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Autonomous Inland Mobility: Reliable Navigation from Lab to the Baltic Coast

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Consortium

J.M. Voith SE & Co. KG | VTA; Weiße Flotte GmbH; Argonav GmbH;
RWTH Aachen University | IRT – Institute of Automatic Control

Mode of Transport



Term

01.02.2023 until 31.01.2026

Funding

BMW - Bundesministerium für Wirtschaft und Energie

Practical Application and Challenges

Full automation of ferries: In light of the federal government's maritime research programme, the project autoFerry fully automates an inland ferry of the Weiße Flotte GmbH. The carrier is the ferry „MF Wittow“. In the future, it will operate on ferry connections around Rügen and Hiddensee.

Technology driver in shipping: The project provides a basis for full automation in inland shipping and acts as a technology driver. Future developments for ship assistance systems can be derived from this project.

System reliability and robustness: The system is designed to achieve high reliability and robustness. These are necessary preconditions for the use of the assistance functions in daily ferry operations.

Automated ferry operations: The autoFerry project automates an inland ferry throughout all operational phases - casting off, transit and berthing. One challenge arises from the spatial constraints that restrict berthing and casting off to a margin of 50cm. Another challenge is that transit may take up to one hour. Thus, navigation should be precise and function effectively long-term.

System robustness under varying coastal conditions: On-board systems should reliably operate under varying coastal conditions, such as high- and low tide. This requires a robust and complex algorithm design. Stormy weather places further demands on system resilience and adaptability.

Situational awareness under traffic: One critical aspect is the handling of mixed traffic, which requires a comprehensive environment perception and a high degree of situational awareness. Such abilities are crucial for safe operation through narrow fairways and avoid traffic.

Solution and Knowledge Transfer

Increase in efficiency and safety: Precise localization, comprehensive environment perception and intelligent routing help to decrease the ferry's fuel use by up to 10%. Meanwhile, safety is increased so that automated operation is possible under difficult environmental conditions.

Traffic management and collision avoidance: When faced with other ferries, cargo ships and sports vessels, traffic rules and collision avoidance are crucial.

Automation and user interaction: Successful simulations demonstrate advances in software development for automated driving. A human-machine interface provides a communication link between the captain and the system.

Technological realization: The technologies and methods developed in the autoFerry project can be adjusted and implemented on other modes of transport, such as buses, light rail transit and freight trains. Where safety is a concern, sectors benefit from precise localization, sensorfusion and intelligent routing. And the challenge of safe navigation under complex traffic conditions is relevant in many transport sectors.

Modular system architecture: The system is designed modular. Therefore, specific components such as object detection and collision avoidance can be easily adapted to other carriers. Furthermore, the modular design enables quick implementation and adaption to different requirements.

Regulatory framework: Operating experience from the project will be used to identify and reduce regulatory hurdles for the automation of other carriers.

Further Information

Scan the QR code to access our **project website**:



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