Fraunhofer IZFP

SENSOR AND DATA SYSTEMS FOR SAFETY, SUSTAINABILITY AND EFFICIENCY

PRESS RELEASE

Distributed sensor electronics for energy-efficient and predictive maintenance of structures

Against the background of an aging infrastructure, determining the condition of critical structures such as bridges, sewage treatment plants or dams is becoming increasingly important in Germany to maintain public safety. But industrial sites also depend on a functioning infrastructure for economic reasons. The German Federal Ministry of Education and Research (BMBF) is funding "ImaB-Edge" with approx. 5.6 million euros.

The unplanned closure of a bridge can cause economic damage amounting to several million euros a day. If damage to infrastructure structures is detected, analyzed, evaluated, and then repaired promptly, costs in the billions can be avoided. The challenge here is to provide a comprehensive data and information base on the structure itself, which is of crucial importance for assessing the condition of the structure.

Permanent monitoring of infrastructure structures

In the ImaB-Edge joint project, materials research and testing facilities are developing a modularly configurable electronic system in cooperation with hardware and software developers, construction companies and infrastructure operators, which lays the foundation for on-site assessment of engineering structures. The system is used for permanent monitoring of the integrity of civil engineering structures. Sensors integrated into a structure continuously record measurement data, which is collected in a node and analyzed and evaluated using artificial intelligence. By simply integrating a mobile ultrasonic inspection system, nondestructive testing can be performed at critical locations as needed to significantly improve the information content. The condition of the structure is then transmitted to a control center or to service personnel.

In addition to highway bridges, critical conditions or significant changes in railroad facilities, tunnels, dams, etc. are to be detected at an early stage so that appropriate measures can be initiated. On the one hand, potentially fatal

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accidents can be avoided, and on the other hand, it can be ensured that cost-intensive construction measures are only carried out when they are necessary. The project thus contributes to the safety of infrastructure and to its cost-saving maintenance.

ImaB-Edge Consortium

With its ten partners involved in the project, the collaborative project is strongly interdisciplinary and complementary, bringing together a broad spectrum of companies in the field of critical infrastructure design, construction, operation, and verification, as well as companies and research institutions focusing on sensor technology, software, and data ecosystems.

The project is funded by the German Federal Ministry of Education and Research (BMBF) as part of the announcement Electronics Systems for Trusted and Energy-Efficient Distributed Computing in Edge Computing (OCTOPUS).

ImaB-Edge Key Data:

- **Joint Project**
- **Coordinated by Leonhard Weiss GmbH & Co. KG**
- **Funding Authority: BMBF (VDI/VDE-IT)**
- **Project Term: 11/2022 to 10/2025**
- **Total funding: approx. 5.6 million €**

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