6GTandem

# Unlock new potential of wireless network

A dual-frequency approach for future 6G applications


**Issue 07**

June 2026


horzion-6gtandem.eu

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6gtandem-horizon


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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

## Editorial — Project successfully completed

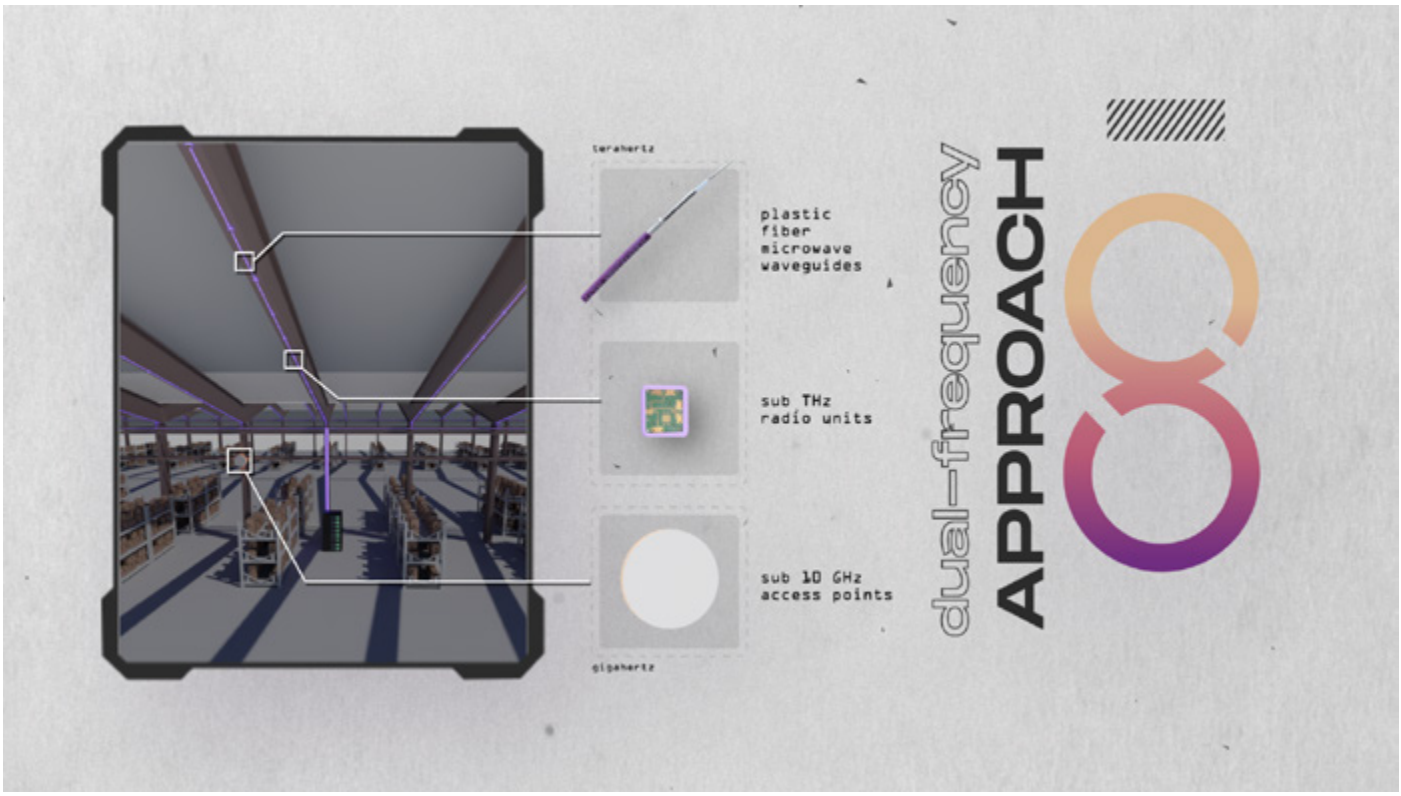
With this seventh and final newsletter edition, 6GTandem reaches the end of its 42-month project journey. What began in early 2023 as an ambitious research effort to explore a dual-frequency approach for future 6G applications has now resulted in a comprehensive set of scientific, technological, and demonstrator-based outcomes. Across the project lifetime, the consortium combined expertise in wireless systems, sub-THz hardware, antennas, packaging, fibre technology, modelling, and validation to address one of the key questions for future high-band wireless systems: how can extreme throughput be made reliable and practically deployable?

