

Call for Papers for the Special Session on

AI-Driven Analysis, Modelling, and Control of Unmanned Engineering Systems

Organized and co-chaired by

Min Ma, Soochow University, Suzhou, China

mma@suda.edu.cn

Zhihong Zhao, Ningbo University of Technology, Ningbo, China.

zhihongzhao@nbut.edu.cn

Tong Wang, Harbin Institute of Technology, Harbin, China

twang@hit.edu.cn

Technical Outline of the Session and Topics

Unmanned engineering systems, such as autonomous ground robots, unmanned surface/underwater vessels, and industrial unmanned platforms, have become indispensable assets in advanced manufacturing, deep-sea exploration, and intelligent transportation. The complex nonlinear dynamics, unpredictable disturbances, and time-varying constraints make it difficult to guarantee a satisfactory performance. AI-driven analysis, modelling, and control schemes can improve autonomy and regulation performance for unmanned systems, supporting dependable deployment in complex and uncertain working conditions.

Meanwhile, AI technologies, particularly deep learning, reinforcement learning and intelligent control methods, have been widely applied in unmanned engineering systems, enabling accurate state estimation, adaptive modelling, and robust control, while enhancing real-time responses and fault-tolerance in practical operations. AI-driven approaches accelerate the technological evolution and industrial development of unmanned systems.

Therefore, this special issue seeks pioneering advances in AI-driven analysis, modelling, and control for unmanned engineering systems, aiming to establish the theoretical foundation and practical simulations for real-world cases. Submissions that enhance the autonomy, safety and operational efficiency of such systems under real-world constraints are particularly encouraged.

Topics of the session include, but are not limited to:

- Decision-making and planning for unmanned systems
- Multi-agent cooperation and swarm intelligence
- AI-enabled modelling for unmanned aerial/ground/marine/space systems under time-varying operating conditions
- Large language models and embodied intelligence for unmanned systems
- Deep learning and reinforcement learning-based adaptive control strategies
- AI-based trajectory planning and motion control for high-precision unmanned operations
- Digital twins and computing architectures
- Multi-modal sensing, perception and fusion
- Cyber-security and privacy-preserving AI techniques for unmanned engineering systems
- New opportunities, challenges and applications in unmanned system

Timeline for Authors

All the instructions for paper submission are available on the conference website. Please visit www.iecon2026.org or scan the QR code for the timeline.

