



Special Session Proposal

Title: Integrated Sensing, Communication, and Positioning for Internet of Things in Future 6G Networks

Description of the proposed special session: This special session focuses on emerging paradigms that integrate communication, sensing, and positioning functionalities for Internet of Things (IoT) services, with a focus on future 6th Generation (6G) networks. It aims to bring together researchers and practitioners working on signal processing, wireless communications, Integrated Sensing and Communication (ISAC), and user/device positioning to explore how next-generation wireless infrastructures can simultaneously provide high-performing connectivity and high-accurate environmental awareness, towards opening new opportunities for scalable, efficient, and secure location-based IoT services and applications.

The special session is technically co-sponsored by the EU project PIONEERS-6G – Platform and Device Innovations for Energy-Efficient, Resilient, and Secure 6G IoT Systems. Funded under the SNS JU programme, PIONEERS-6G aims to design and validate innovative solutions for 6G IoT systems across device, radio access network, and core network domains (expected starting date: May 2026). The project develops an IoT-first platform supporting energy-efficient, resilient, and secure IoT services through AI-native architectures, enhanced ISAC-and-positioning techniques, and seamless integration of terrestrial and non-terrestrial networks. The special session will serve as a dissemination and community-building activity for the project, fostering collaboration with the broader 6G and IoT research community and promoting discussion on emerging challenges and solutions for 6G IoT systems.

Novelty and motivation: The evolution toward 6G systems is expected to fundamentally redefine the role of wireless networks by embedding sensing and positioning capabilities natively into communication infrastructures. Unlike traditional approaches that rely on dedicated and/or separate sensing-and-positioning signals and modalities, ISAC enables joint optimization of communication, sensing, and positioning tasks, offering improved spectral efficiency, reduced hardware redundancy, and enhanced situational awareness. This paradigm is particularly relevant for large-scale IoT deployments, where device density, energy constraints, and dynamic environments pose significant challenges to conventional techniques.

From the perspective of the IPIN community, this topic represents a shift from improvements in positioning algorithms towards a holistic system-level redesign. The proposed special session is novel because it explicitly targets the convergence of ISAC, positioning, IoT, and 6G research domains, rather than treating positioning as an isolated function. It goes beyond standard sessions by emphasizing cross-layer design, joint waveform optimization, and the dual use of communication signals for sensing/positioning purposes. The involvement of the PIONEERS-6G project further highlights the growing research and innovation momentum in this area, providing a bridge between theoretical advances and practical system implementations, and fostering collaboration between academia and industry.

Scope of the session: In this Special Session, we invite authors to submit papers related (but not limited) to:

- ISAC and positioning techniques for IoT networks
- ISAC and positioning solutions using multiple radio access technologies
- Joint communication, sensing, and positioning waveform design
- 6G architectures supporting ISAC and positioning for IoT services and applications
- Signal processing algorithms for ISAC and positioning functions
- Machine learning approaches for ISAC and positioning
- Energy-efficient and low-complexity ISAC and positioning solutions for IoT devices
- Cooperative and distributed ISAC and positioning techniques in dense IoT environments
- mmWave and THz-based sensing and positioning
- Device-free and passive ISAC and positioning techniques
- Experimental platforms, testbeds, and real-world deployments
- Privacy, security, and robustness in ISAC and positioning systems
- Standardization and implementation challenges for 6G ISAC and positioning

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2026!





Keywords:

- Integrated Sensing and Communication (ISAC)
- 6G ISAC and positioning
- Location-based IoT services
- Device-free sensing and positioning
- mmWave / THz ISAC and positioning
- Machine learning for ISAC and positioning

Session Chairs:

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