

2026 第九届 IEEE 国际无人系统大会

特邀专题简介表

特邀专题名称

空地一体无人系统通信网络

组织者

1. 杜智勇，教授，信息支援部队工程大学
2. 汪西明，副教授，信息支援部队工程大学
3. 卢晓珍，教授，南京航空航天大学
4. 韩昊，讲师，陆军工程大学
5. 刘松仪，讲师，陆军工程大学

个人简介



杜智勇，信息支援部队工程大学教授，研究方向为无线通信中的智能决策、在线学习与优化、无人机通信等，主持国家自然科学基金、国防重点实验室基金、综合研究计划等 3 项国家和省部级项目，参研 2 项国家自然科学基金和 1 项科技委项目。授权发明专利 2 项，出版学术专著 1 本，在 IEEE TWC/TVT/COM 等通信领域国际权威期刊和多个国际知名学术会议发表论文 30 余篇，是多个期刊的审稿人和 IEEE ICC/VTC 等知名国际学术会议的程序委员会成员，2020 年入选玛丽居里学者计划。



汪西明，信息支援部队工程大学副教授，研究方向为智能抗干扰通信、无人系统通信、无线网络资源优化等。在 IEEE CM/WCM/WCL 等通信领域国际权威期刊和多个国际知名学术会议发表论文 20 余篇，是多个期刊和学术会议的审稿人，授权国家发明专利 4 项。主持国家自然科学基金青年科学基金、国家自然科学基金地区科学基金子课题、基础加强计划基金子课题等项目 3 项。



卢晓珍，南京航空航天大学教授，研究方向为低空智联网络安全、无人机安全通信、强化学习、分布式学习等。在 IEEE TIFS/TMC/TDSC 等国际期刊和国际学术会议发表论文 40 余篇。主持国家自然科学基金面上及青年项目、江苏省自然科学基金青年基金项目及国家自然科学基金联合基金重点项目课题。



韩昊，陆军工程大学讲师，研究方向为智能无线通信、抗干扰通信、智能通信对抗博弈等。在 IEEE WCM/TCCN/WCL 等通信领域国内外权威期刊和国际知名学术会议发表论文 20 余篇，授权国家发明专利 3 项，获评江苏省优秀学术学位论文。主持基础加强计划基金子课题、陆军工程大学青年自主创新基金各 1 项，参与多项国家国防重大科研项目，获创客行动一等奖。



刘松仪，陆军工程大学讲师，研究方向为多智能体强化学习、智能抗干扰通信、无人自组网。在 IEEE TIFS/TCOM/IOT 等通信领域国际权威期刊和国际知名学术会议发表论文近 20 篇，授权国家发明专利 5 项。主持国家自然科学基金青年科学基金 1 项，参与国家和省部级重大科研项目多项，获创客行动一等奖一项。

特邀专题简介

随着人工智能与通信技术的深度融合，空地一体无人系统通信网络在支撑未来智能交通、应急救援、智慧城市等领域的发展扮演着重要角色。该网络通过整合无人机、无人车、卫星、地面基站等多维度通信节点，构建全域覆盖、动态协同的立体通信架构，为有人、无人系统提供无缝连接与实时决策能力。然而，传统通信理论与技术在应对空地网络的高动态性、网络易受无线攻击及异构资源约束时面临显著局限。AI 技术凭借其强大的模式识别、优化决策与自主学习能力，为解决空地一体无人系统通信网络中的频谱环境认知、任务规划、动态拓扑调整、分布式协同决策、传输方案优化等复杂性问题提供了创新路径。

本特邀专题围绕“空地一体无人系统通信网络”主题征求原创稿件，并借此机会为研究人员交流新思想和新方法、探讨相关问题和挑战提供平台。

- 机器学习在空地一体无人系统通信网络中的应用
- 强化学习在空地一体无人系统通信网络中的应用
- 深度学习在空地一体无人系统通信网络中的应用
- 联邦学习在空地一体无人系统通信网络中的应用
- 生成式 AI 在空地一体无人系统通信网络中的应用
- 任务驱动的空地一体无人系统通信网络分布式协同
- 分布式天线相干增强在空地一体无人系统通信网络中的应用
- 可移动天线技术在空地一体无人系统通信网络中的应用
- 空地一体无人系统通信网络组网技术
- 空地一体无人系统通信网络抗干扰技术
- 空地一体无人系统通信安全技术

