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Budget

€ 5.3 Million

€ 5.1 Million EU-funded



Consortium

9 Partners

5 countries



Duration

42 Months

01/2023 - 06/2026



6GTandem

Unlock new potential of wireless network

A dual-frequency distributed MIMO approach for future 6G applications

Editorial — Entering the Final Technical Stretch

Since the last newsletter, the 6GTandem consortium has made substantial strides, entering the decisive final phase of technical development, integration, and validation. This transition marks a pivotal moment for the project, as teams across multiple work packages have intensified efforts to ensure that all core objectives are met. The successful completion of the P2 periodic review last autumn stands as a testament to the consortium's commitment, with every milestone

and deliverable successfully achieved on schedule and to specification.

In recent months, the project has made significant progress in system modelling, which clarified cross-layer interactions and guided hardware design. The hardware teams achieved advances in RF chain technologies, enhancing D-band modules and high-frequency components for the upcoming demonstrator phase.

2 WP3 Status Update

WP3 is focused on developing energy-efficient, robust dual-frequency distributed MIMO (radio-stripe) services, with current efforts centered on Task 3.4.

Recent progress includes:

- (i) completing the assessment of candidate waveforms,
- (ii) advancing reliable dual-frequency positioning/sensing services using a system-level simulator for validation, and
- (iii) organizing contributions for deliverable D3.4.

2.1 Sub-THz systems coping with an elephant in the room: strengthen first, standardize next

6GTandem has released a policy brief, based on the published paper by Liesbet Van der Perre et. al.: “Distributed Deployment and Dual Frequency Concepts to Strengthen Sub-THz Wireless Systems.

The brief spotlights the promise and pitfalls of sub-THz wireless systems: while these frequencies unlock ultra-fast connections and advanced sensing, they’re surprisingly fragile—links can be disrupted by something as small as a coffee cup, and even slow movement causes major reliability issues. The message is clear: before rushing to standardize, we must first validate robust deployment strategies, like distributed and dual-frequency operation, to ensure sub-THz networks are truly ready for real-world use.

3 WP4 Status Update

WP4 has made significant strides in the development and validation of key components for the 6GTandem project. Four PCB variants were designed by EAB for the second round of development and subsequently manufactured in M33. Samples of the second eWLB package have also been delivered to EAB, marking a crucial milestone in component integration. In parallel, a two-stage D-band power amplifier was designed as part of the B12 tape-out, alongside the finalisation of a B12HFC tape-out in July, which included updated 4-channel phase shifters, RX/TX circuits, waveguide transitions, and switches. The antenna position and electromagnetic band gap (EBG) deployment were re-optimised for Tape-out 2, taking into account PCB size, trace constraints, and solder-ball effects.

WP4 also focused on measurements and validation. Pattern phase measurements and passive assessments for PMF couplers were

3.1 D4.4 Final Report on AiP Solution for Central Unit and Antenna Unit and the Plastic Fibre for the Lab-Demonstrator

D4.4 has been completed and will be publicly available once it receives approval from the EC.

6GTandem aims to establish a competitive edge in European 6G infrastructure by developing a sub-THz radiostripe and validating transmission over polymer microwave fibre (PMF) and over the air (OTA). WP4 manages the design, fabrication, packaging, and testing of integrated circuits using eWLB technology for AiP solutions. Deliverable D4.4 reports on assembled modules—central units (with PMF couplers or antennas), antenna units (radio and

Task 3.4 has moved forward by further developing dual-frequency-enabled reliable services, especially in positioning, sensing, and fronthaul support. Main tasks include ongoing enhancement and validation of uplink positioning algorithms aligned with simulator data, refining the system-level simulator for low-complexity, hardware-constrained evaluations, and collecting partner contributions for D3.4, covering topics such as positioning, power/energy methods, and supporting measurements.



