

# 2024 第七届 IEEE 国际无人系统大会

## 特邀专题简介表

<b>特邀专题名称</b> <p style="text-align: center;">跨域协同无人系统</p>
<b>组织者</b> <ol style="list-style-type: none"><li>1. 杨毅，教授，北京理工大学</li><li>2. 岳裕丰，教授，北京理工大学</li></ol>
<b>个人简介</b> <div data-bbox="252 725 568 1070"></div> <p data-bbox="592 725 1337 1384"><b>杨毅</b>，北京理工大学自动化学院教授、博士生导师，国家级领军人才，长期从事陆上无人系统自主导航方向的教学与科研工作，现担任北京理工大学“特立笃行”（IN2Bot）陆上无人系统研究方向负责人；北京理工大学 ININ 与普林斯顿大学 PAVE “汽车主动安全技术”联合实验室副主任；全国大学生机器人大赛（ROBOCON，团中央主办）专家委员会委员兼裁判长等。承担国家自然科学基金和某领域预研等重要科研项目多项，发表学术论文 50 余篇，授权发明专利 40 余项，参与出版专著、教材 3 部，2020 年以第二完成人获得国家科技进步一等奖，2017 年以第一完成人获得某领域科技进步一等奖 1 项，获得“跨越险阻 2018”陆上无人系统挑战赛地空协同搜索第一名。</p> <div data-bbox="252 1429 523 1774"></div> <p data-bbox="547 1429 1337 2029"><b>岳裕丰</b>，北京理工大学自动化学院教授、博士生导师，2021 年入选国家级青年人才计划，2020 年入选中国科协青年人才托举工程，长期从事自主移动机器人感知与导航研究，具体研究方向包括：多模态深度学习与认知、即时定位与三维场景重建、多机器人协同导航与控制等，承担国家自然科学基金等项目，在 Springer 出版英文专著 1 部，在 IEEE TIE、IEEE TMech、NeurIPS、ICRA 等 SCI 期刊和 EI 会议发表论文 40 余篇，获 2021 IEEE ICUS 最佳论文奖、2020 IEEE ICARCV 最佳论文奖，指导学生获第七届中国国际“互联网+”大学生创新创业大赛金奖，担任 IEEE RAS 自主地面车辆技术委员会青年主席、2020-2022 IROS 副主编以及 ICRA、IROS、</p>

ICUS 等多个国际会议程序委员会委员、分论坛主席。

### 特邀专题简介

近年来，跨域协同无人系统由于其具有的多维感知、全域响应和高效机动等优势，引起研究者的广泛关注。跨域协同无人系统可以是无人机、无人车和无人船等多种无人平台组成的异构协同系统，也可以是具有不同行为和任务同类无人平台组成的同构协同系统。在实际应用中，如何使跨域协同无人系统在复杂环境中具备自主感知和导航能力仍是一个巨大挑战。本次专题会议将重点讨论跨域协同无人系统领域的最新进展，包括感知、定位、建图、导航、控制、机器学习、多机器人系统及相关应用案例。

本次专题会议将为全球科学家，工程师和相关从业人员搭建交流平台，介绍各自在跨域协同无人系统领域取得的最新理论和技术进展。本次专题會議的主题包括但不限于以下领域：

- 跨域协同无人系统多传感器融合；
- 跨域协同无人系统智能感知；
- 跨域协同无人系统定位及建图；
- 跨域协同无人系统自主导航；
- 跨域协同无人系统智能控制；
- 跨域协同无人系统深度学习；
- 跨域协同无人系统在建筑，农业，救援或侦察等场景的应用。

# IEEE ICUS 2024

## Invited Session Summary

### Title of Session

Cross-domain Collaborative Unmanned Systems

### Organizers

#### 1. Prof. Yi Yang

Beijing Institute of Technology, China

#### 2. Prof. Yufeng Yue

Beijing Institute of Technology, China

### Biosketches of Organizers



**Yi Yang**, professor and doctoral supervisor of School of Automation, Beijing Institute of Technology, national-level leading talent. He has been engaged in teaching and research of autonomous navigation of land unmanned systems for a long time. Currently, he serves as the head of research in the field of land-based unmanned systems under the 'IN2Bot' project at Beijing Institute of Technology. He is also the deputy director of the joint laboratory for active automotive safety technology between Beijing Institute of Technology (ININ) and Princeton University (PAVE). Additionally, he serves as a member and chief referee of the Expert Committee for the National University Robot Contest (ROBOCON), hosted by the Communist Youth League Central Committee. He has undertaken multiple important research projects funded by the National Natural Science Foundation and pre-research in certain fields, published over 50 academic papers, obtained over 40 authorized invention patents, co-authored 3 monographs and textbooks, won the first prize in National Science and Technology Progress Award as the second contributor in 2020, won one first prize in the field of science and technology progress as the first contributor in 2017, and achieved first place in the 'Overcoming Obstacles 2018' Land-based Unmanned Systems Challenge for Ground-Air Cooperative Search.



**Yufeng Yue**, a professor and doctoral supervisor at the School of Automation, Beijing Institute of Technology, was selected for the national youth talent program in 2021 and was included in the China Association for Science and Technology's youth talent nurturing program in 2020. He has been engaged in research on autonomous mobile robot perception and navigation for an extended period. His specific research directions include multimodal deep learning and cognition, real-time localization and 3D scene reconstruction, and multi-robot collaborative navigation and control. He has undertaken projects funded by the National Natural Science Foundation and others. He has published one English monograph with Springer and over 40 papers in SCI journals such as IEEE TIE, IEEE TMech, NeurIPS, ICRA, and conferences indexed by EI. He has received the Best Paper Award at the 2021 IEEE ICUS and the 2020 IEEE ICARCV. He has guided students to win the gold prize at the Seventh China International "Internet Plus" University Students Innovation and Entrepreneurship Competition. He serves as the Young Chair of the IEEE RAS Autonomous Ground Vehicles Technical Committee, Vice Editor-in-Chief of IROS (2020-2022), and member of the program committee and sub-forum chair for multiple international conferences such as ICRA, IROS, and ICUS.

### **Details of Session**

In recent years, cross-domain collaborative unmanned systems have attracted extensive attention from researchers due to their advantages of multidimensional perception, full-area response, and efficient maneuvering. Cross-domain collaborative unmanned systems can be heterogeneous collaborative systems composed of multiple unmanned platforms such as drones, unmanned vehicles and unmanned ships, or homogeneous collaborative systems composed of similar unmanned platforms with different behaviours and tasks. In practical applications, how to make cross-domain collaborative unmanned systems with autonomous perception and navigation capabilities in complex environments is still a great challenge. This symposium will focus on the latest advances in the field of cross-domain cooperative unmanned systems, including perception, localization, mapping, navigation, control, machine learning, multi-robot systems and related application cases.

This symposium will provide a platform for scientists, engineers, and practitioners around the world to present their latest theoretical and technological advances in the field of cross-domain collaborative unmanned systems. The topics of this symposium include, but are not limited to the following areas:

- Multi-sensor fusion for cross-domain collaborative unmanned systems;
- Intelligent perception for cross-domain collaborative unmanned systems;
- Localization and mapping for cross-domain collaborative unmanned system;
- Autonomous navigation for cross-domain collaborative unmanned system;
- Intelligent control of cross-domain cooperative unmanned systems;
- Deep Learning for cross-domain collaborative unmanned systems;
- Applications of cross-domain cooperative unmanned systems in scenarios such as construction, agriculture, rescue, or reconnaissance.