



21-24 April 2026  
Offenburg, Germany



IEEE WFCS 2026

## SPECIAL SESSION SS1 – Reliable High-Speed Industrial Wireless in the Unlicensed Spectrum

### ORGANIZED BY:

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### DESCRIPTION

Industrial applications demand diverse network solutions beyond single technologies like 5G or 6G. High costs and complexity related to cellular technologies can hinder widespread adoption of wireless industrial communication. A flexible and complementary approach is the adoption of fast and reliable wireless technologies operating in unlicensed spectrum. High throughput, low latency, and improved robustness in high-density settings are central to Wi-Fi 6 (802.11ax), Wi-Fi 7 (802.11be), and the forthcoming Wi-Fi 8 (802.11bn). The design of Wi-Fi infrastructure allows for customization to unique industrial demands by utilizing new capabilities and configuration parameters. These include multi-link operation, access point coordination, restricted target wake time (TWT), and precise Quality of Service (QoS) configurations. Mobility enhancements are also a feature of Wi-Fi 8, which will support seamless roaming for Multi-Link Device (MLD) STAs. Private WLANs can achieve reduced interference and superior reliability and latency by integrating new spectrum, such as mmWave, optical (LiFi), and lightly (i.e. locally) licensed bands. To this end, AI/ML and digital twins are gaining popularity for managing and optimizing complex industrial wireless networks, to guarantee the strict connectivity requirements for critical industrial processes.

### FOCUS

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

- Advancements in IEEE 802.11 communication protocols and standards, including Wi-Fi 6E, Wi-Fi 7, and Wi-Fi 8.
- Advancements in the Li-Fi communication protocol and standard.
- Li-Fi technologies, test beds, and practical system performance related to industrial applications.
- MmWave and sub-THz unlicensed spectrum advantages for industrial applications.
- Reliability and low latency with multi-AP coordination and multi-link operation techniques across traditional and new mm-wave and optical bands.
- Enhanced Wi-Fi roaming and mobility solutions for industrial equipment.
- Integration of Time-Sensitive Networking (TSN) with Wi-Fi and other high-speed wireless technologies (WTSN).
- Co-existence of wireless network technologies operating in unlicensed bands.
- Open hardware and open software platforms for Wi-Fi protocol development and testing.
- AI/ML techniques and Network Digital Twins for control, management, and optimization of industrial Wi-Fi networks.
- Precise time synchronization and localization over Wi-Fi.
- Security aspects of high-speed wireless technologies in unlicensed bands.
- Managed Wi-Fi solutions for optimal network configurations and performance.
- Techniques and solutions to improve energy efficiency of Wi-Fi networks.
- Wi-Fi technology applied to domains with similar requirements (smart cities, transportation, grids, health, and agriculture).
- Reliable and high-speed personal area networks (IEEE 802.15.4e, Bluetooth) solutions for industrial environments.

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

### IMPORTANT DATES

#### Regular/SS submissions:

Deadline: **January 11, 2026**  
Notifications: **February 22, 2026**  
Final versions: **March 1, 2026**

