DASC 43rd

Digital Avionics Systems Conference

San Diego, CA, USA - September 29-October 3, 2024

DASC 2024

Digital Avionics Systems Conference

CONFERENCE PROGRAM

SPONSORS AND ORGANIZERS

DATC Digital Avionics Technical Committee

IEEE Advancing Technology for Humanity

AESS

Co-Sponsor

AIAA The World's Forum of Aerospace Leadership

Please visit our website for more information!

2024.dasconline.org

Table of Contents

Welcome to the 43rd Digital Avionics Systems Conference

Welcome to the 43rd Digital Avionics Systems Conference (DASC)! We return to San Diego. We were here only five years ago, but it seems like a lifetime ago. Much as happened over the last five years, but we are pleased to say that DASC continues to thrive, thanks to all of you who continue to support our community through your attendance, papers, presentations, and volunteer efforts.

We are greatly honored to be invited to Chair this year's conference. Both of us were General Chairs before, and we are excited to join forces to bring you this year's DASC. DASC continues to grow as we accelerate out of the pandemic. We have a record number of papers this year. We have initiated some new features as well. For instance, in addition to our keynote and two plenary panels, we have for the first time developed session panels that supplement the technical session program. Our Technical Program Chairs have implemented a more extensive peer review system, which has provided actionable feedback to authors and resulted in higher quality papers.

Our technical program chairs, Dr. Steve VanderLeest (Boeing) and Dr. Björn Annighöfer (University of Stuttgart) have put together an exciting technical program that covers a wide range of topics. The final program has 290 presentations spread across 67 sessions, organized in nine tracks. The program is supported by over 96 Session Chairs to provide the best forum for a robust exchange of ideas. Our conference theme this year is "Building Trust in Increasingly Complex Safety-Critical Aviation Systems". This continues our focus on the integration of humans and increasingly autonomous and complex automation in aviation. This theme is reflected in our keynote presentation and two plenary panels.

We are delighted to welcome our keynote speaker, Ms. Heather Cohea. She is the Chief of Staff for Engineering and Technology at Lockheed Martin Aeronautics and has been selected as a Harvard National Security Fellow. Concurrently, she serves as a Colonel (select) in the United States Air Force Reserve. As a space operations expert, with experience in leading engineering teams in the development of future fighter aircraft technologies, she is a leader in driving action from strategy in the implementation of new technologies in aerospace operations.

In the Tuesday plenary panel, a group of industry experts who are leading the development of advanced aircraft-based and flight deck technologies gather to discuss how these technologies can enable advanced air mobility concepts. In the Wednesday plenary panel, a group of experts and government regulators discuss how to create a common understanding of the challenges associated with assuring and safely deploying artificial intelligence (AI) with a specific focus on machine learning (ML) systems in civil aviation contexts.

After the keynote and plenary panel, Tuesday continues with technical sessions and a UAS drone competition to challenge several motivated high school students. Please stop by and cheer on your favorite teams. Tuesday afternoon will cap off with Students Research Competition and Poster Sessions. Please attend to encourage the finalists as they present and answer questions on their research. In parallel, sponsors will showcase products and services, answer questions, and present opportunities for collaboration. There will be a reception for Women in Engineering, where a series of accomplished speakers will share their experiences. Everyone is encouraged to attend.

Wednesday will kick off with the second plenary panel, followed by technical sessions. Wednesday evening, we will meet at the Maritime Museum of San Diego. Attendees will have the opportunity to tour the historic Start of India, the world's oldest active sailing ship, and explore the museum aboard the Steam Ferry Berkeley. Throughout the night, dinner and drinks will be served on the upper deck of the Berkeley with nighttime views of the San Diego Bay and Downtown San Diego.

Technical sessions continue Thursday morning. The conference schedule wraps up with our Awards Ceremony over lunch and will be a great way to close out the conference. Please join us as we present Best of Tracks, Best of Conference, and Best Student Paper awards. The Awards Ceremony is always a highlight of the conference, and we hope to see you there.

We encourage all attendees to take the opportunity to catch up with old friends and meet some new people in our community. We continue to engage with students and young professionals to grow our community in breadth and scope. Aviation is a key domain for the integration of many exciting new technologies. But as a safety critical domain, it will take the thoughtful and innovative integration of new capabilities through the collaboration of industry, academia, and government agencies. DASC continues to serve as a forum for many of these discussions, and we hope that it leads to exciting and productive advances. We have provided plenty of opportunities for conversation, be it during the technical sessions interacting with presenters, in the hallway between sessions, or at dinner on majestic sailing ships.

We have a dedicated set of staff and volunteers to answer any questions, from where to find the next session to how you might want to get more involved in conference organizing. Please communicate with us, the staff, or our volunteers to get the answers you need. Throughout the conference, questions, suggestions, and feedback for real-time improvement are greatly appreciated.

Our sincerest thanks to everyone who have worked tirelessly to organize and bring us this conference including the Session Chairs, Track Chairs, Technical Program Chairs, Conference Organizing Committee and our administrative staff. Let us also thank our sponsors who have continued to be supportive. Finally, our thanks to all of you, for your continued enthusiasm and support for our community.

Finally, on behalf of the AIAA Digital Avionics Technical Committee, the IEEE Aerospace Electronics Systems Society, and Conference Organizing Committee, we would like to welcome you to the 43rd DASC. We look forward to interacting with you all, and working together to make this a rich, rewarding experience everyone will remember. Thank you for your participation.

Dr. Terry Morris
43rd DASC General Co-Chair
NASA Langley Research Center

Dr. Michael Dorneich
43rd DASC General Co-Chairs
Iowa State University

Welcome Message from the Technical Program Chairs

We are honored to welcome you to the 43rd Digital Avionics Systems Conference dedicated to building trust in increasingly complex safety-critical systems. We are proud to report one of the highest number of submissions in DASC history, with 339 abstracts resulting in a total of 247 accepted technical papers and posters. The papers have been divided into one poster track and eight lecture presentation tracks:

- Air Traffic Management (ATM)
- Urban Air and Advanced Mobility (UAAM)
- Communications, Navigation, and Surveillance and Information Networks
- Cyber, Systems, Software (CSS)
- Integrated Modular Avionics (IMA) and Standardized Avionics Platforms
- Human Factors (HF)
- Unmanned Aircraft Systems (UAS)
- Space Systems and Special Topics

The tracks are (mostly) assigned to the same room, so you can stay in the same place if you want to follow that track. Schedules are synchronized so that you can easily move between tracks. Furthermore, each session groups related topics to reduce the need for moving to a minimum. For all presentations, the detailed full papers can be found in the conference proceedings, which will be published after the conference.

We would like to thank all authors for choosing DASC to present their work. We hope inclusion in the technical program provides professional recognition, new contacts, and additional opportunities.

Organizing and executing such a diverse and strong technical program is not possible without strong session and track chairs forming the DASCs spine as the technical committee. DASC is fortunate to have so many competent and diligent volunteers to fill these roles. We are highly grateful for their support. Last but not least we extraordinarily appreciate the support from our ePapers coordinator, Tom Werner, and the Conference Catalysts staff -- especially Claire Folkerts.

This year's conference theme is "Building Trust in Increasingly Complex Safety-Critical Aviation Systems". This is a timely and important topic. It is essential that we can assess intricate safety-critical systems to justify confidence and trust. These intricacies include more extensive software and the progressive adoption of new technologies, such as artificial intelligence. DASC provides a globally unique venue to present new ideas on this and other important digital avionics challenges that confront us. DASC is also a professional forum to engage these ideas with questions, discussion, and respectful debate.

On behalf of the Technical Program Committee, welcome to the 43rd DASC! We hope you find the program helpful, interesting, and engaging.

Steve VanderLeest
43rd DASC Technical Program Chair
Boeing

Björn Anninghöfer
43rd DASC Technical Program Co-Chair
University of Stuttgart

Conference Organizing Committee

General Chairs
Terry Morris
NASA Langley Research Center
Michael Dorneich
Iowa State University

Technical Program Chair
Steve VanderLeest
Boeing

Technical Program Chair
Björn Anninghöfer
University of Stuttgart

Professional Education/Tutorial Chair
Krishna Sampigethaya
Embry-Riddle Aeronautical University-Prescott

Student Research Competition Chair
Giancarmine Fasano
University of Naples

Awards Chair
Leon Turner
Lockheed Martin

Local Arrangements Chair
Andrew Videmsek
Reliable Robotics Corporation

Sponsors & Exhibitor Chair
Paul Kostek
IEEE AESS

Drone Competition Coordinator
Werner Osorio
Southwest Research Institute

Conference Management
Conference Catalysts, LLC

Conference Sponsors

Co-Sponsor

Silver Sponsor

Bronze Sponsors

Exhibitors

UAS Competition Sponsor

Media Sponsor

Program-at-a-Glance

	Sunday 9/29/2024	Monday 9/30/2024		Tuesday 10/1/2024		Wednesday 10/2/2024	Thursday 10/3/2024
7:00 AM	Registration Fairbanks Foyer						
7:30 AM							
8:00 AM	8:00am - 11:00am (3 hrs) Tutorials	8:00am - 11:00am (3 hrs) Tutorials		8:00am - 10:00am Opening Remarks, Keynote, AAM/UAM Plenary Panel		8:00 am - 9:30 am (1.5 hr) Machine Learning & Regulators Plenary Panel	8:00 am - 10:00 am (2 hrs) Technical Sessions
8:30 AM							
9:00 AM							
9:30 AM						9:30 - 10:00 am Coffee Break	
10:00 AM				10:00 - 10:30 am Coffee Break	10:00 am - 5:00 PM Student UAS Competition *Sponsored in part by Southwest Research Institute*	10:00 - 12:00 (2 hrs) Technical Sessions	10:00 - 10:30 am Coffee Break
10:30 AM				10:30 am - 12:00 pm (1.5 hrs) Technical Sessions			10:30 am - 12:00 pm (1.5 hrs) Technical Sessions
11:00 AM							
11:30 AM	11:30am - 2:30pm (3 hrs) Tutorials	11:30am - 2:30pm (3 hrs) Tutorials					
12:00 PM				12:00 - 1:00 (1 hr) Lunch *Sponsored in part by Merlin Labs*		12:00 - 1:00 (1 hr) Lunch	
12:30 PM							12:30 pm - 2:30 pm (2 hrs) Awards Lunch
1:00 PM				1:00 pm - 3:00 pm (2 hrs) Technical Sessions (2 hrs) Cybersecurity Session Panel (1hr)		1:00 pm - 3:00 pm (2 hrs) Technical Sessions (2 hrs) Human Factors Session Panel (1hr)	
1:30 PM							
2:00 PM							
2:30 PM							
3:00 PM	3:00pm - 6:00pm (3 hrs) Tutorials	3:00pm - 6:00pm (3 hrs) Tutorials		3:00 - 3:30 pm Coffee Break		3:00 - 3:30 pm Coffee Break	
3:30 PM				3:30 pm - 5:30 pm (2 hrs) Technical Sessions		3:30 pm - 5:30 pm (2 hrs) Technical Sessions (2 hrs) CNS Session Panel (1 hr)	
4:00 PM							
4:30 PM							
5:00 PM							
5:30 PM			5:30 - 7:30 (2 hrs) Ice Breaker Reception	5:30 pm - 6:30pm Student & Conf Poster Session	5:30 - 7:30pm Exhibitors Reception		
6:00 PM						6:00pm - 10:30pm Special Event	
6:30 PM				6:30 pm - 7:30pm WIE Reception			
7:00 PM							
7:30 PM							
8:00 PM							
8:30 PM							
9:00 PM							
9:30 PM							
10:00 PM							

Keynote Speaker

Tuesday, October 1st | 8:00-9:00 am | Fairbanks Ballroom

Heather Cohea

Lockheed Martin

Heather Cohea is Chief of Staff for Engineering & Technology (E&T) at Lockheed Martin Aeronautics. Appointed to this position in 2020, she ensures execution to achieve E&T strategy, in alignment with Aeronautics, and Lockheed Martin Corporation strategies, across 10,300 engineers and the E&T Vice President's staff. Her responsibilities include executing engineering business operations across F-35, F-16, F-22, Skunkworks, C-130, and future systems.

In her prior position, Ms. Cohea served as Director of Engineering Operations for the Integrated Fighter Group (IFG), responsible for integration of engineering daily execution while managing engineering cost & schedule for the F-16, F-22 & future fighters portfolio. Ms. Cohea previously worked as Senior Manager, Subsystem and Specialty Engineering for IFG, leading 4 teams of 77 engineers for development and integration of specialty engineering for F-16, F-22, and future fighters, and driving action and from strategy.

Ms. Cohea began her career at Lockheed Martin Management and Data Systems (M&DS) in 2002 as a Senior Systems Engineer, ultimately responsible as the Lead Technical Verification engineer for delivery of the ground system for the first geosynchronous satellite to join the Space Based Infrared System, which provides missile warning, technical intelligence and battlespace awareness to the President of the United States and the Combatant Commanders.

Her other roles included research for NASA, Lockheed Martin Space, and the Laboratory for Atmospheric and Space Physics at the University of Colorado at Boulder. Concurrently with her career at Lockheed Martin, Colonel (select) Cohea has served in the United States Air Force Reserve. She is currently Chief of Special Projects for the Future Operations Division at Headquarters United States Space Force at the Pentagon. As a space operations expert, she develops concepts for future space operations, and generates 'best military advice' for the Secretary of the Air Force, Chief of Space Operations, and Deputy Chief of Space Operations. Col (select) Cohea earned both pilot and space wings. A C-17 pilot at Charleston Air Force Base, South Carolina, she qualified in combat air/land, air-refueling, direct delivery, and night vision goggle operations. Heather flew C-17s in support of Operation IRAQI FREEDOM and Operation NOBLE EAGLE/HOMELAND DEFENSE. Also certified in space operations, Col (select) Cohea served as commander for the Reserve SBIRS missile warning squadron and as Course Director for an executive level course covering space policy and acquisitions strategy at the National Security Space Institute.

Ms. Cohea is selected as a Harvard National Security Strategy Fellow. She holds a Master of Science degree in Aerospace Engineering from the University of Colorado at Boulder and a Bachelor of Science degree in Aeronautical and Astronautical Engineering from Purdue University. Lt Col Cohea commissioned as a Distinguished Graduate from Officer Training School and earned multiple academic honors in graduating from Air War College, Air Command and Staff College, Squadron Officer School, the International Junior Officer Leadership Development Program, and several graduate-level Space Professional Development courses.

Trust is a Human Endeavor

The increasing complexity of modern aviation systems demands a nuanced approach to fostering trust in the advancing technology foundational to the products. This talk, entitled "Trust is a Human Endeavor," explores the dynamics of building trust within this environment. Through a multidisciplinary lens, the discussion delves into the human psychological factors essential for establishing and maintaining trust in products embedded with advanced technology. It emphasizes that trust is fundamentally rooted in human experience, necessitating comprehensive understanding of how humans build trust and designing and translating the technical foundations of system trust based on these insights. Ultimately, the paper concludes that fostering trust in aviation not only hinges on advanced technological solutions but on the deeply human endeavor of choosing to trust.

Advanced Aircraft Technologies to Enable AAM Plenary Panel

Tuesday, October 1st | 9:00-10:00 am | Fairbanks Ballroom

This panel will explore a variety of advanced aircraft-based and flight deck technologies that are being developed to enable advanced air mobility concepts. The panel will discuss software assurance, data integrity, sensor performance, and other common themes among the technologies. Technologies included are assistive detect and avoid, detect and avoid for uncrewed operations, fully automated flight, machine vision, multi-vehicle control, automated contingency management, and capabilities leading to increasingly autonomous flight operations.

Moderator

Brandon Suarez leads the development of technical standards and global aviation policy at Reliable Robotics. Prior to joining Reliable, Suarez was the Technical Director for UAS Civil Airspace Integration at General Atomics Aeronautical Systems, Inc. He serves as a Chair of the Aerospace Industry Association's Emerging Technology Committee and is an advisor to the International Civil Aviation Organization. He is a Co-Chair of RTCA Special Committee 228, which has developed FAA-recognized standards for DAA systems and UAS datalinks. Suarez earned undergraduate and Masters degrees in Aeronautical Engineering from the Massachusetts Institute of Technology. He is also an instrument-rated commercial pilot.