Further infos can be found here: [Factsheet #4](#)

Paper: Distributed Deployment and Dual-Frequency Concepts to Strengthen Sub-THz Wireless Systems

performed, while active antenna patterns were measured and re-optimised through adjustments to the measurement setup, demonstrating strong correlation between experimental data and simulations. In terms of materials, WP4 explored a new method of covering dielectric with metal material, aiming for a scalable production route for metal-cladded PMF. The 20 cm PMF pieces produced using this method showed satisfactory results, supporting continued industrialisation efforts.

Overall, WP4’s progress encompasses the design, fabrication, and testing of advanced PCBs, integrated circuits, antennas, and polymer microwave fibres, with promising results in both laboratory validation and production scalability. These developments contribute directly to the readiness of central units and antenna modules for upcoming lab demonstrations within WP5 of the project.

booster configurations), and lab validation results. Central-PMF units reach 100 Gbps over 1-meter PMF; central-OTA units achieve 24 Gbps OTA at short range. Antenna units demonstrate reliable amplification and isolation, with their concept validated. PMF improvements include lower-loss materials, updated dielectric data, and an enhanced launcher for better coupling and reduced loss. Overall, central and antenna units are successfully integrated and characterized, ready for lab demonstration as outlined in Tasks 4.4 and 4.5.

4 WP5 Status Update

WP5 kicked off with the beginning of the final project phase, focusing on validating the 6GTandem concept in real-world environments. Four dedicated demonstration scenarios, based on speci-

fic use cases, have been selected. Further details will be provided in the final newsletter edition – stay tuned.

Scientific Output and Dissemination

Technical Meeting @ Gent

Last autumn the 6GTandem consortium assembled for a technical meeting hosted by KU Leuven in Gent.

PhD Mid-Way Milestone:

On 11th December 2025, Yuyan Cao, PhD student at Lund University successfully completed her mid-way PhD review, marking an important milestone in her doctoral research.

6GTandem at the 6th Marina Forum in Singapore:

6GTandem partner Lund University took part in the 6th MARINA Forum, a vibrant meeting point for advancing next-generation wireless technologies. Buon Kiong Lau gave a keynote presentation on “Dual-Frequency Distributed Deployment for 6G- The Sub-THz Story”.

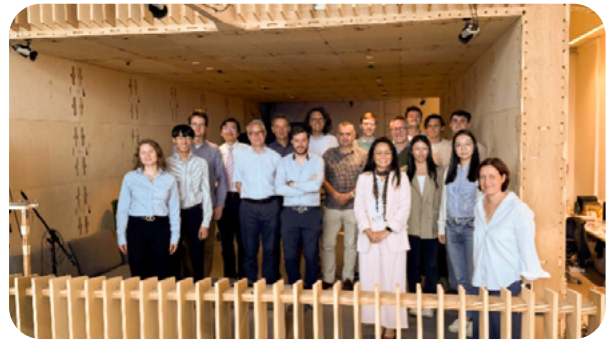
Impact Video released:

The new 6GTandem Impact Video highlights how the project is advancing key enablers for future 6G systems.

Scientific publications:

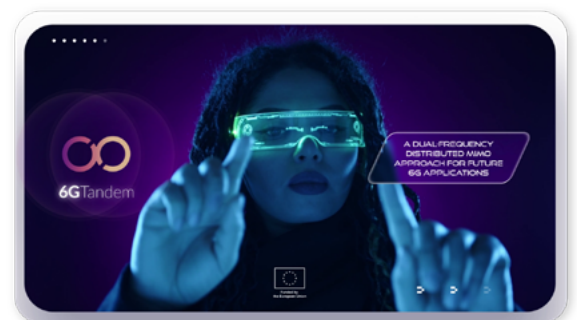
The paper “**Distributed Deployment and Dual-Frequency Concepts to Strengthen Sub-THz Wireless Systems**” was published in IEEE Wireless Communications Magazine. The authors are Liesbet Van der Perre, Gilles Callebaut, Thomas Eriksson, Muris Sarajlic, Christian Fager, Fredrik Tufvesson, Buon Kiong Lau & Erik G. Larsson.

