

IEEE ICUS 2022
Invited Session Summary

Title of Session

Collaborative Perception and Control of Multiple Unmanned Systems

Name, Salutation and Affiliation of Organizers

1. Prof. Yuan Ge

Anhui Polytechnic University, China

2. Prof. Bing Wang

Anhui University of Technology, China

3. Prof. Guang Zhu

Suzhou University, China

Biosketches of Organizers



Dr. Yuan Ge is the professor of school of electrical engineering of Anhui Polytechnic University, and is a reserve candidate for academic and technical leaders in Anhui Province. He graduated from the department of automation, University of Science and Technology of China in June 2011. He was an associate professor of the school of electrical engineering of Anhui Polytechnic University from November 2011 to October 2014 and has been a professor since November 2014. From September 2014 to July 2015, he was a visiting scholar in the department of electrical engineering and applied electronic technology of Tsinghua University. He has published more than 60 papers in some important journals and conferences including IEEE Transactions on Cybernetics, IEEE Transactions on Automation Science and Engineering, Information Sciences, etc. In recent years, he has presided 3 projects of the National Natural Science Foundation of China and some other projects, such as Anhui Science and Technology Plan projects, Anhui Natural Science Foundation projects, State Grid Anhui Electric Power Company Science and Technology projects and so on. He has also authorized 10 invention patents and won 1 third prize of Anhui Science and Technology Award and 1 third prize of Anhui Teaching Achievement Award.



Bing Wang is a professor of Anhui University of technology, and dean of School of electrical and information engineering. He received a bachelor and master degree from Hefei University of technology in 1998 and 2004, a Ph.D degree from the University of science and technology of China in 2006. Dr. Wang had been a senior research assistant in the City University of Hong Kong in 2007, and a postdoctoral in the University of Louisville and Vanderbilt University in the United States from 2008 to 2012. He has published more than 200 academic papers in important journals and conferences, including IEEE Transactions on Instrumentation & measurement, IEEE Journal of emerging and selected topics in power electronics, IEEE Journal of biomedical and health informatics, IEEE / ACM transactions on computational biology and bioinformatics. He also published one academic book, and authorized 13 national invention patents. Currently, he is Senior member of IEEE, director member of Anhui Electronics Society and Robotics Society, chairman of Anhui electronic information automation and communication professional cooperation committee, head of innovation team of Anhui "intelligent control and information processing" scientific research platform, and editorial board of several international journals. He had been selected as a reserve candidate for academic and technical leaders in Anhui Province and won one natural science award in Anhui Province. Dr. Wang's research is supported by 4 grants from NSFC and more than 10 grants from Anhui province and industry.



Dr. Guang Zhu received his Ph.D. in 2012 from East China Normal University. He was a postdoctoral fellow at Northwestern University, USA, and later joined Suzhou University, China, as a professor. His research interests include intelligent manufacturing, intelligent materials and their applications in the energy and environmental fields.

Details of Session

With the continuous development of artificial intelligence technology and intelligent control theory, the cooperative perception and control of unmanned systems such as an unmanned aerial vehicle (UAV), unmanned ground vehicle (UGV), and unmanned surface vessel (USV) have attracted wide attention and in-depth research of scholars at home and abroad. The unmanned system covers the air, land, sea, and other different space applications are gradually penetrated all areas of

national security and social life, promoting a new round of industrial change and related technology highly integrated and developed. As a disruptive technology of artificial intelligence, the collaboration between multi-unmanned systems organically connects the orderly/disorderly distributed unmanned systems in space. Through information interaction and fusion, behavior interaction and coordination, task collaboration and cooperation, the multi-unmanned system realizes the functional complementarity in multi-dimensional aspects such as perception, control, and cooperation, and finally forms a complete chain of target detection, identification and tracking, intelligent decision-making, autonomous control, and effectiveness evaluation, to improve the collaborative operation of multi-unmanned systems in complex environments and working conditions.

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 “Collaborative Perception and Control of Multiple Unmanned Systems”.

- Cross-domain communication and heterogeneous networking of multiple unmanned systems
- Intelligent perception and positioning of multiple unmanned systems
- Autonomous planning and intelligent control of multiple unmanned systems
- Collaborative simulation and evaluation of multiple unmanned systems
- Collaborative detection and identification of multiple unmanned systems
- Multiple unmanned systems swarm combat and intelligent collaboration
- Cooperative confrontation and game of multiple unmanned systems