Panelists

Dr. Darren Cofer is a Principal Fellow at Collins Aerospace. He earned his PhD in Electrical and Computer Engineering from The University of Texas at Austin. His area of expertise is developing and applying advanced analysis methods and tools for verification and certification of high-integrity systems. He is the Collins principal investigator for the DARPA Assured Autonomy program. Dr. Cofer served on RTCA committee SC-205 developing new certification guidance for airborne software (DO-178C) and is currently a member of SAE committee G-34 for Artificial Intelligence in Aviation.

Amelia Memahan leads the systems engineering team for Prime Air's MK30 Drone System. Amelia started at Prime Air in 2020. Amelia is a lead in the Prime Air Women's Affinity Group Leaders in Flight and Technology (LiFT). Amelia has ten years of experience in commercial aviation, ranging from technology integration for experimental flight test, designing low noise and low emissions procedures, and developing global standards for drone communications. Amelia earned degrees in Mechanical and Aerospace Engineering from Oklahoma State University, and a Masters of Engineering from the Georgia Institute of Technology. Amelia serves as the co-chair of the RTCA SC-228 Command and Control working group. Amelia enjoys gardening, and lounging with her rescue greyhound.

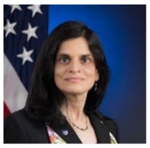
Dr. Eric Mueller is an airspace engineer at Joby Aviation, responsible for ensuring that Joby's operations will integrate with the air traffic control system and finding ways to scale operations over time. Prior to joining Joby, Eric worked on Uber's Elevate team developing concepts, procedures, and technologies to allow for the safe and efficient simultaneous operation of high densities of aerial ridesharing aircraft and small UAS within the existing airspace system. Eric also worked at NASA's Ames Research Center for 17 years leading research teams that developed air traffic management concepts and technologies for traditional aircraft, remotely piloted aircraft systems, and urban air mobility aircraft. He received his PhD in aerospace engineering from Stanford University and his bachelor's degree in mechanical and aerospace engineering from Princeton University.

The Use of AI and ML in Aviation Systems: Regulatory Paths for Technology Acceptance Plenary Panel

Wednesday, October 2nd | 8:00-9:30 am | Fairbanks Ballroom

Artificial Intelligence and Machine Learning applications are proliferating in society today. There has been a concerted push to see if AI or ML can be used in the design, fielding, operations, and maintenance of aviation systems. These AI and/or ML technologies have the potential to become integrated into aircraft and their subsystems, air traffic management functions, airline operations planning and fleet maintenance, infrastructure development and management, and many other aspects of the airspace system. One of the key problems is the inability to assure AI or ML components to the assurance level required for safety critical aviation systems. This workshop aims to bring together technologists and regulators for a discussion on creating a common understanding of the challenges associated with assuring and safely deploying AI and/or ML systems in civil aviation contexts. The goal is to identify fundamental questions to be answered in the design, development, and assurance of these systems; discuss at what point the answers are sufficient to proceed with adoption; and identify the tall polls for transition, how to advance the TRL, and how to define relevant environment testing.

Moderator



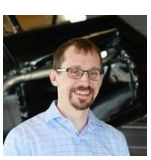
Dr. Natasha Neogi is currently the Senior Technologist for Assured Intelligent Flight Systems at the National Aeronautics and Space Administration (NASA). Her primary research interests are in the verification and validation of software-intensive safety-critical infrastructure systems, as well as certification issues concerning airworthiness of non-conventionally piloted vehicles. She is currently the international chair for AIAA's Intelligent Systems Technical Committee. Previously, she was a staff scientist in the Office of the Chief Scientist, NASA Headquarters. She received her Ph.D. in Aeronautical and Astronautical Engineering from the Massachusetts Institute of Technology. She is an associate fellow of the AIAA and was the recipient of the AIAA Robert A. Mitcheltree and PEC Doug P. Ensor Young Engineer awards as well as NASA's 2021 Outstanding Leadership Medal. She has numerous awards and publications in AIAA, IEEE and ACM conferences and journals.

Panelists

Dr. Trung T. Pham is the FAA's Chief Scientific and Technical Advisor (CSTA) for Artificial Intelligence (AI) – Machine Learning, supporting leadership in research and knowledge related to how AI & Machine Learning may be used in aviation systems, and how to evaluate integration of components based on AI & Machine Learning with aircraft software. Dr. Pham joins the FAA with more than 35 years of software and AI experience. Before joining the FAA, Dr. Pham was at the United States Air Force Academy (USAFA) in Colorado where he worked as an academic professor, teaching in the Department of Computer & Cyber Sciences, and conducting research & development in AI & Machine Learning applications in for the US Air Force Cyberworx (Center of Innovation in Cyber Security) where he was granted the US Top Secret Security Clearance. Previously he taught Control Theory, AI, and Neural Networks at the University of Houston, and was a technical specialist and staff engineer at NASA Johnson Space Center working in the area of Automation & Robotics in the Space Station Program. He also spent a stint at the University of Talca in Chile, South America as a visiting professor and director of the Center of Research in Information Technology, teaching computer sciences, and directing two nationally sponsored R&D projects on product authentication with embedded double-encryption in RFID and data mining on the IoT authentication activities. While in Chile, he received the US State Department's Fulbright Funding for a project on using swarm intelligence for coordinating a fleet of inexpensive drones to detect forest fire. Earlier in his career, Dr. Pham was a Process Engineer at both Seiscom Delta United, and AMF GeoSpace, doing seismic signal processing for the oil exploration in the energy sector.

George Romanski began as the CSTA for Aircraft Computer Software in 2017. In this role, he works to develop rules, guidance, regulations, and technical standards to help industry and regulators maintain a safety framework for aircraft computer software and use of Artificial Intelligence (AI). Mr. Romanski started his professional career as a graduate Programmer in 1970. For the next 20 years he developed compilers, run-time systems, and gradually moved to focusing on real-time systems. In 1990, Mr. Romanski started work on Safety Critical Systems and formed a team specializing in software certification for the aviation industries. In 1999 he co-founded Verocel, a company that develops tools and supports certification projects for companies that want such work performed independently. As a CSTA for the FAA, he contributes to many working groups, including those focused on AI and Machine Learning. Mr. Romanski earned a B.S. in Computer Technology from Wolverhampton Polytechnic in England.

Dr. Jean-Guillaume Durand is the Perception Lead at Joby Aviation, a company developing electric aerial ridesharing. Within Joby Flight Research, he and his team use onboard sensors to develop the "eyes" of autonomous eVTOL aircraft: a suite of certifiable robotics algorithms that enable safe autonomous flight (runway detection, obstacle avoidance, vision-based navigation). Passionate about automating flight, Jean-Guillaume has over 14 years of experience in the field. He began with student robotics competitions with drones and self-driving vehicles, winning several awards along the way. Since then, Jean-Guillaume has contributed to perception systems and full-stack autonomy for a variety of airborne platforms: delivery drones at Amazon Prime Air, cargo aircraft at Xwing, and large passenger aircraft at Airbus Wayfinder. He holds a Ph.D. from the Georgia Institute of Technology.



Robert Voros is the Senior Director of Product Safety Assurance at Merlin Labs, which works to extend levels of autonomy on existing aircraft. There, he supports the development and implementation of System Safety (based on SAE ARP4761), Development Assurance (based on SAE ARP4754A), and Human Factors processes. He acts as a key interface on these topics to both industry organizations and Certification Authorities, at the local and policy levels. He was previously the manager of Engineering Processes for Textron Aviation Inc. (Cessna and Beechcraft), while acting as a subject matter expert for development assurance process & system safety process.

Women in Engineering Reception

Tuesday, October 1st | 18:30-19:30 | Bel Air Ballroom

Join us for the DASC Women in Engineering Reception! This event, open to all attendees, provides fantastic networking opportunities and will highlight the invaluable expertise and insight women in engineering contribute to aeronautics and aerospace every day.

Dr. Kathleen Kramer
University of San Diego

Dr. Kim Wasson
Joby Aviation

Dr. Sarah Lehman
NASA

Dr. Maria Consiglio
NASA

Dr. Natasha Neogi
NASA

Dr. Yemaya Bordain
Daedalean

Student Unmanned Aerial Systems Competition

Tuesday, October 1st | 10:00-15:00 | Bel Air Ballroom

For the past years, the DASC has held an International Drone Competition. The mission behind the competition is to motivate students in academic institution specifically in STEM programs in the fields of engineering for their future.

The competition is an opportunity for High School students to engage with industry engineering leaders in various disciplines that are attending the conference and observing the competition. The conference consists of several industries from aeronautics, astronautics, electrical and electronics engineering.

Tello Drone

STEM High schools will compete flying an Unmanned Aerial System (UAS)/Drone through an indoor obstacle course. The competition consists of being able to fly through several obstacles that are challenging. The idea behind this competition is to allow High School STEM programs compete against local schools. A in depth presentation to STEM leads of each team/school will be provided so they understand all the details of the competition. The Institute of Electrical and Electronics Engineers (IEEE) is a professional engineering organization that will be providing drones to every High School that signs up to compete.

In order to complete the course, each team will fly through the LED lit gates as illustrated in the TRACK section below. The gates are roughly less than 4×4 feet and connected as pairs. The timer starts once the drone has taken off from the start location and the timer stops once the drone has landed on the finish zone. Disqualification occurs when the drone misses entry through a required gate.

A standardized scoring rubric will be used by each of the 5 judges to ensure fairness. At designated times, (e.g., every 10 or 15 minutes), each student team will fly their UAS among different scenarios and use the real-time video feeds to complete their tasks. Each team will be allowed keep their best run out of all the runs they perform during their allotted time. Switching of batteries will be permitted but the same drone must be used throughout the team’s performance.

Key metrics on the High School competition are team effort, every student in a team is required to fly the drone when it is his/her turn. Time will be kept when the drone lifts and it will not stop until you complete the course. Performance of each time is flown will be kept.

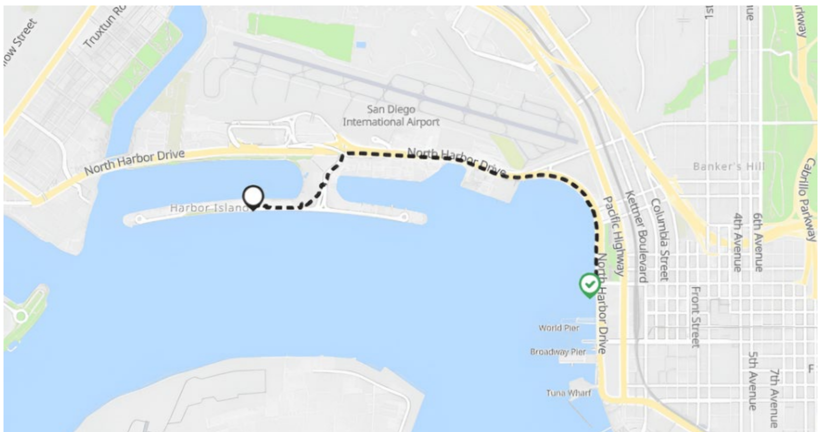
Special Event: Maritime Museum of San Diego

DASC attendees are invited to attend our special event on Wednesday, October 2nd from 6:00 pm to 10:30 pm at the Maritime Museum of San Diego. Attendees will have the opportunity to tour the historic Start of India, the world's oldest active sailing ship, and explore the museum aboard the Steam Ferry Berkeley. Throughout the night, dinner and drinks will be served on the upper deck of the Berkeley with nighttime views of the San Diego Bay and Downtown San Diego.

Be sure to bring your name badge to the event with you. Your name badge will get you into the event. At the entrance to the event you will be provided with a drink ticket for one free drink. After this, we offer a cash/credit bar for beverages to purchase. This event is included in the spouse tickets available for purchase on the registration site.

One-way transportation by bus will be available from the conference hotel to the Maritime Museum of San Diego on a first-come, first-served basis. Travel back to the hotel is up to you! There will be two rounds of buses leaving to go to the museum – the first will leave at 5:45 pm, and then, they will come back for a second round to leave at 6:15 pm.

The Maritime Museum is approximately 2.3 miles (3.7 km) from the Sheraton Bay Tower (6 minutes by car / 51 minutes walking). Plenty of parking is available near the Maritime Museum for an hourly fee for those planning on driving themselves.



Maritime Museum of San Diego

Founded in 1948, the Maritime Museum of San Diego enjoys a worldwide reputation for excellence in restoring, maintaining, and operating historic vessels. The museum brings adventure and discovery to life through interactive exhibits, volunteer opportunities, and educational outreach. The Maritime Museum of San Diego hosts one of the world's finest collections of historic ships, which represent a unique set of international, national and state narratives. Historic ships at the museum include the Californian, HMS Surprise, PCF 816 Swift Boat, Pilot, San Salvador, Start of India, Berkeley, Medea, and USS Dolphin.

About the Star of India: The Star of India, originally named Euterpe after the Greek muse of music and poetry, is an iron-hulled sailing ship built in 1863 in the Isle of Man. Initially serving the jute trade between Great Britain, India, and New Zealand, she was later re-rigged as a barque (a type of sailing vessel with three or more masts) and renamed the Star of India. After serving as a salmon hauler between Alaska and California, she was retired in 1926 and restored in the 1960s. During her time, she circumnavigated the world 21 times. The Star of India is now a seaworthy museum ship based at the Maritime Museum of San Diego, celebrated as the world's oldest active sailing ship.

About the Steam Ferry Berkeley: The Steam Ferry Berkeley, built in 1898 by the Union Iron Works of San Francisco, was the first successful propeller driven ferry on the West Coast. Serving the San Francisco Bay for 60 years, she was the largest commuter ferryboat in the United States at the time of her launching with a capacity of 1,700 passengers. Notably, the Berkeley played a crucial role in ferrying survivors during the 1906 San Francisco earthquake. Operated until 1958, she is now a National Historic Landmark and a cherished exhibit at the Maritime Museum of San Diego

Tutorial Schedule

PDT	Label	Presenter	Title	Track	Room
Sunday, September 29					
8:00-11:00	SM1	Tim Etherington	Modern Avionics Architectures	Avionics and Space Systems	Monterey
11:30-14:30	SL1	George Andrew	Spacecraft Systems Engineering - I	Avionics and Space Systems	Monterey
15:00-18:00	SA1	George Andrew	Spacecraft Systems Engineering - II	Avionics and Space Systems	Monterey
11:30-14:30	SL2	Maarten Uijt de Haag	Assured Navigation for Unmanned Aircraft Systems	UAS	Bel Air Ballroom
15:00-18:00	SA2	Giancarmine Fasano	Detect and Avoid for Unmanned Aircraft Systems	UAS	Carmel
8:00-11:00	SM3	Krishna Sampigethaya	Introduction to Aviation Cybersecurity	Aviation Cyber Security	Carmel
11:30-14:30	SL3	Krishna Sampigethaya	Introduction to Ethical Hacking and Penetration Testing	Aviation Cyber Security	Carmel
11:30-14:30	SL4	Vance Hilderman	Applying the new Aviation Safety/Systems Standards: SAE ARP4754B & ARP4761A [an AFuzion tutorial]	Aircraft Certification	La Jolla
15:00-18:00	SA4	Vance Hilderman	Understanding and Optimizing Avionics Requirements per DO-178C, DO-254, and ARP4754A [an AFuzion© tutorial]	Aircraft Certification	La Jolla
15:00-18:00	SA5	Rohit Mital, Ram Raju, Brian O'Donnell	FREE TUTORIAL: Demystifying Machine Learning, Deep Learning and Generative AI	FREE Tutorial	Bel Air Ballroom
Monday, September 30					
8:00-11:00	MM1	Banavar Sridhar	Impact of Aviation Induced Contrails and Emissions on Climate: Challenges in the Detection, Prediction and Avoidance of Contrail and the Use of ML Techniques to Reduce Uncertainties	Autonomy and ATM	Monterey
11:30-14:30	ML1	Xavier Olive	Machine Learning Techniques for Aircraft Trajectory Analysis	Autonomy and ATM	Monterey
15:00-18:00	MA1	Krishna Kalyanam, Stephen Clarke	Application of AI/ML tools for Air Traffic Management – a NASA perspective	Autonomy and ATM	Monterey
8:00-11:00	MM3	Leonidas Kosmidis	Introduction to CUDA Programming and GPU Hardware Architecture	Aviation Technology	Carmel
11:30-14:30	ML3	Leonidas Kosmidis	Introduction to Certifiable General Purpose GPU Programming for Avionics Systems	Aviation Technology	Carmel
15:00-18:00	MA3	Zamira Daw, Kim Wasson, Michael Holloway	A Guide to Argument-Based Assurance and Certification	Aviation Technology	Carmel
11:30-14:30	ML4	Steven Harbour	Neuromorphic Engineering	Innovations in Aviation	La Jolla
15:00-18:00	MA4	Siddhartha Gupta, Umut Durak	Scenario Modeling for AI-Based Airborne Systems	Innovations in Aviation	La Jolla
8:00-11:00	MM5	Tuan Bui, John Ross, William Vance	FREE TUTORIAL: Introduction to Multi-Core Processing Interference Channel Analysis, Identification, and Mitigation for Safety-Critical Applications	FREE Tutorial	Bel Air Ballroom
11:30-14:30	ML5	Sabatini, Gardi, Blasch, et. al.	AESS FREE TUTORIAL: Digital Avionics for Sustainability	FREE Tutorial	Bel Air Ballroom

Tutorial Descriptions - Sunday, September 29

Avionics and Space Systems

Modern Avionics Architectures

This tutorial explores architectures from numerous civil and military aircraft. Key architecture and design challenges are described for legacy as well as the newest aircraft types. Architectures are examined with comparisons of hardware and avionics functions of each are discussed in detail. Civil aircraft investigated include Boeing 787 and Airbus A350. Military aircraft include F-22 and Rafael. IMA 2G and other advanced concepts will be explored.

