IEEE ICUS 2022
Invited Session Summary

Title of Session

Marine Situation Intelligent Awareness and Cognition of Unmanned System

Name, Salutation and Affiliation of 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. Assoc. Prof. Yu An

Hubei University of Technology, China

6. Dr. Xueqian Wang

Tsinghua University, China

Biosketches of Organizers

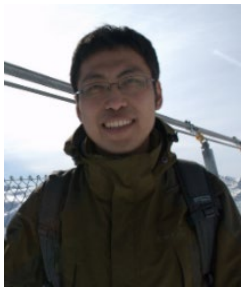
Haipeng Wang, male, is currently the director, professor, and PhD tutor of the Big Data Research Laboratory of Naval Aviation University. He has long been engaged in technical research and engineering applications in the field of maritime target information perception and fusion. He is the direction leader of the He You Academician team "Marine Target Tracking and Recognition". As the project leader, he presided over more than 20 projects such as the General Programs and Key Programs of National Natural Science Foundation of China, Key Programs of Military Commission 173 Plan, National High-tech R&D Program(863 Program), etc., and won one first prize of science and technology progress of Shandong Province, two Military Science and Technology Progress Awards, one secondary prize of Science and Technology Progress Award of Chinese Society of Aeronautics and Astronautics. He authorized more than 30 national invention patents, and published 2 books and more than 40 papers as the first or corresponding author. 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 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 2 first prize and 2 second prizes of provincial and ministerial scientific and technological progress.

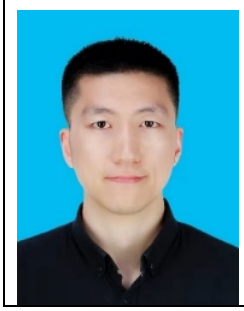
Bo Chen is currently a professor and doctoral supervisor of Harbin University of Technology (Shenzhen), a young top talent of national talent project and a high-level talent in Shenzhen. He also serves as a member of the national Beidou satellite navigation Standardization Technical Committee, a member 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 are 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.

Yu An, male, born in July 1983, is currently an associate professor and master supervisor of Hubei University of technology, head of "photoelectric information fusion" team of Hubei University of Technology. The main research directions include information fusion, target recognition, intelligence processing, data analysis and decision-making, etc. As a technical backbone, completed two pre research projects of the equipment development department in the 13th five year plan and one pre research project of the navy in the 13th five year plan.



Xueqian Wang, Male, Born in 1993. He is a postdoctoral fellow with the Department of Electronic Engineering, Tsinghua University. His main research interests include marine target detection, multi-source data fusion, and remote sensing data processing. He has received three research grants, i.e., China Postdoctoral Innovative Talent Support Program, National

Natural Science Foundation of China for Young Scholars, China Postdoctoral Science Foundation. He has authored 1 book (Springer, in press) and 14 SCI publications. He has authored and co-authored 27 SCI/EI publications. He has received awards of Excellent Doctoral Thesis of the China Education Society of Electronics, Innovative Achievement of China Postdoctoral Innovative Talent Support Program, Shuimu Tsinghua Scholar, and so on. He is a reviewer of IEEE Transactions on Geoscience and Remote Sensing, IEEE Transactions on Signal Processing, IEEE Transactions on Aerospace and Electronic Systems, IEEE Transactions on Communications, and so on.

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