IEEE ICUS 2026

Invited Session Summary

Title of Session

Air-ground Integrated Unmanned System Communication Network

Organizers

1. Prof. Zhiyong Du

Information Support Force Engineering University, China

2. Assoc. Prof. Ximing Wang

Information Support Force Engineering University, China

3. Prof. Xiaozhen Lu

Nanjing University of Aeronautics and Astronautics, China

4. Dr. Hao Han

Army Engineering University, China

5. Dr. Songyi Liu

Army Engineering University, China

Biosketches of Organizers



Zhiyong Du, Professor at Information Support Force Engineering University, his research focuses on intelligent decision-making, online learning and optimization, and UAV communications. He has hosted three national and provincial projects, including the National Natural Science Foundation, the Defense Key Laboratory Fund, and the Comprehensive Research Plan. He has participated in two national and military projects. He has been granted two invention patents, published one academic monograph, and has over 30 publications in international journals and conferences in the field of communications such as IEEE TWC/TVT/COM. He is the reviewer for multiple journals and the program committee member for international conferences such as IEEE ICC/VTC. In 2020, he was selected for the Marie Curie Fellowship program.



Ximing Wang is an Associate Professor in Information Support Force Engineering University, his research interests include intelligent anti-jamming communication, unmanned system communication network, wireless network resource optimization, etc. He has published more than 20 papers in IEEE CM/WCM/WCL and other international journals and conferences. He is the reviewer of many journals and academic conferences, and has authorized 4 national invention patents. He has hosted 3 national and military

projects.



Xiaozhen Lu is currently a Professor at Nanjing University of Aeronautics and Astronautics. Her research interests include secure wireless communication, secure communication for unmanned aerial vehicles, reinforcement learning, and distributed learning. She has published over 40 papers, such as IEEE TIFS/TMC/TDSC, and has hosted several projects.



Hao Han is currently a Lecturer at Army Engineering University, his research interests include intelligent wireless communication, anti-jamming communication, intelligent communication confrontation. He has over 20 publications in international journals and conferences in the field of communications such as IEEE WCM/TCCN/WCL. He has hosted 2 military /university-level projects and won the first prize of the Maker Initiative.



Songyi Liu is a lecturer at the Army Engineering University. His research interests focus on multi-agent reinforcement learning, intelligent anti-jamming communications, and unmanned ad-hoc networks. He has published nearly 20 papers in prestigious international journals and conferences in the field of communications, including IEEE TIFS/TCOM/IOT, and has been granted 5 national invention patents. He has hosted 1 national level projects and won the first prize in the "Maker Action" competition.

Details of Session

With the deep integration of artificial intelligence and communication technologies, air-ground integrated unmanned system communication networks are playing a pivotal role in supporting the development of future intelligent transportation, emergency rescue, smart cities, and other fields. By integrating multi-dimensional communication nodes such as unmanned aerial vehicles (UAVs), autonomous vehicles, satellites, and ground base stations, this network constructs a three-dimensional communication architecture with full-domain coverage and dynamic collaboration, providing seamless connectivity and real-time decision-making capabilities for both manned and unmanned systems. However, traditional communication theories and technologies face significant limitations in addressing the high dynamics of air-ground networks, vulnerability to wireless attacks, and constraints on heterogeneous resources. AI technologies, with their powerful pattern recognition, optimization decision-making, and autonomous learning capabilities,

offer innovative pathways to solve complex challenges in air-ground integrated unmanned system communication networks, including spectrum environment cognition, task planning, dynamic topology adjustment, distributed collaborative decision-making, and transmission scheme optimization.

The invited session calls for original papers relevant to the following selected topics of “Air-Ground Integrated Unmanned System Communication Networks”, aiming to provide a platform for researchers to exchange new ideas, explore innovative methods, and discuss emerging issues and challenges in this field.

- Machine learning for air-ground integrated unmanned system communication network
- Reinforcement learning for air-ground integrated unmanned system communication network
- Deep learning for air-ground integrated unmanned system communication network
- Federated learning for air-ground integrated unmanned system communication network
- Generative AI for air-ground integrated unmanned system communication network
- Task-driven distributed collaboration in air-ground integrated unmanned system communication network
- Distributed antenna coherence enhancement technologies for air-ground integrated unmanned system communication network
- Movable antenna technologies for air-ground integrated unmanned system communication network
- Networking technologies for air-ground integrated unmanned system communication network
- Anti-jamming technologies for air-ground integrated unmanned system communication network
- Security technologies for air-ground integrated unmanned system communication network