Terahertz microsystems - Enabling the large-scale exploitation of the terahertz gap

Fact Sheet

Project information

TERAMICROSYS
Grant agreement ID: 616846
Status
Closed project
Start date 1 April 2014 End date 31 March 2019

Funded under:
FP7-IDEAS-ERC
Overall budget:
€ 1 727 189
EU contribution
€ 1 727 189
Hosted by:
KUNGLIGA TEKNISKA HOEGSKOLAN
Sweden

Objective

This project envisions the wide-spread use of THz technology in various applications in our society, which is enabled by the proposed THz microsystems, providing an unprecedented way of creating highly-integrated, volume-manufacturable, cost and energy-efficient, reconfigurable and thus adaptive submillimeter-wave and THz systems. Advanced three-dimensional micromachining is used as the key enabling fabrication technology. In connection with the technology convergence of advancing microwave semiconductor technology according to international technology programmes and roadmaps, the findings of this project are expected to comprise a significant contribution towards the large-scale exploitation of the heavily sought-after frequency space between 100 GHz and 1 THz, the so-called ‘terahertz gap’. Primary application fields with high impact of the proposed technology are wireless short-range communication links to interconnect future small-cell clouds replacing the current macro-basestation radio access network, and submillimeter-wave/THz sensing with application fields including medical diagnosis, food quality control, agriculture and industrial sensors.

The proposed THz microsystems are based on rectangular waveguide-technology integrated into a multi-wafer stacked silicon substrate, which integrates all passive components needed for completing a submillimeter-wave/THz system around the monolithic-microwave integrated circuits (MMIC). Novel key building blocks investigated in this proposal include platform-integrated sensor and antenna interfaces, micro-electromechanically tuneable filters, phase-shifters, impedance-matching networks and non-galvanic microsystem-to-IC interfaces. The micro-mechanical reconfigurability enables unprecedented
adaptive THz systems. Key outcomes of this project are proof-of-concept prototypes of all key building blocks up to 650 GHz, and of complete THz microsystems implemented for the two key applications telecom links and medical sensors.

**Field of Science**

/agricultural sciences/agriculture, forestry, and fisheries

/agricultural sciences/agriculture, forestry, and fisheries/agriculture

/natural sciences/chemical sciences/inorganic chemistry/inorganic compounds

/natural sciences/physical sciences/electromagnetism and electronics/electrical conductivity/semiconductor

**Programme(s)**

FP7-IDEAS-ERC - Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

**Topic(s)**

ERC-CG-2013-PE7 - ERC Consolidator Grant - Systems and Communication Engineering

**Call for proposal**

ERC-2013-CoG

See other projects for this call

**Funding Scheme**

ERC-CG - ERC Consolidator Grants

**Principal Investigator**

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**Host institution**
KUNGLIGA TEKNISKA HOEGSKOLAN

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Activity type
Higher or Secondary Education Establishments

EU Contribution
€ 1 727 189

Website
Contact the organisation

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Beneficiaries (1)

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