

Newsletter 3.25



Dear readers,

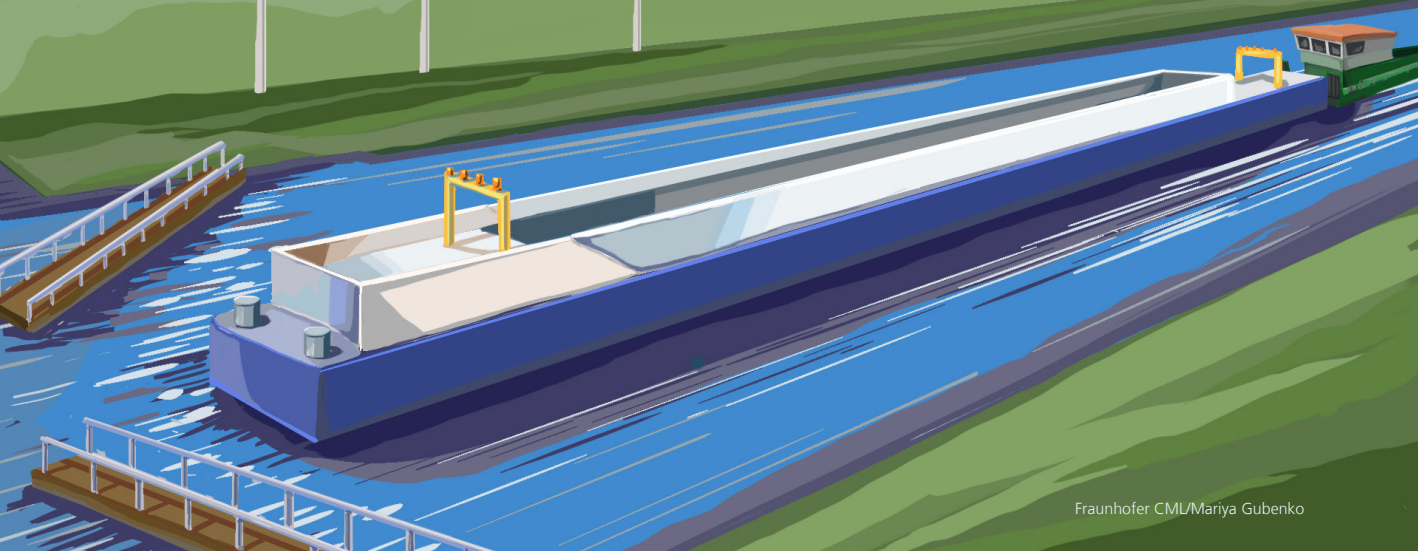


At the beginning of October 2025, the International Conference on Maritime Autonomous Surface Ships (ICMASS) will take place in Hamburg, Germany, for the first time. We are organizing it together with DGON, the German Society for Positioning and Navigation. More on this in this newsletter.

Other topics: A new CML study recommends (semi-) autonomous push barges to increase the transport capacity of the Elbe-Lübeck Canal. The SIM-TWIST project also focuses on design concepts for automated terminals in a simulation environment and the impact of new technologies such as automated twistlock handling. And in the Voice-to-Report project, we are developing an innovative solution for converting visual and acoustic information, which uses smart glasses to convert images and speech into precise maintenance reports via AI.

I hope you enjoy reading this newsletter!

Kind regards, **Prof. Dr.-Ing. Carlos Jahn**
Head of Fraunhofer CML



Fraunhofer CML/Mariya Gubenko

Illustrative example of a push barge as recommended by the new study.

125 years of the Elbe-Lübeck Canal: Renovation needs hold new transport potential

The Elbe-Lübeck Canal (ELK) should remain economically viable for inland waterway transport. The 2030 Federal Transport Infrastructure Plan considers the expansion of the ELK to be an “urgent need,” but it will take many years to complete. Until the waterway undergoes comprehensive expansion, a new study by Fraunhofer CML on behalf of the Lübeck Port Authority (LPA) and the Lübeck Chamber of Industry and Commerce recommends activating existing transport capacities through (semi-) autonomous push barges. This requires investment by industry in appropriate transport units.

In the anniversary year of the 125-year-old ELK, the Chamber of Industry and Commerce and the LPA emphasize its increased importance for the modal shift and geopolitical changes in the Baltic Sea. However, the inland waterway is showing its age: locks, canal beds, and bridges are not designed for modern ship sizes.

In the meantime, the ELK offers potential: (semi-) autonomous push barges could increase the attractiveness of the waterway despite the shortage of skilled workers.

These systems efficiently transport unmanned barges through the ELK, which are coupled into larger convoys from Lauenburg onwards. This enables seamless integration into existing logistics chains. Fraunhofer CML recommends the concept of a push boat convoy with a large barge as a short-term solution. Examples from Belgium and the Rhine show that such systems are legally and technically feasible.

In the long term, the concept remains compatible with an expansion of the ELK and offers potential for meeting the demographic challenges facing inland waterway transport. The aim is to maintain the ELK as a vibrant transport artery and to secure trimodality in the Port of Lübeck. The study (only available in German) can be downloaded free of charge from the [Fraunhofer CML website](#).

Contact

Dipl.-Wirtsch.-Ing. Univ. Hans-Christoph Burmeister
E-mail: hans-christoph.burmeister@cml.fraunhofer.de
Tel.: +49 40 271 6461 - 1500

Terminal automation: Concept evaluation in simulation environment

[The SIM-TWIST project](#) focuses on adapting automated terminal design concepts in a simulation environment with a special focus on studying the impacts of Automated Twistlock Handling (ATH) technologies on terminal performances.

