The NOVIMOVE project and foreseen solutions to cope with varying water levels.

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18.01.2023

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NOVIMOVE project

• EU funded research and innovation project
• Collaboration of 21 partners from 6 european countries
  • The partners are: Universities  Knowledge institutes
    System developpers  Logistics operators
    Port Authorities
• Goal = to increase competitiveness of inland waterborne transport in front of road and rail
• By addressing inefficiencies in seaport and hinterland logistics through innovations
NOVIMOVE project. Innovations

• Cargo reconstruction → raise container load factors
• Mobile terminals → avoid long waiting times in ports
• New climate-resilent ships designs
• Smart navigation system → with real-time water depth data
• Dynamic scheduling system → better corridor management

Funded by the Horizon H2020 Programme of the European Union under grant agreement No 858508
SRNS – Smart River Navigation System

- Two subsystems:
  - SNS – Smart Navigation System
    - Goal to optimise the operation of vessels
      - Reduce fuel consumption
      - Increase cargo load
      - Minimise waiting times at locks & bridges
  - DSS – Dynamic Scheduling System
    - Goal to provide an optimized scheduling
      locks & bridges
      - Reduced waiting times
      - Reliable journey plans

- Connected + Interfaces HMI

Human Machine Interface

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SNS – Smart Navigation System

• River Depth info up-to-date
  → Covadem Box + Covadem Cloud services

• Accurate Vessel Positioning
  → GNSS (GPS or Galileo) + EGNOS + INS

• Voyage planner
  → Gulliver + Optimisation Algorithm
DSS- Dynamic Scheduling System

→ Use of intelligent agents + corridor models
  One scheduler → computationally demanding → Not quick
  → divide IW network into smaller sections ← corridor models
  → each section → one scheduller agent ← intelligent scheduler agents

→ Use of open standards and protocols
  → Integration and operatibility with other systems and services
Inland ship design until 2018

- Size limitations
  - Waterways, locks
  - Regulations
- CAPEX-oriented optimisation
  - Maximising capacity
  - Full Forms, straight surface preferred
- Economies of scale
  - Large Rhine ship (CEMT Va) not large anymore
- Comparison of power demand at trial conditions
  - High water depth
  - Loaded vessels
  - Large Propellers

- Nevertheless diverse fleet
- 4 representative hull shapes

<table>
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- Shallow water case: 3.5 m
- Huge differences in power demand

![Graph showing delivered power vs ship velocity](attachment:image.png)

Water depth: 3.5 m
Measures to increase resilience

• Improved infrastructure

• Dedicated new-build ships
  • Optimised hull shape + propulsion
  • Reduced max draught
  • Tailored hull girders
  • Weight-Watching
  • Smaller ships

• Retrofits
  • Propulsor
  • Aft-ship
  • Added buoyancy
Added buoyancy

• “Innovative vessels that can adapt their physical properties (buoyancy) and maintain an economic feasible payload in low water conditions.”

• First Concepts (w/o existing solutions like coupled convoys):
Hydromechanics

- Quantification of power demand for several variants, ventilation limits.

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WIP to help increase the resilience of IWT in a holistic approach

- Regulatory aspects
- Stability
- Structure & strength
- Operational guidelines
- Kinematics of side-boxes
- New business models
Thank you for your attention!