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SS-01: Advancements in Risk Assessment in Aviation and Space Systems

Mario Brito¹ and Moacyr Machado Cardoso-Junior²

¹ Centre for Risk Research, University of Southampton, United Kingdom

² Aeronautics Institute of Technology, Brazil

m.p.brito@soton.ac.uk; moacyr@ita.br

Description

The aviation and space industries are undergoing significant transformations, with new technologies improving safety, reliability, and risk management. In aviation, innovations such as real-time engine health monitoring, predictive maintenance, and AI integration are reshaping operational efficiency. However, challenges persist in managing operational risks, such as those in High Altitude, Low Opening (HALO) operations, hypersonic vehicle integration, and UAV missions. Human factors like communication delays and pilot workload also remain critical.

In parallel, security threats are evolving rapidly. In aviation, cyberattacks, data breaches, and physical security risks (e.g., hijackings) present ongoing challenges. For space exploration, issues such as satellite security, space debris, and the protection of space systems are becoming more critical. These threats require advanced risk analysis and detection models to mitigate potential security breaches.

The integration of both aviation and space operations introduces complex security concerns, such as cyber vulnerabilities affecting air traffic management or the overlap of space and aviation infrastructures. As these industries evolve, a comprehensive approach to safety, reliability, and security is essential to address both traditional and emerging risks, ensuring the resilience of interconnected systems.

The aim of this Special Session is to provide a collaborative platform for researchers and professionals to share insights and explore the latest developments in aviation and space safety, security, reliability, and risk management. This session will focus on advanced methodologies, real-time monitoring techniques, and the integration of data-driven models to enhance the safety, security, and resilience of both aeronautical and space systems. Discussions will center around identifying emerging security threats and the strategies needed to mitigate them, alongside traditional safety and risk management approaches.

Topics of Interest

- Real-time health monitoring and predictive analytics for aviation systems
- Risk management strategies for aero-engine maintenance and aviation operations
- Advanced simulation techniques in aviation and space safety
- Operational risk analysis and safety/security considerations for hypersonic vehicles and HALO operations
- Impact of components and systems on aerospace performance, reliability, and security
- Human factors and their impact on aviation and space system safety and security
- Space-related hazards and risk management in exploration and commercial space missions
- System-of-systems approach to risk and resilience in integrated aviation and space infrastructures
- Artificial intelligence in aviation and space safety, security, and risk assessments