

# PRESS RELEASE

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## Fraunhofer IIS successfully tests terrestrial IoT technology mioty® via GEO satellite

**Erlangen, Germany: mioty® communication technology enables the simultaneous transmission of data packets from a large number of sensor nodes over long distances and is particularly energy efficient. Previously, providing the Internet of Things (IoT) in a terrestrial network was limited to a range of up to 15 kilometers. Now, transmission tests by the Fraunhofer Institute for Integrated Circuits IIS in Erlangen, Germany, have shown that mioty® can be used via geostationary (GEO) satellites – without having to adapt the wireless protocol. Deploying the IoT via satellite allows the range of a network to be extended at will, up to and including around the globe.**

Fraunhofer IIS recently tested the use of mioty® for massive IoT applications via a GEO satellite. In the test setup, the transmitters with integrated mioty® sensor nodes sent data packets directly to the satellite. Transmission in the S band at about 2 GHz was realized via the EchoStar XXI communications satellite. The transmitters used mioty®'s Telegram Splitting Ultra Narrow Band (TS-UNB) wireless protocol without any special adaptations for satellite communication.

The tests were carried out as part of the European Space Agency's ARTES Future Preparation program.

### **Demonstrated support of massive IoT applications**

With the mioty® transmission method of Telegram Splitting, data packets – i.e. "telegrams" – are split into smaller sub-packets and transmitted over different frequencies and time. The method is particularly robust against interference and allows an enormous number of sensor nodes to be served.

To fully test the total capacity of the transmission system, Fraunhofer IIS used a signal generator to virtually increase the volume of data packets sent to a huge number. The tests showed that in a defined coverage area and at a system bandwidth of only 200 kHz, up to 3.5 million telegrams per day can be successfully transmitted via satellite with mioty®.

"Through the tests, we were able to demonstrate that massive networking of IoT transmitters via satellite isn't just possible, it's straightforward. This paves the way for

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#### **Head of Corporate Communications**

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#### **Editorial notes**

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an entirely new class of applications in which sensors can transmit data from the ground directly to a satellite, independent of terrestrial infrastructure. Some sectors in particular – logistics, transportation, mobility, shipping and agriculture – will benefit greatly from direct IoT solutions via satellite, which can provide connectivity even in the most remote corners of the world,” explains Florian Leschka, Group Manager System Design at Fraunhofer IIS.

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**Energy-efficient terminals in use**

During the tests, the researchers employed the same transmission protocol that conventional mioty® systems on the ground are based on. Moreover, despite the enormous distance to the satellite of about 38,000 kilometers, the user terminals could be operated at transmit power similar to that of terrestrial networks. This allows individual satellite IoT transmitters to be enormously energy efficient in practice, and they can transmit data on their own for years. In addition, the system design of the terminals is based on the use of low-cost, non-proprietary components, such as the conventional rod antenna used to transmit the data during the tests.

The terminals used in the tests have integrated mioty® sensor nodes, and are based on a preliminary development from an ESA-funded project: Energy Efficient User Terminals for Massive Uncoordinated Access via Satellite (E2UT). Within the E2UT project, lab simulations have already demonstrated that massive data transmission with mioty® also works via satellites in low earth orbit (LEO).

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The Fraunhofer-Gesellschaft, headquartered in Germany, is the world’s leading applied research organization. Its research activities are conducted by 75 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of 29,000, 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 16 locations in 12 cities: Erlangen (headquarters), Nuremberg, Fürth, Dresden, further in Ilmenau, Munich, Bamberg, Waischenfeld, Coburg, Würzburg, Deggendorf and Passau. The budget of 167.9 million euros is mainly financed by projects. 29 percent of the budget is subsidized by federal and state funds.

Detailed information on: [www.iis.fraunhofer.de/en](http://www.iis.fraunhofer.de/en)