The paper “**Radio over Fiber with Cascaded Structure: Algorithm for Uplink Positioning**” was published in IEEE Transactions on Wireless Communications. The authors are Dexin Kong, Diana Pamela Moya Osorio & Erik G. Larsson.



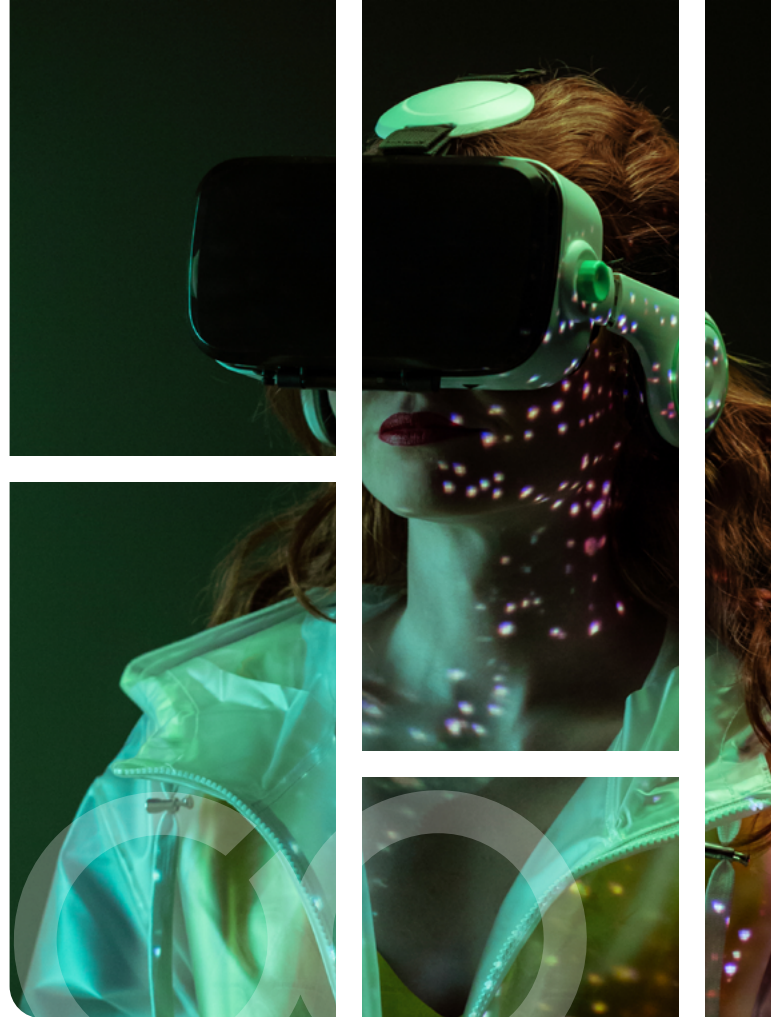
All past and upcoming events can be found on the 6GTandem official webpage:

horizon-6gtandem.eu/events



What's Next?

As the 6GTandem project enters its final project months, efforts will concentrate on completing the co-integration of the developed sub-THz circuits and progressing toward comprehensive end-to-end system evaluation. Preparations are also underway for public demonstrations that will showcase the project's innovations, accompanied by measurement campaigns focused on validating system key performance indicators (KPIs). With the formal start of Work Package 5, the focus expands to the validation of the tandem approach. This phase introduces a hybrid methodology that combines measurements and simulations to verify system-level performance, integrating outcomes from both WP3 and WP4. WP5 will thus play a central role in confirming the feasibility and impact of the 6GTandem architecture in realistic deployment scenarios.



The 6GTandem Consortium

The 6GTandem Consortium consists of 9 partners from 5 different countries (Austria, Sweden, Belgium, Germany and Switzerland). It consists of a well-balanced mixture between academic and

industrial players, from large semiconductors to small SMEs. The team comprises a diversified competence pool with the knowledge and capability to tackle and resolve upcoming challenges.

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