DASC 40th
Digital Avionics Systems Conference
San Antonio, Texas, USA – October 3-7, 2021

CALL FOR PAPERS

IMPORTANT DATES

Submission Deadlines

March 19, 2021
Abstract Submission

April 9, 2021
Notification of Acceptance

May 14, 2021
Full Paper Submission
(If Editorial Review is Requested)

July 16, 2021
Final Paper Submission Deadline

Conference Dates

October 3-4, 2021
Tutorials

October 5-7, 2021
Conference

The 40th Digital Avionics Systems Conference (DASC) promises to continue its rich tradition as the preeminent R&D Conference in the field of digital avionics offered.

In addition to the increasingly diverse background of attendees and relevant technical topics discussed, the conference offers a conducive environment for educational and recreational opportunities for everyone to explore. We are positive that you will have a memorable and educational experience at the 40th DASC.

CONFERENCE THEME
Integrating humans and increasingly autonomous systems in air transportation.

There has been much recent emphasis on the application of autonomy in avionics and impacts on safety. As we move to accept automation in flight systems, UAS platforms, and interaction with ground and space-based systems the need to address interaction with humans, be they pilots, controllers, passengers, or users remains of high concern. This is overlaid on top of current safety requirements, increasing security requirements, and the emergence of machine learning in design and operation. The 40th DASC will explore the integration of human and increasingly autonomous systems within the air transportation system. Conference participants are invited to submit cutting edge research papers and exchange diverse perspectives on application of autonomy alongside humans while maintaining safety and security. Original research on technical challenges, gaps and approaches to enhance traditional ATM, UAS, CNS, IMA, security, space systems, and human factors are also invited.

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

Other Topics

The 40th DASC will continue to offer opportunities to publish and present on a wide range of topics of interest to the avionics technology community (see next page).

Papers, Panels, Education and Workshops

The Technical and Professional Education Programs will incorporate technical research papers and relevant tutorials from international Researchers, Innovators, Engineers, Users, and Designers. Plenary panel discussions and keynote presentations by Leaders in Industry, Government and Academia will discuss topics that are shaping international developments.

Please check our website for periodic updates: **www.dasconline.org**.

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. 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/Advanced Air Mobility (UAM/AAM)

Urban Air Mobility envisions a safe and efficient aviation transportation system that will use highly automated aircraft to transport passengers or cargo at lower altitudes within urban and suburban areas. Advanced Air Mobility builds upon the UAM concept by incorporating use cases not specific to operations in urban environments, such as commercial inter-city, cargo delivery and public services. These ecosystems may include the integration of UTM and UAM concepts to safely manage the widespread use of low-altitude airspace.

UAS Traffic Management (UTM)

Uncontrolled operations separate, but complementary, to ATM system; design of services, roles and responsibilities, information architecture, data exchange protocols, software functions, infrastructure, and performance requirements for enabling the management of low-altitude uncontrolled drone operations; integration of UTM and UAM concepts; infrastructure to enable and safely manage the widespread use of low-altitude airspace and UAS operations; Design of support systems to enable humans to make strategic decisions related to initiation, continuation, and termination of airspace operations.

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.

Examples of possible topics include:

- Basic & Advanced Avionics Systems; Integrated Modular Avionics
- Surveillance & Collision Avoidance; Synthetic Vision; Sensing Modalities
- Navigation Systems Including Technologies and Performance Based Navigation
- Communications Systems and Networks
- Systems Engineering; Program Management
- Software Development & Test Certification (DO-178)
- Environmental Qualification (DO-160)
- System Safety
- Cyber Security
- Autonomy & Application of Modern Techniques to Autonomous Systems

All professional education sessions will offer Continuing Education Units (CEUs) through the IEEE. For more information, contact our Tutorial Chair.

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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