



Dear colleagues, partners, and friends of HARMONY,

Welcome to the eighth edition of the HARMONY project newsletter! As we continue through 2025, our doctoral researchers are making strong progress, with new results, collaborations, and conference contributions. A highlight this quarter was the Network-wide Event in Munich, which brought together the entire HARMONY team for a week of knowledge-sharing and connection!

In this summer edition, we share recent milestones, secondment updates, and how our work aligns with broader European priorities. Let's dive into the latest from the HARMONY community!

[Visit our website to know more about the HARMONY PhDs!](#)

Retrospective

From June 2nd to 6th, the HARMONY team gathered in Munich for our third Network-wide Event—an essential milestone in our collective journey! This time hosted by the Bundeswehr University, the event brought together the doctoral candidates, supervisors, and external guests for five days of technical workshops, collaborative sessions, and social engagement.

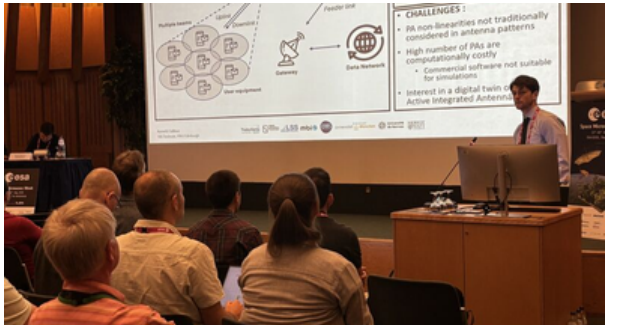


The agenda was filled with presentations on current research, peer feedback sessions, and professional discussions ranging from advanced antenna concepts to entrepreneurship. The Harmonists collaborated on the Space Mission Analysis and Design (SMAD) activity, where they must design a satellite mission for Direct-to-cell connectivity through the Preliminary Design Review (PDR) stage.

Beyond the technical sessions, the event fostered a strong sense of community—over shared meals at the Octoberfest museum, a visit to the Deutsches Museum, and enjoying the Bavarian summer sun (and rain).

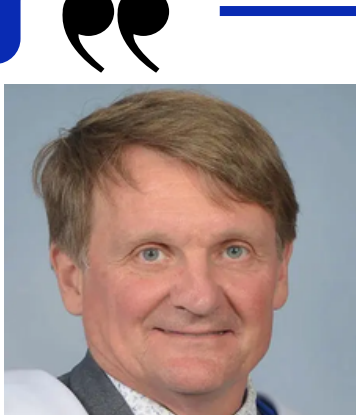


During the last 3 months, HARMONY researchers have also been actively engaging with the broader scientific community through key conferences. In May, Aymeric Cailleux participated in the 2nd ESA Space Microwave Week at ESTEC, presenting his modeling tool for analyzing intermodulation distortion in spaceborne active phased arrays—a contribution aimed at enhancing the performance and resilience of high-frequency satellite systems.



Dorian Chenet successfully submitted a conference paper and will represent HARMONY at the European Data Handling and Data Processing Conference (EDHPC 2025) in October. His work focuses on modeling latency and energy costs in space edge computing architectures, particularly addressing the technical requirements for inter-satellite links and distributed onboard processing. This contribution marks a meaningful advancement in the field of autonomous, in-orbit data handling. Martin Togstad also submitted an abstract for a paper to present at the 43rd ESA Antenna Workshop, where he will showcase his research on reflector distortion compensation in AFR-based antenna architectures.

Voices of HARMONY



The Harmonists are now in a productive phase, developing innovative solutions based on Federated and Fractionated Satellite Systems (FFSS). These architectures are showing clear benefits in applications such as Direct-to-Device communications, with improved throughput and interference mitigation; constellation ground segments, where distributed MIMO antennas simplify complexity; and space localization, where interconnected small satellites enhance accuracy through multiscale processing.

Key enabling technologies are also advancing rapidly, with a focus on feasibility and energy efficiency. Model-Based Systems Engineering is now widely used, and digital twins are helping optimize active antenna performance. Inter-satellite links, deployable antennas, and distributed signal processing are all contributing to the implementation of efficient and scalable FFSS architectures.

It is also a great pleasure to manage technically the whole group, together with the supervising team. The harmonists are enthusiastically working in cohort, with excellent interactions between them, and in a team spirit. The research journey is also very rewarding for the supervisors. We are all growing in skills and in human relations.

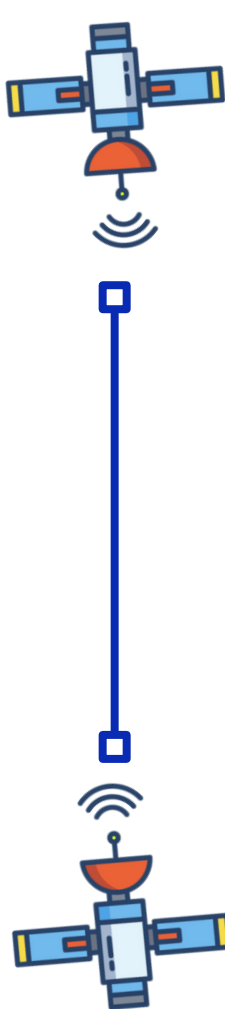
A great and specific thank to Thomas and George, for their strong engagement for success, and for the collaboration mindset they promoted.

Hervé Legay - Main industrial coordinator



Commitment

As HARMONY enters the final stages of its journey, our commitment to excellence in research and its relevance to society remains central. Over the past newsletters, we've reflected on our alignment with key European Commission priorities—ranging from sustainability and inclusivity to public engagement and responsible innovation. These values continue to shape the foundation of our work and remain core to the MSCA mission of preparing researchers to address tomorrow's challenges with both technical expertise and societal awareness. In this edition, we extend our focus to the European Union's broader strategic vision—particularly the EU Digital Decade, which aim to establish resilient, sovereign, and inclusive digital infrastructure across Europe.



Projects within HARMONY address fundamental technical building blocks of future satellite networks—such as distributed architectures, adaptive beamforming, and real-time data handling in orbit. These innovations are essential not only for next-generation telecom and Earth observation missions but also for enabling trusted digital services, ubiquitous coverage, and autonomy in critical infrastructures. This makes HARMONY's contributions important to European efforts in digital sovereignty and secure communications. Moreover, by embedding these themes into our training program—through secondments across academic and industrial environments, interdisciplinary collaboration, and active participation in high-level conferences—we are equipping a new generation of engineers with the vision, flexibility, and ambition to lead in an evolving global landscape!

"Empowering the next generation to pioneer space technologies through collaboration, creativity, and purposeful research."

Looking Ahead

With the final year of HARMONY underway, our researchers are entering a pivotal phase—finalizing experiments, preparing publications, and setting the stage for thesis submissions. The months ahead will bring key conference presentations and continued collaboration across our network. As we approach the conclusion, the focus now shifts to consolidating results and reflecting on the impact of our shared journey.

We wish you all a wonderful and warm summer!

Kind regards,

The HARMONY Team

Thank you!



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