Automation has always been a core priority for container terminals. In pursuit of industry readiness, terminals are increasingly embracing new technologies to attain certain levels of automation and get benefited in terms of efficiency, throughput, safety and cost effectiveness. Nevertheless, the realization of full automation continues to present significant challenges. Even the most automated terminal still requires manual intervention in specific processes, such as twistlock handling. Various technologies for automating twistlock operations are developed globally, but due to the absence of systematic studies evaluating their impacts on terminal performance has prolonged their realization. To address this gap, SIM-TWIST simulation study has been initiated.

Fraunhofer CML, along with its project partners, has conducted an extensive desk study on available ATH systems and classified. Within the project, four basis scenarios are identified: Operation on the crane, operation under the crane and special ATH stations away from the crane, where twist lock handling takes place on the transport vehicle on the one hand and unloading done on the

other. Furthermore, four simulation modules are developed: Crane module, ATH technology module, transport vehicle module, and transport traffic module. When parameterized and connected in specific configurations, these modules represent automated terminal design concepts. The experimentation results will highlight key performance indicators (KPIs) related to terminal performance and provide the basis for deriving recommendations to support the effective integration of ATH technologies within Container terminals environments. The project results will benefit both the ATH system manufacturers and terminal operators. It will enable readers to anticipate the impact of different ATH technologies on terminal performance, thus positioning the study as a pivotal step toward advancing container terminal automation.

SIM-TWIST is funded by Bundesministerium für Digitales und Verkehr (BMDV) for two years (01.2025 – 12.2026). The consortium includes Eurogate Container Terminal Wilhelmshaven GmbH & Co.KG as industrial partner and, Fraunhofer CML and Bremer Institut für Produktion und Logistik GmbH (BIBA) as research partners.

Contact

Dipl.-Wi.-Ing. Johann Bergmann

E-mail: johann.bergmann@cml.fraunhofer.de

Tel.: +49 40 271 6461 - 1600



Voice-to-Report

Innovative technology revolutionizes maintenance reports

In the world of industrial maintenance and repair, companies often face the challenge of creating comprehensive service reports that must be both accurate and timely. An exciting new project, developed in collaboration with our partners Wärtsilä Germany and Adtance GmbH & Co. KG, aims to fundamentally change this process with an AI-powered assistance system.

The core of the solution is a pair of smart glasses (wearable) with an integrated camera and microphone. The focus is on the automatic conversion of spoken explanations by service engineers into structured text – even under difficult conditions such as loud machine noise. While working, technicians can dictate their observations and comments directly, which are then converted into standardized and consistent service and maintenance reports by specially trained AI models.

In addition, photos can be taken using smart glasses and analyzed using AI-based methods. This image information is integrated into the reports, creating comprehensive, multimodal documentation that intelligently combines text and image data. These reports can range

from 10 to over 100 pages and are tailored to the specific requirements of each job.

Another advantage is the ability to automatically compare maintenance histories and wear patterns of identical components. This allows potential problems to be identified as early as possible, reducing downtime and increasing reliability in ship operations. At the same time, the workload for service engineers is significantly reduced, as time-consuming manual documentation processes are no longer necessary – a win-win situation for companies and skilled workers alike.

With this innovative technology, we are setting new standards in maintenance documentation and helping to further improve the efficiency and quality of services. Read more about the [Voice-to-Report project here](#) and feel free to contact our project manager Maximilian Reimann!

Contact

M. Sc. Maximilian Reimann

E-mail: maximilian.reimann@cml.fraunhofer.de

Tel.: +49 40 271 6461 - 1409

Optimizing tugboat dispatching through quantum computing

[The QTs – Quantum Tug Scheduling project](#) addresses the problem of tugboat scheduling in the Port of Hamburg. The aim is to improve planning accuracy and speed through realistic modeling and the integration of innovative quantum computing algorithms. This should reduce fuel consumption and delays for tugboats, while still ensuring reliable availability.

Fraunhofer CML, the tugboat company FAIRPLAY, and the software company soft-park have jointly been awarded a contract for a project funded by the Hamburg Investment and Development Bank (IFB Hamburg) in which quantum computing will be used for the first time to optimize the scheduling of harbor tugs.



ICMASS: High-profile conference on autonomous shipping

On October 8 and 9, 2025, the [8th International Conference on Maritime Autonomous Surface Ships \(ICMASS\)](#) will take place in Hamburg, Germany, for the first time. Fraunhofer CML is organizing the event together with the German Society for Positioning and Navigation (DGON) at its research site in Harburg.

The two-day conference offers a diverse program covering a wide range of topics related to the research and development of autonomous vessels. Nearly 100 presentations cover topics ranging from the technical and regulatory requirements for operating autonomous ships to the challenges and solutions for ports and terminals, as well as navigation when dealing with other ships and objects in the water. In addition, obstacles to the introduction of Maritime Autonomous Surface Ships (MASS) and cybersecurity requirements will be discussed.

ICMASS 2025

8th International Conference
on Maritime Autonomous
Surface Ships



Fraunhofer Center for
Maritime Logistics and Services CML

Blohmstr. 32 · D-21079 Hamburg · www.cml.fraunhofer.de
Tel.: +49 40 2716461-1260 · E-mail: pr@cml.fraunhofer.de



@Fraunhofer CML