IEEE Aerospace Electronic Systems Low-Altitude Wireless Network (LAWN) Technical Working Group

Semi-Annual Report

Weijie Yuan

Chair, Low-Altitude Wireless Network-TWG

AESS Board of Governors Meeting – Spring 2026

15-16 May 2026

Phoenix, AZ, USA

Low-Altitude Wireless Network

1. Aim of LAWN-TWG:

- To explore and support multi-disciplinary research efforts and application ecosystems around LAWN
- To establish a foundational platform connecting airspace communication, regulation, and intelligent service delivery in low-altitude environments

2. Objective of LAWN-TWG:

- **Community Building:** Establish a LAWN community via website, mailing list, seminars, and workshops
- **Technical Leadership:** Promote research on LAWN sensing, communication, control, and computing
- **Education:** Organize tutorials, summer schools, and student design challenges
- **Cross-Society Collaboration:** Strengthen collaboration with AESS panels and other IEEE societies
- **Standardization:** Support standardization efforts and structured dialogue with global regulatory bodies
- **Deployment and Policy Impact:** Develop open datasets, publish white papers, organize IEEE LAWN-focused events

LAWN-TWG Committees

Chair

Weijie Yuan CHN
Southern University of Science and Technology
Region 10 (Asia and Pacific)

- TWG meets online regularly
- Highly diverse technical expertise in LAWN

Founding members

Mohamed Slim Alouini SAU
King Abdullah University of Science and Technology
Region 8 (Africa, Europe, Middle East)

Baha Eddine Youcef BELMEKKI GBR
Heriot-Watt University
Region 8 (Africa, Europe, Middle East)

Giancarmine Fasano ITA
University of Naples "Federico II"
Region 8 (Africa, Europe, Middle East)

Gokhan Inalhan GBR
Cranfield University
Region 8 (Africa, Europe, Middle East)

Maria Sabrina Greco ITA
University of Pisa
AESS
Region 8 (Africa, Europe, Middle East)

Braham Himed USA
Air Force Research Laboratory
Region 2 (Eastern U.S.)

Yanbo Huang USA
US Department of Agricultural
Region 3 (Southeastern U.S.)

Gunes Karabulut Kurt CAN
Polytechnique Montreal
AESS
Region 7 (Canada)

Dong In Kim ROK
Sungkyunkwan University
Region 10 (Asia and Pacific)

Andreas Knopp DEU
Universität der Bundeswehr München
Region 8 (Africa, Europe, Middle East)

Roberto Sabatini ARE
Khalifa University of Science and Technology (UAE, Region 8) and RMIT University (Australia, Region 10)
Region 8 (Africa, Europe, Middle East)

Jiacheng Wang SGP
Nanyang Technological University
Region 10 (Asia and Pacific)

Shuangyang Li DEU
TU Berlin
Region 8 (Africa, Europe, Middle East)

Sofie Pollin BEL
KU Leuven
Region 8 (Africa, Europe, Middle East)

Xiangrong Wang CHN
Beihang University
AESS, SPS
Region 10 (Asia and Pacific)

Jun Wu CHN
Southern University of Science and Technology
Region 10 (Asia and Pacific)

LAWN-TWG Summary of Activities

1. AESS/ComSoc/SMC Ongoing Special Issues

- ☐ IEEE TVT SI on Low-Altitude Wireless Networks (LAWN)
- ☐ IEEE Communications Magazine SI on LAWN: Sensing, Connectivity, and Agentic Intelligence
- ☐ IEEE Transactions on Cybernetics SI on Advanced AI for Low-Altitude Sensing, Communication, Computing, and Control
- ☐ IEEE TNSE SI on Embodied AI for Low-Altitude Economy Networking

2. Conference Workshops and Special Sessions

- ☐ The 1st Workshop on Low-Altitude Wireless Networks in IEEE WCNC Conference,
  Location: Kuala Lumpur, Malaysia
  Time: 13 - 16 April 2026
  Organizers: Dusit Niyato, Weijie Yuan,Eirini Eleni Tsiropoulou, Geng Sun, Jiacheng Wang, Baha Eddine Youcef Belmekki
- ☐ The 20th InternationalSymposium on Wireless Communication Systems
  Location: Gold Coast, Queensland, Australia
  Time: 24-26, August 2026
  General Co-Chairs: Weijie Yuan, Octavia Dobre, Giuseppe Caire, Rodrigo C. de Lamare

