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

无人系统海洋态势智能感知与认知

组织者

1. 王海鹏，教授，中国人民解放军海军航空大学

2. 刘　瑜，教授，中国人民解放军海军航空大学

3. 陈　波，教授，哈尔滨工业大学(深圳)

4. 刘　颢，研究员，武汉数字工程研究所

5. 耿　亮，教授，湖北工业大学

6. 安　彧，副教授，湖北工业大学

个人简介

王海鹏，男，1985 年 4 月出生，海军航空大学信息融合研究所教授、博导。长期从事海洋态势感知与认知方向的技术研究与工程应用，主持国家自然科学基金、山东省重大专项、XX3 等重点课题 10 余项，获山东省科技进步一等奖 2 项，军队科技进步奖 2 项；授权国家发明专利 40 余项；出版著作 5 部，在 Information Fusion、IEEE Transactions on NNLS、TGRS 等发表论文 30 余篇。被评为青年长江学者、军队拔尖人才、山东省青年泰山学者等，享受国务院特殊津贴，获求是杰出青年奖、山东省青年科技奖，荣立二等功、三等功各 1 次。兼任教育部“电子信息类”教学指导委员会副秘书长、中国指挥与控制学会青工委副主任委员、多域态势感知与智能认知专委会副主任委员、中国人工智能学会智能融合专委会常委等。

刘瑜，男，1986 年 12 月出生，海军航空大学教授，获国家自然科学基金优秀青年基金资助，兼任中国航空学会理事。长期致力于多模态数据智能融合、无人系统智能博弈等方向的研究，主持或主力完成了 973 计划课题、国家自然科学基金面上项目等 10 余项省部级以上科研项目，主要成果已应用于多项实际装备系统中。发表论

文 60 余篇，获发明专利 20 余项，以核心完成人身份获省部级科技一等奖 3 项、二等奖 2 项。

陈波，现任哈尔滨工业大学（深圳）教授、博士生导师，国家人才工程青年拔尖人才，深圳市高层次人才。兼任全国北斗卫星导航标准化技术委员会委员、中国宇航学会飞行器任务规划专委会委员、中国 GIS 协会空间大数据工委会副秘书长、中国遥感应用协会遥感卫星数据处理专委会委员等学术职务。长期致力于卫星数据智能处理、智能边缘计算、空间大数据等方向的研究，主持并完成了 973 计划课题、863 项目、国家重点研发计划课题、装备预研计划、创新特区计划等 20 余项国家级科研项目，部分成果已发展成国家和行业标准，服务于测绘、减灾、环保、北斗、高分等国家重要行业和领域。出版专著 3 部，发表论文 80 余篇，参与编写国标、国军标等重要国家级标准 5 部，获发明专利 20 余项，以核心完成人身份获省部级科技进步一等奖 1 项、二等奖 9 项。

刘颢，男，1983 年 6 月出生，现为中船 709 所总体部第三研究室副主任，研究员，中船集团青年拔尖人才，中国指挥与控制学会青年工作委员会常务委员、航空学会信息融合分会委员，主要研究方向为信息融合、态势认知，作为负责人主持海军、军委装备发展部、军科委 173 计划等课题 5 项，作为主要人员参与 10 余项，牵头研制了多型船信息融合系统，获集团科技进步一等奖、二等奖各 1 项，获山东省科技进步一等奖 1 项，军队科技进步二等奖 1 项，获授权国家发明专利 10 余项，发表 SCI、EI、中文核心论文 10 余篇。

耿亮，男，1977 年 7 月出生，现为湖北工业大学教授、硕士生导师，中国现场统计研究会资源与环境统计分会常务理事，湖北省数学学会第十三届理事会理事，武汉市数学学会第十三届理事会理事，武汉工业与应用数学学会第九届理事会理事。主要研究方向为数据科学与决策、态势认

