

PRESS RELEASE

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45 meters draught: Test Center for Maritime Technologies puts research area off Helgoland in the North Sea into operation

Only a few nautical miles away from the island of Helgoland, eight yellow buoys mark a three square kilometers large and 45 meters deep test field since April 23rd. The field can be used to test surface and underwater applications. With the opening of the Test Center for Maritime Technologies in summer 2019, the land-based logistics have been set up, and research work can now also begin on the high seas.

Research on the open sea has up until now been either impossible or only possible under challenging conditions. Anyone wishing to investigate large components or complete maritime systems must hire a ship and hope for the right weather conditions. Long-term experiments are hardly feasible. Now this research site, which is unique in Europe, gives scientists and partners from the industry the opportunity to develop surface and underwater technologies under real-life conditions and to test them in both long-term experiments and short-term test scenarios.

Surface and underwater robotics on the high seas

On the one hand, autonomous underwater vehicles are to be used to study material cycles such as carbon uptake in the sea or eddies and currents that are important for phytoplankton production. On the other hand, such underwater vehicles as well as autonomous flight systems will be tested in the defined sea area itself. Mobile robotics has the potential to revolutionize industrial measurement methods and repair work of offshore facilities. This means that complex maintenance work under and above water can be replaced by innovative procedures that require less energy and time.

In the future, underwater vehicles will be able to move independently, examine underwater structures for damages, and repair them autonomously. Intelligent flight systems are also being tested in the area that are for example to be used for the

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inspection and maintenance of offshore wind turbines and thus relieve people of this dangerous work.

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Test site for maritime applications

To fulfil this broad spectrum of tasks, the autonomous vehicles must be equipped with efficient electric propulsion systems, extensive sensor technology, sensor data acquisition and evaluation, as well as appropriate algorithms for the autonomous execution of complex missions. For these applications, high demands are placed on system reliability and the implementation of digitization in maritime contexts.

Proving the reliability of this hard- and software under real environmental conditions is the main focus of the research and development work. Specific developments from the field of mobile robotics can prove their reliability in sea state, currents, sediment loads, high wind speeds and under limited visibility. In addition, different inspection and test scenarios can be set up in the test field depending on the area of application.

The tests provide important findings for development questions and for the optimization of systems. Researchers at the test center will particularly address topics such as the electrification of ship propulsion systems, the reliability and efficiency of propulsion systems for underwater vehicles as well as electrical energy storage systems for surface and underwater applications.

Maritime research as an important innovation driver and economic factor

Not only in the north of Germany, but also worldwide, the maritime economy is one of the most important industrial sectors. In order to strengthen and expand this powerful economic sector, products and services of the highest quality are necessary. High requirements are made in terms of reliability, and digitization in the maritime sector is also considered a challenge. In order to meet these demands, experiments and long-term tests under application-oriented conditions are indispensable.

In order to advance research and development for the maritime sector, an interdisciplinary research consortium was founded under the leadership of the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM together with the German Research Center for Artificial Intelligence (DFKI), the Helmholtz-Zentrum Geesthacht, Centre for Materials and Coastal Research (HZG), the Institute for Chemistry and Biology of the Marine Environment (ICBM) at the University of Oldenburg and Jacobs University Bremen. In addition, the consortium receives

scientific support from the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI). Within the Test Center for Maritime Technologies, the research partners combine their specific expertise in materials research and manufacturing technologies, artificial intelligence and robotics, materials and coastal research, marine geology, marine material cycles and energy flows as well as polar and marine research in order to develop future technologies for application in the maritime sector.

At the same time, industrial partners seeking suitable partners and test environments for the development of robust and reliable systems can make use of the scientific know-how and range of services offered by the Test Center for Maritime Technologies. The service portfolio includes planning, implementation and evaluation of application-related performance assessments at the test site. In addition, professional support by experienced technicians can be provided in the areas of logistics, engineering, workshop and control room.

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Further information

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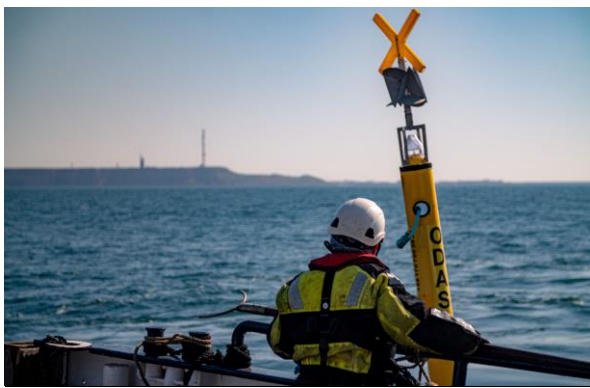
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Underwater robotics in the test field for maritime technologies.
DFKI GmbH, Animation: Meltem Fischer