



SPECIAL SESSION SS2 – TSN and Beyond: Architectures for Reliable and Real-Time Industrial Communication

ORGANIZED BY:

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DESCRIPTION

As manufacturing environments move toward more distributed and flexible architectures, new demands are placed on communication networks. Examples of these applications include mobile robots, AGVs/AMRs, real-time monitoring and control of machines, and reconfigurable production units. This paradigm shift amplifies the influence of network-induced effects on distributed decision-making, coordination, and control, highlighting the need for deterministic and dependable communication solutions.

Time-Sensitive Networking (TSN), Wireless TSN, and hybrid TSN–5G/6G domains are becoming key technologies for meeting the strict timing, reliability, and interoperability requirements of current and next-generation industrial communication systems. Their foundations in precise time synchronization, seamless redundancy, traffic scheduling and shaping, bounded latency, and resource reservation make TSN and its wireless extensions essential for mitigating latency variations, jitter, and packet loss. These capabilities enable reliability, synchronization, control, and determinism in highly dynamic industrial environments.

This special session focuses on recent advances in TSN and TSN-enabled communication architectures for industrial automation. The aim is to highlight communication solutions that ensure predictable performance and robustness in increasingly heterogeneous and dynamic industrial environments. The goal is to bring together researchers and practitioners to discuss progress in deterministic wired and wireless TSN, the integration of TSN with 5G/6G networks, TSN-supported edge/cloud coordination, and TSN-based IT/OT convergence for real-time control. Contributions addressing performance evaluation, implementation challenges, and industrial use cases are particularly encouraged.

FOCUS

The Special Session focuses on (but is not limited to):

- TSN mechanisms and scheduling strategies for deterministic industrial communication
- Integration of TSN with next-generation wireless technologies (5G/6G, wireless TSN)
- Wired/wireless coexistence and interoperability in TSN-enabled networks
- TSN-based time synchronization techniques for real-time and distributed control
- TSN support for mobile and reconfigurable production systems (e. g., AGVs/AMRs, modular production)
- TSN-driven IT/OT convergence and unified communication architectures
- Edge and cloud coordination enabled by TSN for low-latency and predictable computation
- Performance evaluation, quality assurance, and conformance testing of TSN components and profiles
- TSN-enabled approaches to reliability, fault tolerance, and network health monitoring
- Industrial deployments, testbeds, and practical experiences with TSN in real-world applications

PAPER SUBMISSION: Instructions for paper submission are included in the conference website: <https://hs-offenburg.de/wfcs26>

IMPORTANT DATES

Regular/SS submissions:

Hard Deadline: **February 1, 2026**

Notifications: **February 27, 2026**

Final versions: **March 6, 2026**