3. Continuing the LAWN seminar series with invited speakers from academia, industry, and government

- ☐ Urban Air Mobility (UAM) by Prof. Susan A. Shaheen from UC Berkeley
- ☐ Drone-enabled precision agriculture by Dr. Yanbo Huang from the US Department of Agriculture
- ☐ Signal processing for LAWN by Prof. Braham Himed from Air Force Research Laboratory
- ☐ Intelligent Aerial Robotics by Prof. Hugh Liu from the University of Toronto

LAWN-TWG Summary of Activities

Planned and Emerging LAWN-TWG Activities in 2026

1. LAWN Tutorials

- ☐ Develop online tutorials on LAWN architectures, applications, and enabling technologies
- ☐ Cover key topics such as sensing-communication-control integration, aerial networking, edge computing, and intelligent decision-making
- ☐ Provide accessible educational materials for students, researchers, and practitioners entering the LAWN field

2. **LAWN Summer School and Student Competition**

- ☐ Organize a LAWN summer school for systematic training and community building
- ☐ Invite leading researchers to deliver lectures, tutorials, and technical discussions
- ☐ Launch a student design competition to encourage hands-on innovation in low-altitude wireless networking and intelligent aerial systems

3. **Standards and Long-Term Initiatives**

- ☐ Explore LAWN-related standardization opportunities within AESS
- ☐ Build structured dialogue with aviation regulators, industry stakeholders, and standard-setting organizations
- ☐ Consider future AESS-focused activities on LAWN datasets, white papers, technical guidelines, and demonstration platforms

LAWN-TWG

The LAWN-TWG continued to promote research and community development for low-altitude wireless networks, with emphasis on integrated communication, sensing, navigation, control, edge intelligence, and secure aerial networking.

- Refined the technical scope and roadmap of LAWN for drones, eVTOLs, and low-altitude aerial platforms.
- Supported publications, tutorials, surveys, workshops, panels, and special sessions related to LAWN.
- Encouraged open datasets, benchmarks, simulation platforms, and experimental testbeds for reproducible research.
- Strengthened collaboration among academia, industry, government, and standardization communities.
- Expanded international participation and cross-disciplinary engagement within IEEE AESS and related societies.

Conference Contributions

- Workshops
  - 13th Workshop on Integrated Sensing and Communications for Low-Altitude Intelligence at IEEE GLOBECOM 2025
  - WS-19: The 1st Workshop on Low-Altitude WirelessNetworks at IEEE WCNC 2026
- Tutorials
  - Multi-Layer Non-Terrestrial Networks: From LEO Satellite Constellations to Low-Altitude Wireless Networks at IEEE WCNC 2026

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WS-19: The 1st Workshop on Low-Altitude Wireless Networks

Monday | 04.13.2026 | 9:00 am - 3:30 pm

Workshop

Abstract:

As the global demand for intelligent aerial services continues to grow, researchers have turned their attention to the low-altitude airspace (typically ranging from 100 to 3,000 meters above ground) as a new frontier for digital infrastructure. A common vision in this evolving landscape is that the low-altitude airspace would not merely serve as an aerial extension of traditional communication networks, but would actually become a fully integrated, mission-aware platform that supports seamless connectivity, real-time sensing, distributed control, and onboard intelligence. Inspired by recent advances in wireless communications, robotics, and autonomous control, the concept of Low-Altitude Wireless Networks (LAWN) has emerged as a promising framework to meet these requirements. Unlike conventional aerial communication systems that treat unmanned aerial vehicles (UAVs) primarily as flying relays or base stations, LAWN envisions a tightly coupled cyber-physical system where drones, ground nodes, and edge computing resources collaboratively support highly dynamic, service-driven aerial operations. In this architecture, communication, sensing, and control are jointly optimized to deliver critical services such as real-time situational awareness, cooperative navigation, and autonomous mission execution.