Specific architecture examples are used to represent real word design challenges and solutions. Integrated and connected aircraft concepts are explored in reference to the integrated modular avionics architectures and how they can support integrated digital datalink and future air traffic management. Architectures have been carefully chosen to cover the following:

- Broad spectrum of aircraft types, military and civilian
- Federated and integrated designs with emphasis on the latest modern commercial and military aircraft
- Emphasis on the latest integrated architectures with partitioning and connected aircraft
- Line Replaceable Unit (LRU) vis-à-vis modular packaging
- Impact of the Modular Open Systems Approach (MOSA) on architecture
- Range of non-essential to flight critical applications and the impact on future designs
- Connected aircraft and design decisions for integrated designs

Presenter's Bio

Timothy Etherington graduated from North Dakota State University with a Master of Science in Electrical Engineering in 1987. Tim conducts flight deck research at NASA Langley Research Center and is recently retired from Collins Aerospace as a Technical Fellow. Mr. Etherington had worked at Rockwell Collins for over thirty years with extensive experience in military and commercial flight deck design and applied human factors. He helped design the flight decks for the Canadair Regional Jet and other business and regional primary flight display systems. He led the perspective, synthetic and enhanced flight deck research at Rockwell Collins including the flight-testing completed with NASA Langley and Air Force Research labs. He holds an FAA Airline Transport Pilot certificate with a Citation Type Rating and holds commercial fixed wing and private pilot rotorcraft ratings. Mr. Etherington is co-chair for RTCA SC-213 working on standards for enhanced and synthetic vision systems.

Spacecraft Avionics Systems Engineering Fundamentals -I and II

This course offers a detailed look at basic spacecraft avionics systems engineering and design processes and principals. All spacecraft avionics systems have similarities, but differ in many ways. This course addresses the up-front systems engineering process; requirement levels, trade studies, requirements allocation/linking requirements derivation, requirements verification, risk and risk assessment, safety, integration and test, costing, scheduling, and then applying all this to the avionics subsystem level design on a subsystem-by-subsystem basis. Attendees will be exposed to avionics subsystem designs that are typically used on satellite buses and will learn the terms, nomenclature and rules of thumb used in the development process. Each avionics subsystem is explained in detail to gain insight into manpower and cost requirements. In addition to spacecraft avionics equipment, the design, fabrication, and qualification of the electrical ground support equipment required for satellites are discussed in detail.

Who Should Attend:
Space, Spacecraft, and Launch Vehicle Systems Engineers, Avionics Subsystem Designers, Managers, Business Development personnel, System Safety Engineers, Risk Engineers and Managers, Electrical Ground Support Equipment Engineers, Integration and Test Engineers, and Environmental Test Engineers

What You Will Learn:
Applying the systems engineering process and principles to the system level design, developing the overall and subsystem architectures and then down into each of the Avionics Subsystems. How the systems engineering process is applied to evaluate and determine the risks, safety, and trade studies to the requirements derivation process, subsystem design, and then requirements verification.

Presenter's Bio

George Andrew has over 38 years of experience relating to spacecraft, space instrument and launch vehicle avionics architecture, design, manufacturing and testing. In addition, Mr. Andrew has extensive mission / systems engineering, and program/project management experience. He has consulted with start-up launch vehicle and spacecraft companies, managing the flight and ground hardware/software architecture, design, development, manufacturing, test, and launch. Mr. Andrew has been the program/project manager for several spacecraft program contracts and the Avionics Department Manager for two start-up launch vehicles. He is currently supporting the NASA Earth Science Program Office in the Program Systems Engineering office located at the NASA Goddard Space Flight Center in Greenbelt, MD. Mr. Andrew is President of GNA Aerospace Consulting Group and is an Associate Fellow within the AIAA.

UAS

Assured Navigation for Unmanned Aircraft Systems

This course provides a fundamental background in assured navigation for unmanned aircraft systems (UAS). It first introduces the various UAS/RPAS application domains and operational environments, UAS flight management and path planning, required performance parameters, and autonomy at the various levels of the Guidance, Navigation and Control function. Furthermore, it addresses the foundations of Global Navigation Satellite Systems (GNSS) and inertial navigation and discusses the challenges of operating in the various target environments with sole-means GNSS. Next, augmentation methods and alternative navigation methods will be discussed with a focus on guaranteeing required navigation performance in, especially, GNSS-challenged environments. Finally, the course will talk about the role of the navigation function in surveillance, geo-fencing and relative navigation in case of swarms of UAS.

Presenter's Bio

Dr. Maarten Uijt de Haag is Professor at the Technische Universität Berlin (TU Berlin) and leads the Chair of Flight Guidance and Air Traffic in the Institute of Aeronautics & Astronautics. He obtained his M.S.E.E. ('ir') degree from Delft University in The Netherlands in 1994 and a Ph.D. in Electrical Engineering from Ohio University in Athens, Ohio in 1999. He has been involved with navigation-related research since 1992. More recently, his research activities have focused on sensor integration methods using lasers, vision, GNSS, and inertial for manned and unmanned aerial vehicles, terrain referenced navigation, aerial vehicle surveillance, collision avoidance and information management systems. He has authored or co-authored over 180 navigation-related publications and seven book chapters. He is a member of the Institute of Navigation (ION), a senior member of the IEEE and an associate Fellow of the AIAA and Royal Institute of Navigation (RIN). He was awarded the 2007 Institute of Navigation Colonel Thomas L. Thurlow Award for his contributions to laser-based navigation and integrity monitors for synthetic vision systems.

Detect and Avoid for Unmanned Aircraft Systems

In the latest years, sense and avoid (SAA), or detect and avoid (DAA), has represented one of the main roadblocks to the integration of unmanned aircraft systems (UAS) operations. This course outlines and reviews architectures, technologies, and algorithms for SAA. First, starting from a discussion about what constitutes a UAS and how it is different than manned aircraft, basic SAA definitions and taxonomies are discussed. Ground-based/airborne and cooperative/non-cooperative architectures are covered. The SAA process is dissected into its fundamental tasks, which are discussed in details. Different sensing algorithms and technologies are presented, including radar and optical systems. Potential and challenges of multi-sensor-based systems and data fusion are pointed out. Techniques for conflict detection, and approaches for remotely operated or autonomous avoidance are introduced. The tutorial ends with an overview of current perspectives and recent progress relevant to SAA for UAS integration in the Air Traffic Management (ATM) system and in the framework of UAS Traffic Management (UTM) / U-Space and Urban Air Mobility.

Presenter's Bio

Giancarmine Fasano is Associate Professor at the University of Naples "Federico II", where he holds courses in "Unmanned Aircraft Systems" and "Space Flight Dynamics". His research activities in the field of aeronautics are focused on UAS, and in particular on sense and avoid and cooperative multi-UAV systems. In the space field he is mainly interested in distributed space systems and proximity operations, with emphasis on relative motion design and control. He is Member of the Avionics Systems Panel of the IEEE Aerospace and Electronic Systems Society and Associate Editor of the IEEE AESS Magazine for the UAS area of specialty. He is also Member of the AIAA Sensor Systems and Information Fusion Technical Committee and of the IAA Committee on Small Satellites. He has co-authored over 110 publications and five book chapters.

Aviation Cyber Security

Introduction to Aviation Cyber Security

The cyber threat landscape of aviation is increasing. Threats bring new security risks that are specific to aviation and impact public safety and well-being. This tutorial will introduce you to aviation cyber security, focusing on the aircraft at the center of an increasingly complex and technology-driven aviation ecosystem.
Upon completion of this tutorial, you will be able to:

- comprehensively summarize and skillfully analyze today's aviation cyber threat and security landscape.
- considerations in securing crewed aircraft, UAS aircraft, and their supporting systems.
- analyze case studies to evaluate threats from vulnerabilities as well as risks from threats to aviation systems.
- recognize, examine, and compare some of the recent advances in aviation cyber security, including those related to avionics, crew, and aircraft, air traffic control, UAS, and UTM systems.
- cybersecurity terms and concepts and their application to the aviation industry
- Identify and discuss applicable legal and governmental policy frameworks and issues.

Introduction to Ethical Hacking and Penetration Testing

To securely build and defend your systems against attacks, it is essential to adopt the mindset of an adversary. This tutorial will enable you to do so and provide you a foundational understanding of cybersecurity principles and practices in the context of aviation. You will learn about ethical hacking and penetration testing methodologies and explore how they are used to identify and exploit vulnerabilities in computer systems and networks. Essential topics such as information gathering and reconnaissance, network scanning and enumeration, and system exploitation, along with some demonstrations are provided. Standards, legal and ethical frameworks and guidelines are also covered.

Presenter's Bio

Krishna Sampigethaya is Professor and Department Chair of Cyber Intelligence and Security at the Embry-Riddle Aeronautical University in Prescott, AZ. https://prescott.erau.edu/cyber. The department is DHS/NSA CAE-CD designated, ABET-Cyber accredited, US Cyber Command AEN member, DoD Cyber Scholarship winner, and part of the only NSF SFS institution for aviation and aerospace cyber security.

Krishna received his Ph.D. in electrical engineering from the University of Washington (2007) and was one of the first in the world to defend a thesis on connected vehicle privacy and aviation cyber security research. He then joined The Boeing Company and was soon selected as the first Boeing Associate Technical Fellow for aviation cyber-physical security in 2012. Most recently he was an Associate Director for cyber security at the United Technologies Corporation (UTC) Research Center (2016-2018), focusing on the security of aerospace systems and commercial products. He has also been an Assistant Director for the Masters in Telecom program at the University of Maryland (2014-2015), developing new courses on software-defined networks and connected vehicles.

Krishna founded the first aviation cyber security technical committee, sponsored by the SAE in 2008, and has been organizing aviation cyber security tracks at SAE as well as AIAA/IEEE conferences since then. He co-edited the first special issue on cyber-physical systems, published in the first centennial year issue of the Proceedings of the IEEE journal (2012). He has authored over 50 papers—including 3 award-winning publications (at IEEE DASC and I-CNS)—delivered over 16 keynotes and holds over 16 US patents in aviation cyber security. His work has been recognized in the community with awards such as the American Society of Engineers of Indian Origin (ASEI) Engineer of the Year Award (2013), ASEI Corporate Engineering Excellence Award (2013), and a Best Instructor Award at UMD (2015). Most recently, he led a team of Embry-Riddle cybersecurity program students to design the first aviation cybersecurity competition at the DEF CON Aerospace Village, AIAA, Aviation ISAC, and DHS ACI. He is one of the main instructors for the only in-person ICAO professional course on aviation cyber security.

Aircraft Certification

Applying the new Aviation Safety/Systems Standards: SAE ARP4754B & ARP4761A [an AFuzion tutorial]

SAE-ARP4754B provides guidance for the development of aircraft and aircraft systems while taking into account the overall aircraft operating environment and functions. ARP4761A is the corresponding Safety Assessment for aircraft and electronic systems ("avionics"). ARP4754 was long "suggested" for commercial avionicsl, ARP4754A was mandatory, and the newest version ARP4754B (along with ARP4761A) is now required and increasingly mandatory for all avionics including worldwide militaries and UAV's beginning 2024. ARP-754B is commonly called "DO-178 for Aircraft & Aviation Systems", but it's really much different: ARP4754B requires detailed Safety processes (ARP4761A), a full ecosystem of 7 Planning documents, optional Model-Based Systems Engineering (MBSE) and enhanced Validation, Unintended Behaviors, FDAL/IDAL assignment per FHA and updates via PASA/PSSA, traceability with verification, and tight configuration management. While bearing some semblance to DO-178C, the new ARP4754B and 4761A really covers the Aviation Development Ecosystem and is a mandatory foundation – it must come BEFORE DO-178C/254 and have continuous evidence of usage throughout aircraft and system development. The processes for developing systems requirements are rigorous and formal processes must be proven in place before software and hardware development begin.

KEY FEATURES:

- How ARP4754B fits into the Avionics Development Ecosystem including ARP4761A, DO-178C, and DO-254
- Example Checklists per AP4754B
- Differences between ARP4754B and ARP4754A, and ARP4761A versus 4761
- ARP4754B Planning – what is really required including FDAL/IDAL per FHAs
- Aviation Safety: what is required for ARP4761A
- Model-Based Systems Engineering – MBSE per ARP4754B and ARP4761
- System Requirements – What, Where, Why, and How
- Planning, Development, and Traceability Processes for Aircraft & Systems
- ARP4754B / ARP4761A Documentation
- ARP4754B Verification & Validation
- ARP4754B Best Practices & Common Mistakes

Understanding and Optimizing Avionics Requirements per DO-178C, DO-254, and ARP4754A [an AFuzion© tutorial]

Aircraft, systems, software, and hardware have one common Primary Ingredient: "REQUIREMENTS"! But unlike other industries, aviation has very explicit rules and best-practices for developing and managing those "requirements". But can you answer these questions below?

- What are good versus great systems/software/hardware requirements?
- What is the role of ARP4754B and ARP4761A in creating good aircraft, systems, and safety requirements?
- What are necessary requirements "Standards" for DO-XXX and ARP47XX and what are actual samples of such requirements standards?
- What is a "derived" versus "safety" versus "functional" versus "decomposed" requirement?
- How should requirements be decomposed and what is requirements-based Transitions and Traceability?
- How does Model Based Development (MBD) change requirements definition, capture, and management?
- How should requirements be validated? Verified?
- What are best practices for FAA, EASA, and Military certification authorities for requirements certification?
- What are the common mistakes of requirements development and how to avoid them?

If you know the answers to the above, this course will be interesting. If you know most of the answers, this course will be useful. If you aren't sure of most of the answer, this course should be like aviation requirements: "Mandatory".

KEY FEATURES:

- Answers will provided to fully understand aircraft, systems, software, and hardware requirements per ARP47XX and DO-XXX.
- Answers will provided to all of the above Questions in the course description.
- Example Systems Requirements Checklists walkthrough per AP4754B

Presenter's Bio

Mr. Vance Hilderman is CTO of AFuzion, the world's largest dedicated avionics certification services company. Hilderman is a 35-year avionics safety-critical engineering expert, holding a BSEE and MBA from Gonzaga University, and a Masters in Computer Engineering from USC (Hughes Fellow). Mr. Hilderman has focused on safety-critical aviation and avionics software, safety, systems, hardware development and related technical certification solutions for his entire career. Hilderman has trained over 35,000 engineers and certification professionals worldwide in ARP4754A/4761 and DO-178C/DO-254. Of the four books published on aviation certification, Hilderman is the author of two. His company AFuzion is America's largest aviation certification services company performing aircraft and avionics development and certification services. AFuzion's solutions are onboard 75% of the world's aircraft via working with 85% of the world's top 400 aircraft and avionics systems developers. Of the top 10 eVTOL aircraft developers, six of those have selected AFuzion's development/certification training, AFuzion Avionics Framework for certification to ARP4754A/DO-178C/DO-254, Mentoring, and/or engineering. Each year AFuzion and Hilderman work in 20+ countries worldwide on 50+ aviation development and certification projects.

