



Interreg
North Sea Region
AVATAR

European Regional Development Fund



EUROPEAN UNION

Sustainable urban freight transport with autonomous zero-emission vessels

Project **AVATAR**

Last mile innovation through urban
autonomous & zero-emission inland
waterway transport solutions

*Thomas Brauner, Logistics Initiative Hamburg,
Project Manager Innovation*

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LOGISTICS INITIATIVE HAMBURG

- Hamburg-based cluster organization, public-private partnership with the City of Hamburg
- 500+ members, largest institutionalized logistics cluster in Europe

What we do

- linking logistics industry, administration & politics & research
- ensuring and fostering innovation transfer and capacity building, this includes national and EU innovation projects



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QUICK FACTS (I)



- EU **innovation project** on **urban, autonomous & zero emission** water-bound cargo transport solutions for last mile distribution
- Funding scheme: **co-financed by the European Union** from the EU Interreg North Sea Region (European Regional Development Fund)
- Project period: May 2020 - June 2023
- Project budget: Total EUR 1,89 million, 50% of which EU (ERDF) funding

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QUICK FACTS (II)



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- **7 project partners from 3 countries** (Netherlands, Belgium, Germany):
of which: 3 universities, 2 SMEs & 2 cluster organisations / innovation agencies
- providing combined economic and engineering expertise (multidisciplinary approach)



www.vanwingen.be



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WHY URBAN IWT?

MOTIVATION

- Many European cities have a large & branched waterway network (< CEMT I) that was built for and originally used for cargo transport
- Today: Predominantly recreational navigation / use, waterways generally not economically viable for freight distribution → underutilised
- At the same time: road congestion, increasing competition for urban space and need for sustainability in urban commercial transport
- AVATAR project aims to tackle those challenges by developing, testing and assessing adequate technologies and business models for urban autonomous zero-emission IWT.



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ITS CONGRESS

TOPICS ADDRESSED



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AUTOMATED, COOPERATIVE AND CONNECTED MOBILITY

GOODS JOURNEY FROM PORTS TO CUSTOMERS

NEW SERVICES FROM NEW TECHNOLOGIES

SOLUTIONS FOR CITIES AND CITIZENS



- Research, prototyping & demonstration of autonomous urban vessels
- Use case development for city freight distribution, CEP and others creating new distribution services
- Emission reduction and socio-economic benefits for cities and people

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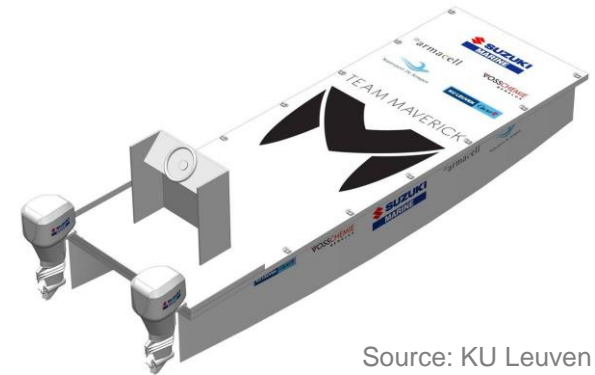
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AUTONOMOUS VESSELS (I)

- AVATAR develops 2 vessels for pilots in a 3-step approach
- In a **first step**, AVATAR is currently converting an existing 1 ton vessel (“MAVERICK”) and expanding the automation level (0 → 2 to 3) of this vessel in Leuven (Belgium).
- **The MAVERICK test catamaran** from KU Leuven is currently being equipped with perception sensors (LiDAR, stereo cameras, GNSS, IMU), fully electric drive system & onboard computer + PLC.



Source: KU Leuven



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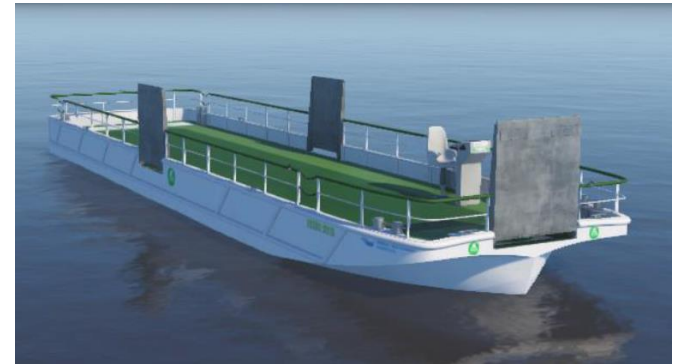
DEVELOPMENT OF AUTONOMOUS VESSELS (II)

- In a **second step**, a newly built vessel with a capacity of approx. 10 tons is being developed
- Currently, the aluminum hull is being built in a Dutch shipyard, the fully electric drive system will be integrated in Ghent (Belgium) starting in Q3/2021
- Expected completion: Q2/2022
- For this vessel, the sensor technology and learnings from the Maverick will be scaled up and subsequently implemented onto the new vessel

Source:
#IWTS2.0 project



The AVATAR vessel will be similar to the „Green Wave“ vessel from the #IWTS2.0 project