IEEE GLOBECOM

IEEE Global Communications Conference
8–12 December 2025 // Taipei, Taiwan
Sustainable Communications for Ubiquitous Intelligence

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WS-27: 13TH WORKSHOP ON INTEGRATED SENSING AND COMMUNICATIONS FOR LOW-ALTITUDE INTELLIGENCE

WS-27: 13TH WORKSHOP ON INTEGRATED SENSING AND COMMUNICATIONS FOR LOW-ALTITUDE INTELLIGENCE

Low-altitude sensing and communication networks typically rely on unmanned aerial vehicles (UAVs) or drones to collect and transmit data, crucial for a variety of automated applications like environmental monitoring, disaster response, agricultural surveillance, and smart cities. The evolution of UAV technology and advancements in wireless communication have significantly accelerated the growth of these networks. Efficient operation of low-altitude sensing networks hinges on effective data acquisition and processing to ensure timely and accurate environmental insights, especially in dynamic settings. Traditional methods struggle to keep pace with changing conditions and diverse sensing requirements. Recent advancements in sensor integration, such as LiDAR and radar on UAV platforms, have opened up new possibilities for monitoring and data collection, becoming indispensable in modern low-altitude ecosystems.

T12: Multi-Layer Non-Terrestrial Networks: From LEO Satellite Constellations to Low-Altitude Wireless Networks

Monday | 04.13.2026 | 2:00 pm - 5:30 pm

Tutorial In-Person

Room: MR 408

Presenters:

Ruibo Wang, King Abdullah University of Science and Technology, Saudi Arabia
Weijie Yuan, Southern University of Science and Technology, China
Jiacheng Wang, Nanyang Technological University, Singapore
Mustafa A. Kishk, Maynooth University, Ireland
Jun Wu, Southern University of Science and Technology, China
Dusit Niyato, Nanyang Technological University, Singapore
Yongxing Zhou, Beijing University of Posts and Telecommunications, China
Mohamed-Slim Alouini, King Abdullah University of Science and Technology, Saudi Arabia

LAWN-TWG - 2026 Semi-Annual Report

IEEE

Publication Activities

- ***IEEE Wireless Commun.*** SI on Toward Practical Low-Altitude Economy Networking: Standardization, Testbeds, and Real-world Deployments. **(1 June 2025, received 57 submissions)**
- ***IEEE IoTJ*** SI on Augmented Edge Sensing Intelligence for Low-Altitude IoT Systems. **(15 June 2025, received 84 submissions)**
- ***IEEE TCCN*** SI on Artificial General Intelligence for Low-Altitude Economy Networking. **(1 June 2025, received 171 submissions)**
- ***IEEE TNSE*** SI on Security and Privacy in Low Altitude Networking. **(1 August 2025, received 65 submissions)**

Toward Practical Low-Altitude Economy Networking: Standardization, Testbeds, and Real-world Deployments

Toward Practical Low-Altitude Economy Networking: Standardization, Testbeds, and Real-world Deployments

Publication Date	Manuscript Submission Deadline
February 2026	1 June 2025

Special Issue

Call for Papers

SUBMIT A PAPER

The increasing shortage of ground transportation resources has prompted the exploration of low-altitude airspace, leading to the emergence of the low-altitude economy (LAE). LAE involves carry out various activities, such as cargo transportation and low-altitude inspections, in the airspace extending up to 3,000 meters above the ground, by using manned and uncrewed aerial vehicles (UAV), such as drones and electric vertical take-off and landing aircraft (eVTOL). Unlike traditional UAV and non-terrestrial networks, the LAE involves deploying a large number of flying vehicles that not only act as base stations but also function as service-providing devices, such as air taxis. Due to the high mobility of aerial vehicles and weather challenges, constructing the low-altitude wireless network presents significant challenges in standardization, technological innovation, testbeds, and practical deployments.

For developing standardized communication protocols and regulations, it is vital to consider physical obstacles in airspace, mechanical operation restrictions, and compatibility with existing aerial communication networks. From a technological perspective, providing reliable communication services to massive aerial vehicles requires addressing issues, such as electromagnetic interference and the cooperation with terrestrial communication networks. Besides, integrating communications with sensing and computing is also important due to the dynamic features of the airspace and the limited endurance of aerial vehicles. Such integration requires more advanced methods to manage and optimize spectrum, computing, and storage resources, due to the increased dimensionality and dynamics of the constraints. Moreover, the deployment, testing, and optimization of the low-altitude wireless network in real-world scenarios, along with the development of relevant testing platforms, are also crucial to ensure the safety of LAE applications. Given the challenges mentioned above, this Special Issue (SI) aims to explore the relevant solutions within the context of LAE, covering aspects of standards, technologies, testbeds, and practical deployments of low-altitude wireless networks. The scope includes but not limited to:

- Design, simulation, practical trials, and standardization of communications architectures and protocols for LAE.
- Sustainable real-world deployment strategies and use case for low-altitude wireless networks.
- Practical dynamic spectrum access and management for LAE applications.
- Scalable framework design, practical evaluation, and standardization for integrating low-altitude wireless network with existing aerial network.
- Privacy and data security protocol design and standardization in wireless communications for LAE.
- Design, evaluation, and analysis of the metrics in practical environment for LAE.
- Interference management and integration among satellite, low-altitude, and terrestrial networks in LAE.
- Integrating communication, sensing, and computing for real-world LAE applications.
- Resource management and optimization for communications, computation, and storage in LAE.
- Airspace sensing, reconstruction, and analysis technologies for LAE applications.
- Testbed design, implementation, analysis, and standardization for LAE Applications.

Evidence of real testbeds and demos, such as figures, videos, and datasets, is strongly preferred.

CALL FOR PAPERS

IEEE Internet of Things Journal Special Issue on Augmented Edge Sensing Intelligence for Low-Altitude IoT Systems

With the development of the Internet of Things (IoT), low-altitude systems such as drones, unmanned aerial vehicles (UAVs), and other aerial devices have garnered significant attention due to their unique capabilities and applications in environmental monitoring, disaster management and smart city implementations. The deployment and efficacy of low-altitude IoT systems hinge critically on the seamless integration of sensing and intelligence. However, the existing solutions encounter several challenges. First, the isolated-point wireless sensing by low-altitude nodes without network connectivity lacks data awareness, reducing overall sensing effectiveness. Meanwhile, the vast amounts of complex sensory data necessitate advanced processing capabilities to interpret the data accurately and efficiently. Then, traditional cloud-based data processing requires cross-domain communication, which risks data leakage and long response delays and thus is particularly impertinent for low-altitude IoT systems operating in dynamic and often unpredictable environments.

These observations motivate the emerging research theme of edge sensing intelligence, which refers to the integration of edge artificial intelligence (AI) and wireless sensing at the network edge. This fusion aims to achieve fast data processing and decision-making, offering advantages of reducing data transmission latency, enhancing data privacy and security, and lowering computing costs. Typically, base stations (BSs) and IoT devices leverage existing communication signal formats to perform uplink and downlink sensing in a task-oriented manner aligned with specific objectives. This approach facilitates subsequent data processing and decision-making, enabling the edge network to directly access massive real-time and diverse data. Such access contributes to real-time responsiveness, optimization of resource allocation, and implementation of privacy/security measures, while also driving the development of novel applications. As the intersection of edge AI and wireless sensing, edge sensing intelligence represents a groundbreaking paradigm where data is not only collected directly at the edge network but also wirelessly transmitted and intelligently processed.

The revolution of existing architecture necessitates a rethinking of current low-altitude IoT network in terms of fundamental limits and tradeoffs, hardware integration, information extraction, processing technologies, learning principles, and emerging challenges related to public security and privacy. This special issue aims to provide a comprehensive overview of state-of-the-art technologies and theories for integrating wireless sensing and AI in low-altitude IoT systems. It will provide a forum for the latest research, innovations, and applications of edge sensing intelligence technologies in these systems, helping to bridge the gap between theory and practice. We solicit high-quality original research papers on topics including, but not limited to:

- Fundamental limits for edge sensing intelligence in low-altitude IoT networks
- Low-altitude IoT Network architectures/transmission protocols/frame designs for edge sensing intelligence
- Artificial Intelligence (AI) and big data-driven designs for edge sensing intelligence
- Cloud/edge computing and task/data/computation offloading for edge sensing intelligence
- Waveform/receiver design for edge sensing intelligence in low-altitude IoT networks
- Security and privacy issues of edge sensing intelligence for low-altitude IoT applications
- Machine learning methods in edge sensing intelligence for low-altitude IoT connectivity
- Massive MIMO/Intelligent Reflecting Surface (IRS)/holographic MIMO surface for edge sensing intelligence in low-altitude IoT systems
- Standardization progress of edge sensing intelligence for low-altitude IoT
- Experimental demonstrations and prototypes of edge sensing intelligence for low-altitude IoT