FREE Tutorial

FREE Tutorial: Demystifying Machine Learning, Deep Learning and Generative AI

This tutorial is designed to provide a hands-on, deep dive into Machine Learning and Deep Learning models by applying such models in a real-world use cases. Operators and analysts are being overwhelmed with the amount of data available in aerospace environments. The magnitude of the data becomes potentially too great to analyze by conventional means. Machine Learning has been proposed as a solution to “big data” problems which will enable analysts to evaluate and determine courses of action based on the information derived from the data. A lot of misinformation surrounds Machine Learning and its potential to enhance operational efficiencies and address current challenges.

This tutorial will delve into Machine Learning and Neural Network models and show how such models can solve potential problems of interest to participants. It presents an overview of current technologies but especially the crucial details on Machine Learning algorithms for aspiring or current users so that they can successfully utilize these techniques in their exploitation of existing data. A key aspect of this course is the discussion of how and when Machine Learning is applicable. An overview of emerging technologies in Machine Learning and Artificial Intelligence will be presented. Although many of the examples presented in this course deal with the exploitation of operational data, the techniques can be applied to other data types and domains as well.

Presenters’ Bios

Mr. Rohit Mital is Chief Technologist at KBR. He has over 25 years of experience in developing and delivering high-performance, scalable, complex software systems and solutions in multiple industries, including transportation, insurance, capital markets, telecommunications, and defense. He leads several initiatives in partnership with KBR customers in leveraging digital technologies including Cloud, AI/Machine Learning, Edge Computing and Distributed Ledger. Prior to joining KBR, Rohit spent two decades managing innovation and technology development for early-stage technology companies. He was featured as one of the creative people in small cities across the U.S. by Fast Company in 2004. Rohit has master’s degrees in Electrical Engineering and Mathematics. He has published and presented at conferences on big data, machine learning and distributed ledger in transportation and space domains.

Mr. Ramakrishna (Ram) Raju is a subject matter expert supporting FAA and DOT projects at the Volpe National Transportation Systems Center in Cambridge, MA for over 15 years. He has over 25 years of experience in the field of designing and developing IT solutions to meet customer needs. He has successfully led the development and deployment of several mission-critical FAA systems. Ram is also the lead of KBRs AI/ML Academy, a company-wide initiative to train KBR staff skills in the AI and ML domain.

Brian O’Donnell is a senior project manager and AI subject matter expert at the Volpe National Transportation Systems Center, an agency of the U.S. Department of Transportation. Before joining Volpe, Brian worked on machine learning, computer vision, and signal processing technologies in industry and the private sector. He served as the Vice President of Technology for G4S, the world’s largest security company, and was their subject matter expert for biometrics and intelligent surveillance. Brian invented AI-based stock trading algorithms for a start-up company working as a 'Wall Street Quant.' Brian has a B.S. in Applied Physics and an M.S. in Electrical Engineering and is a doctoral student in computer science with a specialization in AI. In addition, Brian is a senior member of the I.E.E.E. and holds several U.S. patents for machine learning and image processing applications in the defense and surveillance industries. Brian is a retired Navy officer and spent the last part of his career as an Engineering Duty Officer in the Reserves working on Los Angeles Class nuclear submarines.

Tutorial Descriptions - Monday, September 30

Autonomy and ATM

Impact of Aviation Induced Contrails and Emissions on Climate: Challenges in the Detection, Prediction and Avoidance of Contrail and the Use of ML Techniques to Reduce Uncertainties

The main goal of Air Traffic Management (ATM) is to enable safe operation of air traffic while accommodating the demand and doing it efficiently with minimum disruption to schedules. The impact of aircraft emissions and contrails on the environment adds an additional dimension to the planning of aircraft operations. This tutorial describes fundamentals of aircraft emissions, contrails and how they can be modeled in a simulation capability to analyze the relationship between air traffic operations and their impact on the environment. The simulation integrates an airspace simulation with models of aircraft emissions and contrails, a common metric to combine the effects of different types of emissions, and algorithms to generate alternate aircraft trajectories for aircraft traveling between city-pairs. The integrated simulation is used to evaluate the energy efficiency of contrail reduction strategies. The aircraft trajectories are varied from their baseline plans to reduce contrails in three different ways: (a) changes to altitude, (b) optimal changes to planned route, and (c) three-dimensional change of trajectory. The method is applied to three different scenarios: changing the trajectory of a single aircraft, simulated traffic between 12 city-pairs and to all aircraft flying in the US airspace. Initial results show that contrail reduction strategies involving altitude changes applied to medium and long-range flights on days with high-contrail activity are promising and provide the maximum environmental benefit for a small reduction in energy efficiency. The tutorial discusses the effect of uncertainties in the planning of aircraft routing and the role of machine intelligence to provide further understanding and operational solutions to the problem.

Presenter's Bio

The course will be conducted by Dr. Banavar Sridhar, Visiting Professor and Senior Fellow, Institute of Transportation Studies, University of California, Berkeley, CA. At Berkeley, Banavar created and taught the first of its kind graduate and undergraduate course in Data Sciences and Aviation combining machine learning, use of big data and concepts in aviation operations to advance simulation, modeling and optimization of U.S National Airspace System to accommodate current and emerging new class of aircraft with electric, hydrogen and alternative fuels. Earlier he served as the NASA Senior Scientist for Air Transportation Systems. His research interests are in the application of modeling and optimization techniques to aerospace systems. He has authored more than 200 publications in the areas of Air Transportation, Optimization, Data Analytics, Neural Networks, Automated Helicopter Guidance and Control Systems. Dr. Sridhar received the 2004 IEEE Control System Technology Award for his contributions to the development of modeling and simulation techniques for multi-vehicle traffic networks. He led the development of traffic flow management software, Future ATM Concepts Evaluation Tool (FACET), which received the AIAA Engineering Software Award in 2009, the NASA Invention of the Year Award in 2010 and the FAA Award for the Excellence in Aviation Research in 2010. He is a Fellow of the IEEE and the AIAA.

Machine Learning Techniques for Aircraft Trajectory Analysis

This tutorial aims to provide participants with a comprehensive understanding of aircraft trajectory analysis using deterministic rule-based methods and machine learning techniques. Over the course of three hours, participants will learn how to access trajectory data, implement analysis techniques in Python, and design machine learning algorithms for more advanced studies. By the end of the tutorial, participants will acquire the necessary knowledge to analyse and interpret aircraft trajectories in diverse real-world scenarios.

Presenter's Bio

Dr Xavier Olive is a Research Scientist at ONERA, The French Aerospace Lab. His main interests include Data Science, Machine Learning and Decision Science applied to aviation, with a particular focus on optimization, anomaly and pattern detection. Applications range from air traffic management, operations, predictive maintenance, safety analyses and risk assessment. He is also passionate about aircraft, data visualization, geographic information systems and programming languages and maintains the traffic library which interfaces with the OpenSky Network.

Application of AI/ML tools for Air Traffic Management – a NASA perspective

The tutorial introduces several Air Traffic Management (ATM) initiatives envisioned by the Federal Aviation Administration (FAA) for a bold future airspace that combines conventional traffic and new entrants (e.g., drones) without sacrificing safety. In this framework, we demonstrate the use of state-of-the-art AI/ML modeling and prediction tools that will enable efficient and safe traffic flow in the U.S. National Airspace System (NAS). In particular, Natural Language Processing (NLP) tools can help extract data (e.g., airspace constraints) that are currently contained in legacy text and audio format and convert them into digital information. The digitized information can be ingested by route planning, arrival scheduling and other decision support tools both on the ground and in the flight deck. We also show how historical data (track, weather & events) can be preprocessed, cleaned and utilized to create accurate models to predict flight trajectories and events of interest (e.g., Traffic Management Initiatives). We show several application areas within ATM that benefit from AI/ML including trajectory prediction, airport runway configuration management, automatic speech to text (of FAA command center webinars) and digitization of Letters of Agreement. The overarching goal of the work is to accelerate the integration of package delivery drones, air taxis and autonomous cargo aircraft into the NAS without impacting the safety and efficacy of current manned operations. With the correct application of modern AI/ML tools and availability of abundant data (both structured and unstructured), it is possible to build accurate models to do both prediction (e.g., estimated time of arrival) and provide recommendations (e.g., which runway configuration should be used). This tutorial is tailored to educate students, researchers and practitioners on what NASA is doing in this problem space and how AI/ML can help in solving some challenging problems in ATM. We will showcase several AI/ML methods used e.g., random forest, XGBoost, model free RL and NER by showing code snippets, input data samples and example output/results that validate our research.

Presenters' Bio

Krishna M. Kalyanam is a Sr. Aerospace Research Engineer with NASA Ames Research Center. He is the AI/ML tech lead for AAM and NextGen ATM initiatives within NASA Aviation Systems Division and NASA Aeronautics Research Institute (NARI). He received the B.Tech. degree from the Indian Institute of Technology, Madras, in 2000, and the M.S. and Ph.D. degrees from the University of California at Los Angeles, in 2003 and 2005, respectively, all in mechanical engineering. Prior to joining NASA, he did various research stints with GE Global Research, U.S. Air Force Research Lab (AFRL) and Xerox Palo Alto Research Center (PARC). Over the years, his work has spanned precision machining (PhD), Train optimal control and Wind Farm layout optimization (for GE) and multi-UAV scheduling and optimization for AFRL. He has co-authored 20+ journal articles and 40+ peer-reviewed conference publications in diverse areas including optimal control, operations research and autonomous systems. He is a co-inventor of GE's Trip Optimizer and WindLAYOUT optimization services, both of which have generated multi-billion dollar revenues for GE. He has co-designed several multi-UAV scheduling algorithms that have been successfully flight tested as part of AFRL's Intelligent Control & Evaluation of Teams (ICE-T) program. He is an associate fellow of AIAA and senior member of IEEE.

Stephen Clarke is a Aerospace Research Engineer affiliated with the NASA Aeronautics Research Institute (NARI) at NASA Ames Research Center. In this position, he is interested in applying cutting edge AI/ML techniques to complex decision problems in Air Traffic Management (ATM) with a focus on natural language processing. Some specific areas of interest include text data mining, transfer learning and speech to text. He holds a BS in Computer Science and Mathematics from Sacred Heart University and an MS in Computer Engineering from Fairleigh Dickenson University.

Aviation Technology

Introduction to CUDA Programming and GPU Hardware Architecture

GPUs are currently considered from all safety critical industries, including avionics and aerospace to accelerate general purpose computations and meet performance requirements of new advanced functionalities, which are not possible with the legacy, single-core processors used in these domains, such as in the recent Airbus project Automatic Taxi, Take- off and Landing (ATTOL) project. This tutorial aims to provide a basic understanding of GPU programming and the GPU architecture. Both aspects are required for the acceleration of high performance algorithms for new generation avionics and aerospace systems, and more importantly for their certification. The tutorial will focus on GPU programming using the CUDA programming language and will explain the Hardware Architecture of both NVIDIA GPUs as well as AMD GPUs, which are currently used in avionics systems mainly for graphics, but also considered for general purpose computing in the near future.

Introduction to Certifiable General Purpose GPU Programming for Avionics Systems

GPUs are currently considered from all safety critical industries, including avionics and aerospace to accelerate general purpose computations and meet performance requirements of new advanced functionalities, which are not possible with the legacy, single-core processors used in these domains, such as in the recent Airbus project Automatic Taxi, Take- off and Landing (ATTOL) project. However, most of the R&D is currently focused on proof of concepts, which demonstrate the capabilities of employing GPUs in avionics, ignoring the certification challenges introduced by GPUs. This tutorial is the outcome of years or research at Barcelona Supercomputing Center (BSC) and technology transfer within safety critical industries, which culminated in the recent approval of these methods (July 2022) from the competent airworthiness authority in Spain and soon by EASA, for the first time in Europe. The attendees will learn how general purpose GPU code can be developed and certified according to safety critical standards used in these industries by using graphics-based technologies (OpenGL SC 1.0.1 and 2.0) which have are already used in certified safety critical products of the highest criticality (DAL-A avionics according to DO-178C and ASIL D according to ISO 26262). This will include the latest GPU programming API for safety critical systems ratified by Khronos, Vulkan SC, in March 2022, which one of the organisers (Dr. Leonidas Kosmidis) has been one of the earliest adopters and helped to be defined by participating in its Khronos Vulkan Safety Critical Advisory Panel. Special attention will be paid on Brook Auto/BRASIL, an open source technology developed at BSC (https://github.com/lkosmid/brook), which abstracts away the complexities of programming in these graphics based solutions in a CUDA like language, while retaining their certification benefits, and have been demonstrated with industrial use cases. Finally, the tutorial will include a hands-on session with exercises, during which the attendees will have the opportunity to experiment with the certifiable solution(s) of their interest. BSC will provide remote access to relevant GPUs with preinstalled certifiable GPU languages/APIs.

Presenter’s Bio

Dr. Leonidas Kosmidis is a Senior Researcher at the Barcelona Supercomputing Center (BSC) and Faculty Member at the Universitat Politècnica de Catalunya (UPC). He holds a PhD and MSc in Computer Architecture from Universitat Politècnica de Catalunya, Spain, and a BSc in Computer Science from University of Crete, Greece. He is leading the research on embedded GPUs and accelerators for safety critical systems, both at hardware and system software level within the CAOS (Computer Architecture/Operating Systems) group at BSC. Dr. Kosmidis is the recipient of the RISC-V Educator of the Year Award in 2019 from the RISC- V Foundation and an Honourable Mention for the EuroSyS Roger Needham PhD Award in 2018, which is awarded to the best PhD thesis in Europe in the area of Systems. He is the Principal Investigator of several projects funded by the European Space Agency (ESA) such as the GPU4S (GPU for Space) and the Horizon Europe METASAT project funded by the European Commission, as well as projects funded by industry such as the Airbus Defence and Space, which focus on the adoption of GPUs in space and avionics systems, including their certification. He is also participating in several standardisation efforts regarding GPU programming in safety critical systems within Khronos, in Vulkan SC and SYCL SC, as well as an external expert for the revision of the ECSS standards ECSS-E-ST-20-40 and ECSS-Q-ST-60-02C on ASIC, FPGA and IP Core developments. Currently, he serves as Outreach Officer of the Khronos SYCL SC WG. Website: https://personals.ac.upc.edu/lkosmidi.

A Guide to Argument-Based Assurance and Certification

Due to rapid technological advancement, certification authorities frequently find themselves challenged to keep up with emerging innovations, with AI technologies standing out as a prime example of this struggle. The process of developing certification standards, rooted in the consensus of domain experts, is often slow and arduous, requiring years to finalize. Compounding this issue is the relentless pace of technological development, which can render the final standard outdated by the time it is implemented. The Overarching Properties (OPs)1 provide a structured framework for evaluating means of compliance for incoming technologies, centering around arguing a system possesses three essential properties: Intent, Correctness, and Innocuity. By leveraging OPs, applicants and regulatory bodies can articulate compliance methodologies through reasoned argumentation, offering a dynamic and adaptable approach tailored to the specifics of each technological application. While literature exists regarding the utilization of OPs, a solid introduction to concepts, together with hands-on practice, will help novice practitioners gain and improve skill in constructing OP-related arguments (OPRAs). This tutorial introduces argumentation and the OPs, providing attendees with insights and practical strategies for learning the art of argumentation within the context of certification. Throughout the tutorial, participants will actively engage in the creation of an OPRA for a system reliant on technologies where traditional certification standards prove inadequate. By immersing themselves in this practical exercise, attendees will gain invaluable experience in applying argumentation techniques to real-world certification challenges, ultimately empowering them to navigate the evolving certification landscape with more confidence and proficiency.

Presenter’s Bio

Prof. Zamira Daw of Aircraft Systems at the University of Stuttgart. She earned her PhD at Kassel University in Germany and honed her expertise in model-driven development for safety-critical embedded systems using formal methods during her subsequent postdoctoral research at the University of Maryland in the USA. With 7 years of industry experience in aerospace sector at Raytheon Technologies Research Center, Dr. Daw had contributed to DARPA, ONR and NASA funded project to areas, spanning formal verification, certification, knowledge reasoning, and autonomous systems. In her current academic role, she aims to develop innovative certification methods that streamline the seamless integration of AI into aerospace systems. She was part of Overarching Properties Working Group (OPWG) and now is also part of the working group EUROCAE WG-114 to create standards for the certification of aeronautical systems implementing AI-technologies.

