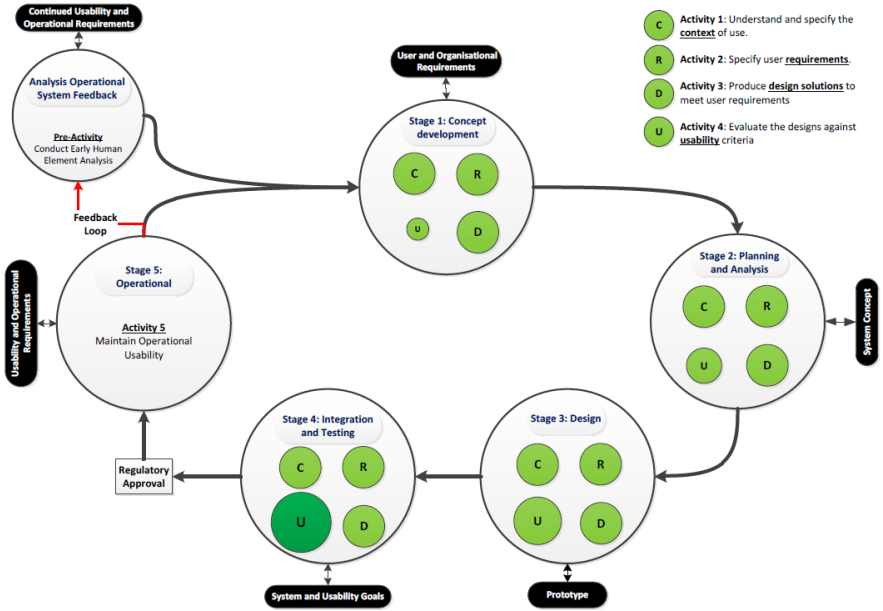
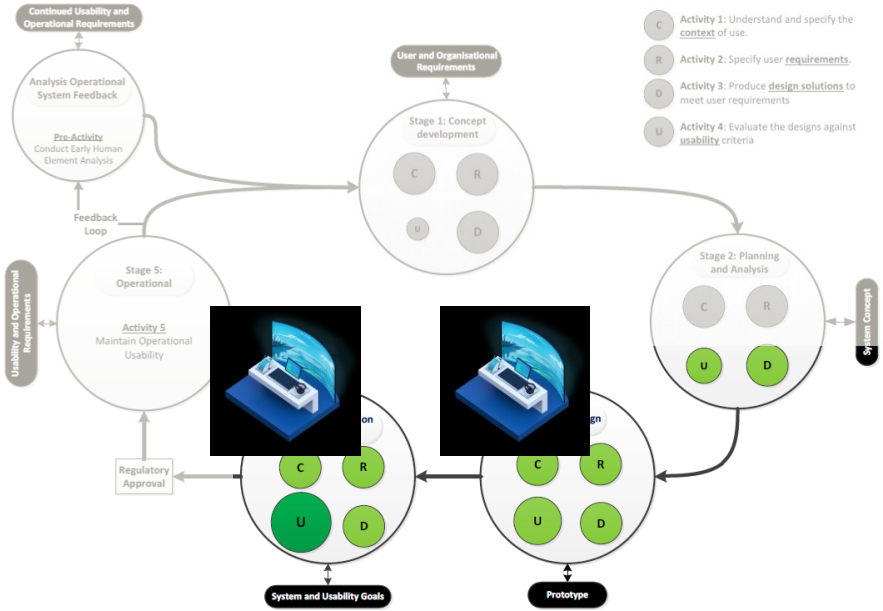
Software Life Cycle for e-navigation



