DASC 41st

Digital Avionics Systems Conference

Portsmouth, VA, USA – September 18-22, 2022

CALL FOR PAPERS

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IMPORTANT DATES

Submission Deadlines

April 2, 2022
Abstract Submission

April 11, 2022
Acceptance Notification to Authors

April 29, 2022
Papers Submission for Peer Review

June 18, 2022
Final Paper Submission

Sep 18-19, 2022
Tutorial Dates

Conference Dates

September 18 – 22, 2022

Join us in Portsmouth, Virginia for the 41st AIAA/IEEE Digital Avionics Systems Conference (DASC), the preeminent R&D conference in the field of digital avionics offered by two distinguished professional societies, the American Institute of Aeronautics and Astronautics (AIAA) and the Institute of Electrical and Electronics Engineers (IEEE). Continuing its rich tradition of incorporating attendees from diverse backgrounds to discuss relevant technical topics, the conference continues to provide an environment that includes educational and recreational opportunities. We welcome everyone to join us at the 41st DASC.

CONFERENCE THEME

Roadmap for Increasingly Autonomous Systems in Air Transportation

The current age of information technology has seen the rise of increasingly autonomous systems where human intelligence is augmented with machine intelligence, and the roadmap for adopting autonomous technologies in aviation is ramping up. As we move to accept increased autonomy in flight systems, in drones, UAS platforms, larger air transport, and in their interactions with ground and space-based systems, the need to assure the safety and verification of these technologies is paramount, particularly for those technologies that incorporate learning enabled functionality. Integrating these technologies within the air transport system while maintaining safety and security requirements will effectively reveal assurance challenges which will, over time, produce certification requirements beneficial to both design and operations at the appropriate level of risk. Beyond certification, there are ethical and environmental considerations along with liability concerns surrounding autonomous machine decisions, especially while managing emergency operations. The 41st DASC will explore the technology roadmap that will enable increasingly autonomous systems that incorporate humans and machines along with formulations that can aid the future certification of these systems for air transportation. Conference participants are invited to submit cutting edge research papers and exchange diverse perspectives on how the industry currently is or how it should be realizing the vision for autonomy in the future. Original research on technical challenges, gaps, and approaches to enhance traditional ATM, UAS, CNS, IMA, security, space systems, and human factors are encouraged.

Areas of emphasis will include:

- Machine Learning in Practice
- Adaptive Networks
- Cognitive Assistants
- Safety Assurance and Human Factors
- Integration of Autonomous Vehicles
- Multi-modal Interaction to support human-autonomy teaming
- Security/Assurance
- Single pilot and reduced crew operations
- Trust in automation
- Certification

DATC AIAA Digital Avionics Technical Committee

IEEE Advancing Technology for Humanity

AESS

Co-sponsor AIAA The World's Forum for Aerospace Leadership

TECHNICAL PROGRAM

Air Traffic Management (ATM) Machine Learning & Automation.

Application of AI and machine learning to leverage distributed knowledgebase, fusion of sensor data from multiple airborne and ground systems to address ATM challenges; predictive automation aids to reduce controller and pilot workload.

ATM– Airspace and Spectrum Management (ATM-ASM)

Automation and cognitive radios to support dynamic sectors and mitigate escalating spectrum demand; Traffic flow management; spacing, sequencing, and scheduling; command and control technologies for future ATM; separation management; unmanned aircraft system traffic management (UTM) inspired air traffic management for new entrants; simulation and modeling needs.

Unmanned Aircraft Systems (UAS).

Issues, challenges, and opportunities arising from emerging drone and autonomy technology developments; remotely piloted systems (RPA) and the certification of autonomy and machine learning enabled components (MLEC); UAS system design, applications, and mission optimization. Of significant interest are concepts for integrating UAS into both controlled and uncontrolled airspace.

Communications, Navigation, and Surveillance and Information Networks (CNS).

Role of machine learning and AI in navigation, and surveillance; distributed knowledgebase enabled by broadband communications; on-board and ground-based CNS systems for all vehicles and services. Emerging fields include: surface wireless networks; air/ground datalink; satellite-based CNS; optical communications; global navigation satellite systems (GNSS); alternative positioning navigation and timing (APNT); performance-based navigation; and, surveillance systems for ATM and collision avoidance; self-forming / healing networks; quality of service (QoS) driven software defined networks.

Cyber, Systems, and Software (CSS).

Design, testing, verification and validation, and certification of large complex aviation systems with multiple design assurance levels; avionics cyber security; cyber-physical security threat assessment and mitigation development; airborne network security and risk; software assurance versus regular security patches. Multiple Independent Levels of security safety (MILS); physical and virtual system firewalls; AI-based deep packet inspection; data security for shared data buses; operating system security; virtual versus physical domain separation.

Integrated Modular Avionics (IMA).

System resources and performance allocation, configuration, integration, verification and certification processes and tools; model-based system engineering; scalability; inter-partition interference on multicore processors; assessing system demand and resource availability; mitigation of common mode failures; system maintenance; wired and wireless communication; health monitoring; optimization techniques; architectures including open interface standards; operating systems; ARINC-653; alternate API solutions, communication standards, use of Commercial-Off-The-Shelf (COTS) technologies; modularity vs. scalability.

Human Factors (HF).

Developing AI behavior that is unambiguous or predictable to human operators and demonstration that such systems meet their intended function in all foreseeable operating conditions. Methods and considerations to support human-autonomy teaming. Issues on human interaction with automation such as mode awareness, trust in automation, roles and responsibilities, flight deck displays and controls, and decision support tools; assessment and modeling of human performance; and methods for avoiding the presentation of hazardously misleading information.

Urban Air Mobility (UAM)/ Advanced Air Mobility (AAM)

Urban Air Mobility envisions a safe and efficient aviation transportation system that will use highly automated aircraft that will operate and transport passengers or cargo at lower altitudes within urban and suburban areas. UAM will include an ecosystem that considers the evolution and safety of the aircraft, the framework for operation, and access to airspace. Advanced Air Mobility (AAM) builds upon the UAM concept by incorporating use cases not specific to operations in urban environments, such as commercial inter-city, cargo delivery, public services and private or recreational vehicles.

Space Systems & Special Topics (SSST).

Includes space systems and topics that do not fit the above areas or are recently emerging from new technical innovations, such as but not limited to: emerging systems architectures; safety-critical avionics; mission planning, and operations; risk management methods; computer aided design.

SPONSORS AND EXHIBITS

This year's conference will feature exhibits and product demonstrations by representatives of key avionics-related industries and institutions. To have your organization represented in our exhibit hall, please contact our Sponsors and Exhibits Chair via the conference website.

For inquiries regarding paper submissions, please contact:

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