

PRESS RELEASE

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Sensor connectivity in buildings via a single base station – Fraunhofer IIS presents LoPAN, a robust new energy-efficient wireless technology

Erlangen/Nuremberg: The new LoPAN wireless technology from the Fraunhofer Institute for Integrated Circuits IIS paves the way for numerous practical applications, such as connecting temperature sensors to an air-conditioning system to reduce energy costs and simultaneously or selectively monitoring and controlling numerous blinds, postboxes, and heating systems over a remote connection. This technology links up and networks any number of sensors via a single base station. Unlike conventional remote maintenance and control applications for smart homes and smart buildings, LoPAN brings together advantages such as high energy efficiency, broadcast communication, a long range of several kilometers, and highly robust and therefore reliable transmission of the required sensor data – even in the vicinity of coexisting wireless protocols or in challenging environmental conditions.

By now, we are all familiar with the concept of the smart home, in which blinds, heating systems, and windows can be controlled and regulated from a smartphone at any time – but all these solutions face some unavoidable limitations, depending on the exact system we choose. With LoPAN technology, however, sensors/actuators everywhere from the basement to the roof can be networked and controlled via a single base station. The system can be expanded and is even designed for mobile applications, for which other systems require multiple base stations in order to ensure the reliable transmission of sensor data and are also permanently installed. All of the compromises that previously hampered smart home applications can be resolved by LoPAN (Long Range Personal Area Network), a lead project of the Leistungszentrum Elektroniksysteme (LZE) that is now being presented by scientists and developers from the LZE and Fraunhofer IIS. The LoPAN project is supported by the Bavarian Ministry of Economic Affairs, Regional Development and Energy.

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Editorial notes

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LoPAN combines high reliability, scalability, and cost efficiency

LoPAN was developed as a robust wireless technology optimized for long-range use in smart home and smart building applications. At the heart of both technologies is a patented telegram splitting method standardized by the European Telecommunications Standards Institute (ETSI). Telegram splitting divides the sensor message up into smaller packages and sends them in staggered transmissions over multiple frequency bands. This technique guarantees a high level of reliability and therefore highly interference-proof data transmission, which is of the utmost priority both in a business context and for private applications. The method is already used in products as part of the mioty® ecosystem for massive IoT applications in industry that involve many hundreds of thousands of sensors.

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Low maintenance and versatility for building and home control systems

In the consumer sector, both reliable transmission and cost-efficient implementation are key factors in building and home control systems. The combination of low-power wide-area networks (LPWANs) and wireless personal area networks (WPANs) for close-range applications via inexpensive base stations succeeds in bringing together the advantages of the two network technologies, so that many thousands of sensors can be networked directly and actively retrieved via a single, cost-effective base station. In other words, with a tap of the smartphone or tablet, the user can not only retrieve sensor data but also control a wide range of actuators selectively or simultaneously.

The sensors are extremely low-maintenance thanks to a considerable reduction in energy consumption, and they can be used in parallel with many wireless technologies. Integration with various cloud solutions and the use of affordably priced base stations makes LoPAN technology an attractive supplement to new or expanded business models.

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Base station allowing robust communication for sensor connections in buildings © Fraunhofer IIS | Image in color and print quality: www.iis.fraunhofer.de/pr.

The Fraunhofer-Gesellschaft, headquartered in Germany, is the world's leading applied research organization. Its research activities are conducted by 74 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of 28,000, who work with an annual research budget totaling more than 2.8 billion euros.

The **Fraunhofer Institute for Integrated Circuits IIS**, headquartered in Erlangen, Germany, conducts world-class research on microelectronic and IT system solutions and services. Today, it is the largest institute of the Fraunhofer-Gesellschaft. Research at Fraunhofer IIS revolves around two guiding topics:

In the area of **"Audio and Media Technologies"**, the institute has been shaping the digitalization of media for more than 30 years now.

Fraunhofer IIS was instrumental in the development of mp3 and AAC and played a significant role in the digitalization of the cinema. Current developments are opening up whole new sound worlds and are being used in virtual reality, automotive sound systems, mobile telephony, streaming and broadcasting.

In the context of **"cognitive sensor technologies"**, the institute researches technologies for sensor technology, data transmission technology, data analysis methods and the exploitation of data as part of data-driven services and their accompanying business models. This adds a cognitive component to the function of the conventional "smart" sensor.

More than 1100 employees conduct contract research for industry, the service sector and public authorities. Founded in 1985 in Erlangen, Fraunhofer IIS has now 14 locations in 11 cities: Erlangen (headquarters), Nuremberg, Fürth, Dresden, further in Bamberg, Weischenfeld, Coburg, Würzburg, Ilmenau, Deggendorf and Passau. The budget of 169.9 million euros is mainly financed by projects. 26 percent of the budget is subsidized by federal and state funds.

Detailed information on: www.iis.fraunhofer.de/en