Solution enables compact devices for telecommunications, security camera applications at even higher frequencies

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VTT Technical Research Centre of Finland has developed a new manufacturing technology for the integration of very high-frequency terahertz systems. This enables the cost-effective development of telecommunications and imaging solutions and space instruments that are even smaller and have higher frequencies. VTT's technology was awarded at the European Microwave Conference.

The use of systems operating at frequencies exceeding 100 gigahertz is limited by the expensive manufacturing methods. Additionally, the current waveguide-based systems are too large for wide scale use.

"The new solution enables the cost-effective manufacturing of systems exceeding 100 gigahertz," says team leader Pekka Pursula from VTT.

The system is based on micromechanical waveguides manufactured on a silicon wafer and active millimetre-wave monolithic integrated circuits (MMIC). The waveguides allow the low-loss transfer of signals to the MMIC circuits and also acts as the enclosure solution for the MMIC circuit.

The technology can be utilised in telecommunications applications, where radio links built in frequency bands of over one hundred gigahertz lay down the groundwork for wireless data transfer that is faster than today. This also benefits imaging solutions operating at terahertz

frequencies such as security cameras that reveal, for example, bladed objects hidden under clothing. The technology is also suitable for the manufacturing of increasingly smaller remote mapping devices used in satellites in space.

"Our goal is to reduce the production costs to one tenth of what can be achieved with the current standard manufacturing methods, while making the components significantly smaller," says Pursula, and notes that the development work is still ongoing.

Provided by VTT Technical Research Centre of Finland