Important Dates

- Manuscript Submission Deadline: June 15th, 2025
- First Review Due: August 20th, 2025
- Revised Manuscript Due: October 10th, 2025
- Acceptance Notification: November 20th, 2025
- Final Manuscript Due: December 15th, 2025
- Publication Date: February 2026

Guest Editors

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Artificial General Intelligence for Low-Altitude Economy Networking

Artificial General Intelligence for Low-Altitude Economy Networking

Publication Date	Manuscript Submission Deadline
2026	1 June 2025

Special Issue

Call for Papers

SUBMIT A PAPER

The advancement of drone technology coupled with the increasing congestion of terrestrial road resources is catalyzing the exploration of low-altitude economy. It denotes the utilization of the airspace up to 3000 meters above ground level, where flying equipment such as unmanned aerial vehicles (UAVs) are employed to foster various applications. These initiatives are designed to exploit the low-altitude range to revolutionize industries such as urban transportation, logistics, agriculture, and tourism, thereby attracting significant attention from various industries across several countries. In comparison to terrestrial networks, the airspace offers greater freedom of movement, which provides more space for multi-UAV path optimization, communication strategy selection, etc. Moreover, unlike the traditional UAV networks, applications within the low-altitude economy framework typically involve massive flying devices acting as air taxis, aerial base stations, and airborne charging stations, each tasked with different missions and having distinct communication needs. This requires advanced capabilities from both drones and low-altitude communication networks.

Artificial general intelligence (AGI), bolstered by diverse AI technologies, such as deep learning models, generative AI models, deep transfer learning techniques, and large language models, possesses capabilities such as autonomous perception, learning, decision-making, execution, and social collaboration. These capabilities enable AGI to independently handle a variety of tasks effectively at or above human level. Within the low-altitude economy, AGI empowers massive UAVs to navigate under varying weather conditions, evade random obstacles like birds, and optimize flight paths, thereby enhancing energy efficiency and promoting sustainability. In low-altitude network communications, AGI enhances the network's cognitive, learning, and decision-making capabilities, playing a crucial role in optimizing network resources, facilitating self-organization and repair, and assessing security vulnerabilities. Despite its promise, using AGI in this context poses significant challenges. These include the training of various robust AGI models that prioritize the security of UAV communications and can autonomously detect and rectify network faults. Moreover, given the highly dynamic nature of low-altitude airspace, developing AGI models capable of robustly handling complex tasks, including the integration of sensor data, real-time processing, and prompt decision-making, also presents difficulties. Therefore, this special issue aims to delve deeply into these challenges and opportunities, inviting contributions on theoretical advancements, technological solutions, and case studies that support various applications within low-altitude airspace via different AI models, to facilitate the development of the low-altitude economy. Potential topics of interest include but are not limited to the following:

- AGI-based integrated communication, sensing, and computing for low-altitude transport networks
- AGI-based resource management and optimization for low-altitude communication networks
- AGI-based cognitive communication capabilities enhancement
- Structure and protocol designs for low-altitude communication system via AGI
- Integrated satellite, low altitude, and terrestrial communication networks based on AGI
- AGI-enabled semantic communication for low-altitude communication
- AGI-based UAV detection, positioning, and navigation for low altitude logistics
- AGI-enabled swarm technology for low-altitude economy applications
- AGI-based environment perception and reconstruction technology via low-altitude UAV
- AGI model design, deployment, and evaluation for low-altitude applications
- Testbed and real-world evaluation of AGI-enabled UAV systems
- Security and privacy of AGI model in low-altitude communication networks

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Security and Privacy in Low Altitude Networking

Publication Date	Manuscript Submission Deadline
First Quarter 2026	1 August 2025

Special Issue

Call for Papers

SUBMIT A PAPER

The rapid emergence of the low-altitude economy, driven by autonomous aerial vehicles (AAVs), manned aircraft, and electric vertical take-off and landing (eVTOL) vehicles operating at altitudes within 1,000 to 3,000 meters, has triggered a broad range of applications such as aerial passenger transport, logistic delivery, low-altitude surveillance, and emergency response. For instance, air taxis offer a novel solution to urban congestion by ferrying passengers across cityscapes at low altitudes, which effectively bypasses traditional road traffic, reduces commute times, and alleviates urban congestion. These applications require the support of various technologies, including positioning and navigation, wireless communication, automatic control, which rely heavily on robust and efficient low-altitude networking. For instance, delivery drones require uninterrupted communication links for accurate navigation, payload management, and remote control.

