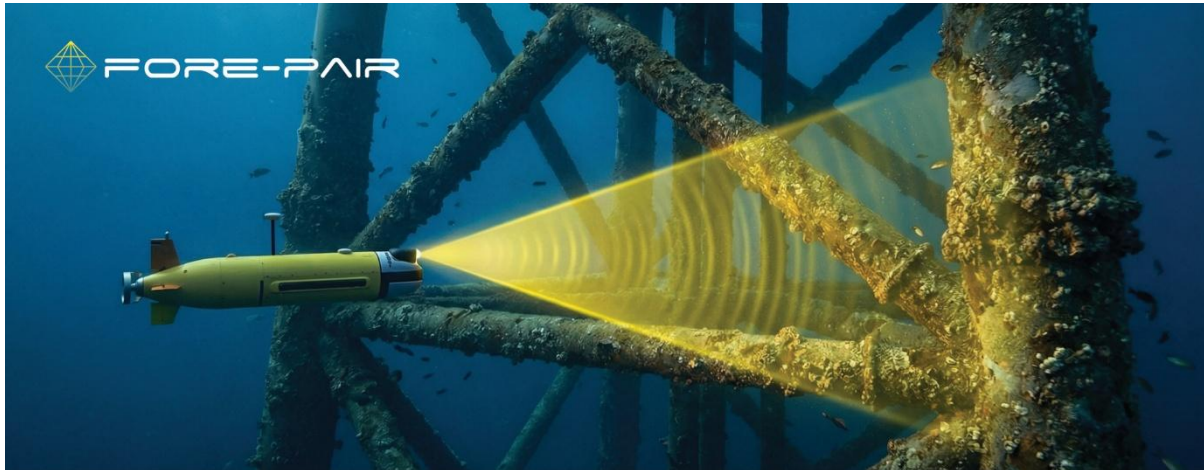


Press release

Federal funding for autonomous underwater robotics project to inspect floating offshore energy platforms

Bremen, 10 December 2025. With federal funding of approximately 10 million euros, the FORE-PAIR consortium project launches the development of autonomous robotic technologies for the inspection, maintenance and cleaning of floating offshore energy platforms such as floating wind and floating solar systems.



Symbolfoto, KI-generiert mit Google Gemini AI Nano BananaPro.

Offshore inspection and maintenance face a number of critical challenges: demanding environmental conditions such as strong currents, biofouling, corrosion and limited visibility significantly complicate precise underwater operations. At the same time, diver-based inspections are costly and associated with considerable risks, further increasing the need for automated alternatives. Additionally, there is still a lack of standardized and proven technologies for autonomous underwater inspections, meaning that many processes continue to rely on manual work or extensive logistics. As a result, the demand for data, simulation and inspection systems that reliably aggregate, digitally represent and efficiently evaluate information is steadily rising.

To effectively address these complex challenges, leading research institutions and industrial partners join forces in the FORE-PAIR project. The Federal Institute for Materials Research and Testing (BAM), the Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM), and Rosenxt as a technology group combine scientific expertise, long-standing offshore experience and advanced technological development to create new solutions that make underwater inspection, maintenance and cleaning safer, more efficient and more sustainable.

Key Innovations and Technological Focus Areas

The project aims to develop technologies that fundamentally improve the inspection, maintenance and cleaning of floating offshore platforms. This includes autonomous underwater vehicles (AUVs) capable of reliably assessing the supporting structures of offshore installations even at greater depths and under challenging conditions such as strong currents or limited visibility. High-resolution 3D sensing systems and digital twins will map platform conditions in real time, automatically detect changes and support data-driven maintenance decisions. In addition, sustainable protective solutions will be investigated to reduce fouling and extend asset lifetimes. AR/VR-supported tools will also be developed, enabling maintenance personnel to simulate operations in the digital twin, optimize workflows and prepare inspection scenarios efficiently.

