

Press release

Autonomous research boats, maritime robotics and underwater laser scanning systems - innovative applications for the maritime sector at the Fraunhofer booth at SMM 2022

At the world's leading maritime trade fair SMM in Hamburg, Germany, from September 6 to 9, 2022, nine Fraunhofer institutes will showcase customized solutions for shipping companies, shipyards, ports, logistics service providers and the maritime supply industry. An amalgamation of the Fraunhofer facilities in the "Waterborne" group will present the Fraunhofer booth in **hall B6 at booth 327**. In addition to the Fraunhofer CML, the Fraunhofer institutes FKIE, ICT, IFAM, IGP, IPM, ISI, IWES, and LBF will exhibit. Fraunhofer research here focuses not only on efficiency and the environmental impact of maritime shipping, but also in particular on the integrated consideration of digitalization, automation and the development of new manufacturing technologies in the context of Industry 4.0.

Visitors will be able to see the autonomous research boat "**SeaLion**", a prototype developed by Fraunhofer CML and already used in practice several times. In addition to autonomous maritime technologies and possible applications of artificial intelligence in operational ship operation, the CML will also present an innovative VR application: With the "**Fast Rescue Boat**", seafarers will be able to train complex nautical maneuvers very realistically in the future.

Modern approaches to cyber security are presented by the Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE. Various offensive and defensive solutions for secure bridge systems will focus on the "Bridge Attack Tool" and the "Cyber Incident Monitor", which can be used to identify existing vulnerabilities and sustainably strengthen the security of maritime systems through targeted protective measures.

The Fraunhofer Institute for Chemical Technology ICT focuses on energy and propulsion systems. The institute is currently investigating the **use of silicon particles** as an energy source in the maritime sector, which according to its own studies could save a cruise ship up to 50 percent of its energy consumption. The "SiShip" project will be presented.

The Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM is responsible for the shipbuilding and offshore industry, with a focus on functional coatings and corrosion protection. To facilitate the process of **analyzing surfaces**, a robot has been developed to carry out corresponding inspections in an automated manner. In addition, a **plasma-coated ship's bell** is presented.

The Fraunhofer Institute for Large Structures in Production Engineering IGP will be demonstrating a modern, sophisticated optimized maintenance management system. Both in order management and in maintenance measures, complexity and effort can be significantly reduced. An important step towards **intelligent automation in steel shipbuilding**.

A **laser scanning system for underwater monitoring** is being developed by the Fraunhofer Institute for Physical Measurement Techniques IPM and will be presented at SMM. In the future, underwater

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structures could be examined with the help of laser-based measurement technology. With the corresponding LiDAR system "Uli", 3D measurements can be carried out for the first time even in turbid water over distances of several tens of meters.

At the Fraunhofer Institute for Systems and Innovation Research ISI, the main focus of development is on **new propulsion technologies** that could provide an efficient alternative to diesel engines in the future of shipping. A special tool in this context is the agent-based transformation model "MATISSE-SHIP".

Concepts for zero-emission shipping are also the focus of work at the Fraunhofer Institute for Wind Energy Systems IWES. In particular, crossover and upscaling effects between sail technology and classic wind energy systems are used. A **model of a Flettner rotor** and a **model ship with a sail system** will be presented at the fair.

The Fraunhofer Institute for Structural Durability and System Reliability LBF specializes in monitoring systems using smart sensors. The "**Rotatory Energy Harvester**" presented at SMM acts as an energy collector, allowing sensors to act independently and be placed in hard-to-reach places. Also on display are **vibroacoustic metamaterials** that LBF is developing to reduce vibration.

For **more information**, visit <https://www.cml.fraunhofer.de/en/events/upcoming-events/smm-2022.html>.

The Fraunhofer-Gesellschaft based in Germany is the world's leading applied research organization. Prioritizing key future-relevant technologies and commercializing its findings in business and industry, it plays a major role in the innovation process. A trailblazer and trendsetter in innovative developments and research excellence, it is helping shape our society and our future. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 76 institutes and research units throughout Germany. Over 30,000 employees, predominantly scientists and engineers, work with an annual research budget of €2.9 billion. Fraunhofer generates €2.5 billion of this from contract research.

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