

WAAE 2026 Track 10 Description

Basic Information:

专栏题目
Title

中文：航空航天传感、仪器与测量系统
英文：Aerospace Sensing, Instrumentation, and Measurement Systems

专栏介绍和征稿主题
Introduction and topics

中文：随着航空航天装备向智能化、网络化、极端环境适应性与高可靠性方向持续发展，传感、仪器与测量系统作为获取飞行器结构、环境及系统状态信息的基础与核心，已成为保障飞行器安全运行、自主控制与健康管理的關鍵支撑。飞机、航天器、高超声速飞行器及航空发动机等复杂系统在高温、高压、强振动、强辐射等极端工况下长期服役，对传感精度、响应速度、环境适应性与系统鲁棒性提出了严苛要求。特别是在复杂动态环境下，传感信号易受干扰、退化或失效，测量数据的准确性与可靠性面临巨大挑战，直接影响飞行器的状态感知、故障诊断与剩余寿命评估能力。

近年来，随着先进敏感材料、微纳制造、智能信息处理、无线无源传感及数字孪生等技术的快速发展，航空航天传感与测量系统正由传统单一参数检测向多参量、分布式、智能化、微型化与自诊断方向演进。围绕先进传感器设计、极端环境测试计量、高精度校准、故障检测与信号处理、MEMS/NEMS 传感器开发等方向开展系统研究，对于提升航空航天装备的环境感知能力、数据可信度和系统自主性具有重要意义。

本专栏旨在汇聚航空航天传感、仪器与测量系统领域的最新理论成果、关键技术突破与工程应用案例，促进相关领域学者与工程技术人员之间的学术交流。欢迎国内外相关领域专家、学者及工程技术人员踊跃投稿。

针对以上内容，主要征稿主题包括但不限于：

1. 先进传感器与智能感知技术
2. 极端环境下的测试与计量技术
3. 高精度仪器与校准技术
4. 传感系统的故障检测与信号处理
5. 面向航空航天应用的 MEMS/NEMS 传感器
6. 无线无源传感与遥测技术
7. 多参量集成传感器与分布式测量系统
8. 光纤传感与光电测量技术在航空航天中的应用
9. 高温、高压、强振动环境下的传感与测量方法
10. 传感数据融合、状态估计与智能信息处理
11. 数字孪生驱动的传感测量与健康监测
12. 传感器可靠性评估与寿命预测
13. 航空航天测试仪器的抗干扰与电磁兼容技术
14. 机载、星载传感系统的适航要求与工程应用案例

英文：

As aerospace systems continue to evolve toward higher intelligence, networked operation, extreme environmental adaptability, and enhanced reliability, sensing, instrumentation, and measurement systems have become fundamental to acquiring structural, environmental, and system state information. These systems are critical for ensuring the safe operation, autonomous control, and health management of aircraft, spacecraft, hypersonic vehicles, aero-engines, and other complex systems operating under extreme conditions such as high temperature, high pressure, strong vibration, and high radiation. Such harsh environments impose stringent requirements on sensing accuracy, response speed, environmental robustness, and system resilience. Under complex dynamic conditions, sensor signals are prone to interference, degradation, or even failure, posing

significant challenges to measurement data accuracy and reliability, which in turn directly affect state awareness, fault diagnosis, and residual life assessment.

In recent years, driven by advances in advanced sensitive materials, micro/nano manufacturing, intelligent information processing, wireless passive sensing, and digital twin technologies, aerospace sensing and measurement systems have been evolving from traditional single-parameter detection toward multi-parameter, distributed, intelligent, miniaturized, and self-diagnostic approaches. Systematic research on advanced sensor design, extreme-environment testing and metrology, high-precision calibration, fault detection and signal processing, and MEMS/NEMS sensors is of great significance for enhancing the environmental perception capability, data trustworthiness, and system autonomy of aerospace equipment.

This Special Issue aims to bring together the latest theoretical advancements, key technological breakthroughs, and engineering application cases in the field of aerospace sensing, instrumentation, and measurement systems, fostering academic exchange among researchers and practitioners. Contributions from experts, scholars, and engineers in related fields are cordially invited.

Topics of interest include, but are not limited to:

1. Advanced Sensors and Intelligent Sensing Technologies
2. Testing And Metrology in Extreme Environments
3. High-Precision Instrumentation and Calibration Techniques
4. Fault Detection And Signal Processing for Sensing Systems
5. MEMS/NEMS Sensors for Aerospace Applications
6. Wireless passive sensing and telemetry technologies
7. Multi-parameter integrated sensors and distributed measurement systems
8. Fiber optic sensing and optoelectronic measurement in aerospace
9. Sensing and measurement methods under high temperature, high pressure, and strong vibration
10. Sensor data fusion, state estimation, and intelligent information processing
11. Digital twin-driven sensing, measurement, and health monitoring
12. Sensor reliability evaluation and life prediction
13. Anti-interference and electromagnetic compatibility of aerospace test instruments
14. Airworthiness requirements and engineering application cases for onboard and spaceborne sensing systems

Track Chair(s):

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Organizer's Brief Biography

中文：李瑞亚，武汉理工大学副教授，硕士生导师，英国伯明翰大学访问学者，美国电气电子工程师学会 Senior Member。近年来主要从事光纤传感技术、大型复杂装备多物理状态智能监测技术、机器人智能柔性关节技术的研究工作，主持相关科研项 8 项。迄今已在 Mech. Syst. Signal Pr.、IEEE Trans. Autom. Sci. Eng.、Comput. Ind. Eng.、Meas. Sci. Technol.、Struct. Health Monit.等国内外高水平学术期刊及知名会议发表学术论文 40 余篇，获国家发明专利授权 20 项，软件著作权 3 项，获湖北省技术发明二等奖 1 项，中国计量测试学会科技进步二等奖 1 项，中国仪器仪表学会科技进步二等奖 1 项。

英文：Ruiya Li, Associate Professor and Master's Supervisor at Wuhan University of Technology, Visiting Scholar at the University of Birmingham (UK), and Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). In recent years, his research has primarily focused on optical fiber sensing technology, multi-physical-state intelligent monitoring technology for large and complex equipment, and intelligent flexible joint technology for robots. He has

led 8 research projects in related fields. To date, he has published over 40 academic papers in prestigious domestic and international journals and conferences, including Mechanical Systems and Signal Processing, IEEE Transactions on Automation Science and Engineering, Computers & Industrial Engineering, Measurement Science and Technology, and Structural Health Monitoring. He holds 20 authorized national invention patents and 3 software copyrights. He has received one Second Prize of Technological Invention of Hubei Province, one Second Prize of Scientific and Technological Progress from the Chinese Society for Measurement, and one Second Prize of Scientific and Technological Progress from the China Instrument and Control Society.