In its final phase, the project successfully translated this vision into concrete results. The consortium completed its validation activities, delivered four dedicated demonstrator scenarios, expanded its scientific publication record well

beyond the original targets, and created a broad portfolio of public communication and dissemination materials. As 6GTandem now comes to a close, this final issue looks back on the project's last major achievements while also pointing beyond the formal end of the action. Many of the developed concepts, methods, and technical building blocks will continue to inform future research, follow-up collaborations, and the wider European discussion on the path toward practical sub-THz and 6G systems.

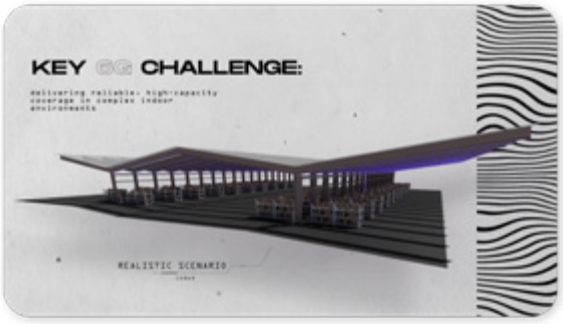
## 2 Validation of the 6GTandem Concept via 4 Demos

With the final project phase completed, 6GTandem has translated its core research into four dedicated demonstration scenarios that validate the tandem concept from complementary technical angles. Together, these demos show how dual-frequency operation, distributed sub-THz deployment, advanced hardware integration, and intelligent system coordination can be combined to address key 6G challenges such as reliable coverage, ultra-high throughput, positioning-assisted operation, and flexible fronthaul. Each demonstration focuses on a distinct application-relevant aspect while collectively illustrating how the 6GTandem approach can strengthen the practical deployability of future sub-THz wireless systems.




### 2.1 DEMO1 – Reliable and High-Capacity Coverage

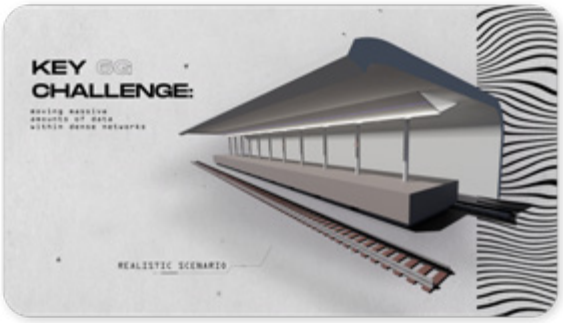
The first demonstrator focuses on consistent and reliable coverage in a realistic indoor industrial environment. It presents the 6GTandem architecture as an integrated system in which a central unit distributes signals along polymer microwave fibre stripes to multiple radio units mounted across the ceiling structure. These radio units can either transmit sub-THz signals to users or act as booster units along the stripe, while a complementary sub-10 GHz layer supports coverage robustness. The demonstrator highlights how intelligent radio-unit and beam selection enable high-capacity sub-THz communication even in challenging environments where distance, geometry, and blockage can degrade the link. By combining distributed deployment with dual-frequency support, the demo shows how reliable service continuity can be maintained in scenarios where sub-THz links alone would be too fragile for practical operation.




https://vimeo.com/technikon/6gtandem-demonstrator-01

### 2.2 DEMO2 – Massive amounts of data in dense networks

The second demonstrator addresses one of the most ambitious goals of 6GTandem: achieving extremely high-capacity links through a combination of polymer microwave fibre and wireless sub-THz transmission. In laboratory validation, the project demonstrated ultra-high data-rate connectivity using hardware modules developed within the consortium, including transceiver chipsets, couplers, antenna-in-package solutions, and polymer microwave fibre components. The demonstrator illustrates how this hardware platform can support data rates exceeding 100 Gbit/s over short fibre segments and more than 20 Gbit/s over wireless sub-THz links, thereby showcasing the feasibility of the tandem concept for future high-throughput indoor infrastructures. Beyond the peak numbers, the demo also reflects the strong integration effort behind the project, bringing together circuit design, packaging, fibre technology, and antenna development into one coherent validation setup.