Dr. Kim Wasson is a Staff Development Assurance Engineer and the Autonomy Certification Lead at Joby Aviation, where she is establishing assurance strategies and certification pathways for systems that integrate autonomous and other emerging capabilities. She has over 20 years of experience investigating, developing, and executing policy and practice for the safety assurance and certification of complex engineered systems. She now focuses on emerging means and methods to assure emerging capabilities, and on translating these to technical and regulatory practice. Prior to joining Joby in 2020, she founded and led Federated Safety, LLC, providing strategic and technical leadership in safety and certification to industry, agency, and defense organizations, and for applications ranging from collision avoidance systems to drug infusion pumps. Dr. Wasson is active in several standards development efforts and advisory groups concerning safety, autonomy, human factors, and AI. She additionally co-led the FAA-sponsored Overarching Properties Working Group (OPWG) and co-authored its foundation papers. Dr. Wasson received her PhD in Computer Science from the University of Virginia in 2006.

C. Michael Holloway is a senior research computer engineer at the NASA Langley Research Center in Hampton, Virginia, where he has worked since 1983. He received an excellent undergraduate education from the University of Virginia and a graduate education from the University of Illinois in Urbana-Champaign. He does research trying to identify (when possible) and build (when necessary) epistemically sound foundations on which informed decision can be made about whether a system will be sufficiently safe in use to justify creating, approving, and deploying it. During his career he has authored over 75 publications and received numerous awards, including NASA Langley's premier research fellowship. Many of his papers are available at https://bit.ly/cmhpapers.

Innovations in Aviation

Neuromorphic Engineering

Neuromorphic computing is an interdisciplinary field that combines concepts from neuroscience, computer science, biology, and electrical and computer engineering. It is an exciting and innovative field miming the human brain's structure, function, and operation. It aims to create computational systems that mimic the brain's neural architecture and processing capabilities. It encompasses hardware and software design, spiking neural networks, biology, neuroscience, and neurology. Here's a summary of the critical components of neuromorphic computing that will be covered:

- Neuromorphic Hardware - Design and Architecture
- Neuromorphic Software
- Neuroscience and Neurology
- Robotics, Autonomous Systems
- Artificial Intelligence
- Healthcare
- Research and Development
- Applications and Future Directions

Presenter's Bio

Dr. Steven Harbour is a senior leader and defense research and engineering professional with over 25 years of experience in multiple engineering and aviation disciplines and applications. He possesses subject matter expertise in Neuromorphic Engineering, Artificial Intelligence / Machine Learning, Human Autonomy Teaming, Neuroscience, Electrical and Computer Engineering, Avionics, Human Factors, Unmanned Aerial Systems, and Autonomous Vehicles. Dr. Harbour, is a AI Hardware Research director, leading BRAIN as the PI. He is the author of over 50 papers on nanotechnology and nanoscale architectures, including microcircuit design with the AI algorithm Spiking Neural Network (SNN). Parallax team members have over 20 years of experience in AI algorithms, hardware, image sensor processing, and chip design for commercial and defense applications. He served as the Global Hawk Chief of Avionics Engineering and Modernization Programs, wherein he supported the Air Force Research Laboratory Sensors Directorate at Wright-Patterson Air Force Base, OH, and the Air Force Life Cycle Management Center in the ISR / SOF directorate. He is a former USAF fighter flight test pilot with over 5,000 hours of total flying time in F-16, F-4, AT-38, T-37, B-52, and EC-135 aircraft. Flew the MIG-29 as part of the US State Department's military-to-military visit program under the Nunn-Lugar Act. He has a Ph.D. in Neuroscience (Specializations: Artificial Intelligence & Machine Learning and Neuromorphics). Dr. Harbour also teaches at the University of Dayton & Sinclair College.

Scenario and Operational Design Domain Modeling for AI-Based Airborne Systems

AI-based functions and, eventually, autonomy are getting an increasing interest in the airborne systems domain. They indeed challenge how we assure the system's safety. Scenario- based testing approaches have recently emerged as an answer to this and have matured quite a bit, especially in the automotive industry in the Automated Vehicle domain. The German Aerospace Center (DLR) and the Technical University of Clausthal research groups have been developing and refining scenario and Operational Design Domain (ODD) modelling techniques for airborne systems with accompanying tools for the past few years. This tutorial will showcase the techniques with real-life examples and enable attendees to use our modelling tool for their verification needs. The tutorial will focus on the following aspects for verifying AI systems in aviation, which will begin with the theoretical background and delve into the practical aspects of modelling scenarios and ODD using an open-source graphical tool called the Operational Domain Modelling Environment (ODME).

- History of aviation safety
- Current regulatory framework
- Artificial Intelligence in aviation and EASA guidelines for ML applications
- Model-based techniques for scenarios and ODD foundational concepts
- Introduction to the ODME and its capabilities
- Defining domain model for a use case on ODME
- Automated generation of scenario and ODD models from the domain model
- Customizing behavior of scenarios
- Generating ODD coverage for scenarios
- Sharing scenario and ODD as machine-readable formats

Presenters' Bios

Umut Durak is the Group Leader for Avionics Systems in the Institute of Flight Systems at the German Aerospace Center (DLR). He is also a Professor of Aeronautical Informatics at the Informatics Institute at the Clausthal University of Technology. His research interests concentrate on the engineering of software-intensive airborne systems. He has published five books and more than 100 papers in various conference proceedings and journals. He is an Associate Fellow and the Chair of the Software Technical Committee at the American Institute of Aeronautics and Astronautics (AIAA) and an Executive Board Member of the German Simulation Association Arbeitsgemeinschaft Simulation (ASIM).

Siddhartha Gupta is a research scientist in the Avionics Systems Research Group at the Institute of Flight Systems at the German Aerospace Center (DLR) in Braunschweig, Germany. He is also a researcher at the Aeronautical Informatics group at the Technical University of Clausthal. His research focus is the safety and certification of AI-based systems in aviation, exploring model-driven techniques for verifying such systems. Recently, he has been studying the efficacy of scenario and ODD modelling techniques with their application in simulation-based verification of AI-models in Aviation. He has been using these techniques in many examples in various Cyber-Physical systems as a part of National and EU projects.

FREE Tutorials

Introduction to multi-core processing interference channel analysis, identification, and mitigation for safety-critical applications

Multi-core processors (MCPs) have been readily available since 2005, but developers have been constrained to using a single core in real-time or safety-critical applications because of the non- deterministic nature of shared resources on a multi-core chip.

However, in today's development landscape, the need for heavy processing power combined with physical space limitations has pushed the real-time and safety-critical industries to utilize the full benefit of multi-core processing. With this new requirement comes the need to understand how to mitigate the non- deterministic effects of multi-core processing known as interference channels and maintain a system with full real-time safety-critical compliance. The best way to help the industries with this task is to provide a methodology for analyzing, identifying, and mitigating the effects of the interference channels. The goal of this tutorial is to educate the user and introduce them to these concepts.

This tutorial aims to:

- Educate the audience on multi-core processing interference channels and safety-critical challenges.
- Explain how multi-core processing interference negatively impacts safety-critical industries, such as DoD aviation and commercial aviation.
- Provide an interactive tutorial on the process of analyzing, identifying, and mitigating multi-core processing interference channels in a critical application.
- Explain the benefits of including multi-core characterization and mitigations in the beginning stages of the design of safety-critical applications.
- Discuss the emerging trends in hardware/software and future pathways.

Presenters' Bios

Tuan Bui – US ARMY AvMC Software Airworthiness Division, Systems Readiness Directorate. Tuan Bui is a software engineer working at the U.S. Army AvMC Systems Readiness Directorate (SRD), Software Airworthiness Division. He obtained a master's degree in Computer Engineering from the University Alabama in Huntsville specialized in software. He has over 30 years of experience in embedded systems and software airworthiness evaluation. He currently supports various Army Aviation programs with focus on real-time, safety-critical systems regarding multi- core processors software architect and airworthiness requirements.

John Ross – US ARMY AvMC Multi-Core Processing Laboratory (CTR). John Ross has worked with computer systems since the mid-1990s. He has a degree from the University of Alabama in Huntsville in Computer Engineering, specializing in parallel processing and massively parallel processing (MPP). He has a paper published on the topic of general- purpose GPU processing in the IEEE SouthEastCon 2013. He currently works in the US ARMY multi-core processing lab with over 5 years of experience analyzing the effects of multi-core processing interference on embedded systems.

William Vance – US ARMY AvMC Multi-Core Processing Laboratory (CTR). William Vance is a computer engineer working at the U.S. Army multi-core processing lab. He obtained a master's degree in Computer Engineering from Auburn University. He has over 4 years of experience in embedded programming and software airworthiness evaluation. His research interests are in the areas of multi-core interference analysis and real-time systems. William has authored a paper titled "Insights from Preliminary Analysis of Local Cache Performance in COTS RTOS for Multi-Core Processors".

FREE Tutorials

IEEE AESS FREE Tutorial: Digital Avionics for Sustainability

For several decades, the aviation sector has demonstrated remarkable growth and resilience, weathering various socioeconomic and geopolitical crises. As a result, without substantial further interventions, this sector alone is projected to contribute significantly to climate change, accounting for 6-10% of human-induced climate impacts by 2050. The market growth is also expected to accelerate with the rise of commercial Unmanned Aircraft Systems (UAS) and Advanced Air Mobility (AAM) services, and further expansion is anticipated with the rise of operations above Flight Level 600 and point-to-point space transport. Several factors have intensified pressure on the aviation industry and are hindering the current stride to achieving sustainability, among which a more volatile geopolitical and macroeconomic context and an escalating market pressure. Additionally, new technologies such as UAS and AAM necessitate a substantial evolution of standards, regulations and operational procedures. In the last two decades, major initiatives to modernize avionics and Air Traffic Management (ATM) systems have endeavored to accommodate an unimpeded growth of traffic and to mitigate congestion and inefficiencies by supporting a more harmonized, collaborative, performance-based and trajectory-based management, supported by a rapidly increasing digitization. While unprecedented environmental targets were set, the road to carbon neutrality is still long and several technological challenges are still to be effectively addressed. A key contemporary priority is the rapid integration of digital technologies, particularly network-centric avionics and Communication, Navigation, Surveillance and ATM (CNS/ATM) systems supporting higher automation levels, increased airspace capacity, and significant environmental sustainability improvements for both passenger and cargo transport. This tutorial discusses the role of digital avionics and ATM systems R&D in enhancing the environmental sustainability of the aviation sector. The aim is to disseminate recent research outcomes and to identify opportunities for industrial innovation in strategic areas, such as future systems for ATFM, DAM and cooperative/non-cooperative surveillance. Starting from SESAR/NextGen top-level operational and technical requirements, this tutorial discusses the role of integrated CNS+A system architectures implementing 4-Dimensional Trajectory Optimization (4DTO) algorithms, data link communications and enhanced surveillance technologies, as well as adaptive cognitive forms of Human-Machine Interface and Interaction (HMI2), allowing the automated negotiation and validation of aircraft intents for safer and more efficient ATM operations. As an integral part of this CNS+A evolutionary process, specific requirements for UAS navigation, communication and cooperative/non-cooperative Sense-and-Avoid (SAA) are being addressed to allow the safe and unrestricted access of UAS to all classes of airspace.

Presenters' Bios

Roberto Sabatini is a Professor of Aerospace Engineering at Khalifa University of Science and Technology (UAE) and an Honorary Professor at RMIT University (Australia). He has three decades of experience in Avionics, Spaceflight and Robotics/Autonomous Systems research and education. Throughout his career, Prof. Sabatini has led several industry and government funded research projects and he has authored or co-authored more than 300 peer-reviewed international publications and several books. Prof. Sabatini is a Fellow and Executive of the Institution of Engineers Australia, Fellow of the Royal Aeronautical Society, Fellow of the Royal Institute of Navigation, and Senior Member of IEEE and AIAA. In addition to his primary academic duties and various honorary/consulting appointments in Europe, North America, Australia, Asia and South Africa, he contributes to the IEEE community as member of the AESS Board of Governors, Chair of the AESS Avionics Systems Panel, and AESS Distinguished Lecturer, as well as editorial board member for various IEEE journals and book series, including the IEEE Transaction on Aerospace and Electronic Systems, the IEEE Series on Aeronautics and Astronautics Systems, and the AESS Systems Magazine.

Erik P. Blasch, Ph.D./MBA, is a program officer with the Air Force Research Laboratory. He received his B.S. in Mech. Eng. from the Massachusetts Institute of Technology and Ph.D. in Electrical Eng. from Wright State University in addition to numerous Master's Degrees in Mech. Eng., Ind. Eng., Elect. Eng., Medicine, Military Studies, and Economics. Additionally, his assignments include Colonel (ret) in the USAF reserves, adjunct associate professor, and president of professional societies. His areas of research include information-fusion performance evaluation, image fusion, avionics, and human-machine integration; compiling over 120 journal papers, 900 publications, 42 patents, and 8 books. He is a Fellow of AIAA, IEEE, MSS, and SPIE.

Giancarmine Fasano is Associate Professor at the University of Naples "Federico II", where he holds courses in "Unmanned Aircraft Systems" and "Space Flight Dynamics". His research activities in the field of aeronautics are focused on UAS, and in particular on sense and avoid and cooperative multi-UAV systems. In the space field he is mainly interested in distributed space systems and proximity operations, with emphasis on relative motion design and control. He is Member of the Avionics Systems Panel of the IEEE Aerospace and Electronic Systems Society and Associate Editor of the IEEE AESS Magazine for the UAS area of specialty. He is also Member of the AIAA Sensor Systems and Information Fusion Technical Committee and of the IAA Committee on Small Satellites. He has co-authored over 110 publications and five book chapters.

Mr. Aloke Roy is the Managing Partner at VisionAR Systems, LLC, which provides systems engineering services to the aerospace industry. Mr. Roy covers technology research on cyber security artificial intelligence, machine learning, and wireless communications. Mr. Roy is an advisor to FAA and International Civil Aviation Organization (ICAO) on communication and cyber security technologies. Prior to this, Mr. Roy was with Honeywell Advanced Technology organization managing data communication, information security and radio technology development programs supporting Honeywell Aerospace. He is currently the Chair of IEEE AESS Cybersecurity Panel and Chair of AIAA DATC ICNS Executive Committee. Previously, he was the Chair of IEEE AESS Avionics Systems Panel and chaired RTCA Special Committee 223, to develop the Aviation Internet Protocol and Aeronautical Mobile Airport Communication System requirements and operational performance standards. Mr. Roy holds several patents on aeronautical wireless and secure communications.

Irfan Majid is an Assistant Professor in the Department of Avionics Engineering at Institute of Space Technology, Islamabad, Pakistan. He is a seasoned Avionics Engineer with over thirty years of experience. His work experiences include avionics maintenance and life cycle support, research and development for design of avionics systems for manned and unmanned aircraft. Presently he teaches Avionics System Design and Guidance & Navigation courses to Avionics Engineering students and conducts research related to avionics systems. His current research areas include certification for AI/ML in safety critical systems, CNS systems for UAM and Aircraft Electromagnetic Compatibility Analysis. He has authored a number of journal publications and a book chapter.

Carlos C. Insaurralde is a Senior Lecturer in Electronic Engineering at the University of the West of England, Bristol, UK. He has worked in US-funded(AFRL), UK-funded(MoD), and EU-funded projects on robotics and autonomous systems with different application domains (ground, sea, air, and space). He has over twenty-five years of hands-on experience in software engineering for robotics and autonomous systems along with solid expertise in embedded systems and CPSs. He is member of the ASP and a Distinguished Lecturer for IEEE Aerospace & Electronics Systems Society (AESS). His research interests are multidisciplinary development of high-integrity systems, architectures of intelligent and autonomous systems, and metric assessment of systems performance. He is author of over one hundred international publications and twenty technical reports. He also received a mention "Doctor Europaeus" accredited by the European University Association in 2007, and Best of Session Paper awards at the Digital Avionics Systems Conference (DASC), 2004, 2008, 2013, 2014, and 2022 as well as appreciation awards for significant contribution as Track and Session Chair at DASC in 2016, 2021, and 2022. He is also a tutorial instructor for Intelligent Control Vehicle Architectures at DASC since 2018.

Alessandro Gardi is an Assistant Professor at Khalifa University (UAE) and Associate of RMIT University (Australia). He obtained BSc and MSc degrees in Aerospace Engineering from Politecnico di Milano (Italy) and a PhD in the same discipline from RMIT University. Dr Gardi's research focuses on aerospace cyber-physical systems (UAS, satellites, ATM systems and avionics). In this domain, he specializes in multi-objective trajectory optimization with emphasis on optimal control methods, multidisciplinary design optimization and AI/metaheuristics for air and space platforms.

