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News 1.25

Dear reader,



Above you can see the Senator for Economics and Innovation Dr. Melanie Leonhard and I christening our research ship Vektor together. In this first newsletter of the year, you can find out where it comes from and what we plan to do with it in the future.

It is now in its seventh year: our annual event MII, Maritime Innovation Insights. Here you will gain concrete insights into our research with added value, because Fraunhofer focuses on the practical relevance of its projects for partners from business and industry. You haven't registered yet? This newsletter will tell you why it's worth taking part. I would be delighted to see you at the MII.

Achieving climate neutrality by 2050 is also the declared goal in the inland shipping sector. That is why the Fraunhofer CML is working with seven European partners to develop a new transport system for small waterways - with the AUTOFLEX project.

I wish you a stimulating read!

Kind regards
Prof. Carlos Jahn
 Leiter Fraunhofer CML

German Shipping Day

As part of the German Shipping Day, the CML, together with the German Maritime Center, invites you to the German-speaking event "[AI in Maritime Shipping](#)" on May 7, 2025 from 1 pm at the International Maritime Museum.

Transport Logistic 2025

Visit us from June 2 to 5 at the Fraunhofer booth in hall B1, booth 501/602! Container handling, handling, stowage planning - this year everything revolves around optimization using AI.

CML at the Harburg Inland Port Festival 2025

For the third time, the CML will be opening its large hall door at the Harburg Inland Port Festival to showcase some of its projects. You are welcome to visit us on Saturday, June 14, 2025 between 2 and 4 p.m. in our large hall - and in front of it if the weather is fine.

Senator Leonhard christens CML research ship

On February 20, Dr. Melanie Leonhard christened our research vessel Vektor. The former police patrol boat is 13 meters long, 4.10 meters wide and can accommodate up to twelve people. There are three workstations for scientists on the bridge and four below deck. Special features of the Vektor are the hull shape, which also allows it to be used in rough sea conditions, and the lowerable stern with a crane that can be loaded with 250 kilograms. This makes it possible to lower and retrieve research equipment such as underwater robots and our multibeam sonar.

Other strengths of the Vektor include a work deck for storing additional material and good night-time usability, supported by a large searchlight. In the deckhouse, the Vektor is equipped with nautical gear like a real cargo ship and will be fitted with further technical equipment in the coming months. Further installations for new communication and navigation technologies will be carried out so that it can serve as a test and development platform for the researchers. With their support, solutions for autonomous driving will be developed and tested, among other things.

In addition, the newly christened ship serves as a platform for the use of surface and underwater drones and for data collection using various sensor systems. The Fraunhofer CML also offers

tests and projects in these research areas to its partners from industry.



"As scientific knowledge, technology and the innovation needs of our partners progress, the scope of the boat will change and adapt," says Carlos Jahn, Head of the Fraunhofer CML.

How did the vector get its name? A vector plays an important role in maritime research, particularly in the fields of navigation, fluid dynamics and geodesy, the science of measuring and mapping the earth's surface. Overall, vectors are a fundamental mathematical tool for analyzing movements and forces in water.

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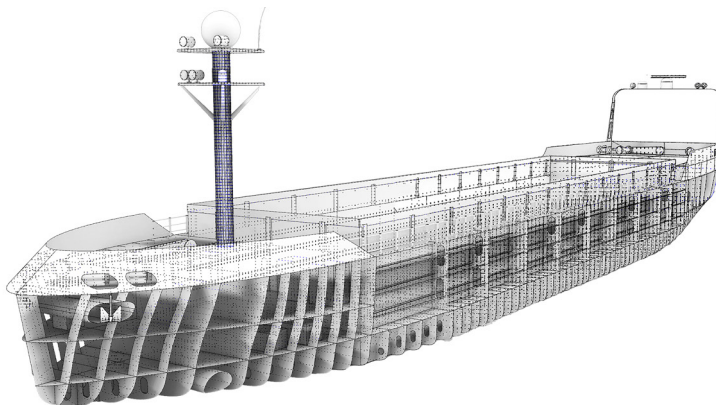
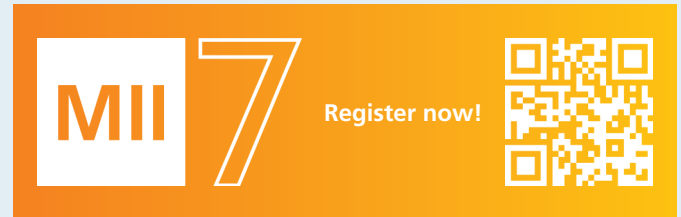
Maritime Innovation Insights 2025: Increasing efficiency through AI, robotics and digitalized processes