Low-altitude networks face unique security and privacy challenges due to their dynamic, decentralized nature and critical requirements for navigation and communication. The open and dynamic nature of low-altitude networks, combined with critical requirements for positioning, navigation, and communication, makes traditional frameworks insufficient. Threats such as real-time attack coordination by adversarial swarms, identity management vulnerabilities from frequent transitions between operational zones, and privacy risks associated with trajectory analysis further complicate the landscape. Generative AI (GenAI) offers transformative solutions by enhancing authentication, mitigating forgery risks, and preserving privacy through synthetic data generation. This special issue aims to collect innovative solutions that enhance network security, robust encryption methods, and privacy-preserving technologies, ensuring low-altitude networks remain secure, adaptive, and resilient. This special issue seeks to collect innovative solutions that enhance network security, robust encryption methods, and privacy-preserving technologies, thereby ensuring that low altitude networks are both secure and resilient. We welcome original high-quality submissions on topics including, but not limited to:

- Threat detection and mitigation in low-altitude systems
- Privacy-enhancing cryptography for low-altitude networking
- Privacy-enhanced identification and identity management in low-altitude networking
- Energy depletion attack and security strategies in low-altitude networking
- Privacy-preserving federated learning for low-altitude networks
- Secure and privacy-aware data sharing in low-altitude systems
- Trust and reputation mechanisms for low-altitude networking
- Privacy and security challenges of aerial computing applications
- Secure GenAI based resource optimization for low-altitude networking
- Privacy and security in Agentic AI for low-altitude networking
- Privacy preserving crowdsourcing for low-altitude network
- Standards and protocols for secure low-altitude networking
- Intrusion detection and prevention in low-altitude systems
- 5G/beyond and 6G-enabled low-latency secure communication for low-altitude computing
- Homomorphic encryption for secure low-altitude data processing
- Post-quantum cryptography for low-altitude networks
- Quantum key distribution in low-altitude networking
- Zero-knowledge proofs for low-altitude privacy preservation
- Secure multi-party computation in for low-altitude networking

AESS

LAWN-TWG - 2026 Semi-Annual Report

IEEE

Publication Activities

- ***IEEE Network*** SI on Low-Altitude Wireless Networks (LAWN) **(received 71 submissions.)**
- ***IEEE Commag*** SI on Low-Altitude Wireless Networks: Sensing, Connectivity, and Agentic Intelligence. **(received 76 submissions)**
- ***IEEE IOTM*** SI on Intelligent and Secure Internet of Things for Low-Altitude Economy Networking **(received 37 submissions)**
- ***VTS-IEEE TVT*** SI on Low-Altitude Wireless Networks (LAWN) **(received 348 submissions)**
- ***SPS-IEEE JSTSP*** SI on Advanced AI and Signal Processing for Low-Altitude Wireless Networks. **(received 154 submissions)**

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Low-Altitude Wireless Network

Special Issue

Important Dates

Manuscript Submission Deadline: 28 February 2026
Initial Decision: 15 May 2026
Revised Manuscript Due: 30 June 2026
Final Decision: 30 July 2026
Final Manuscript Due: 15 August 2026
Publication Date: November 2026

Scope

With the rapid growth of applications, such as drone logistics and electric vertical takeoff and landing (eVTOL) vehicles, low-altitude airspace —defined as the region below 3,000 meters —has become the primary operational domain for small and medium-sized uncrewed aerial vehicles (UAVs). These emerging services demand reliable communication and sensing support, which cannot be met by existing terrestrial wireless networks originally designed for ground-based handheld devices. To address this gap, wireless coverage must evolve from two-dimensional ground-based systems to a three-dimensional infrastructure that integrates sensing and communication, enabling full digitalization of the low-altitude airspace. This emerging paradigm is referred to as Low-Altitude Wireless Network (LAWN), and it is increasingly recognized as a key direction for future wireless network evolution.

The LAWN aims to establish a digital airspace by reusing communication infrastructure as air traffic control system, which is empowered by the integrating communication and sensing (ISAC) technologies, striving for extremely low-latency communication and high-precision perception. In the LAWN, the base stations are no longer limited to data transmission but also serve as distributed sensors capable of performing real-time situational awareness, which enables critical functions, such as non-line-of-sight (NLOS) target detection, environmental monitoring, and airspace perception. Meanwhile, advancements in 3D massive MIMO, millimeter-wave and terahertz communications, and edge intelligence provide the necessary capacity, coverage, and responsiveness for real-time air-ground coordination.