43rd DASC Conference Tracks

Track 1: Air Traffic Management (ATM) Chairs

Bernd Korn
DLR

Rainer Koelle
EUROCONTROL

Track 2: Urban Air and Advanced Mobility (UAM) Chairs

Tim Etherington
NASA

Maria Consiglio
NASA

Track 3: Communications, Navigation, and Surveillance and Information Networks (CNS) Chairs

Michael Schnell
DLR

Michael Durling
GE Aerospace Research

Track 4: Cyber, Systems, and Software (CSS) Chairs

Scott Crawford
Collins Aerospace

Zamira Daw
University of Stuttgart

Track 5: Integrated Modular Avionics (IMA) and Standardized Avionics Platforms Chairs

Martin Halle
Hamburg University of Technology (TUHH)

Bastian Lüttig
University of Stuttgart

Track 6: Human Factors (HF) Chairs

Steven Harbour
Parallax Advanced Research

Jan Bořil
University of Defence

Track 7: Unmanned Aircraft Systems (UAS) Chairs

Steve Young
NASA

Divya Chandra
USDOT Volpe Center

Carlos Insaurralde
University of the West of England, Bristol, UK

Track 8:
Space Systems and Special Topics (SSST) Chairs

Yemaya Bordain
Daedalean

Denis Loubach
Aeronautics Institute of Technology

Ivan Perez
NASA

Poster Papers Chair

Giancarmine Fasano
University of Naples Federico II

Technical Sessions - Tuesday, October 1, 10:30-12:00

PDT	10:30	11:00	11:30
AI Application in ATM **Chairs: Xavier Olive, Carmo Kluencker** Track 1 *Carmel*	**Towards an Operational Design Domain for Safe Human-Ai Teaming in the Field of AI-Based Air Traffic Controller Operations** Thomas Stefani, German Aerospace Center DLR e.V.	**Empowering Human-Ai Collaboration in Air Traffic Control Through Smart Interaction Design** Lukas Tyburzy, German Aerospace Center DLR e.V.	**Towards an Aviation Large Language Model by Fine-Tuning and Evaluating Transformers** David Nielsen, KBR Wyle Services LLC, NASA Ames Research Center
UAM Traffic Management **Chair: Rorie Conrad, Jason Prince** Track 2 *Coronado A*	**Urban Air Mobility Traffic Analysis Tool for Airspace Involving Vertiport Hub Operations to Examine Simulated Conflicts** Antoni Kopyt, Warsaw University of Technology	**Flight Risk Assessment of Urban Air Mobility Vehicles and Routes Based on Battery Energy Consumption** Yonas Ayalew, North Carolina Agricultural and Technical State University	**Urban Air Mobility Fleet Rebalancing with Real-Time Updates on Estimated Time of Arrival** Seokbin Yoon, Korea Aerospace University
Communication Security **Chair: Ryan Hale** Track 3 *La Jolla*	**A Secure Framework for Controller Pilot Data Link Communications in Aviation Network** Andrei Gurtov, Linköping University	**Evaluating Post-Quantum Key Exchange Mechanisms for UAV Communication Security** Ridwane Aissaoui, ENAC, University of Toulouse	**Design and Implementation of 4A Service in Aviation Broadband Communication System** Pei Xu, Civil Aviation University of China
Security Analysis and Modeling 1 **Chair: Johnny Marques** Track 4 *Coronado B*	**Model-Based Avionics Cybersecurity Framework for Identification of Risk and Evaluation** Mario Werthwein, Universität Stuttgart	**Airworthiness Security Methods: Modeling and Highlighting Attack Paths in System and Software** Marvin Blecken, Hamburg University of Technology	**Hierarchical Assurance Patterns for Cyber-Resilient Systems Engineering** Isaac Amundson, Collins Aerospace
Safety **Chair: Maarten Uijt de Haag** Track 7 *Point Loma A*	**Testing a Run-Time Assurance Framework Coupled with Integrated Risk Mitigation Capabilities for Autonomous Urban UAS Flights** Ersin Ancel, NASA Langley Research Center	**Scaled Flight Tests Using an Autopilot with Automated Test Capabilities** Luca Garbarino, Italian Aerospace Research Centre	**Proposed Flight Recorder Recommendations for Unmanned Aircraft Systems Integration Into the National Airspace System** Waleed Raza, Embry-Riddle Aeronautical University
Space Systems **Chair: Carlo Tiana** Track 8 *Del Mar*	**Fragmentation Modeling and Risk Assessment for Low Earth Orbits** Giancarmine Fasano, Università degli Studi di Napoli Federico II	**Resident Space Objects Tracking Using Estimation-Based Data Fusion** Khaja Faisal Hussain, Khalifa University	**Martian Flight: Enabling Motion Estimation of NASA's Next-Generation Mars Flying Drone by Implementing a Neuromorphic Event-Camera and Explainable Fuzzy Spiking Neural Network Model** David Harbour, University of Dayton, NASA Ohio Space Grant Consortium

Technical Sessions - Tuesday, October 1, 13:00-15:00

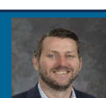
PDT	13:00	13:30	14:00	14:30
Performance and Impact Assessment **Chairs: Lothar Meyer, Mara Weber** Track 1 *Carmel*	**Using Variational Autoencoders to Generate 4D Synthetic Flight Tracks for Collision Risk Safety Analysis** Shahab Aref, George Mason University	**Initial Integration of a Conflict Probabilities Service for Upper Class E Traffic Management** Abhinay Tiwari, San Jose State University Research Foundation, NASA Ames Research Center	**Statistical Modeling of Arrival Performance in Terminal Airspace** Mayara Condé Rocha Murça, Aeronautics Institute of Technology	**Impact of Flight Centric Air Traffic Control on the Cost Efficiency of Air Navigation Service Providers** Tobias Finck, German Aerospace Center DLR e.V.
Airspace Procedures **Chairs: Yonas Ayalew, David Wing** Track 2 *Coronado A*	**Development of Candidate Airspace Procedures for Urban Air Mobility in the Dallas Area** Rania Ghatas, NASA Langley Research Center	**A Comparative Analysis of the European U-Space Framework and the US-American UAS Traffic Management (UTM) System** Teemu Joonas Lieb, German Aerospace Center DLR e.V.	**Quantifying Effects of Departure and Flight Time Uncertainty on Urban Air Mobility Operations** Rishabh Bhandari, NASA Ames Research Center	**Demand-Capacity Balancing Algorithms for Urban Air Mobility Operations** Kushal Moolchandani, Universities Space Research Association, NASA Ames Research Center
Communications **Chair: Rafael Apaza** Track 3 *La Jolla*	**Towards 6G UAV Networks: Experimental Performance Analysis** Saba Al-Rubaye, Cranfield University	**Unmanned Air Vehicle Operational Framework for Public Safety Communications** Saba Al-Rubaye, Cranfield University	**Redefining Flight Crew Communications Tasks: A New Approach to Automating Air Traffic Control Interaction** Katarina Vuckovic, Collins Aerospace	**Hardware Implementation of Temporal Interference Mitigation for Integrated Sensing and Communication Systems** Saquib Siddiqui, Arizona State University
Tools and Data for Certification **Chair: Timothy Wang** Track 4 *Coronado B*	**A Semantic Triplestore-Based ARP4754A Compliance Summary Dashboard** Saswata Paul, GE Aerospace Research	**Fielding Faster: Removing Time and Cost Barriers to Software Certification Using Qualifiable Code Generators** Brian Senese, RTI - Real-Time Innovations	**Principles and Metrics for Digital Curation in Aviation** Kit Siu, GE Aerospace Research	**Continuous Safety & Security Evidence Generation, Curation and Assurance Case Construction Using the Evidential Tool Bus** Kit Siu, GE Aerospace Research
FPGA, Wired and Wireless Communication in Avionics **Chairs: Darbaz Darwesh, Leonidas Kosmidis** Track 5 *Point Loma B*	**FPGA-Based Fault Tolerance Framework for Avionics Systems** Phillip Nöldeke, German Aerospace Center DLR e.V.	**A Deterministic, Versatile and Time-Synchronized Data Network Infrastructure for Next Generation Modular Avionics** Roman Schmidt, Airbus Defence & Space GmbH, Manching	**An Equivalent Channel Shortening Prefilter for MIMO-OFDM in Wireless Avionics Intra-Communications** Yuedong Zhuo, Beihang University	**Towards in Situ Wire Fault Detection Using Powerline Communication Technology** Stephen Dominiak, plc-tec AG
Flight Deck and Simulation **Chairs: Sonia Dodd, Alex Henderson Jr** Track 6 *Monterey*	**Flight Deck Design of a Hybrid Turbine/Electric Passenger Aircraft** Tim Etherington, Analytic Mechanics Associates	**Flight Deck Perspectives on Departure Procedures for Multiple Airport Route Separation** Andrea Sparko, U.S. Department of Transportation, John A. Volpe National Transportation Systems Center	**Evaluation of Extended Reality Authoring Tool for General Aviation Weather Training** Jiwon Kim, Iowa State University	**The Effects of Type of Guidance, Runway Visual Range, and Runway Lighting on Touchdown Point Dispersion When Conducting ILS Approaches in Low-Visibility Conditions** Daniela Kratchounova, Federal Aviation Administration
Design Assurance **Chairs: Natasha Neogi, Sarah Lehman** Track 7 *Point Loma A*	**A Verification Framework for Runtime Assurance of Autonomous UAS** Lauren White, NASA Langley Research Center	**An Object-Oriented Approach for Developing Standard Operating Procedures for Novel Aerial Systems** Markus Maly, Technische Universität München	**Runtime Monitoring of Flight Control with Incremental Nonlinear Dynamic Inversion** Hannes Hofsäß, Technische Universität München	**From Operational Design Domain to Runtime Monitoring of AI-Based Aviation Systems** Siddhartha Gupta, German Aerospace Center DLR e.V.
Aerospace Special Topics **Chair: Yemaya Bordain** Track 8 *Del Mar*	**Deobfuscating Machine Learning Assurance and Approval** Kimberly Wasson, Joby Aviation	**Multi-Label Classification with Generative Large Language Models** Nobal Niraula, Boeing Company	**Advancing Wildland Fire Response with NASA's Second Shift Capabilities** Hyo-Sang Yoo, Universities Space Research Association, NASA Ames Research Center	**Standardizing Video-Based Avionics and Mission Systems Around the ARINC 818-3 Video Bus** Tim Keller, Great River Technology
PANEL: Cybersecurity **Chair: Zamira Daw** Track 4 *Catalina*	**Towards Cybersecurity Risk Assessment for Future ATM – First Steps** Vladimíra Čanádyová, Deep Blue srl	**Recommendations for Cybersecurity Analysis in the "New" Regulatory Environment** Dave Matthews, Boeing Company	**Importance of Assessment Methodologies for Aerospace Cyber Risk Mitigation Panel** Aloke Roy, Krishna Sampigethaya, Victor Murray, Jeffrey Chavis, David Matthews	

Moderator

Aloke Roy
VisionAR Systems, LLC

Panelists

Krishna Sampigethaya
ERAU



Victor Murray
SwRI

Jeffrey Chavis
JHU-APL

David Matthews
Boeing

Technical Sessions - Tuesday, October 1, 15:30-17:30

PDT	15:30	16:00	16:30	17:00
Ground and Airborne Flow Management **Chairs: Tobias Finck, Thomas Dautermann** Track 1 *Carmel*	**Towards Full ATC Automation for Aircraft Ground Movement: A First Step** Lennard Nöhren, German Aerospace Center DLR e.V.	**A Hierarchical Multi-Agent Coordinated Decision-Making for Strategic Slot Allocation** Nhat-Hoang Phan Nguyen, Nanyang Technological University	**A New Intrinsic Complexity Metric for Air Traffic De-Conflicting** Patrice Zombré, ASECNA	
Trajectory Generation **Chairs: Kushal Moolchandani, Jillian Keeler** Track 2 *Coronado A*	**Minimum Separation Boundary for UAM Tactical Deconfliction Based on Avoidance Risk Ratio Model** Junsoo Kim, Korea Advanced Institute of Science and Technology	**Towards a Strategic Deconfliction Service Based on Multi-Objective Path Planning for Low Altitude Airspace** Flavia Causa, Università degli Studi di Napoli Federico II	**Transformer-Based Heuristic for Advanced Air Mobility Planning** Jun Xiang, San Diego State University	**Comparison of Strategic Conflict Prevention Methods for Departure Planning in Drone Delivery** Sasha Vlaskin, Royal Netherlands Aerospace Centre, Delft University of Technology
Navigation and Guidance **Chair: Michael Felux** Track 3 *La Jolla*	**AI-Assisted Digital Terrain System for an Advanced Jet Trainer** Umit Can Bekar, Turkish Aerospace Industries, Inc.	**Learning Weather Navigation Skills from Human Pilots Demonstrations Using Airborne Radar Data** Moslem Kazemi, Merlin Labs Inc	**Degradation of Photometric Characteristics of Phosphor Layers in LED Based Airfield Lights** Stanislav Perina, University of Defence	**Forecasting-Based Anomaly Detection with Temporal Fusion Transformers Using Flight Operational Quality Assurance Data** Bulent Ayhan, MITRE Corporation
AI/ML Tools and Data Management **Chair: Thanakorn Khamvilai** Track 4 *Coronado B*	**Artificial Intelligence Verification Based on Operational Design Domain (ODD) Characterizations Utilizing Subset Simulation** Lukas Höhndorf, Industrieanlagen-Betriebsgesellschaft mbH	**Towards Certifiable AI in Aviation: A Framework for Neural Network Assurance Using Advanced Visualization and Safety Nets** Johann Maximilian Christensen, German Aerospace Center DLR e.V.	**Considerations for Tool Qualification in Flight-Critical Applications Using Machine Learning** Glenn Carter, U.S. Army Combat Capabilities Development Command Aviation & Missile Center	**Framework Architecture for AI/ML Data Management for Safety-Critical Applications** Pedro Tostes, Embraer
Modern IMA Systems Development **Chairs: Peter Müller, Bjorn Andersson** Track 5 *Point Loma B*	**Describing Virtualization in Avionics Systems with an Extended Open Avionics Architecture Model** Bastian Luettig, Universität Stuttgart	**Conceptual Design of IMA Platforms with Distributed A653-P4 Computing Modules for Next-Generation Aircraft** Jasmin Broehan, Hamburg University of Technology	**Hypervisors and Plug & Fly in a New Space Launcher. A Scalable Approach to Enhance Space Launcher Development** Raphael Rohrmueller, Universität Stuttgart	**From Architecture Models to a Target Platform: A Systematic Approach to Model-Driven Development of Dynamically Reconfigurable Avionics Systems** Phillip Nöldeke, German Aerospace Center DLR e.V.
Pilot Training and Performance **Chairs: Andrew Thatcher, David Harbour** Track 6 *Monterey*	**Resolution Requirements for Virtual and Mixed Reality Pilot Training** Marek Polcak, Vrgineers, Inc.	**Multi-Modal Speech-Touch Controls on the Flight Deck: Impact on Pilot Performance** Sonia Dodd, Honeywell Aerospace	**Training the Powered-Lift Evaluation Pilot** Michael Feary, NASA	**How Fatigued Could the Pilot Be? Fatigue Levels Through PVT and Physiological Indications** Güliz Tokadlı, Collins Aerospace
Autonomous Flight Control **Chairs: Paul Lee, Ersin Ancel** Track 7 *Point Loma A*	**Enhancing Fixed-Wing UAS Autonomy: A ROS2 Package for XPlane** V V R M Krishna Rao Muvva, University of Nebraska–Lincoln	**Data Driven Flight Control for Multicopters - A Survey** Stephanos Papakonstantinou, Hamburg University of Technology	**Autonomous Emergency Landing System to Unknown Terrain for UAVs** Emre Saldiran, Cranfield University	**Finite Time Horizon State Synchronization of Asynchronous Flight Control Computers** Evangelos Huber, Technische Universität München
Air Mobility, Mission Planning & Operations **Chair: Jiwon Kim** Track 8 *Del Mar*	**A Near-Optimal Air Vehicle Energy Management Algorithm Using Surrogate Model** Yu-Shun Wang, National Chung-Shan Institute of Science and Technology	**NavIC Based Real Time Aircraft Tracking System**	**Estimating Preferenced Observation Positions for Landing Site Monitoring in Distress** David Nospes, Universität der Bundeswehr München	**Trajectory and Binning Strategy with LQG/LTR Controller for Aircraft Arresting Gear System** Raymond Sepe Jr., Electro Standards Laboratories
Multicore Processing **Chair: Dionisio Deniz** Track 4 *Catalina*	**Analyzing Shared Cache Partitioning on an NXP P4080 Processor as a Method of Multi-Core Interference Mitigation** John Ross, U.S. Army Combat Capabilities Development Command Aviation & Missile Center	**Analysis of Cache Memory Interference on Multicore Systems Utilizing Shared Memory Aggressor Applications** William Vance, TriVector Services, Inc.	**Combining Argumentation-Based and Model-Based Approaches for the Certification of Multi-Core Architectures: The PHYLOG Methodology** Anthony Fernandes Pires, ONERA	**Analyzing Data Flow and Control Flow of Multicore Software: A Solution for Efficient Worst-Case Execution Time Analysis** Ehsan Salehi, LDRA Technology, Inc.

