

PRESS RELEASE

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RFicient chips for a sustainable Internet of Things: Fraunhofer IIS research team wins Joseph von Fraunhofer Prize 2022

Keeping things constantly connected to the internet costs energy — a lot of energy. Even small Internet-of-Things nodes run out of battery entirely in just a few weeks. All of this is changing with the RFicient® chip, developed by the Fraunhofer Institute for Integrated Circuits IIS, which saves power consumption by up to 99 percent. This development is a big step forward for the Internet of Things and has secured the Joseph von Fraunhofer Prize for the developer team. The Prize is awarded to employees of the Fraunhofer-Gesellschaft for their outstanding scientific achievements in solving application-related problems.

Heaters and coffee machines that can be turned on or off using an app while on the move or on the couch? Waste containers with built-in fill level sensors that can autonomously detect when they need to be emptied and report this to waste collectors? Those are just two striking examples from the Internet of Things, or IoT: objects that are connected to the internet and send data to each other. The number of these wirelessly networked devices is growing rapidly, both among private consumers and in industry. For devices to be available at all times, however, their wireless receiver needs to be permanently switched on, which limits the battery life of small, battery-powered IoT nodes to just a few weeks.

A hundred times the battery life with prompt response times

The RFicient® chip, developed by the Fraunhofer Institute for Integrated Circuits IIS, represents a huge leap forward. “Our chip enables us to save up to 99 percent of power — so a battery that would have managed just over a month with conventional technology can now last ten years,” says Dr. Frank Oehler enthusiastically. The appeal of this product lies in the fact that, even with the extended battery life, the sensor node is still ready to receive signals at any time: it needs just 30 milliseconds to respond by performing an action. While other wake-up receivers are often switched off for minutes at a time and can sometimes take too long to respond, the RFicient® chip guarantees an immediate response. This is important not only in time-critical applications, but also in situations where there are many services running

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simultaneously or many different nodes being queried — such as at airports, train stations or football stadiums.

This market-ready product, along with the registration of 16 patent families, has secured the Joseph von Fraunhofer Prize for the entire team, represented by Dr. Frank Oehler, Dr. Heinrich Milosiu and Dr. Markus Eppel. The jury was impressed not only by the entire process chain from idea to implementation, but also and above all by the chip's particular societal relevance in light of the soaring numbers of wirelessly networked devices and the associated consumption of energy and resources.

Developed and market-ready

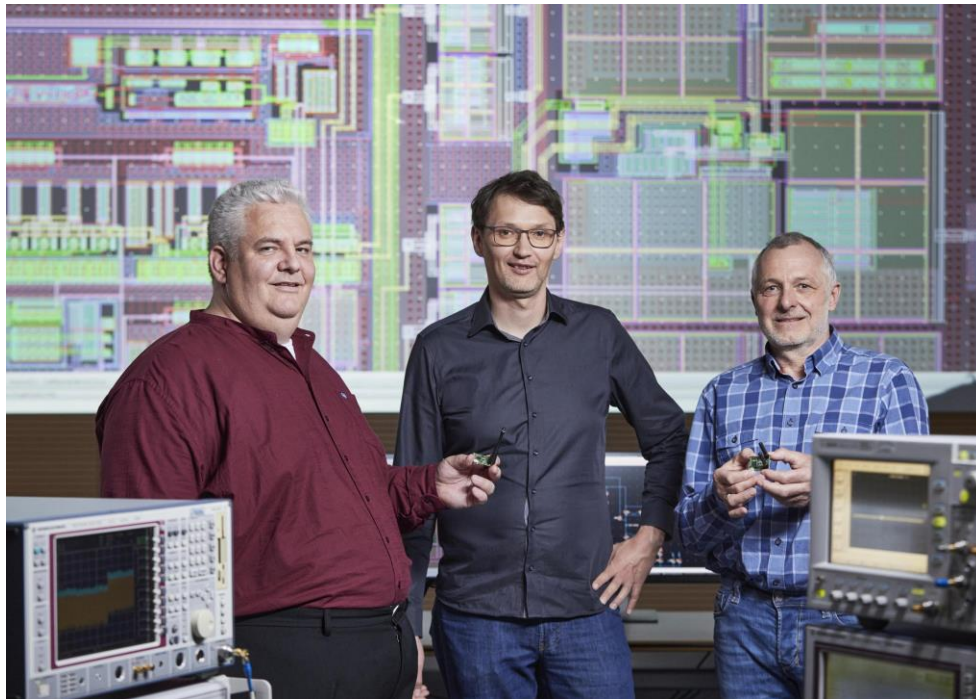
The RFicient® technology has now been developed from an initial idea into a commercially available standard chip. The US semiconductor manufacturers Globalfoundries Inc., RoodMicrotec GmbH and EBV Elektronik GmbH & Co. KG have also been welcomed on board as industry partners. "What the industry needs is IoT receivers that are always available and quick to respond — and that continue working for a long time without needing to be maintained. Thanks to the new Fraunhofer receivers, we can now deliver this for the first time ever," says Thomas Staudinger, President of EBV Elektronik GmbH. Dr. Oehler is excited about the interest from industry: "We have been bombarded with over 100 inquiries from various application areas: Our customers are already eager to equip their new products with RFicient®." Conservative estimates suggest that over 50 million IoT devices will benefit from the RFicient® technology in the coming years. Its developers have put their finger on the pulse of the current age in two ways: by opening up a vast new area for the Internet of Things, and by moving sustainability forward.

