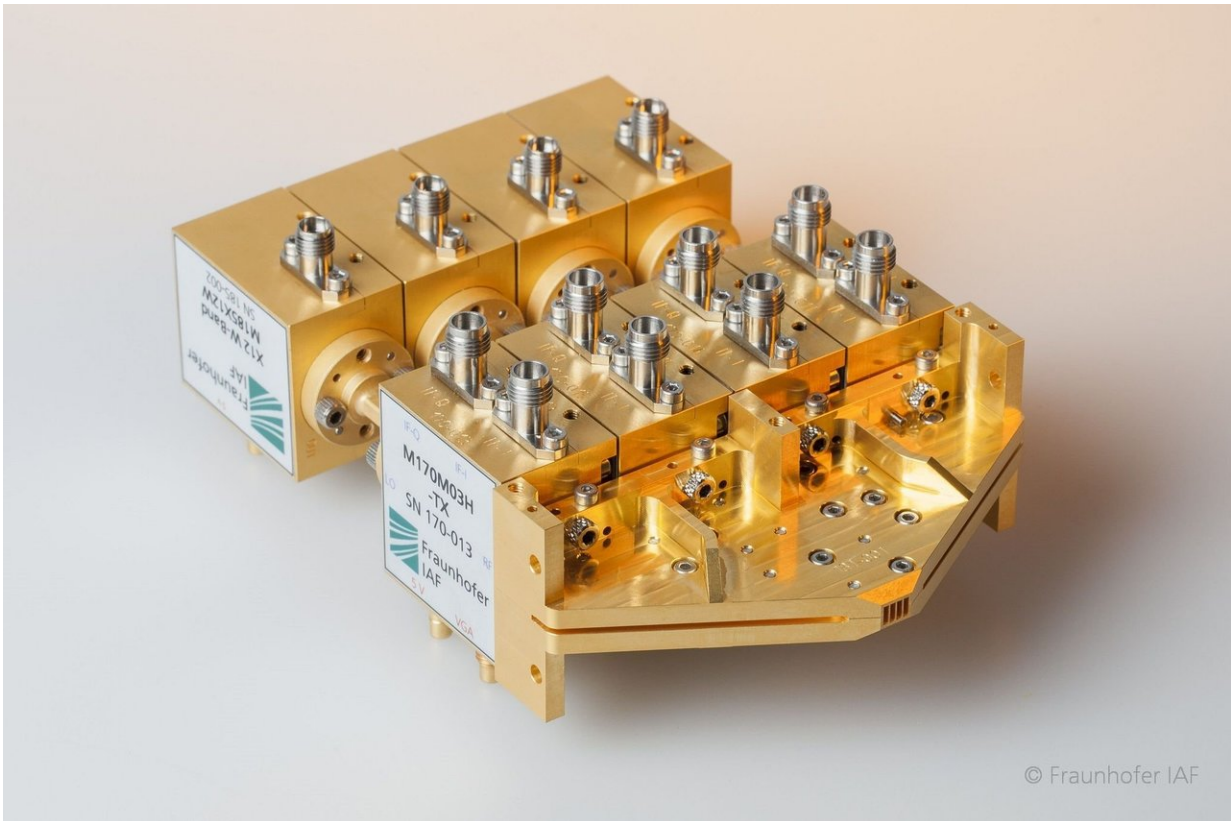


Terranova – thinking beyond a network standard

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Functional prototype of a 300 GHz multichannel wireless system. Credit: Fraunhofer-Gesellschaft

The future is digital: interconnected machines exchange huge amounts of data in real time and the demand for high data rates in the financial

sector and in data centers is increasing by the day. Meanwhile, rural areas still lack fast data transmission rates and threaten to fall behind.

The upcoming mobile radio standard 5G promises an enormous increase in performance in wireless communication. According to the Federal Network Agency's reports, existing frequency bands are not going to suffice as the demand for stable wireless communication will continue to increase in the years ahead.

Together with Fraunhofer HHI and European partners from industry and research Fraunhofer IAF is starting the project Terranova. Its primary goal is it to embed wireless links with carrier frequencies in the THz range into fiber optic links and thus enable very high data rates on the entire [transmission](#) path. Also, the development of new frequency bands is part of the project. Terranova is funded by the European Commission within "Horizon 2020".

Wireless data transmission with up to 400 Gbit/s for network expansion

By combining established fiber optics with the microwave technology, scientists aspire to enable a network connection in the THz frequency range stable enough to transport data wirelessly at a rate of up to 400 gigabits per second. To date, such transmission rates are only possible using pure glass fiber connections. However, the laying and routing of the fiber can entail high costs and effort, which is one of the reasons why [rural areas](#) divert more and more from technology's current state of the art.

"We are working on a transfer from optical to wireless [data transmission](#), one could say from 'radio over fiber' to 'fiber over radio,'" explains project manager Thomas Merkle from Fraunhofer IAF. IAF researchers

are developing and testing the hardware implementations of the future-oriented [network](#) structure in close collaboration with Fraunhofer HHI.

Though limited in scope at 300 GHz, the great advantage of wireless links is their ability to easily bridge water, as well as mountainous or inaccessible terrain. Today, mobile radio base stations are already supplied with data via radio, but with very limited data rates. In contrast to the complex laying of fiber optic cables, data transmission via radio can be realized quickly, easily and wirelessly over a distance of up to one kilometer using the point-to-point wireless link technology.

The advantage of the wireless THz radio communication lies within the big variety of possible applications: It can be of interest both for "Smart Factories" with connected machines and devices, as well as for the connection of base stations supporting the expansion of [mobile radio](#) and wifi networks. The integration of THz [radio](#) communication represents a real alternative to the classical glass fiber networks for the long-term expansion of high-speed internet in rural areas as well as for wireless connections in [data centers](#).

With the combination of wireless link and fiber optics, the Terranova project is taking a step towards future data networks beyond the 5G standard.

Provided by Fraunhofer-Gesellschaft

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