

# EYES AND EARS FOR THE CAR OF THE FUTURE



**EU FUNDED PROJECT COMPLETES MISSION TO EXTEND EUROPE'S SUCCESS STORY ON ADVANCED, SMART ELECTRONIC SENSOR SYSTEMS INTO THE SUB-THZ FREQUENCY SPECTRUM AND INTO NEW EMERGING APPLICATIONS.**

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The Car2TERA project has come to a successful conclusion. The project was launched in January 2019 to develop emerging sub-THz smart electronic systems based on latest semiconductor, microsystem and nanoelectronics technologies, and was aiming to implement TRL-4 demonstrators in two high-potential application scenarios:

1. a new class of compact, high-resolution, electronic-beam-steering short-range car radar sensors, with the primary application being in-cabin passenger monitoring (currently fastest growing car sensor market) for individually and real-time adjusted crash mitigation measures and vital-sign detection;
2. short-distance, high data-rate THz-over-plastic data links for telecommunication radio-access and backbone networks facilitating the data growth demanded by 5G and IoT, replacing costly and unreliable fiber links.

Car2TERA combined, for the first time, the results of recent achievements in semiconductor, micro- and nanoelectronics scientific projects, including the Graphene Flagship, an ERC and several EU collaboration projects, with the following emerging THz technologies: (1) 600-GHz-fmax SiGe monolithic-microwave integrated circuits (MMICs); (2) silicon micromachining for system integration, packaging and phased-array antenna front-end; (3) integrated MEMS reconfigurability; and (4) large-bandwidth, high-linearity graphene MMICs; (5) advanced signal processing including OFDM radar signals and AI sensor fusion. The main innovations of Car2TERA were novel, miniaturized sub-THz beam-forming frontend using innovative micromachined waveguide system integration technology,

with novel functionality such as beam-shape switching; a new plastic-microwave fiber interface for cost-efficient and high performance coupling to industrial-grade SiGe MMICs; and graphene MMIC technology. Furthermore, Car2TERA had a large number of smaller innovations ranging from data fusion algorithms in computational-imaging radar signal processing to graphene MMIC back-end-of-line. The Car2TERA consortium was made up of eight highly qualified industrial and academic partners from Austria, Sweden, Poland, Italy and Spain. The project was coordinated by Technikon in Austria. Technikon is a private research service and engineering company in Austria which manages multinational teams in the organization, execution and assessment of research projects. Technikon is Europe's leading private company coordinating and disseminating technology-based cooperative European research projects.

For more information about the Car2TERA project, visit our website or contact the coordinator directly:

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