Call for Papers

Special Issue on Multifunctional Low-Altitude Wireless Network for Intelligent Transportation Systems

IEEE VEHICULAR TECHNOLOGY Magazine
Connecting the Mobile World

Important Dates

Manuscript Submission by:	**31 October 2026**
First Round Reviews by:	**1 February 2027**
Second Round Submissions by:	**1 April 2027**
Second Round Reviews / Editorial Decision:	**15 May 2027**

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The rapid growth of global mobility demand is putting unprecedented pressure on ground vehicular systems. Urban road networks are increasingly congested, public transit is operating near capacity, and expanding physical infrastructure is costly and often infeasible in dense metropolitan areas. In parallel, the low-altitude airspace is emerging as a new layer that can host services such as low-altitude logistics, air taxis and shuttles, infrastructure inspection, and aerial sensing for traffic management and public safety. To support these applications at scale, it is not sufficient to treat aerial vehicles as isolated links or ad hoc relays. Instead, there is a strong need to build multifunctional low-altitude wireless networks (LAWNs) that serve as shared digital infrastructure for intelligent vehicular systems (IVS). In practice, such LAWNs can, for example, provide 3D V2X connectivity between connected vehicles and overhead UAVs at complex intersections, support cooperative perception of road traffic from aerial vantage points to enhance safety for automated driving, and offer an additional control and communication layer that complements roadside units along congested corridors. At the same time, LAWNs must remain compatible with existing aviation and airspace management systems (e.g., UTM/U-space, conventional air traffic control) while interworking seamlessly with terrestrial V2X, cellular, and backbone networks.

Designing multifunctional LAWNs is challenging. Dense operations of heterogeneous low-altitude aircraft (e.g., logistics drones, air taxis, micro-UAVs) cause strong 3D interference, complex air-ground channels, and tightly coupled spectrum usage with terrestrial vehicular systems and cellular systems, while limited edge and onboard computing must be shared among safety-critical control, inspection video, and real-time traffic monitoring. Coordinated air traffic management must guarantee safe separation across routes and altitudes under weather, no-fly zones, and dynamic ground traffic, and the joint design of sensing and communication (e.g., radar-communication waveforms) further tightens trade-offs among sensing accuracy, data rate, latency, and reliability. Advanced AI offers powerful tools to address these challenges. For instance, multi-agent reinforcement learning can coordinate fleets to manage airspace flows, graph neural networks can support interference-aware power control, channel selection, and beam management, generative-AI-driven slicing can allocate spectrum and edge resources among mixed-criticality services, and digital-twin-based predictive control can proactively adapt routes, altitudes, and configurations based on traffic, weather, and demand. Therefore, this Special Issue aims to gather cutting-edge research on the design, optimization, and deployment of multifunctional LAWNs for intelligent vehicular systems, with AI as a key enabler for turning the low-altitude airspace into an integral part of future mobility.

The research topics suitable for this special issue include, but are not limited to:

- Architectures for multifunctional LAWNs as a 3D extension of IVS and V2X infrastructure
- Foundational agentic-AI frameworks and cross-layer optimization for LAWN-enabled intelligent transportation systems
- Security, privacy, and reliability mechanisms for AI-enabled LAWNs in IVS and V2X environments
- Agentic-AI-enabled coordination of UAVs, connected vehicles, and roadside units in low-altitude transportation corridors
- Multi-agent and deep reinforcement learning for joint airspace management, V2X-aware routing, and traffic flow control in LAWN-enabled IVS
- Agentic-AI-enabled edge intelligence for real-time decision-making on UAVs, vehicles, and roadside/edge units
- LLM- and generative-AI-driven semantic networking, intent-aware control, and mission planning in LAWN-enabled vehicular systems
- Generative-AI-assisted interference and spectrum management in 3D airspace for LAWN-enabled IVS
- Embodied-AI-based integrated sensing, communication, computing, and control for low-altitude navigation and traffic-aware operation
- Embodied-AI-enabled system-level design and optimization of air-ground cooperative control and networking

- Safety, energy efficiency, and human-in-the-loop design of agentic and embodied AI for LAWN-enabled IVS
- Experimental platforms, large-scale simulations, field trials, and standardization activities for LAWNs in IVS and V2X integration

Submission Guidelines

All manuscripts should present state-of-the-art materials in a tutorial or survey style, adhering to the IEEE Vehicular Technology Magazine (VTM) guidelines. All manuscripts to be considered for publication must be submitted by the deadline through the magazine's IEEE Author Portal submission site.

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