

CALL FOR PAPERS

IMPORTANT DATES

Submission Deadlines

February 23, 2024

Abstract Submission

March 19, 2024

Notification of Acceptance

May 7, 2024

Initial Paper for Optional Review

July 1, 2024

Final Paper Submission

Conference Dates

September 29-30, 2024

Tutorial Dates

October 1-3, 2024

Plenaries and Sessions

ORGANIZERS

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Claire Folkerts

Conference Catalysts

The 43rd AIAA/IEEE Digital Avionics Systems Conference (DASC) continues a rich tradition as 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).

With an increasingly diverse background of attendees and relevant technical topics, the conference offers a collaborative environment for educational and professional opportunities. We are confident that you will have a memorable, engaging, and educational experience.

CONFERENCE THEME:

BUILDING TRUST IN INCREASINGLY COMPLEX SAFETY-CRITICAL AVIATION SYSTEMS

Aviation systems are growing significantly more complex due to multiple industry trends, including increased use of digital modeling, automation functions, introduction of Artificial Intelligence (AI), use of multicore processors, increased airspace congestion from manned and unmanned aircraft, and unanticipated consequences of integration of many systems whose overall behavior is not sufficiently specified. These trends provide new capability and new opportunities. However, complexity also challenges our ability to comprehend the overall picture necessary to provide confidence in the safety and security of these systems. The 43rd DASC will explore and characterize trends that increase complexity and investigate the tools, models, and methods necessary to obtain the promised benefits while mitigating the attendant risks.

Conference participants are invited to submit cutting-edge research papers and exchange diverse perspectives on complex new trends infusing aviation systems, with consideration for the safety-criticality of the domain. Original research on technical challenges, gaps and approaches to enhance any of the conference tracks (described on next page) are also welcome.

Areas of emphasis will include:

- » Artificial Intelligence and autonomy
- » Improving comprehension of massively complex integrated systems
- » Fidelity of digital modeling of physical systems and software capability
- » Safety assurance and human factors
- » Validation, verification, and certification
- » Integration of autonomous vehicles into the airspace
- » Anticipating and managing interactions of large number of manned and unmanned aircraft
- » Multi-modal interaction including speech recognition and synthesis

Other Topics: The conference 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. Check our website for periodic updates:

<http://www.dasconline.org>.

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. Automation and cognitive radios to support dynamic sectors and mitigate escalating spectrum demand; Traffic flow management; spacing, sequencing, and scheduling; command and control technologies; separation management; unmanned aircraft traffic management; simulation/modeling needs.

UNMANNED AIRCRAFT SYSTEMS (UAS)

Issues, challenges, and opportunities arising from emerging UAS applications and trends to greater roles for digital avionics. Of particular interest: Assuring the safe and appropriate introduction of more highly-automated systems; Applications of machine learning; System design and mission optimization methods; Safety risk mitigation during operations (e.g., for lost-link / loss of nav); Vehicle system health state and trajectory prediction methods; Nav system performance; Human factors; Certification, policy, and standards.

COMMUNICATIONS, NAVIGATION, AND SURVEILLANCE AND INFORMATION NETWORKS

On-board and ground-based CNS systems for all vehicles and services using radio-frequency and optical technology. Surface wireless nets; air/ground and air/air datalink; satellite-based comm; Global Navigation Satellite Systems; Alternative Positioning Navigation and Timing; performance-based navigation; surveillance systems for ATM and collision avoidance; self-forming/healing networks; QoS in SW-defined networks, cloud services; aircraft Statement of Capability; contingency management; emerging fields of AI; big-data.

CYBER, SYSTEMS, AND SOFTWARE

Design, testing, verification/validation, certification of large complex aviation systems; handling multiple design assurance levels; avionics cyber-security; cyber-physical security threat assessment and mitigation; airborne network security and risk; security patches; qualification automation; digital certification; automated, model-based, graphical system design and assessment; formal methods; complex (e.g. AI) SW verification; combining safety and security; requirements formalization; safety-critical SW tools and languages.

INTEGRATED MODULAR AVIONICS (IMA) AND STANDARDIZED AVIONICS PLATFORMS

System integration, verification and certification tools and related (digital) processes; model-based IMA system design, optimization and simulation; model-based tooling and automation methods; RTOS; multi-core; wired and wireless communication; use of COTS and open-source; modularity vs. scalability; ARINC 653; AI and high-performance computing; middleware; open standards; modern DevOps for IMA; safety implications; IMA for new vehicles; dynamic re- and auto-configuration

HUMAN FACTORS

Issues on human interaction with increasingly autonomous systems such as mode awareness, trust in automation (including AI), roles and responsibilities, flight deck displays and controls, & decision support tools; assessment/modeling of human performance; methods for avoiding presentation of misleading information; information abstraction, information automation; appropriate levels of workload and crew coordination; remote or multi-vehicle piloting, human-autonomy teaming, single-pilot cockpits; aviation simulation technology and technical aspects of aerospace medicine.

URBAN AND ADVANCED AIR MOBILITY

Urban Air Mobility (UAM) covers safe and efficient aviation transportation systems using highly automated aircraft transporting passengers or cargo at lower altitudes within urban and suburban areas; ecosystem that considers evolution and safety of aircraft; framework for operation and access to airspace. Advanced air mobility builds upon the UAM concept, 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 AND SPECIAL TOPICS

Includes space systems and topics that do not fit the above areas or are recently emerging from new technical innovations, including but not limited to: emerging systems architectures; safety-critical space avionics; low-power avionics, mission planning, and operations; risk management methods; computer aided design; space systems, radiation-hardening (including software techniques).

PROFESSIONAL EDUCATION

DASC will offer two days of Professional Education sessions spanning relevant engineering disciplines. These tutorials will be presented by educators and practicing professionals who are recognized experts in their field. Possible topics include:

- Basic & Advanced Avionics Systems
- Partitioning for Safety and Security, IMA, Multicore
- Surveillance & Collision Avoidance; Synthetic Vision; Sensing
- Navigation Systems, Performance Based Navigation
- Communications Systems and Networks
- Model-based Development, Digital Twin
- Systems Engineering; Program Management
- Software Development & Test Certification (DO-178)
- Environmental Qualification (DO-160)
- System Safety and/or Cybersecurity
- Autonomous Systems

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