Despite its potential, the deployment of LAWN still faces significant technical challenges. In

Home / Publications / Magazines / IEEE Communications Magazine / Call for Papers / Low-Altitude Wireless Networks: Sensing, Connectivity, and Agentic Intelligence

Low-Altitude Wireless Networks: Sensing, Connectivity, and Agentic Intelligence

Publication Date	Manuscript Submission Deadline
August 2026	15 February 2026

Special Issue

Call for Papers

SUBMIT A PAPER

The low-altitude airspace, which is generally below 3,000 meters above ground, is fast becoming a new frontier for wireless communications. Enabled by rapid advances in unmanned aerial vehicles (UAVs), drone swarms, and urban air mobility (UAM) platforms, the Low-Altitude Wireless Network (LAWN) is poised to revolutionize sectors ranging from smart cities and public safety to logistics, environmental monitoring, and next-generation digital infrastructure. LAWN envisions a tightly integrated, service-aware, and resilient 3D network fabric where communication, real-time sensing, cooperative control, and agentic intelligence are jointly optimized. This paradigm shift goes far beyond conventional aerial networks, demanding innovations across technology, policy, and business. With the rapidly growing global R&D efforts and regulatory developments, this Special Issue (SI) aims to bring together leading research, industrial innovation, and policy perspectives to address the unique opportunities and multidisciplinary challenges presented by LAWN. Prospective authors are invited to submit articles on topics including, but not limited to:

- Architectural frameworks for agentic LAWNs and 3D network fabrics.
- Cross-layer optimization and co-design of multi-functions in agentic aerial networks.
- Air-to-ground, air-to-air, and air-to-space channel modeling and measurement campaigns.
- Spectrum management, sharing, and coexistence strategies for Agentic AI-driven 3D airspace.
- Intelligent network management, edge computing, and distributed Agentic AI for aerial platforms.
- Integrated Sensing and Communication (ISAC) and multi-modal data fusion in the agentic LAWNs.
- Ultra-reliable and low-latency communication (URLLC) for agentic aerial applications.
- Swarm coordination, autonomous navigation, and collaborative multi-agent systems.
- Energy-efficient protocols and wireless power transfer technologies for agentic LAWNs.
- Security, privacy, and resilience in agentic LAWNs.
- Field trials, testbeds, and large-scale demonstrations of LAWN deployments.
- Urban air mobility, drone-based logistics, public safety, and emergency response applications powered by agentic intelligence.
- Integration of LAWNs with terrestrial, maritime, and satellite networks for seamless 3D connectivity.
- Emerging business models, socio-economic impact, and sustainability of low-altitude airspace operations.

Submission Guidelines

Manuscripts should conform to the standard format as indicated in the Information for Authors section of the Manuscript Submission Guidelines. Please, check these guidelines carefully before submitting since submissions not complying with them will be administratively rejected without review.

All manuscripts to be considered for publication must be submitted by the deadline through IEEE Submission Portal. Select the "Low-Altitude Wireless Networks" topic from the drop-down menu of Topic/Series titles. Please observe the dates specified below, noting that there will be no extension of the submission deadline.

Important Dates

Manuscript Submission Deadline: 15 February 2026
Initial Decision Date: 30 March 2026
Revised Manuscript Due: 30 April 2026
Final Decision Date: 15 May 2026

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Intelligent and Secure Internet of Things for Low-Altitude Economy Networking

Special Issue

As terrestrial resources become increasingly scarce and ground infrastructure reaches its limits, the development of intelligent and secure Internet of Things (IoT) for low-altitude economy networking become an urgent necessity. This effort is fueling the rise of a new low-altitude economy, an intelligent and secure ecosystem of services and industries leveraging the airspace accessible to uncrewed aerial vehicles (UAVs) for activities such as aerial logistics and urban air mobility. To thrive low-altitude activities, international regulatory, and standardization efforts, such as Europe's U-space that manages drone traffic, are essential. Besides, the supporting IoT infrastructure that integrates sensing, communication, computing, and security is also vital. Such IoT networks can analyze wireless signals to infer UAV orientation for collision avoidance while applying cryptographic and physical-layer defenses against attackers. Meanwhile, processing rich multimodal data with advanced AI models, including language models (LLMs) and generative AI (GenAI) models, while preserving privacy through techniques like differential privacy, is irreplaceable. Therefore, intelligent partitioning of workloads between aerial nodes and ground/cloud resources is needed to deliver timely decisions.

