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Fraunhofer IZFP presents the cutting-edge infrastructure monitoring system "MAUS" at BAU 2025

Intelligent sensor platform revolutionizes the monitoring of critical infrastructure

At BAU 2025, the Fraunhofer Institute for Nondestructive Testing IZFP from Saarbrücken, Germany, will be presenting its latest infrastructure monitoring system "MAUS". In view of the growing importance of the safety of critical infrastructure, especially bridges, continuous monitoring of sensitive areas is becoming increasingly important. This development underlines the need to implement innovative solutions to detect potential risks at an early stage. MAUS offers a comprehensive solution for permanently recording and analyzing condition data to ensure the safe operation of critical infrastructures. The flexible sensor platform will not only change the monitoring of existing critical infrastructures, but also set new standards for safety in the construction industry. Experts from Fraunhofer IZFP will showcase the sensor platform at BAU 2025 in Munich, taking place from January 13 to 17, 2025 (Messe München, Hall C2, Stand 528).

Fraunhofer IZFP has created an innovative solution that meets current requirements with the multimodal and self-sufficient MAUS sensor platform: This platform combines power supply, communication and sensor modules in a flexible system that can be adapted effortlessly and quickly to the specific needs of operators.

MAUS enables secure and reliable storage and transmission of the collected data directly to the operators. This is extremely important for detecting potential damage at an early stage and taking appropriate maintenance measures. The modular design of the platform allows different sensors to be integrated depending on the condition data of interest, resulting in a customized monitoring solution.

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“With the development of MAUS, we are taking an important step towards the intelligent and safe monitoring of critical infrastructure structures,” explains Christoph Weingard, research associate at Fraunhofer IZFP. “Our platform not only offers a high degree of flexibility, but also the possibility of significantly extending the service life of bridges, for example, by detecting damage at an early stage. To achieve this, we rely on reliable sensors to measure temperature, humidity, air pressure, displacement, and other parameters. We also combine this information with data from nondestructive testing sensors, such as ultrasound, eddy current or micromagnetic methods. This produces high-quality results directly in the MAUS monitoring system, providing deeper insights.”

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The introduction of the MAUS sensor platform represents a significant advance in the monitoring of bridges and helps to increase safety in the transportation sector.

Flexibility and adaptability

The sensor platform uses an energy-efficient architecture that enables it to operate without a wired power supply. This makes the platform particularly suitable for use in remote or hard-to-access areas of structures.

The flexible monitoring system integrates state-of-the-art sensors that continuously collect data on structural loads, vibrations, and temperature changes. This information is analyzed in real time and fused into higher quality results to identify potential weaknesses and hazards at an early stage. As a result, this technology enables preventive maintenance and helps to avoid costly damage.

The innovative MAUS sensor platform is characterized by its flexibility. It can be adapted to different construction projects and materials, allowing it to be used in a wide range of applications, from bridges to tunnels and high-rise buildings. This makes it an ideal solution for builders who want to respond to individual requirements.

Another outstanding feature of MAUS is the use of various communication interfaces, which enables seamless connection to existing data rooms. This allows important information to be collected, analyzed, and evaluated in real time, enabling proactive maintenance and early identification of potential risks.

The **Fraunhofer-Gesellschaft**, based in Germany, is a leading applied research organization. It plays a crucial role in the innovation process by prioritizing research in key future technologies and transferring its research findings to industry in order to strengthen Germany as a hub of industrial activity as well as for the benefit of society. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 76 institutes and research units throughout Germany. Its nearly 32,000 employees, predominantly scientists and engineers, work with an annual business volume of 3.4 billion euros; 3.0 billion euros of this stems from contract research, which is divided into three funding pillars. Fraunhofer generates a share of this from industry and license-fee revenue, totaling 836 million euros. This high proportion of industrial revenue is Fraunhofer's unique selling point in the German research landscape. Another share of contract research revenue comes from publicly funded research projects. The final share is base funding supplied by the German federal and state governments and enables our institutes to develop solutions now that will become relevant to the private sector and society in a few years.

SENSOR AND DATA SYSTEMS FOR SAFETY, SUSTAINABILITY, AND EFFICIENCY

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Implementation of "MAUS" on a busy bridge in Munich; © Fraunhofer IZFP

A step towards sustainability

In addition to safety optimization, the technology also contributes to sustainability in the construction industry. The precise monitoring of structures can optimize the use of materials and resources, which leads to a reduction in the ecological footprint.

First demonstrations at BAU 2025

Researchers from Fraunhofer IZFP will be giving live demonstrations of the intelligent sensor platform at BAU 2025 and explaining the benefits of this smart technology. Trade visitors will have the opportunity to find out about the functionality and areas of application on site and to exchange ideas with the German research team from Saarbrücken.

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