IEEE ICUS 2022

Invited Session Summary

Title of Session

Cross-Domain Collaborative Unmanned Systems

Name, Salutation and Affiliation of Organizers

1. Prof. Yi Yang

Beijing Institute of Technology, China

2. Assoc. Prof. Yufeng Yue

Beijing Institute of Technology, China

3. Prof. Zhigang Shang

Harbin Institute of Technology, China

Biosketches of Organizers

Yang Yi, received the Ph.D. degree in automation from Beijing Institute of Technology. He is currently a Professor with the School of Automation, Beijing Institute of Technology, and is a Senior Young Talent of the Ministry of Education. At the same time, he also is serving as a member of the expert committee of China University Robot Competition. His research focuses on the field of unmanned systems and autonomous navigation, and he has also authored or coauthored over 100 papers and patents in the field. Based on his research interests, he undertook a number of national important projects; and achieved the first prize of provincial and ministerial Science and Technology Progress Award and the second prize of National Science and Technology Progress Award.

Yufeng Yue is an associate professor and doctoral supervisor of the School of Automation, Beijing Institute of Technology. His research field is autonomous mobile robot perception and navigation. He is supported by the 6th CAST "Young Talents Support Project" project, National Natural Science Youth Fund and Singapore national scientific research projects. He has published a monograph in Springer as the first author, and more than 40 papers in top-tier journals and conferences such as IEEE TIE、IEEE TMech、ICRA、IROS. He served as the Associate Editor for 2020-2021 IEEE/RSJ IROS. He received 2020 IEEE ICARCV Best Paper Award and 2019 ROBIO Best

Paper Award Finalist.

Zhigang Shang, a professor at Harbin Engineering University (HEU), Youth Promotion Talents, received his Ph.D. degrees in Signal and information processing from Chinese Academy of Sciences, China in 2015. Prof. Shang, Senior member in Command and Control Society, worked in the China Academy of Electronic Sciences and China Satellite Internet. His research interests cover Air-sea Cross domain communication, underwater acoustic engineering and Underwater Unmanned cluster. He has also conducted in-depth research on Cross-domain communication and has achieved the leading level. In the past five years, he has published 30 scientific papers, 32 patents and 7 books. Prof. Shang served as reviewer of nearly ten academic journals such as IEEE, signal processing and Journal of acoustics. He served as the chairman of the sub session of the International Intelligent Control and Automation Conference, the EITCE 2020 organizing committee, and one of the leaders of the Underwater AAcoustic Engineering of the electronic information engineering technology development (Blue Book) of the Chinese Academy of engineering.

Details of Session

Recently, cross-domain collaborative unmanned systems have attracted increasing attention due to their highly complementary perception and mobility characteristics. Cross-domain collaborative unmanned systems can be evident as physical difference between unmanned systems (UAV, UGV, USV, etc.) or as behavioral difference when unmanned systems serve diverse roles in a cooperating team. As we look to the future, cross-domain collaborative unmanned systems that can operate autonomously in complex environments remain a significant challenge. This invited session will focus on cross-domain collaborative unmanned systems, including areas of perception, localization, mapping, navigation, control, machine learning, multi-robot systems and relevant applications.

The purpose of this invited session is to create a forum for scientists, engineers and practitioners throughout the world to present the latest theoretical and technological achievements in cross-domain collaborative unmanned systems. Papers presenting newly emerging fields and applications are especially welcome. Topics to be covered in this invited session include, but not limited to, the following:

- 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 systems;
- autonomous navigation for cross-domain collaborative unmanned systems;
- intelligent control for cross-domain collaborative unmanned systems;
- deep learning for cross-domain collaborative unmanned systems;
- cross-domain collaborative unmanned systems applied in construction, agricultural, rescue or exploration tasks.