知。主持及参与多项军科委 173 计划项目子课题、国家自然科学基金项目以及省部级研究项目，主编教材 2 部，发表论文 20 余篇。

安彧，男，1983 年 7 月出生，现为湖北工业大学副教授、硕士生导师，中国指挥与控制学会青年工作委员会委员，主要研究方向为多传感器智能感知、态势认知、数据分析与决策，作为技术骨干参与完成了多项海军、军委装备发展部预研课题。作为项目负责人完成军科委 173 计划项目子课题 1 项及多项相关研究领域横向课题。

特邀专题简介

随着先进传感器的广泛应用以及人工智能技术新潮流的快速兴起，海上无人系统进入高速发展时期。当今的海上无人系统群体可实现在复杂海况下协同感知海域中的目标实体及海洋信息，为海洋态势智能感知与认知提供新的技术手段。本特邀专题目的在于促进无人系统海洋态势智能感知与认知领域的新概念、新理论及新技术的发展，为相关领域的专家、学者及工程技术人员提供交流平台。

本特邀专题邀请以下与“无人系统海洋态势智能感知与认知”主题相关的包含创新思想、概念、新发现、改进以及新应用的原创论文。

- 态势时空知识图谱构建与演进
- 海上态势智能感知
- 可解释性态势深度认知
- 海上无人系统自主控制
- 海上态势智能认知计算加速
- 海上无人系统行为意图研判与反欺骗
- 海上无人系统博弈对抗
- 面向大模型的海洋态势认知框架构建
- 面向海上态势认知的智能图计算系统

IEEE ICUS 2025
Invited Session Summary

Title of Session

Marine Situation Intelligent Awareness and Cognition of Unmanned System

Organizers

1. Prof. Haipeng Wang

Naval Aviation University, China

2. Prof. Yu Liu

Naval Aviation University, China

3. Prof. Bo Chen

Harbin Institute of Technology, Shenzhen, China

4. Prof. Hao Liu

Wuhan Digital Engineering Institute, China

5. Prof. Liang Geng

Hubei University of Technology, China

6. Assoc. Prof. Yu An

Hubei University of Technology, China

Biosketches of Organizers

Haipeng Wang, male, is currently the professor and doctoral supervisor of Information Fusion Research Institute of Naval Aviation University. He has been engaged in technical research and engineering application in the direction of Marine situation awareness and cognition for a long time, presided over more than 10 key projects such as the National Natural Science Foundation, major projects of Shandong Province and XX3, and won 2 first prize of Shandong Province Science and Technology Progress Award and 2 Military Science and Technology Progress Award. More than 40 national invention patents were authorized. He has published 5 books and more than 30 papers in Information Fusion, IEEE Transactions on NNLS, TGRS, etc. He is selected as the "Yangtze River Scholar" by the Ministry of Education, Subject Top-notch Talent of the Military High-level Scientific and Technological Innovation Talent Project, Young Expert of the Shandong Taishan Scholar, Leader of "Youth Innovation Science and Technology Program" in Shandong Universities, and Young Scientists of Chinese Institute of

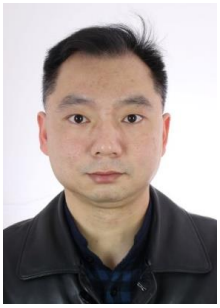
Command and Control. He enjoys the special government allowances of the State Council and the post allowances for outstanding military professionals, earning second-class merit and third-class merit once each. He also serves as the Deputy Secretary-General of the "Electronic Information" Teaching Steering Committee of the Ministry of Education, an expert on Shandong Science and Technology Awards, and a data scientist at the Shanghai Key Laboratory of Data Science.

Yu Liu, male, is currently a professor of Naval Aviation University, funded by the National Science Fund for Outstanding Young Scholars. He also serves as a director of the Chinese Society of Aeronautics and Astronautics. For a long time, it has been committed to the research on intelligent fusion of multi-modal data, intelligent game in unmanned systems and other directions. It has presided over and completed more than 10 national scientific research projects such as 973 program, the National Natural Science Foundation of China. Some of the achievements have developed into national and industrial filed. He has published more than 60 papers, won more than 20 invention patents, and won 3 first prize and 2 second prizes of provincial and ministerial scientific and technological progress.