However, constructing an intelligent and secure IoT architecture presents several challenges. First, advanced AI models require considerable computation and memory, straining the limited processing and energy reserves of aerial platforms. Second, many low-altitude applications are delay-sensitive, requiring the network to provide feedback with ultra-low latency communication to aerial nodes. This imposes stringent requirements on task offloading strategies and real-time resource scheduling across the network. In addition, the vast amount of sensor data collected by aerial platforms raises concerns about storage, bandwidth, and privacy, especially when such data includes sensitive information about individuals or critical infrastructure. This brings new challenges to the design and optimization of security strategies.

Addressing these challenges require innovative solutions from two perspectives. On one hand, we must optimize the acquisition, transmission, and processing of multimodal sensor data throughout the low-altitude networking. For example, model pruning and compression techniques can be applied to reduce large AI models' size and energy consumption while preserving security, thereby improving the efficiency of on-board data processing. Advanced data

IEEE JSTSP Special Issue on Advanced AI and Signal Processing for Low-Altitude Wireless Networks

Special Issue Deadlines

CALL FOR PAPERS - *IEEE Journal of Selected Topics in Signal Processing*

Advanced AI and Signal Processing for Low-Altitude Wireless Networks

Low-altitude wireless networks (LAWNs), which interconnect unmanned aerial vehicles (UAVs), low-altitude platform stations, aerial robots, and connected ground vehicles, are set to be the backbone of next-generation intelligent systems. These networks facilitate critical applications such as last-mile delivery, disaster relief, air-traffic surveillance, smart-city sensing, and precision agriculture. However, operating in a three-dimensional (3-D) environment below 3 km altitude introduces unique challenges due to rapid topology changes, Doppler shifts, altitude-dependent interference, and stringent size, weight, and power (SWaP) constraints. While traditional wireless network designs have focused on 2-D communication environments, the distinctive 3-D nature of LAWN calls for novel signal processing approaches to address the complexities of these dynamic, aerial systems. Furthermore, emerging artificial intelligence (AI) techniques, including generative models, large-language-model (LLM)-inspired protocol agents, transformers, and graph neural networks, offer transformative potential for enhancing the design and optimization of LAWN systems.

This Special Issue seeks to bring together the latest advancements in signal processing and AI to address the unique challenges faced by LAWN. Topics of interest include, but are not limited to:

- 3-D air-space-aware channel modelling & tracking with adaptive signal processing
- Cooperative localization and navigation for multi-drone meshes
- Doppler-resilient waveform design and altitude-adaptive precoding design
- AI-enhanced 3D beamforming
- Energy-efficient signal processing for battery-constrained LAWNs
- Generative AI and digital-twin frameworks for signal processing in LAWNs

Education Activities

- Organized LAWN-oriented seminars to share recent advances in air-ground networking, integrated sensing and communication, and low-altitude intelligence.
- Planned a student competition to encourage young researchers to develop innovative solutions for LAWN modeling, optimization, simulation, and testbed validation.
- Promoted tutorials, panels, and technical discussions for students, and practitioners.
- Affiliated AESS Distinguished Lecturers
  - Giancarmine Fasano — UAVs, detect-and-avoid, multi-drone systems
  - Maria Sabrina Greco — radar systems, cognitive radar
  - Gokhan Inalhan — AI, autonomy, avionics, UAVs
  - Roberto Sabatini — avionics, autonomy, aerospace systems
  - Xiangrong Wang — joint radar-communications, automotive sensing

LAWN-TWG - Future Plans

- Develop a clearer LAWN technical roadmap covering communication, sensing, navigation, control, edge intelligence, and security.
- Organize LAWN-focused seminars, workshops, tutorials, panels, and student competitions.
- Promote special issues, magazine articles, surveys, and white papers on LAWN-related topics.
- Strengthen industry and standards engagement with aviation, wireless, and low-altitude economy stakeholders.
- Encourage open datasets, benchmarks, simulation tools, and experimental testbeds.
- Expand international membership and involve more early-career researchers and students.
- Build stronger collaboration with IEEE societies, AESS technical panels, academia, industry, and government agencies.