Stages

1. Concept Development
2. Planning and Analyses
3. Design
4. Integration and Testing
5. Operational

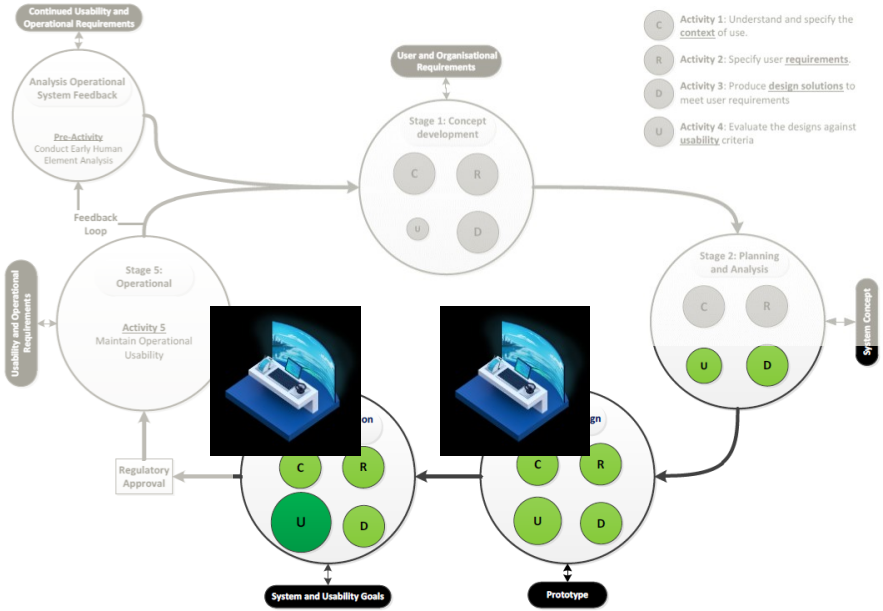
Software Life Cycle for e-navigation



Stages

1. Concept Development
2. Planning and Analyses
3. **Design**
4. **Integration and Testing**
5. Operational

Simulation is a proven tool



SHS exercises is "*the only way to ensure that technical ship handling and the important human factors, are sufficiently incorporated*" (PIANC 121-2014)

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Co-partners

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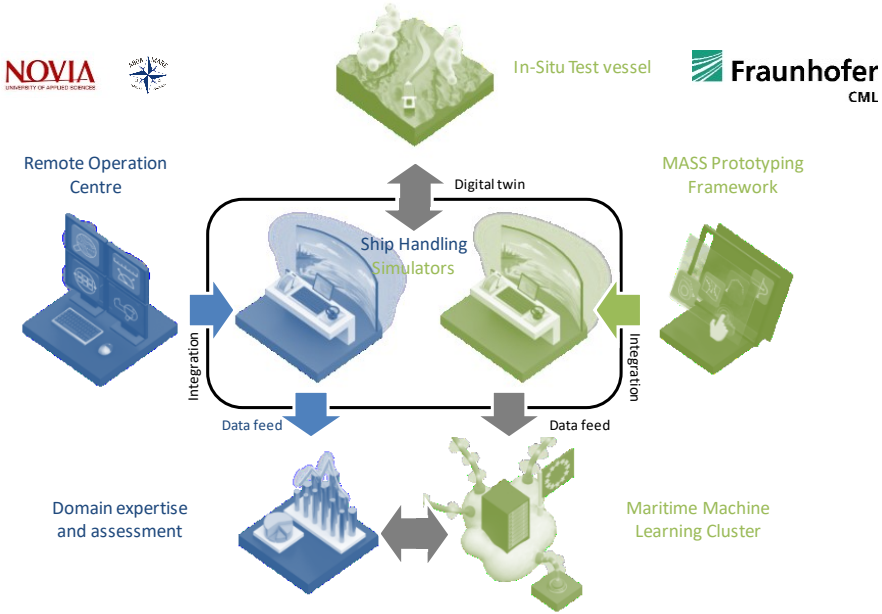
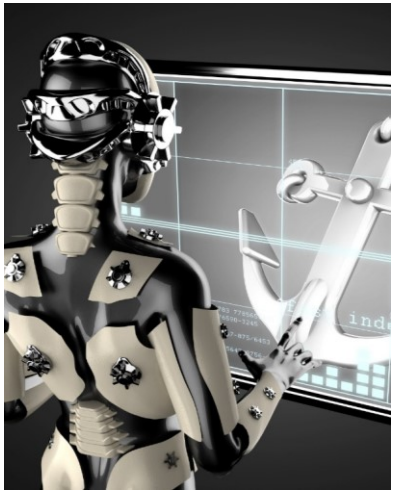
Technology meets seafaring





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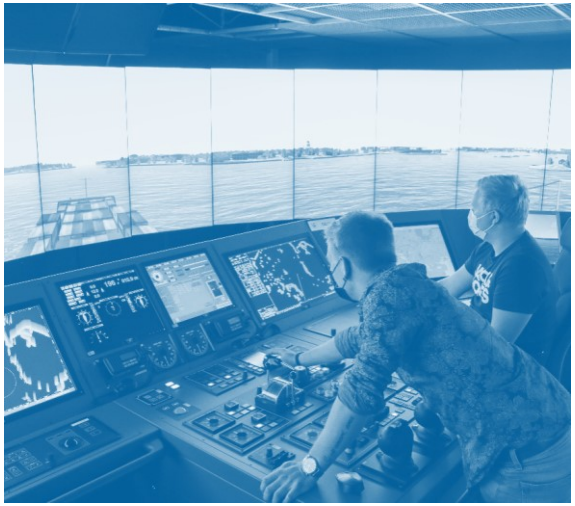
R&D Activities