https://vimeo.com/technikon/6gtandem-demonstrator-02

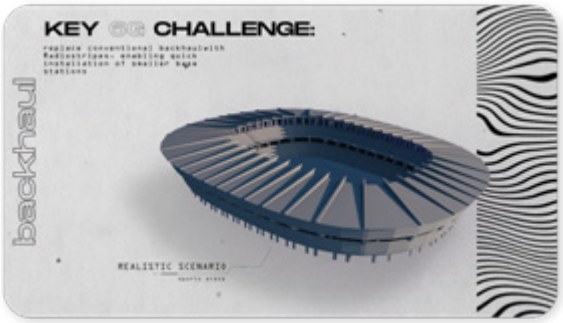
### 2.3 DEMO3 – Locating users and radio unit selection

The third demonstrator highlights the role of dual-frequency operation in making sub-THz systems more efficient and reliable. It shows how sub-10 GHz positioning information can be used to support the selection of the most suitable sub-THz radio unit, thereby reducing unnecessary scanning and improving link establishment. In the presented setup, three sub-10 GHz access points estimate the position of a user in real time, while a Lidar-based reference trajectory enables precise performance assessment. The achieved positioning accuracy is sufficient to guide radio-unit selection and to support targeted channel measurements at sub-THz frequencies, including in more complex indoor environments with strong reflections and blockages. This demonstrator underlines a central message of the project: robust lower-frequency signals can serve as an essential enabler for practical, scalable use of fragile but high-capacity sub-THz links.


https://vimeo.com/technikon/6gtandem-demonstrator-03

### 2.4 DEMO4 – Wireless sub-THz fronthaul

The fourth demonstrator explores wireless sub-THz fronthaul and the possibility of using radio stripes not only to serve end users directly, but also to connect conventional sub-10 GHz base stations. This approach offers an alternative to fixed point-to-point microwave backhaul or fibre-only infrastructure by enabling smaller and more flexible deployments. In the demonstrated lab setup, a radio unit integrated into a radiostripe communicates with a receiver module developed within the project, validating the concept of high-data-rate wireless connectivity between distributed stripe infrastructure and external network nodes. Early results confirm multi-gigabit transmission with advanced modulation, while the demonstrator also points toward broader infrastructure concepts in which dual-frequency, new waveforms, and integrated sensing capabilities can support flexible and scalable 6G deployments.




https://vimeo.com/technikon/6gtandem-demonstrator-04

# 3 Recap and outlook on creating impact

Beyond its technical achievements, 6GTandem placed strong emphasis on creating lasting impact through scientific dissemination, targeted knowledge transfer, and continued community engagement. Over the course of the project, the consortium built a substantial portfolio of publications, training activities, public communication formats, and outreach events that helped position 6GTandem within the wider European 6G research landscape. As the project comes to a close, these activities provide an important bridge from project results toward continued uptake in research, education, and future innovation initiatives.

### 3.1 Significant scientific output

One of the clearest indicators of the project's impact is its strong scientific publication record. By the end of the project, 6GTandem had produced a broad set of peer-reviewed publications spanning communication theory, system design, hardware integration, antenna development, polymer microwave fibre technology, and demonstrator-related validation. These outputs substantially exceeded the original dissemination targets and reflect the project's inter disciplinary character as well as the close collaboration between academic and industrial partners. Many of the publications are openly accessible via the project website, ensuring that the generated knowledge remains available to the wider research community beyond the formal end of the action.

A complete overview of the publications is available in the Results section of the 6GTandem project website, where readers can access the openly available outputs directly.

horizon-6gtandem.eu/scientific-publications/

### 3.2 Spring school

On 24 April 2026, the 6GTandem project successfully organised its Spring School in Linköping, Sweden, bringing together researchers and project partners to explore recent advances in sub-THz and low-frequency wireless sensing technologies. The Spring School was co-located with the ELLIIT Focus Period Symposium on Wireless Sensing Technologies for Emerging Applications, enabling participants to engage with a broader research community and benefit from high-level scientific exchange across communication and sensing disciplines.

The programme provided in-depth insight into the technological developments of the 6GTandem project, with a particular focus on integrated low-frequency and sub-THz distributed MIMO system operation. A dedicated hands-on demonstration session based on an open-source sub-THz simulation framework complemented the technical lectures, allowing participants to directly apply concepts discussed during the day. By combining project-internal insights with practical experimentation, the Spring School actively contributed to training the next generation of 6G experts, strengthening skills at the interface of communication and sensing for future 6G systems.