It will take place again on Thursday, May 22: Our annual event that shows the benefits that industrial and commercial companies can derive from maritime research. This is because [Maritime Innovation Insights](#), or MII for short, which is now taking place for the seventh time, focuses on practical demonstrations and applications.

Before the varied program, Senator Dr. Melanie Leonhard, President of the Ministry of Economics and Innovation, will start with the topic "Innovations for the maritime industry - made in Harburg". Prof. Axel Müller-Groeling, member of the Fraunhofer Executive Board, will then give a welcome address. As a further highlight, Dr. Wolfgang Hildesheim, IBM Germany, will give a keynote speech with an opportunity for discussion on the question of how we can shape a better future with artificial intelligence. Scientific presentations and live demonstrations in our laboratories will provide participants with in-depth insights into the latest innovations in shipping, maritime autonomous systems and port technologies. Under the title "Increasing efficiency through AI, robotics and digitalized processes", we will be presenting topics such as mobile

robotics on land and under water, the potential of automated processes and optimization through digital innovation. Speakers include experts and users from the maritime industry as well as researchers from the Fraunhofer CML.

Maritime Innovation Insights offers the opportunity to gain new insights, make valuable contacts, discuss specific concerns, exchange ideas with experts and find tailor-made solutions. The German-speaking event lasts from 9:30 am to 5 pm and takes place in the CML research building in Harburg's inland port.



Design concept of an autonomous inland waterway vessel (© Project AUTOFLEX).

Climate neutrality by 2050: Development of autonomous, flexible inland waterway vessels

The European Green Deal requires new ideas and solutions: With the aim of achieving climate neutrality in the inland waterway transport sector by 2050, the Fraunhofer CML is working with seven European partners to design a new transportation system for small waterways. In view of the task of shifting goods to lower-emission inland waterway vessels, the [AUTOFLEX](#) project aims to design small, autonomous units that can be used on waterways that are little or no longer used today. Many requirements are placed on them: low-emission drives, shallow draught, compatibility with partly new handling infrastructures and, of course, a digital framework for navigation and communication. The design of the transport system is based on an analysis of existing freight volumes in Belgium and the Netherlands, two reference regions. Under the leadership of the CML, the potential for relocation, predominantly agricultural products, building materials and containerized products, was determined within the Randstad region around

Amsterdam and in the East Flemish city of Ghent.

A complex, innovative software tool called SeaGuard is being developed in collaboration with the CML to ensure that the safety of autonomous ships is permanently guaranteed in every situation, for example during encounters, but also in the event of changing nautical conditions. SeaGuard has the task of monitoring nautical data from real and simulated operating scenarios and protecting it against cyber attacks so that specifications for subsequent operations can be derived.

AUTOFLEX is funded by the European Union for a period of three years (Grant Agreement No. 101136257). Research and industry partners from six different countries are on board.

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Briefly noted

On board ships, containers not only stand on top of each other, but are also connected to each other at all four corners by twistlocks. The handling of these twistlocks during ship handling is still mainly done manually. This is where the SIM-TWIST project comes in: different technologies for automating twistlock handling are being analyzed and their use for current terminal operating concepts is being investigated using logistics simulation. SIM-TWIST is being funded by the Federal Ministry of Transport as part of IHATEC and is being carried out jointly with Eurogate and BIBA.

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