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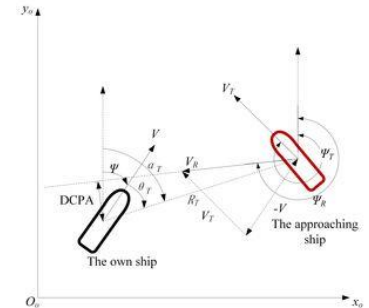
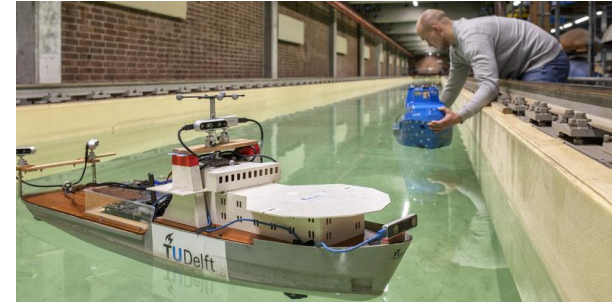


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DEVELOPMENT OF AUTONOMOUS VESSELS (IV)

- In parallel, as a **third pillar**, research on vessel-to-vessel communication & multiple vessel coordination is being carried out with small-scale research vessels developed and equipped at the TU Delft Research Lab for Autonomous Shipping (RAS).
- University of Oldenburg is researching and developing remote control systems (control center, vessel-to-shore communication & communication layer) for the project



Source: TU Delft, University of Oldenburg

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PILOTING & TESTING THE AUTONOMOUS VESSELS

- After finalizing the development of the 1 ton Maverick vessel as well as the 10 ton vessel, both **vessels are planned to be tested within several pilot demonstrations** in the project partner regions in 2022/23.
- Testing locations for those demonstrations are either already available or are currently being defined in Ghent, Leuven, Delft and Hamburg.
- At least 3 pilots will be carried out, depending on the findings of use case development and local interest.



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USE CASE & BUSINESS CASE DEVELOPMENT MARKET REVIEW



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- Some solutions already exist today, where barges are being used for city freight distribution
- AVATAR has recently published a market review (30+ cases) on this matter → available online
- Currently, AVATAR project partners are identifying and developing use cases for Ghent & Hamburg and assessing the benefits of partially autonomous vessels in terms of economic viability
- **AVATAR invites any stakeholder, public or private, interested in discussing potentials of such transport solutions to get in touch!**

„Beerboat“
in Utrecht



CEP Services
by DHL in
London,
Amsterdam &
Ghent



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USE CASE & BUSINESS CASE DEVELOPMENT STATUS



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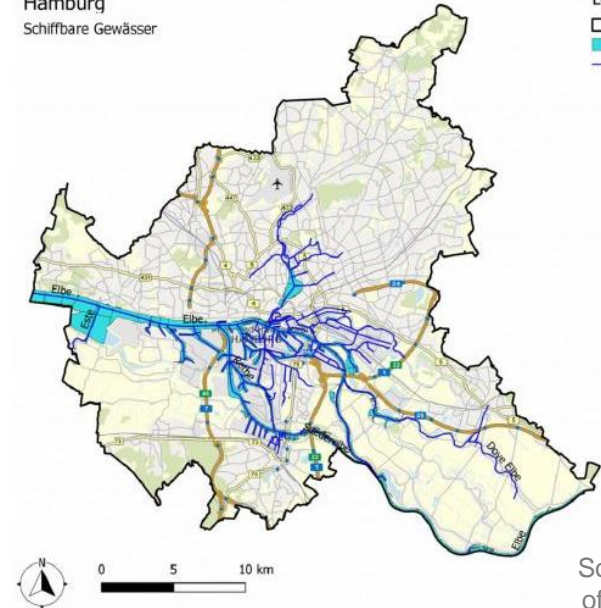
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HAMBURG USE CASES



- Logistics Initiative Hamburg and City of Hamburg have partnered for the identification of use cases by creating the **“WaCaBa” concept**
- Currently, an in-depth feasibility study is carried out, results will be available in 12/2021
- Workshops & discussions with possible local users are currently ongoing (CEP service providers, retail food & non-food)

Hamburg
Schiffbare Gewässer



Legende

- Landesgrenze
- Gewässerfläche
- Schiffbare Gewässer

Source: City of Hamburg

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STATUS

Source: E. van Wingen

GHENT USE CASES

- Close alignment with City of Ghent - 2 year exemption permit for a testbed has been approved
- Energy use case: Business case development to **integrate hydrogen powered charging stations** in one or more cases, pilot in preparation for 2023
- Solution: ICE CHP (Internal combustion engine & combined heat and power) system running on H2
 - Opportunity: storing green electricity produced in the Port of Ghent during the day to charge electric vessel(s) at night
 - Use of waste heat e.g. in logistics buildings to increase (cost) efficiency



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GET IN TOUCH



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SCAN ME

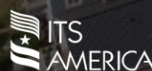


[More information](#), downloads & our
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project website northsearegion.eu/avatar

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