Posters - Tuesday, October 1, 17:30-18:30

Poster Session Chair: Giancarmine Fasano *Bel Air Ballroom*			
Using Surface Fitting to Quickly Solve Flight Energy Management Problems Yu-Shun Wang, National Chung-Shan Institute of Science and Technology	**A Strategic 4D Trajectory Planning Method Based on Ensemble Prediction Systems** Yi Zhou, Nanjing University of Aeronautics and Astronautics	**A UAV Communication System with Anti-Interference and Covert Communication Capabilities Using Two Antennas** Jiateng Chen, Tsinghua University	**Data-Centric Threat Modeling Delivers Validated Cybersecurity** Andre Odermatt, RTI - Real-Time Innovations
Towards a Heuristic Optimizer for a Target Time Management System in Air Traffic Flow Management Paul Feichtenschlager, Frequentis AG	**Predictive Workload Model for Air Traffic Controllers During UAM Operations** Amir Farrahi, Universities Space Research Association, NASA Ames Research Center	**Mission-Based Quadcopter Flight Simulation** Vahid Hemmati, North Carolina Agricultural and Technical State University	**Scientific Machine Learning Based Pursuit-Evasion Strategy in Unmanned Surface Vessel Defense Tactics** Ugurcan Celik, Cranfield University
Network Performance Evaluation Based on Interference Analysis in Avionics Switched Networks Xinyue Zhang, Beihang University	**Effective Aerodynamics Modeling Based on Physics-Informed Neural Network and Flight Data** Huanyu Wang, Tsinghua University	**Effectivity of Early Evaluation Methodology for Flight Deck Display Format by Dual Approaches** Yoichi Yamai, Mitsubishi Heavy Industries, Ltd., University of Tsukuba	**A Simulation Tool for Space Traffic Management** Roberto Sabatini, Khalifa University
Multi-Obstacle Path Planning Using Deep Reinforcement Learning Lena Trigg, University of Oklahoma	**Textual and Network Analysis of Title 14 CFR Part 107 Waivers** Misty Davies, NASA Ames Research Center	**NACA-0006 Aerodynamic Characterization of Airfoil High-Speed Flow Field**	

Technical Sessions - Wednesday, October 2, 10:00-12:00

PDT	10:00	10:30	11:00	11:30
AAM and UTM Traffic Integration **Chairs: Alexander Kuenz, Fabian Morscheck** Track 1 *Carmel*	**VFR Trajectory Forecasting Using Deep Generative Model for Autonomous Airspace Operations** Aastha Acharya, Metis Technology Solutions, NASA Ames Research Center	**The Proposal and Evaluation of Robust Air Traffic Control System Against Environmental Conditions** Taku Shimizu, Hitachi, Ltd.	**Application of Two-Layered Genetic Algorithm for Demand-Oriented UAS Public Route Network Design** Zhaoxuan Liu, Beijing Jiaotong University	**Considering an Accountability Chain for a Digitally-Enabled Cooperative Operating Mode** David Wing, NASA Langley Research Center
Simulation Frameworks **Chairs: Rania Ghatas, Michael Zintl** Track 2 *Coronado A*	**Enhancing Drone Surveillance with NeRF: Real-World Applications and Simulated Environments** Joakim Lindén, Mälardalen University	**A Human-in-the-Loop Simulation for Urban Air Mobility in the Terminal Area** Anne Suzuki, San Jose State University Research Foundation, NASA Ames Research Center	**Digital Twin Enviroment for Testing Aerospace Functionalities** Luca Garbarino, Italian Aerospace Research Centre	**A Robust Machine Learning Method for Safe and Efficient UAS Integration** Anahita Imanian, MITRE Corporation
Navigation for Drones **Chair: Saswata Paul** Track 3 *La Jolla*	**Ground-Corrected Barometric Vertical Navigation System for Vertiport Operations** Samuel Heilein, German Aerospace Center DLR e.V.	**Comparison of Visual-Inertial Sensor Fusion Techniques for GNSS-Resilient Navigation** Lorenzo Turci, Università degli Studi di Napoli Federico II	**Assessing Radar-Aided Navigation for UAM Approach and Landing Through High-Fidelity Simulations and Flight Testing** Paolo Veneruso, Università degli Studi di Napoli Federico II	**A Soft Actor-Critic Based Reinforcement Learning Approach for Motion Planning of UAVs Using Depth Images** Aadi Nath Mishra, Yardstick Robotics GmbH
AI/ML Safety Considerations **Chair: Kristina Forsberg** Track 4 *Coronado B*	**Safety Assessment of a Machine Learning-Based Aircraft Emergency Braking System: A Case Study** Konstantin Dmitriev, Technische Universität München	**Failure Modes or Not Failure Modes? Integrating Machine Learning in Aerospace Safety Assessment Processes** Adrian Hogen, Universität Stuttgart	**Robustness Assessment of a Runway Object Classifier for Safe Aircraft Taxiing** Omri Isac, Hebrew University of Jerusalem	**Safe and Reliable Training of Learning-Based Aerospace Controllers** Udayan Mandal, Stanford University
Challenges and Assessment of Avionic Platforms **Chairs: Umut Durak, Vance Hilderman** Track 5 *Point Loma B*	**Integrated Modular Avionics System – Where Are the Real Development Challenges** Martial Montrichard, Metavonics	**Managing Requirement Development Challenges in IMA Platform Development** Yıldız Uludağ, TÜBİTAK Informatics and Information Security Research Center	**Another Way of Assessing Complexity in Avionics: Derived 3D Avionics Platform Models** Martin Halle, Hamburg University of Technology	**Introducing ML to IMA Technology – System Perspective** Bastian Luettig, Universität Stuttgart
Air Traffic Control **Chair: Carla Hackworth** Track 6 *Monterey*	**Eye in the Sky: Predicting Air Traffic Controller Workload Through Eye Tracking Based Machine Learning** Anastasia Lemetti, Linköping University	**Gaze Analysis of Air Traffic Contoller Using AI-Based Conflict Detection** Celina Vetter, Zurich University of Applied Sciences	**Designing Training Scenarios for Stressful Air Traffic Control Procedures** Tor Finseth, Honeywell Aerospace	**Subjective Assessment of Initial and Mid-Term UAM Operations and the Impact on Air Traffic Controllers' Workload** Gabriela Rosado Torres, NASA Ames Research Center
Sensing 1 **Chair: Andrew Videmsek** Track 7 *Point Loma A*	**Monocular Fisheye Depth Estimation for UAV Applications with Segmentation Feature Integration** Stephanos Papakonstantinou, Hamburg University of Technology	**Evaluating Point-Cloud Based Safe Landing Zone Detection Algorithms for VTOL-UAV: An Overview** Giridhar Vitta Bukka, Universität der Bundeswehr München	**Airborne Optical Sensing: Improving Ground Target Tracking with GIS Road Network Integration** Johannes Ostler, Universität der Bundeswehr München	
Models, Simulation & Embedded Aerospace Systems **Chair: Johnny Marques** Track 8 *Del Mar*	**A Methodology to Evaluate Image Target Tracking Algorithms' Implementation in Different Hardware Architectures** Gabriel Duarte, Aeronautics Institute of Technology	**ASP: An Aerospace Specification Process for Modules Using VHDL** Johnny Marques, Aeronautics Institute of Technology	**Heterogeneous System Modeling Using Timed- and Untimed-Based Models of Computation: A Case Study for Avionics Systems Domain** Gabriel Duarte, Aeronautics Institute of Technology	**Developing Modular Vehicle and Flight Control Management Functions for eVTOL Aircraft: From Conceptual Design to Embedded Design Models** Valentin Marvakov, eRC-System GmbH
Security Solutions **Chair: Mario Werthwein** Track 4 *Catalina*	**Towards High-Assurance Cross-Domain Solutions for Connected Aviation** Taylor Prins, DornerWorks	**Moving Target Defence in 6G UAV Networks** Saba Al-Rubaye, Cranfield University	**Intrusion Detection on Arinc-429 Communication Bus** İsa Can Babir, ASELSAN A.Ş.	**Hardware Fingerprinting Using Machine and Deep Learning Methods on MIL-STD-1553** Mehmet Atınç Gökyer, ASELSAN A.Ş.

Technical Sessions - Wednesday, October 2, 13:00-15:00

PDT	13:00	13:30	14:00	14:30
Climate Impact and Trajectory Based Operations **Chairs: Mayara Conde Rocha Murca, Anastasia Lemetti** Track 1 *Carmel*	**Enabling Near-Term Improved Environmental Performance in Aviation** Nicholas Rozen, MITRE Corporation	**OpenSky Report 2024: Analysis of Global Flight Contrail Formation and Mitigation Potential** Xavier Olive, ONERA	**Evaluation of the Impact on Air Traffic Controllers of Air-Ground Datalink Technologies (LDACS and Current CPDLC) in Flight Centric ATC** Mara Weber, German Aerospace Center DLR e.V.	**Air-Ground Datalink Technologies (LDACS and Current CPDLC) in Flight Centric ATC: Analysis of a Fast-Time Simulation and Outlook on a Complementary Real-Time Simulation** Mara Weber, German Aerospace Center DLR e.V.
Communicatons Technologies **Chairs: Quang Dao, Rafael Apaza** Track 2 *Coronado A*	**HIRF Tolerance and Avoidance for Advanced Air Mobility Vehicles** Truong Nguyen, NASA Langley Research Center	**AAM Air Ground Channel Characterization in the C Band: Initial Laboratory and Drive Test Results** Zeenat Afroze, University of South Carolina	**A Conical Antenna for Urban Canyon Navigation** Saeed Khan, Kansas State University	**Advanced Mobility Flight Dynamics Restriction to Support High Availability Communication Systems** Saba Al-Rubaye, Cranfield University
GNSS and Trajectories **Chair: Connie Brasil** Track 3 *La Jolla*	**GPS Multipath Emulation Using Software Generated Signals** Russell Gilabert, NASA Langley Research Center	**Smoother Guidance – Less Emissions? GNSS-Based Precision Approach Guidance vs. ILS** Michael Felux, Zurich University of Applied Sciences	**Natural Language Explanation for Autonomous Navigation** Lena Trigg, University of Oklahoma	
System and Safety Considerations **Chair: Shana Fliginger** Track 4 *Coronado B*	**System Grid Method for Seamless Definition and Integration of Huge Complicated Products** Cijo Jose, Boeing India Engineering and Technology Centre	**Simulation-Driven Failure Modes and Effects Analysis of Flight Control System Architectures** Julian Rhein, Technische Universität München	**Estimating the Potential and Limitations of Software-Defined Safety-Critical Systems** Björn Annighöfer, Universität Stuttgart	**The Importance of a System-Level Approach When Bringing in New Technologies in Avionics** Håkan Forsberg, Mälardalen University
Fighter and Tactical Aerospace **Chairs: Petr Františ, Jamison T. Colter** Track 6 *Monterey*	**Assessing State-of-the-Art Mission Planning User Interfaces for Application to Next Generation Fighter Concept of Operations** Tim Laudien, German Aerospace Center DLR e.V.	**The Effect of Using Different Feature Sets on the Fidelity of Deep Learning Based System Identification of a Fighter Aircraft** Mehmet Can Sen, Turkish Aerospace Industries, Inc.	**Cognitive Modeling Approach for Generating Authentic Tactical Agent Behavior** Jiří Hanák, Brno University of Technology	**Tactical Scenario Adaptation for Pilot Training** Jiří Hanák, Brno University of Technology
Sensing 2 **Chair: Chester Dolph** Track 7 *Point Loma A*	**Model-Based Automated Intent Estimation of Unmanned Aerial Vehicles with Sensor Fusion** Dyar Aziz, George Mason University	**Probabilistic Parameter Estimators and Calibration Metrics for Pose Estimation from Image Features** Romeo Valentin, Stanford University	**Vision-Based Localization and Autonomous Homing for UAVs** Aniruddha Perumalla, Pennsylvania State University	**Implementation of Unscented Kalman Filter and Complementary Filter Applied to the ASSE Scheme for Synthetic Flow Angles Estimation** Luca de Pasquale, Politecnico di Torino
AI/ML Verification and Certification **Chair: Umut Durak** Track 4 *Del Mar*	**Assurance of AI/ML-Based Aerospace Systems Using Overarching Properties** Saswata Paul, GE Aerospace Research	**Towards Detecting Unintended Behaviors in Machine Learning Algorithms** Henry Späth, Universität Stuttgart	**DEM: A Method for Certifying Deep Neural Network Classifier Outputs in Aerospace** Raz Yerushalmi, Weizmann Institute of Science	**Evaluation of New Assurance Tools for Airborne Machine Learning-Based Functions** Darren Cofer, Collins Aerospace
PANEL: Technology Perspectives on Human Factors Challenges **Chairs: Divya Chandra, Bill Kaliardos** Track 6 *Catalina*	**Development of a Safety Hazards Risk Assessment Tool for Uncrewed Aircraft System Traffic Management During Preflight Planning** Vimmy Gujral, NASA Ames Research Center	**Identifying Human Factors Research for Unmanned Aircraft Systems and Advanced Air Mobility** William Kaliardos, Federal Aviation Administration	**Technology Perspectives on Human Factors Challenges for UAS & Other Automated Novel Aircraft Panel** Bill Kaliardos, Divya Chandra, Husni Idris, Erik Theunissen, Brandon Suarez, Wesley Olson	

