FOREMAST

FOREMAST overview

Funded by the European Union

This project has received funding from the Horizon Europe framework programme under Grant Agreement No 101138261

Project Facts

Title: Freight vOlumes transfer from Road to waterborne transport, using zero-EMission, Automated, Small, and flexible vessel protoTypes
Call: HORIZON-CL5-2023-D5-01
Granting authority: European Climate, Infrastructure and Environment Executive Agency
Start date: 1st January 2024
Duration: 3 years
Consortium: 16 partners
Coordinator: Inlecom Group
Website: https://foremast.eu/

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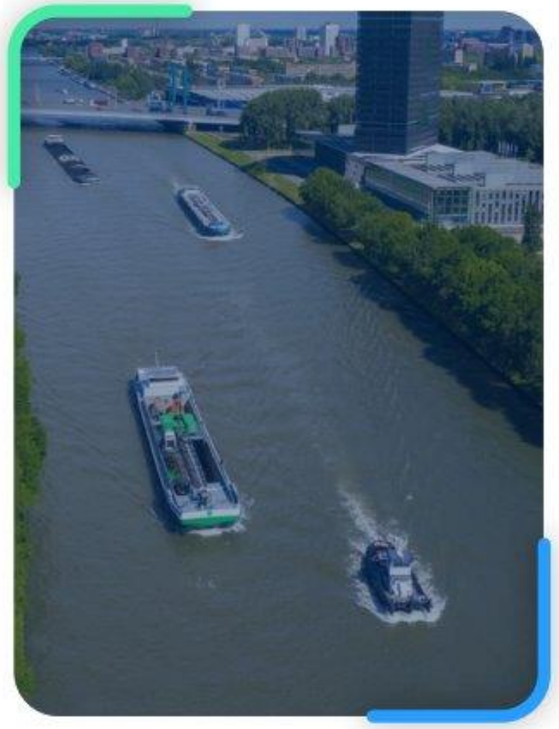
Project Vision

FOREMAST is fully committed to sustainability, aiming to create a cleaner, smarter, and more efficient transportation system. FOREMAST will facilitate the movement of goods in urban and coastal areas by creating a **Small, Flexible Automated, Zero-emission (SFAZ) vessel** that enables the **efficient, safe, and sustainable transportation of cargo shift to inland waterways**.



Main objectives

- Examine the **techno-economic aspects** of SFAZ vessels in smart, competitive and green transport systems
- Undertake **focused research** in SFAZ design and solution components in line with vessel research
- Test and demonstrate the SFAZ vessel concept in the **FOREMAST Living Labs**
- Accelerate the **wider deployment** of SFAZ vessel

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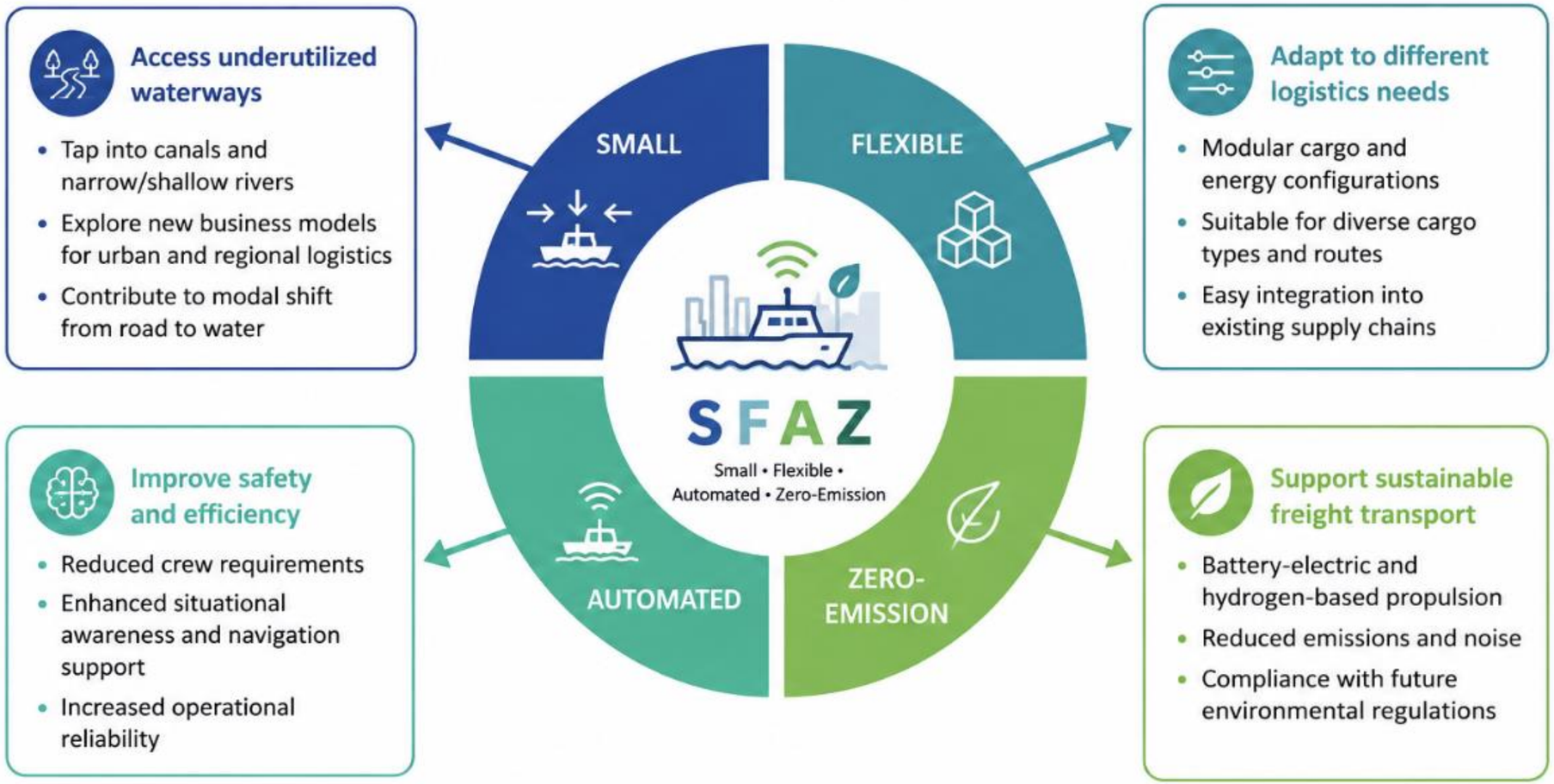
SFAZ definition



