

TeraComp

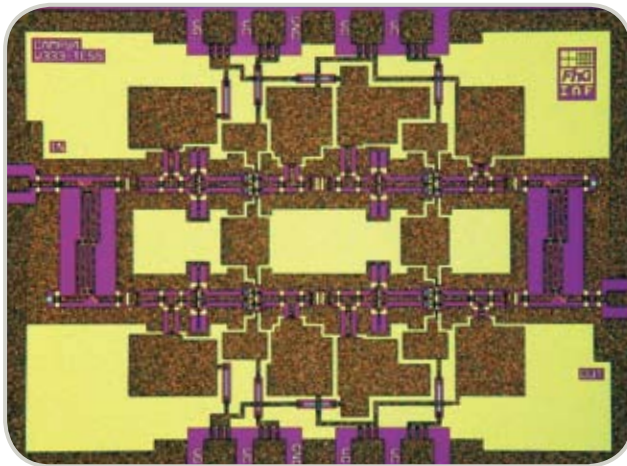
Terahertz heterodyne receiver components for future European space missions

HARVESTING SCIENCE FROM RADIO WAVES

Looking for life on other planets, the high end of the electromagnetic spectrum holds huge scientific potential. Yet current performance of terahertz receivers is insufficient, and European supply inexistent. The project TeraComp takes on this challenge.

High frequency radio waves are paramount for scientific exploration and Earth observation from satellites. This part of the electromagnetic spectrum provides for enhanced precision of transmitted and received signals. Therefore, the development in Europe of an industrial capability to receive terahertz signals is supported by the TeraComp project. TeraComp is complementary to the MIDAS project, which supports the development of amplification capabilities in this area of critical technologies for European strategic non-dependence.

Like MIDAS, TeraComp focuses on high frequency Schottky diodes, as the project aims at developing a European industrial level capability to design and manufacture terahertz front-end electronics. Moreover, TeraComp involves novel Heterostructure Barrier Varactor and mHEMT MMIC



A 94 GHz MMIC chip © TeraComp

technology, which offer a unique compact solution for efficient terahertz signal generation. Such electronics may both support life science, improving our capability to detect molecules that might bear traces of life on other planets or moons, and refine Europe's Earth observation capability, especially in the GMES atmospheric domain. Indeed, terahertz signals herald enhanced monitoring of clouds, a key climate change variable.

TeraComp undertakes the development of a low noise 557 GHz subharmonic Schottky diode mixer, a 275 GHz Heterostructure Barrier Varactor frequency tripler, a 92 GHz mHEMP power amplifier, and a 15 to 92 GHz 6x multiplier. Whilst contributing to European non-dependence, the development of these critical technologies is also set to increase the current state-of-the-art in this domain, making the technologies smaller and more energy efficient, and therefore more suited for satellite use.



Monolithic InP-HBV chip mounted in a waveguide block



Terahertz single side band mixer block



JAN STAKE
IS PROJECT COORDINATOR

QUESTIONS & ANSWERS

What do you want to achieve with this project?

We aim to demonstrate a compact and integrated terahertz receiver, based on European components, suitable for a number of future earth observation and space science missions.

Why is this project important for Europe?

The project addresses strategic technology for space terahertz instrumentation and will develop a European industrial capability to design and manufacture terahertz components and electronics.

How does your work benefit European citizens?

In the long-term, the outcome of TeraComp will play a role in gaining knowledge of the earth atmosphere, the climate system and understanding of the universe. Terahertz electronics will also find dual use applications in ground-based systems and open up for new markets.

TeraComp reduces European dependency on imports from third countries when monitoring Earth's atmosphere or looking for traces of life in the universe by developing industrial level capability to design and manufacture terahertz front-end electronics.

TeraComp

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LIST OF PARTNERS

- Chalmers University of Technology, Sweden
- Fraunhofer Institute for Applied Solid State Physics, Germany
- Deutsches Zentrum für Luft- und Raumfahrt e.V., Germany
- Technical University of Denmark, Denmark
- Omnisys Instruments AB, Sweden
- Wasa Millimeter Wave AB, Sweden
- Goethe-University Frankfurt, Germany

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PROJECT INFORMATION

Terahertz heterodyne receiver components for future European space missions (TeraComp)

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