

PRESS RELEASE

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mioty® – The all-around talent for industrial IoT applications handles 3.5 million messages per day

Erlangen/Nuremberg, Germany: Robust transmission of sensor data for condition monitoring and smart metering – this is what recommends the wireless and standardized transmission technology mioty from the Fraunhofer Institute for Integrated Circuits IIS for applications in the Industrial Internet of Things (IIoT). But it can do even more: it enables hundreds of thousands of sensors to be connected via just one base station. This is a huge advantage, especially in the smart city and smart building sectors with many end devices. Using mioty, 3.5 million messages per base station can be read out and transmitted per day.

In the age of the digital Internet of Things (IoT), the way to measure and transmit data such as meter and water levels, the tightness of pipelines or the preload of screw connections is via connected sensors and wireless communication. A major Bavarian city such as Nuremberg, with an area of approximately 187 km², has up to an estimated 1 million IoT devices in operation, assuming an average of two devices (such as digital water meters or heating controls) per household. A base station with a range of about 2.5 kilometers can receive data from up to 110,000 such devices.

3.5 million data telegrams and only one base station for smart metering

However, not all devices transmit their data at the same time, and so they are not constantly using the available radio channels. The extremely small data packets, known as telegrams, that the mioty technology uses for Low Power Wide Area Networks (LPWANs) can receive up to 150 telegrams simultaneously and achieve a transmission capacity of around 3.5 million telegrams per day.

This high number of transmissions is made possible by systematically improved algorithms, which have been optimized to such an extent that they now run on the energy-saving ARM processors that have long been in widespread use.

“After our initial calculations of many applications that are already using our mioty technology in the field, we have now performed new tests and calculations to improve the technology even further. The result is optimization of still greater numbers of

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messages, plus enhanced energy efficiency of transmission and a robust protocol,” says Josef Bernhard, technical project manager in the development of the technology. “The high number of data telegrams per day that we are now achieving in practice provides an optimum starting point for use in smart city and smart building applications, where a high number of sensors transmit simultaneously. This spurs us on to continue to push the rollout of mioty together with our partners from industry and from the mioty alliance, not only in these areas, but in agriculture and industry as well.”

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Convincing advantages: Reliable, energy efficient and “retrofittable”

mioty is a standardized technology of the European Telecommunication Standards Institute ETSI, an independent body of private companies and research institutes. A telegram splitting method, which was also developed by Fraunhofer scientists, makes it possible to ensure complete, reliable data transmission even if up to half the telegrams fail or are transmitted incorrectly. This is achieved by splitting the overall data into small data packets/telegrams and transmitting them redundantly over several frequencies in the band. In addition, the method uses less energy than conventional methods. With the evaluation kit, any interested company can learn about the advantages of the technology in a practical way. Two of these advantages stand out: one, this technology is especially well-suited for retrofitting into existing setups; and two, it can be used in parallel with other radio technologies. These features and more make mioty a promising option for many existing applications as well as an investment in the future of IoT applications.

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The Fraunhofer-Gesellschaft, headquartered in Germany, is the world's leading applied research organization. Its research activities are conducted by 76 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of more than 30,000, who work with an annual research budget totaling more than 2.9 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 10 cities: Erlangen (headquarters), Nuremberg, Fürth, Dresden, further in Ilmenau, Bamberg, Waischenfeld, Würzburg, Deggendorf and Passau. 75 percent of the budget of 191 million euros a year is financed by contract research projects. Approximately 25 percent is subsidized by federal and state funds as well as internal projects of the Fraunhofer-Gesellschaft. Detailed information on: www.iis.fraunhofer.de/en