Bo Chen, male, is currently a professor and doctoral supervisor of Harbin University of Technology (Shenzhen), a young top talent of national talent project and a high-level talent in Shenzhen. He also serves as a member of the national Beidou satellite navigation Standardization Technical Committee, a member of the special committee for aircraft mission planning of China Aerospace society, the Deputy Secretary General of the space big data working committee of China GIS Association, and a member of the special committee for remote sensing satellite data processing of China Remote Sensing Application Association. For a long time, it has been committed to the research on intelligent processing of satellite data, intelligent edge computing, space big data and other directions. It has presided over and completed more than 20 national scientific research projects such as 973 program, 863 project, national key R & D program, equipment pre research plan and innovation special zone plan. Some of the achievements have developed into national and industrial standards, serving important national industries and fields such as surveying and mapping, disaster

reduction, environmental protection, Beidou and Gaofen. He has published 3 monographs, more than 80 papers, participated in the preparation of 5 important national standards such as national standards and national military standards, won more than 20 invention patents, and won 1 first prize and 9 second prizes of provincial and ministerial scientific and technological progress.

Hao Liu, male, member of the youth committee of CICC, member of the information fusion branch of CSAA, is currently a professor at Wuhan digital engineer institute. His main research interests include information fusion and situation cognition. As the person in charge, he presided over 4 topics, such as sub topics of the 173 key projects, pre study of Navy and the equipment development department of the Military Commission, participated in more than 10 projects as the main personnel, and led the development of multi type ship information fusion system. It won one 1st prize and one 2nd prize of the group's scientific and technological progress, one 1st prize of Shandong provincial scientific and technological progress, one 2nd prize of military scientific and technological progress, 10 authorized national invention patents, and published 9 SCI, EI and Chinese core papers.



Liang Geng, male, is currently a professor and master's supervisor at Hubei University of Technology. He holds the position of standing council member of the Resource and Environmental Statistics Branch of the Chinese Association for Applied Statistics, council member of the 13th Hubei Mathematical Society, council member of the 13th Wuhan Mathematical Society, and council member of the 9th Wuhan Industrial and Applied Mathematics Society. His primary research focuses on data science and decision-making, as well as situational awareness. He has led and participated in multiple sub-projects under the Military Science Commission's 173 Program, National Natural Science Foundation projects, and various provincial and ministerial research initiatives. Additionally, he has authored two textbooks and published over 20 academic papers.

Yu An, male, member of the youth committee of CICC, is currently a associate professor and master's supervisor of Hubei University of Technology. His main research interests include multi-sensor intelligent perception, situation cognition, data analysis and decision-making. As a technical backbone, he has participated in a number of pre-research projects of the Navy and the Equipment Development Department of the Military Commission. As the project leader, he completed 1 sub-project of the Military Science Commission's 173 Program and a number of horizontal projects in related research fields.

Details of Session

With the wide application of advanced sensors and the rapid rise of the new trend of artificial intelligence technology, marine unmanned systems have entered a period of rapid development. Nowadays, marine unmanned system groups can realize the cooperative awareness of target entities and marine information under complex marine situation, providing new technical means for marine situation intelligent awareness and cognition. The aim of the invited session is to promote the development of new concepts, theories and technologies in the field of marine situation intelligent awareness and cognition of unmanned system. It provides a communication platform for experts, scholars and engineering technicians in relevant fields.

The invited session invites original papers of innovative ideas and concepts, new discoveries and improvements, and novel applications relevant to the following selected topics of "Marine situation intelligent awareness and cognition of unmanned system".

- Construction and evolution of situation spatiotemporal knowledge graph
- Intelligent awareness of marine situation
- Interpretable of situation depth cognition
- Autonomous control of marine unmanned system
- Computing acceleration of marine situation intelligence cognition
- Behavioral intent judgment and anti-spoofing of marine unmanned systems
- Game confrontation of marine unmanned systems
- Construction of cognitive framework of marine situation oriented to large model
- Intelligent Graph Computing System for Situation Cognition at Sea