Cost-effective and high quality R&D



Excellence in maritime simulations

Digital twins for shipping and ship-building

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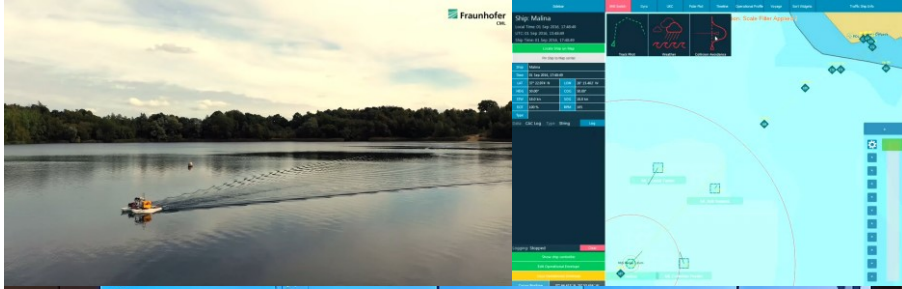
FIP-S2's value

- **State-of-the-art facilities**
  - Simulation-based and mixed-reality testing
  - Prototyping and validation possibility
- **Productisation of technology**
  - Prototyping based on industrial practices and standards
- **Realistic testing**
  - One test-bed for technical and human testing



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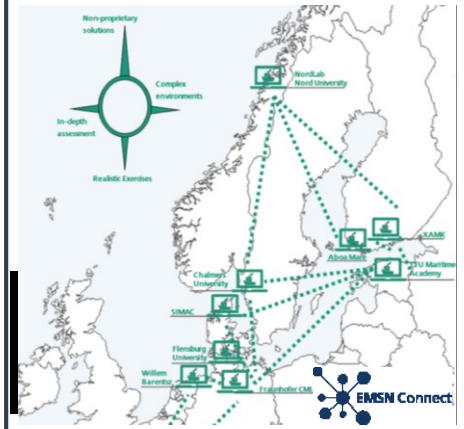
FIP-S2@Novia | Infrastructure baseline

/// MASS-ready simulator test-beds

/// In-situ model testing capabilities

/// Large-scale simulation



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Simulation-based test environments

Task-oriented navigation & ship guidance systems

- Evaluation of maritime HMIs
  - Eye tracking
  - SAGAT method
- Deriving best practices for classic screen-based systems
- Investigation of new interaction and visualization technology
  - Augmented reality
  - VR as sandbox for AR-UX design

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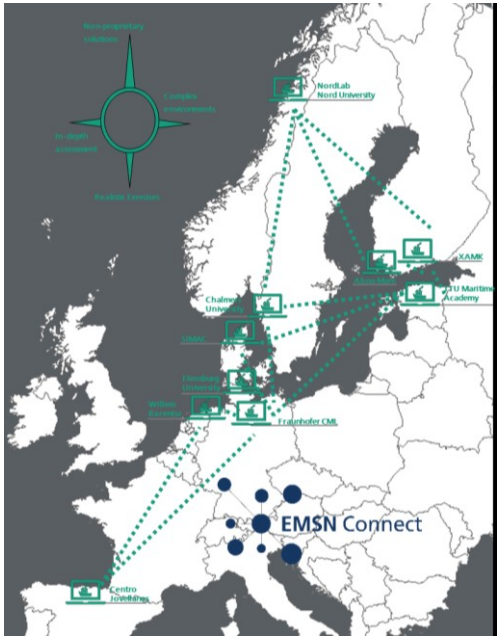
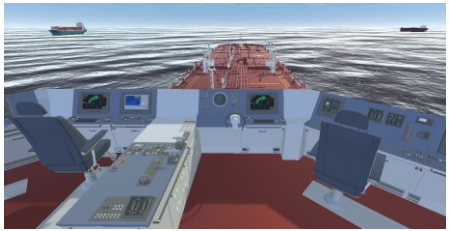
Collaborative simulations