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Living Lab 1: Ghent, Belgium

Scope

Retrofitting the AVATAR vessel for urban and intra-urban goods transport, integrated with:

- SEAFAR AI-powered remote navigation aid to enhance situational awareness via vessel detection and monocular depth estimation
- PEL flexible battery-electric or hydrogen-based energy management through its modular SWAP BOX.

Supports real-world business cases like transporting construction materials and excavated soil from the Opera House renovation project in Ghent.

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Living Lab 2: Caen, France

Scope

Creating and validating a multihull (trimaran, catamaran) Class I SFAZ vessel prototype, for the transportation of goods within urban and intra-urban areas in Caen and Le Havre.

- **Compact vessels (<10m) designed by UGAL, optimized via CFD for efficiency, maneuverability, and urban suitability.**
- **Full-scale maneuvering trials** lead by UGENT (zig-zag, turning circle, etc.) to develop data-driven maneuvering models for automation.
- **Modular control architecture** provided by ABBBS with advanced **GNC** features (disturbance rejection, system federation), enabling **human-autonomy collaboration**.

Testing split between real-life trials (Caen) and simulation (Le Havre).

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Living Lab 3: Galati, Romania

Scope

- Virtual Living Lab
- Adapt the SFAZ concept to South-Eastern Romania’s inland and coastal navigation.
- Focusing on **transferability** across regions using the DT platform to validate its simulation framework.

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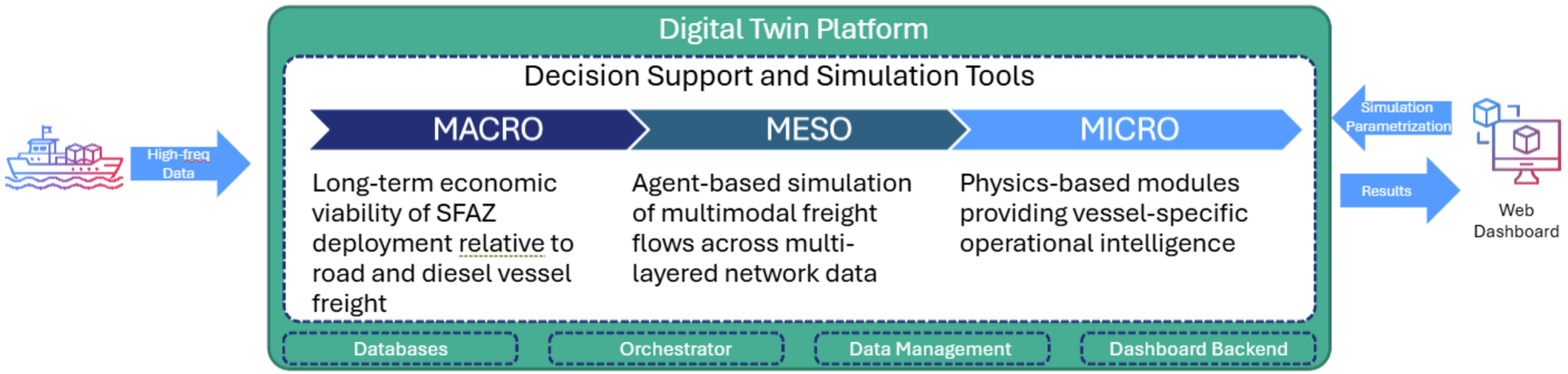
From Living Lab Scenarios to Digital Twin Simulation

Research Contribution

A Multi-Scale Simulation Framework for Zero-Emission IWT Planning



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SFAZ Adoption & Market Uptake: Where Is the Market Today?

- **Current market position: inertia phase**
  The market is still in an “inertia phase”, with stakeholders continuing to prefer road transport because it is fast, door-to-door and cost-effective at low volumes.

- **Economic tipping point**
  The TCO analysis shows that SFAZ becomes cost-competitive with electric trucks only above certain daily cargo volumes: around **26 tons/day for OHB2** and **19–38 tons/day for NEAC2**. Below these thresholds, road transport remains the cheaper option.

- **Value propositions for IWT competitiveness**
  SFAZ adoption depends on key enabling conditions: regular cargo flows, consolidation centres to massify loads, automation to reduce crew costs, and local authority support through measures such as low-emission zones, docking exemptions and urban logistics incentives.

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YOUR VOICE MATTERS! Thank you for your help

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Thank You

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