A Dual-frequency Distributed MIMO Approach for Future 6G Applications

6GTandem

The Horizon Europe project "6GTandem" will co-design novel dual-frequency operation at sub-10 GHz and sub-THz frequencies and a new highly integrated and distributed radio transceiver architecture to deliver high-performance energy-efficient services for future 6G applications.

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Sixth-generation technology (6G) is expected to include operation at higher frequencies to achieve a greater capacity overall. 6G networks will progress communication networks to support to transform society, enhance businesses, create new technologies and advance communication systems.

6GTandem is a part of this crucial change and will **co-design novel dual-frequency operation** and a new **highly integrated and distributed radiostripe** to achieve superior value with respect to energy, service availability and cost of deployment.

The 6GTandem project aims:

- to achieve **competitive advantage** by defining and shaping the future of 6G infrastructures in Europe and contributing to the **long-term impact** of smart, flexible and scalable Radio Access Network (RAN) evolution and offering hardware products that will reach a unique level in terms of Radio Frequency (RF) performance, cost-, spectrum- and energy-efficiency in the global market.
- to improve performance and enable future in-demand services at acceptable costs, which will result in bigger revenue streams and **enhance Europe's position in telecommunications**. Apart from broad economic and scientific impact the outcome will lead to new services for society with increased resilience and reliability, creating smarter cities and smarter homes.

Key elements for 6GTandem:

- A system defining an 'aligned tandem' dual-frequency distributed MIMO architecture.
- Medium-aware waveforms, transmission schemes and communication strategies for energy-efficient operation and development of cross-layer solutions to offer required service levels on the novel dual-frequency infrastructure.
- Novel, "radiostripe" hardware including transceivers at 130GHz-175GHz, packaging, integration, and plastic waveguide for a low-cost, easy-deployable sub-THz infrastructure.
- Conception of a combined low-frequency and sub-THz distributed MIMO system supporting joint high-resolution sensing, high-accuracy positioning, and high-resilience and reliability communication.

6GTandem is three-and-a-half-year project **funded by the European Union (Grant requested 5,047,688 EUR, Total Costs 5,259,461.75 EUR)**, which started in January 2023.

The 6GTandem **consortium** is driven by the goal to provide uniform ultra-high throughput coverage, off-load lower frequency bands and offer new services. It consists of nine partners – including four highly qualified **industry** partners (Ericsson AB, Infineon Technologies AG Austria and Germany and associated Partner Huber + Suhner AG), four high **research** ranked academic partners (KU Leuven, Chalmers University of Technology, Linköping University and Lund University) and an experienced **SME** (Technikon). With our strong team of industrial, academic and research partners we are convinced that 6GTandem will deliver unique results in the highly promising of direction dual-frequency networks, which will fuel R&D output and eventual new products.

The project is **coordinated by Technikon Forschungs- und Planungsgesellschaft mbH** a private research service and engineering company based 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 6GTandem project, visit our website or contact the project coordinator:

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