2025 第八届 IEEE 国际无人系统大会
特邀专题简介表

特邀专题名称

智能协同与动态优化敏捷指挥控制

组织者

1. 李兵，研究员，航天七院七部

2. 王涛，教授，国防科技大学系统工程学院

3. 侯俊亮，研究员，成都西南信息控制研究院

4. 李娟，副研究员，北京理工大学机电学院

个人简介

李兵，男，博士，研究员，科技部专家库入库专家，中国航天科技集团青年拔尖人才，海军航空大学兼职高层次人才专家，北京理工大学校外博士生导师，中国指控学会智能博弈与兵棋推演专委会常务委员，专业特长无人作战装备体系总体技术、无人系统技术。获国防科技进步三等奖 1 项，集团科技进步二等奖 1 项，承担多项国家级项目，发表论文 23 篇，申请专利 22 项，编写专著一本。

王涛，男，博士，教授，国防科技大学系统工程学院战略博弈与战略管理教研中心主任，目前主要从事无人体系设计、系统仿真等领域研究；具有丰富的重大项目管理、重大平台研制、重大活动支撑经验，带队参与了若干重大活动，有力支撑机关首长决策；承担军队重大项目、国家社科科学基金等 10 余项，在高水平期刊发表论文数十篇；获得省部级科技进步奖 2 项，学校优秀教学奖、大学生科技创新竞赛优秀教师奖。

侯俊亮，男，成都西南信息控制研究院研究员，北京理工大学博士、博士后，长期从事装备运用、无人系统和指挥控制系统相关研究，主持多项装备预和型号研制项目，发表学术论文 20 余篇，授权发明专利 10 余项。

李娟，女，博士，北京理工大学机电学院副研究员，目前主要从事智能优化算法（多目标优化和不确定优化）、无人系统设计与集成、群体智能以及复杂环境下大规模无人系统自主决策等研究；承担国家及学校课题四项，参与多个军兵种重点研发项目；发表高水平国际期刊论文八篇、会议论文十余篇，编写专著两本。

特邀专题简介

在当今复杂多变的作战环境下，传统指挥控制模式逐渐难以满足快速响应与灵活决策的需求，敏捷指挥控制（Agile Command and Control，AC2）已成为提升决策效率、增强系统韧性的核心技术方向。它强调以高度的灵活性、快速的适应性和高效的协同性，打破层级限制，实现指挥要素的动态重组与任务的快速分配。敏捷指挥控制不仅是技术的革新，更是作战理念与组织架构的深度变革，通过融合先进信息技术，如大数据、人工智能、云计算等，赋能指挥控制体系，使其能够在瞬息万变的战场态势中，迅速感知、精准判断、果断决策、高效执行，进而掌握战场主动权，塑造未来战争的新优势。

近年来，在人工智能技术推动下敏捷指挥控制系统在军事协同作战等领域展现出巨大潜力，但仍面临动态环境适应性不足、异构资源协同效率低、人机协同可信度有限等挑战。为此，本专题将涵盖以下研究方向：

- 敏捷指挥控制体系架构设计
- 基于人工智能的态势感知与决策辅助技术
- 分布式协同指挥控制机制
- 系统韧性评估与安全防护
- 敏捷指挥控制应用研究

IEEE ICUS 2025
Invited Session Summary

Title of Session

Intelligent Collaboration and Dynamic Optimization of Agile Command and Control

Organizers

1. Prof. Bing Li

System Engineering Institute of Sichuan Aerospace, China

2. Prof. Tao Wang

National University of Defense Technology, China

3. Prof. Junliang Hou

Chengdu Southwest Research Institute of Information Control, China

4. Assoc. Prof. Juan Li

Beijing Institute of Technology, China

Biosketches of Organizers

Bing Li, male, Ph.D., Professor, Experts in the System Engineering Institute of Sichuan Aerospace, Experts in the Expert Database of the Ministry of Science and Technology，Selected into the Out-standing Youth Talent Plan, Visiting Professor of Chengdu University of Technology, Member of the Expert Committee of Sichuan New Standard Rail Gear Transmission Equipment Engineering Research Center. His research interests include unmanned combat equipment system and unmanned system technology. He has been awarded a second prize at the provincial and ministerial level and completed the integration verification and evaluation optimization technology of an unmanned system as the technical director and deputy director of the project office. He also participated in several important projects. He has published 23 high-level international journal papers, 22 patents and co-authored a book.

Tao Wang, male, Ph.D., Professor, Director of the Teaching and Research Center for Strategic Game and Strategic Management, College of Systems Engineering, National University of Defense Technology. His interest is strategic system-of-systems designing and system simulation. He led the team to participate in several major activities, and strongly supporting the decision-making of the head of the agency. He undertook more than ten major projects, and published dozens of papers in high-level journals.

Junliang Hou， Professor at Chengdu Southwest Research Institute of Information Control, a doctor and post-doctor of Beijing Institute of Technology, has long been engaged in research related to equipment application, unmanned systems, and command and control systems. He has presided over several equipment advanced research and model development projects, published more than 20 academic papers, and been authorized over 10 invention patents.

Juan Li, female, Ph.D., Associate Professor at Beijing Institute of Technology, China. Her current research interests include intelligent optimization (multi-objective evolutionary optimization, and uncertain optimization), unmanned systems design and integration, swarm intelligence, and autonomous decision-making of large-scale unmanned systems under complex environments. She participated in several important projects, undertook 4 national and school projects. She has published eight high-level international journal papers, more than ten conference papers and co-authored two books.

Details of Session

In the complex and ever-changing combat environment today, the traditional command-and-control mode is gradually becoming unable to meet the demands for rapid response and flexible decision - making. Agile Command and Control (AC2) has become a core technological direction for enhancing decision-making efficiency and system resilience. It emphasizes high flexibility, rapid adaptability, and efficient synergy to break through hierarchical limitations and achieve the dynamic recombination of command elements and the rapid allocation of tasks. Agile

Command and Control is not merely a technological innovation but also a profound transformation of combat concepts and organizational structures. By integrating advanced information technologies such as big data, artificial intelligence, and cloud computing, it empowers the command - and - control system, enabling it to rapidly perceive, accurately judge, decisively make decisions, and efficiently execute in the ever - changing battlefield situation, thus seizing the initiative on the battlefield and shaping new advantages for future wars.

Recently, driven by artificial intelligence technology, Agile Command and Control systems have demonstrated great potential in fields such as military cooperative operations. However, they still face challenges such as insufficient adaptability to dynamic environments, low-efficiency collaboration of heterogeneous resources, and limited trustworthiness in human-machine collaboration. Therefore, this special topic will cover the following research directions:

- Agile Command and Control system architecture design
- Artificial-intelligence-based situation awareness and decision-making assistance technologies
- Distributed collaborative command-and-control mechanisms
- System resilience assessment and security protection
- Research on the application of Agile Command and Control