

IEEE Microwave and Wireless Components Letters

Special Issue on

Radar and Microwave Sensor Systems

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Motivation:

This Special Issue is devoted to technical papers on radar and sensor systems in the microwave and millimeter-wave bands. Massive technological progress has been made in recent years at the microwave device and component level, enabling new research directions on sophisticated microwave and millimeter-wave systems. Among the most significant fields of application for such systems has been sensor technology, with a major emphasis on radar systems. Interest in automotive sensing, wireless human-computer interaction, biometric measurements, industrial monitoring, and target tracking among many other applications has driven this interest. Advances in device and component technology are supporting system design concepts that treat the microwave hardware as a co-design element of the system, along with signal processing and antenna design. Such co-design is of particular importance in radar and sensor systems, where a rapidly increasing number of wireless devices and an increasingly crowded spectrum necessitates the design and use of specialized signals (both temporal waveform designs and spatial beamforming) to maintain and improve sensor performance. Systems designed for general broad applicability are becoming more challenging to implement, while specialized systems that co-design the aperture, microwave hardware, and signal processing are becoming increasingly relevant. Technologies such as digital array radar, distributed and networked sensors, computational imagers, high-sensitivity Doppler radars, and integrated millimeter-wave radar, to name only a few, have supported system-level developments. This Special Issue is intended to highlight advancements in these and other microwave system-level technologies.

Topics of interest include, but are not limited to:

- *Microwave and millimeter-wave radar and sensor system design and demonstration:* radar and sensor demonstrations, beamforming systems, passive and networked radar, joint radar and communication systems, joint sensing and communications systems, synthetic aperture radar, new and emerging sensor system implementations.
- *Millimeter-wave imaging systems:* active and passive phased arrays, MIMO arrays, interferometric systems, signal processing for imaging systems, calibration.
- *Distributed, networked and cooperative radar:* network architectures, repeaters, coherent and non-coherent networks, cooperative sensor systems, distributed MIMO.
- *Hardware/software co-design:* MIMO antenna arrays, angle estimation, hardware-supported signal processing approaches, modulation schemes for MIMO sensing systems.
- *Millimeter-wave sensor MMICs and components:* MMICs and circuits using solid state and non-solid state technologies, multi-channel transceivers, power amplifier, complex systems on chip, signal cancelling chips for duplex systems, integrated antennas.
- *Experimental demonstrations of novel modulation schemes for sensing and radar applications:* digital modulation, OFDM, PMCW, chirp sequence systems, non-linear modulations, novel waveform design and demonstration.
- *Applications of radar and microwave sensor systems:* automotive and industrial applications, wireless human-computer interaction, biometric measurements, industrial monitoring, target tracking, remote sensing, new and emerging sensor applications.

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