Joseph von Fraunhofer Prize

Since 1978, the Fraunhofer-Gesellschaft has awarded annual prizes to its employees for outstanding scientific achievements that solve practical problems. This year, three prizes were awarded, each worth 50,000 euros. The prizewinners also received a silver pin featuring the profile of Joseph von Fraunhofer.

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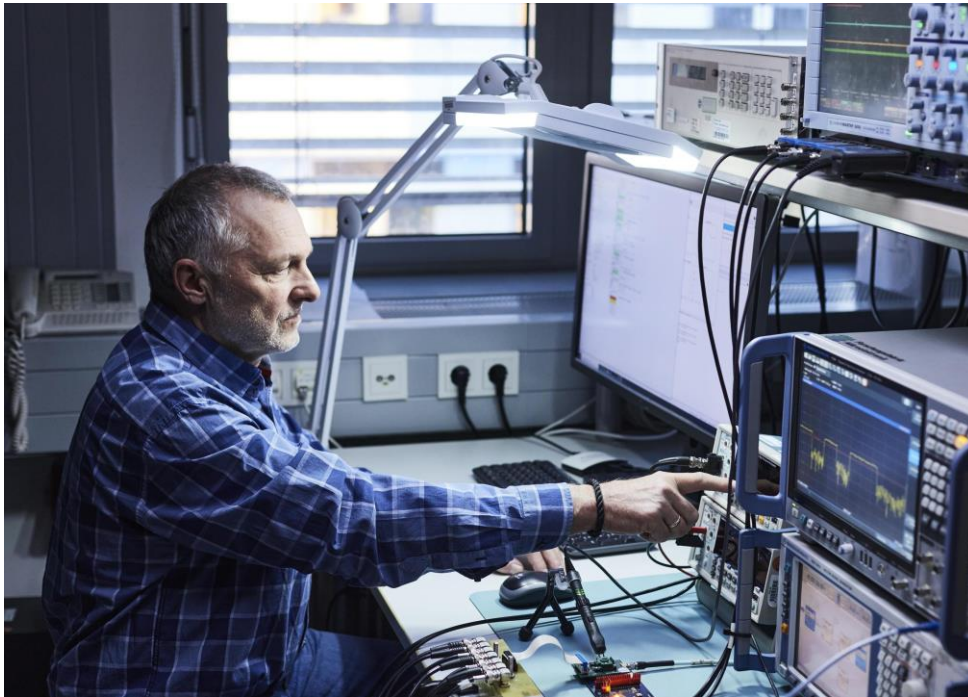
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Winners of the Joseph von Fraunhofer Prize for the energy-saving RFicient® chip: Dr. Heinrich Milosiu, Dr. Markus Eppel and Dr. Frank Oehler (from left to right)
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Always ready to receive signals from neighboring nodes with a current of just three microamperes.

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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