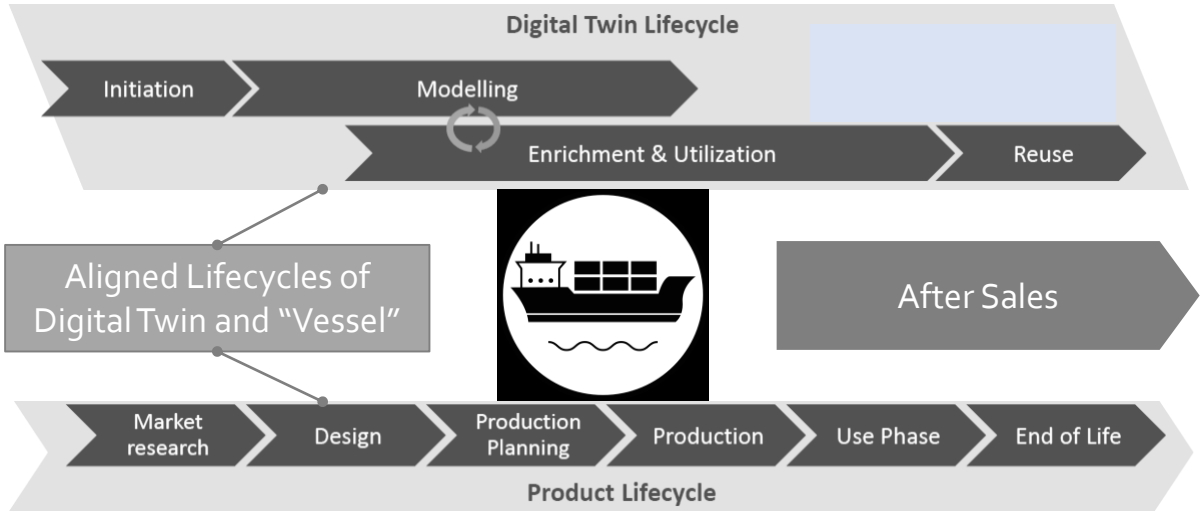
Virtual reality interfaces

- Connecting SHSs from different institutes and companies
  - High number of human-operated ships within a single environment
  - Complex and realistic traffic situations in real-time
- Participation in VR without the need of an additional SHS
- Collaborative briefing and debriefing via VR is planned

Digital Twins in Maritime Industry

- Continuous digital optimization process to increase efficiency and sustainability of shipping and ship building → digital twins
- Numerous possibilities due to digital twins: increasing safety and operational efficiency, improving usability of new automation solutions
- Challenges in digital twin development: different systems do not interact with each other, complexity of a whole ship as entity

Digital Twin for After Sales



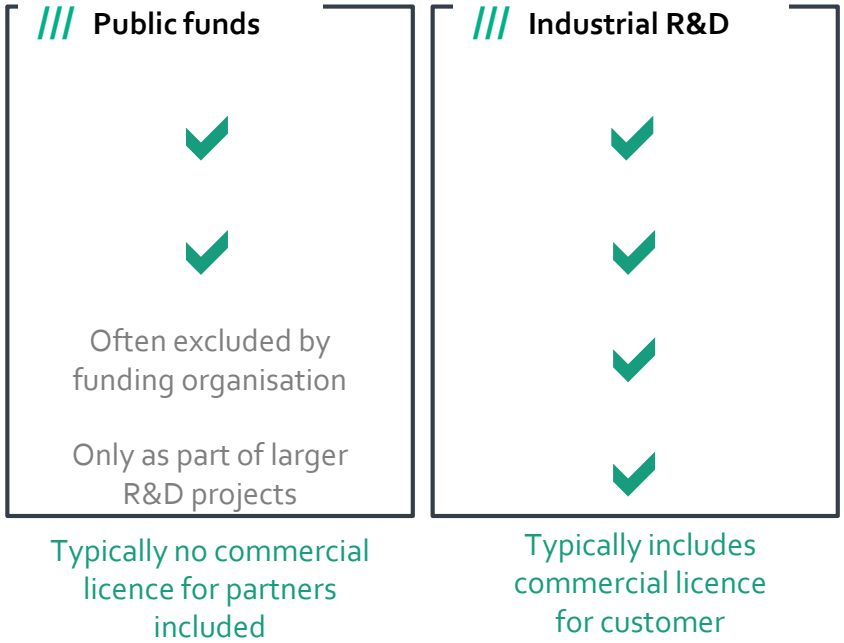
Goals for establishing Digital Twins for ships:

- Condition based/Predictive Maintenance
- Voyage planning
- Operational improvements
- Monitor Load Cases
- Providing data for Retrofits
- Feedback to Design and Market research

Specialized R&D for the industry

General service portfolio of FIP-S2@NOVIA

- Feasibility and market studies
- Prototype development (up to TRL 6)
- Integration into product (beyond TRL 6)
- Testbeds for assessing products



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R&D Transparency by simulation

Potential of simulation techniques in maritime

- Testing of future operational principles
- Safe fail-to-safe analyses
- Continious data-driven optimization

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