The importance of the project is underscored by the participating partners. Özlem Özcan, expert for material and surface technologies at BAM, explains: *“Reliable assessment of material conditions under extreme environmental influences is a key factor in ensuring the safety and longevity of offshore energy systems. With FORE-PAIR, we are laying the foundation for integrating advanced inspection and testing technologies into a fully autonomous system and establishing new standards for the operation of such installations.”*

Fraunhofer IFAM also highlights the project's potential: *"Future offshore energy systems require robust, automatable and sustainable solutions – from reliable repair processes to innovative protection technologies. FORE-PAIR provides a unique opportunity to bring together our expertise in adhesive bonding, surface technologies, cyber-physical quality assurance and mobile robotic systems to develop practical applications for the maritime industry,"* says Tim Heusinger von Waldegge, project manager at Fraunhofer IFAM.

From the perspective of industry partner Rosenxt, the focus is on transferring the technologies into real operational environments, as Dr. Peter Kampmann, Head of Maritime Robotics, emphasizes: *"As a technology-driven company specializing in operations in harsh environments, we see FORE-PAIR as a key step forward for the offshore energy sector. The funding enables us to contribute our engineering expertise to the development of market-ready solutions that make inspection, maintenance and cleaning at sea safer, more efficient and more sustainable."*

The project, running until 2029, is funded by the Federal Ministry for Economic Affairs and Energy (BMWi) and supported under the Maritime Research Program by Project Management Jülich (PtJ). Further information on the progress of the program is available at www.fore-pair.de.

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About the FORE-PAIR Project

FORE-PAIR (Floating Offshore Renewable Energy Platforms with Autonomous Inspection Robots) is an interdisciplinary research and development project aimed at strengthening offshore energy infrastructure in Germany. The project integrates robotics, sensor technology, digital twins and innovative inspection technologies to develop autonomous, safe and sustainable solutions for floating energy platforms. Funded under grant number 03SX628A, the project runs from 01 June 2025 to 31 May 2029.

About the Federal Institute for Materials Research and Testing (BAM)

BAM is a scientific and technical federal institute within the portfolio of the Federal Ministry for Economic Affairs and Energy (BMWi). Its statutory mission is to ensure and continuously advance safety in technology and chemistry. In doing so, BAM contributes to addressing key societal challenges and plays an important role in strengthening Germany's and Europe's competitiveness and technological leadership. For more information, please visit www.bam.de.

About the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM

Founded in 1968 and part of the Fraunhofer-Gesellschaft since 1974, the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM is today one of Europe's leading independent research organizations in the fields of adhesive bonding, surfaces, shaping and functional materials. Across seven locations – Bremen, Dresden, Stade, Wolfsburg, Braunschweig, Helgoland and Cuxhaven – around 700 employees work toward one goal: practical solutions that rapidly find their way into industrial application.

The institute's portfolio addresses key future sectors such as mobility, energy, aerospace, maritime technologies, medical technology and life sciences. Its work is based on seven closely interconnected core competencies: metallic and polymer materials, surface technology, adhesive bonding, shaping and component manufacturing, energy storage and conversion, as well as automation and robotics. Together, these competencies cover the entire value chain – from material development and product design to pilot production, quality assurance and integration into manufacturing processes. For more information, please visit www.ifam.fraunhofer.de.

About Rosenxt

Rosenxt is a forward-thinking technology group. Launched in 2023 by Hermann Rosen, the founder of the ROSEN Group, the company builds on decades of engineering excellence. As a privately owned global partner with more than 500 employees, Rosenxt continues to focus on developing cutting-edge technologies and has a broad expertise in sensor technology, autonomous robotics, AI, and advanced materials. The company explores

and develops highly innovative products and services for customers in very challenging environments – the underwater sector, industrial production, renewable energy, and integrity of assets in water and energy supply. The headquarters of the Rosenxt Group is located in Switzerland. For more information, please visit www.rosenxt.com.