### 3.3 EuCNC poster booth

6GTandem was also represented at EuCNC through a dedicated poster presence coordinated by Infineon, providing an additional opportunity to showcase project results to the European communications research community. This visibility at one of the key annual events in the 6G field supported direct exchange with researchers, industry stakeholders, and other SNS projects, while reinforcing the project's role in the broader ecosystem of European next-generation wireless research. Such formats complemented the more formal publication and workshop activities by enabling focused discussion around the project's technical achievements and future relevance.

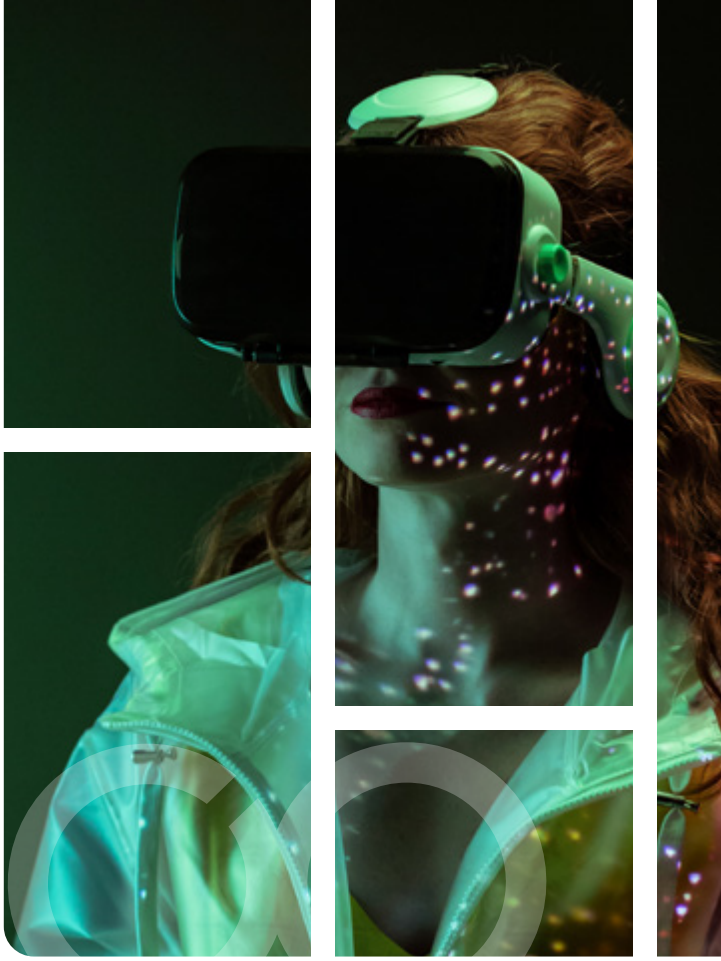
### 3.4 EuSIPCO satellite workshop – call for posters

Although the formal project duration ends in June 2026, 6GTandem's dissemination activities will continue beyond the project lifetime. A notable example is the satellite workshop planned and coordinated by KU Leuven for EUSIPCO 2026 in Bruges, Belgium, entitled "Communicating on the slippery sub-THz highway: innovative deployments and signal processing at the rescue". The work-

shop will provide a dedicated platform to communicate 6GTandem's findings on sub-THz wireless communications, positioning, sensing, and resilient deployment strategies to a wider signal processing audience. Its programme is designed to combine invited expert talks, interactive discussion, and exchange around how advanced signal processing and innovative deployment concepts can help address the practical limitations of sub-THz systems. In this way, the event extends key 6GTandem messages beyond the formal project lifetime and creates a concrete mechanism for sustaining scientific dialogue and visibility around the project's results.

## Call for posters:

https://eusipco2026.org/satellite-workshops/



## 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.

1. Technikon Forschungs- und Planungsgesellschaft mbH
AUSTRIA [Villach]

2. Ericsson AB
SWEDEN [Gothenburg]

3. KU Leuven
BELGIUM [Ghent]

4. Infineon Technologies Austria AG
AUSTRIA [Villach]

5. Chalmers University of Technology AB
SWEDEN [Gothenburg]

6. Linköping University
SWEDEN [Linköping]

7. Lund University,
SWEDEN [Lund]

8. Infineon Technologies AG,
GERMANY [Munich]

9. Huber + Suhner AG,
SWITZERLAND [Herisau]

The 6GTandem project has received funding from the Smart Networks and Services Joint Undertaking (SNS JU) under the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101096302. Views and opinions expressed are; however, those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.