Moderators

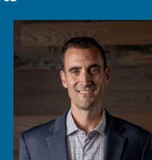

Bill Kaliardos
FAA


Divya Chandra
USDOT Volpe Center

Panelists


Husni Idris
NASA Ames


Erik Theunissen
NLDA

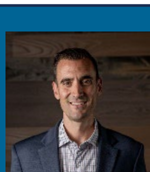

Brandon Suarez
Reliable Robotics


Wesley Olson
MIT Lincoln Laboratory

Technical Sessions - Wednesday, October 2, 15:30-17:30

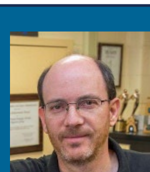
PDT	15:30	16:00	16:30	17:00
Separation and Trajectory Management **Chairs: Jordan Sakakeeny, Lance Sherry** Track 1 *Carmel*	**Efficient Conflict Avoidance by Proactive 4D-Routing** Alexander Kuenz, German Aerospace Center DLR e.V.	**Advancing Operational Efficiency: Airspace Users' Perspective on Trajectory-Based Operations** Ítalo Romani de Oliveira, Boeing Company	**Multi-Party Flight Trajectory Negotiation for Upper Class E Traffic Management** Tien Nguyen, San Jose State University	**Human-Machine Pilot Navigation Method Using Nonlinear Model Predictive Control, Simulation and Inflight Testing** Jeremy Bertoncini, Universität der Bundeswehr München
UAM Special Topics **Chairs: Gregory Wagner, Anahita Imanian** Track 2 *Coronado A*	**An Augmented Reality Pilot Assistance Concept for Advanced Air Mobility Aircraft Employing Simplified Vehicle Operations** Michael Zintl, Technische Universität München	**An Examination of Powered-Lift Aircraft Operations in Urban Areas** Michael Feary, NASA Ames Research Center	**Visual Navigation: Simultaneous Localization and Mapping on Aerial Vehicles** Tewodros Biresaw, Supernal, LLC	
Aeronautical Communication Networks **Chair: Saba Al-Rubaye** Track 3 *La Jolla*	**Intelligent Message Routing and Optimization for Aircraft in 6G Terrestrial and Non-Terrestrial Networks** Fadhil Firyaguna, Collins Aerospace Ireland, Limited	**Graph-Based Handover for Future Aeronautical 6G Integrated Terrestrial and Non-Terrestrial Networks** Fadhil Firyaguna, Collins Aerospace Ireland, Limited	**Software Defined-High Altitude Platform Relays in Integrated Terrestrial-HAP-Satellite Networks** Fadhil Firyaguna, Collins Aerospace Ireland, Limited	**Innovative Methodology for Optimizing Wireless Connectivity Within Electrical Interconnection Design in Aviation** Ronald Hageman, GKN Fokker Aerospace B.V.
Software Topics **Chair: Vance Hilderman** Track 4 *Coronado B*	**Trade Study of Scripting Languages for Avionics Systems** Arnau Prat, German Aerospace Center DLR e.V.	**Defining Quantifiable Measures for Data Coupling and Control Coupling** Chris Hubbs, Collins Aerospace	**A Proposal for an Adapted Scrum for Aeronautical Software Development** Johnny Marques, Aeronautics Institute of Technology	**A Development Approach for Electronic Flight Bag Software** Johnny Marques, Aeronautics Institute of Technology
Model-based Avionics Platform Development **Chairs: Marc Gatti, Paul Meng** Track 5 *Point Loma B*	**Airworthy-Certification Compliant Specification Modeling Framework for Avionics Development** Bela Joshi, Boeing Company	**Exploring SysML v2 for Model-Based Engineering of Safety-Critical Avionics Systems** Alexander Ahlbrecht, German Aerospace Center DLR e.V.	**Universal Configuration Format for Virtual, Hybrid and Hardware Testing of Avionic Platforms** Philipp Chrysalidis, Hamburg University of Technology	**Applying Qualifiable Model Transformations in Integrated Modular Avionics Configuration Development with Automated Tool Qualification Support** Constantin Frey, Universität Stuttgart
Human Autonomy and Flight Data **Chairs: Güliz Tokadli, Katharine Woodruff** Track 6 *Monterey*	**Reducing Workload: A Double-Edged Sword** Aaron Ladurini, RTX Corporation	**Towards Informing Joint Contingency Diagnosis for Autonomous Low-Altitude Flight** Abhinay Paladugu, The Ohio State University	**Towards Safe Collaboration Between Autonomous Pilots and Human Crews for Intelligence, Surveillance, and Reconnaissance** Richard Agbeyibor, Georgia Institute of Technology	**Advances and Challenges Towards Enabling Human-AI-Teaming Applications for Flight Deck Operations** Patrick Lorrig, Universität Stuttgart
Navigation **Chair: Russell Gilabert** Track 7 *Point Loma A*	**Robust Hybrid Navigation Unit for Urban Air Mobility Scenarios** Gianluca Corraro, Italian Aerospace Research Centre	**Optimal Guidance Laws for Aircraft and Drones Along Specified Flight Paths in the Presence of Wind** Bilge Kacmaz, Queen Mary University of London	**UWB-Based Localization of sUAS Swarms as Part of an Indoor U-Space Evaluation Range** Maarten Uijt de Haag, Technische Universität Berlin	**Exploring RNP Applications in Urban Air Mobility: A Quadrotor UAV Accuracy Study** Maria Hanna, German Aerospace Center DLR e.V.
PANEL: Digital Flight Rules **Chair: Michael R. Durling** Track 3 *Catalina*	**Integrated Vision-Aided Precision Navigation and Obstacle Detection Sensing Pipeline for UAM Approach and Landing** Enrico Miccio, Università degli Studi di Napoli Federico II	**Intelligent Cyber-Physical System for Advanced Air Mobility and UAS Traffic Management** Roberto Sabatini, Khalifa University	**Digital Flight - The Benefits of Digital Avionics for All Panel** Brandon Suarez, David Wing, Sandro Salguerio	

Moderator

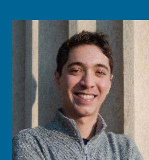


Brandon Suarez
Reliable Robotics

Panelists



David Wing
NASA



Sandro Salguerio
SkyGrid

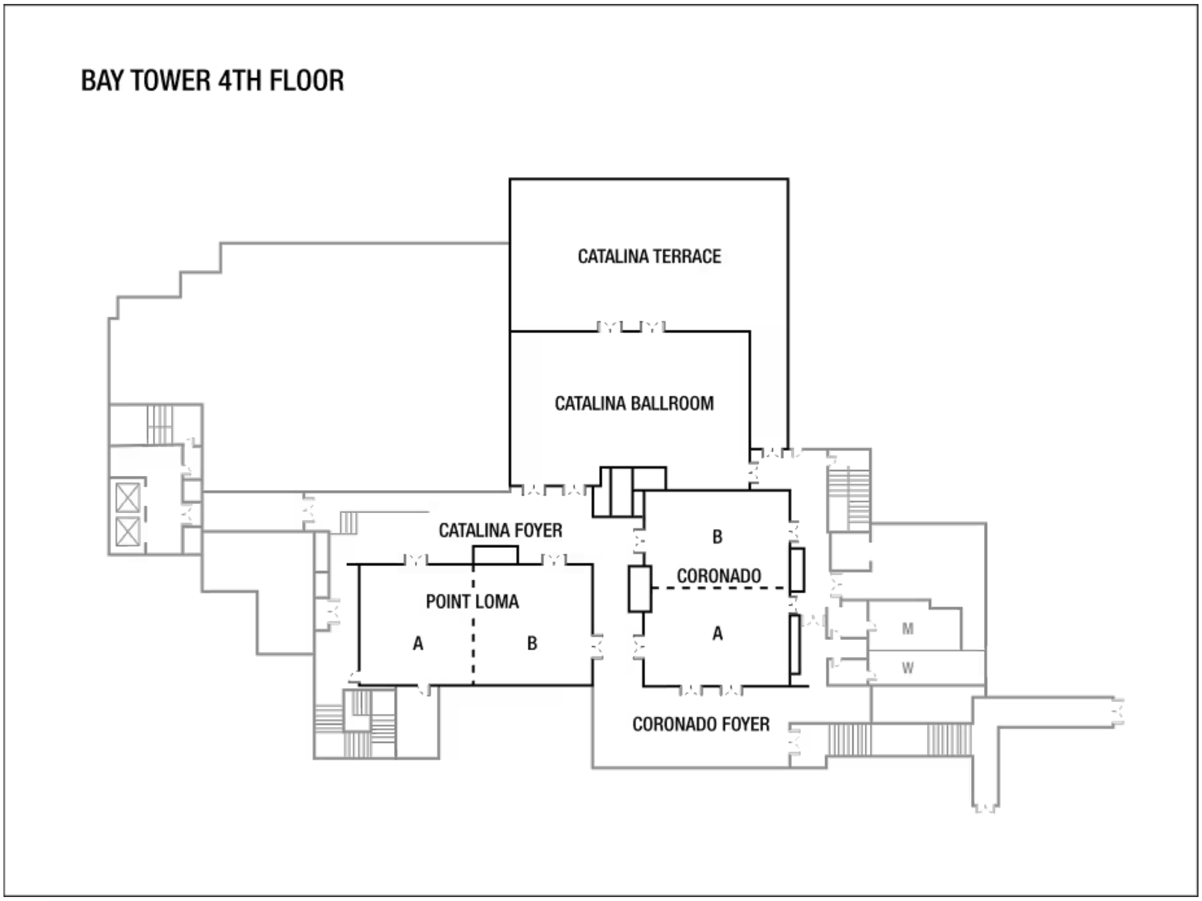
Technical Sessions - Thursday, October 3, 8:00-10:00

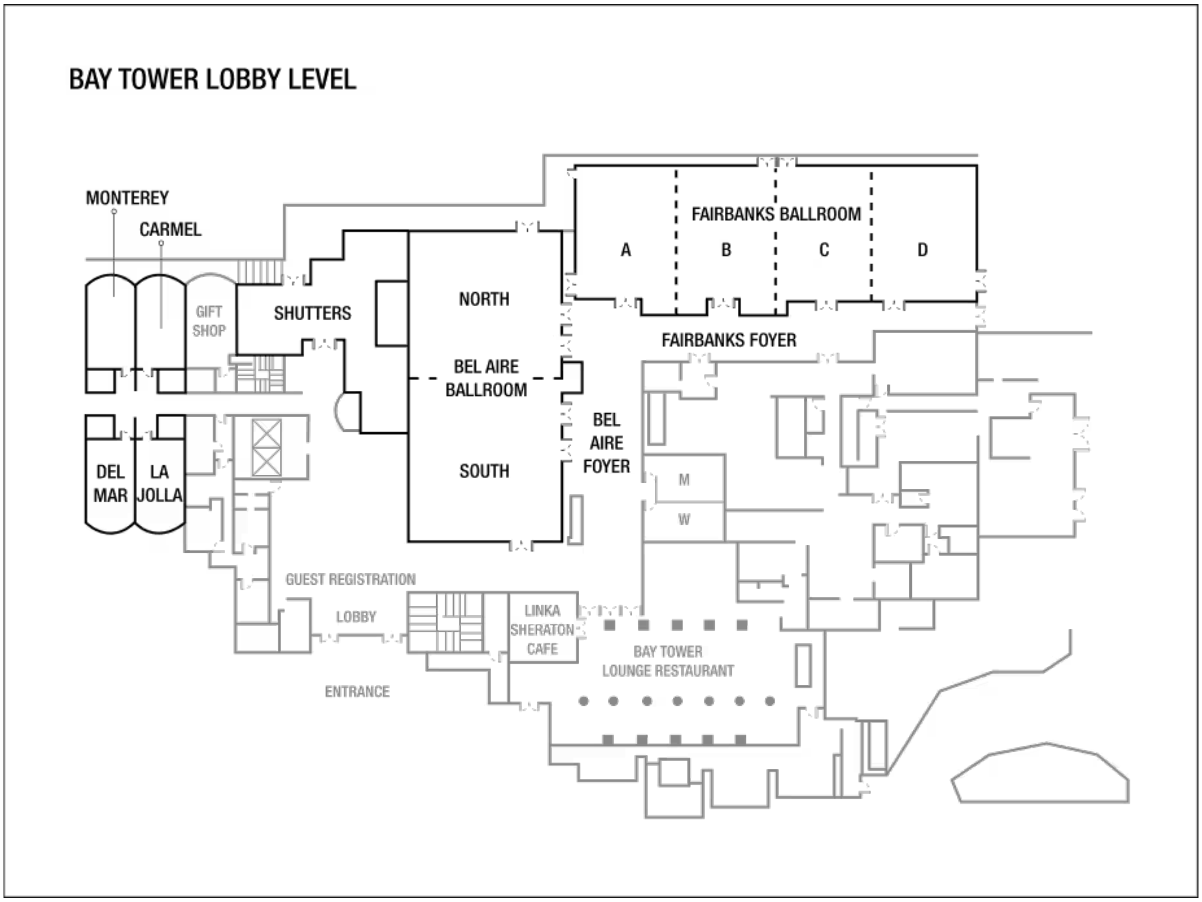
PDT	8:00	8:30	9:00	9:30
UTM/DAA Chair: Ersin Ancel Track 7 *Carmel*	**Analyzing the Impact of Sensor Noise in the TCPA-DCPA Domain** Erik Theunissen, Netherlands Defence Academy	**How to Implement U-Space at an Airport – A General Overview of an Interaction and Synchronization Concept** Praveen Kumar Selvam, German Aerospace Center DLR e.V.	**Enhancing Separation Assurance by Using Newly Developed ADS-L Messages Containing GNSS Raw Measurement Data** Benjamin Lochow, Technische Universität Berlin	
Detect and Avoid Chairs: Hanbong Lee, Cesar Munoz Track 2 *Coronado A*	**DANTi: A Tool for Assistive Detect and Avoid Research** Paolo Masci, AMA Inc	**Assistive Detect and Avoid Technology in Urban Air Mobility Environments** James Chamberlain, AMA Inc	**Detect and Avoid and Collision Avoidance Flight Test Results with ACAS Xr** Robert Rorie, NASA Ames Research Center	**A Study on Lateral Separation for Urban Air Mobility Using Simulation Model** Yoonsung Yang, Korea Aerospace University
Surveillance Chair: Jordan Sakakeeny Track 3 *La Jolla*	**Marrying Compressed Sensing and Deep Signal Separation** Truman Hickok, Southwest Research Institute	**Optimizing Electronics Architecture for the Deployment of Convolution Neural Networks Using System-Level Modeling** Deepak Shankar, Mirabilis Design Inc.	**Automated Landing Gear Detection via Ground-Based Visible Optics and ADS-B Receivers** Ronald Ankner, MIT Lincoln Laboratory	**Enhancing Airport Airspace Safety: A Small Radar System for Mitigating Bird, Drone, and Wake Vortex Hazards** Jiangkun Gong, Wuhan University
AI/ML Applications Chair: Isaac Admunson Track 4 *Coronado B*	**Machine Learning Based Radar Cross-Section Clustering Towards Enhanced Situational Awareness for Next-Generation Fighter Aircraft** Mustafa Rasit Ozdemir, Middle East Technical University	**Physics Informed Machine Learning (PIML) Methods for Estimating the Remaining Useful Lifetime (RUL) of Aircraft Engines** Truman Hickok, Southwest Research Institute	**A Certifiable AI-Based Braking Control Framework for Landing Using Scientific Machine Learning** Mevlut Uzun, Cranfield University	
Modular Open System Approach Chairs: Harold Tiedeman, Marco Bimbi Track 5 *Point Loma B*	**A Proposal for a Life Cycle Standardization Approach for the European Avionics' Ecosystem** Darbaz Darwesh, ESG Elektroniksystem- und Logistik-GmbH	**PYRAMID - Collaboration and Adaptability Through the Application of an Avionics Reference Architecture and Modular Open Systems** Mike Lane, RAF Rapid Capabilities Office	**Avilution's Extensible Flight System (XFS) Software: Making MOSA Practical** Mark Spencer, Avilution LLC	**Adoption of Evolving Network Standards to Mosa Using FPGA Certifiable Network Adaptors** Greg McCrea, North Atlantic Industries
Special Topics Chairs: Thomas Van Dillen, Carla Hackworth Track 6 *Monterey*	**MURDOC: Transforming Pixels Into Perception for Camouflage Detection** Debra Hogue, 76 Software Engineering Group, United States Air Force, University of Oklahoma	**Incorporating UAS Traffic Management Into Wildland Firefighting Operations: Initial Findings of Subject Matter Expert Interviews** Deborah Bakowski, San Jose State University Research Foundation, NASA Ames Research Center	**Exploring the Factors Influencing Public Acceptance and Intention to Use Automated Drone Delivery Systems: A Trust Theory Approach** Virpi Oksman, VTT Technical Research Centre of Finland	**Design of HMI Concepts Enhancing Approach Controllers Awareness of Departures** Martin Insulander, GEISTT AB
AI and Machine Learning Chairs: Luis Alvarez, Sarah Lehman Track 7 *Point Loma A*	**Coverage-Driven Synthetic Data Generation for Machine Learning Assurance** Manuel Hirschle, Collins Aerospace	**Towards the Monitoring of Operational Design Domains Using Temporal Scene Analysis in the Realm of Artificial Intelligence in Aviation** Akshay Anilkumar Girija, German Aerospace Center DLR e.V.	**Real-Time Imitation NMPC Using Least-Squares Optimization for Aircraft Trajectory Tracking** Sonali Rani, Universität der Bundeswehr München	**Explainable and Fast-Converging Artificial Intelligence Solution to Control a Nonlinear Aircraft Model in Air Combat** Enes Erdogan, Istanbul Technical University
Testing and Certification Chair: Kit Siu Track 4 *Del Mar*	**Examining Certification Challenges for Pre-Existing Software-Defined Radio in Safety-Critical Avionics Applications** Lin Bao, École de Technologie Supérieure	**How to Achieve Qualifiable Model-Based Software for Avionics Systems Development?** Vanessa Tietz, Universität Stuttgart	**Process for Database Specification and Verification in Airborne Systems** Johnny Marques, Aeronautics Institute of Technology	
Formal Methods Chair: Pierluigi Nuzzo Track 4 *Catalina*	**What Is Determinism? Definitions and Implications for Airworthiness and Critical Software** Bjorn Andersson, Carnegie Mellon University	**Flight Incident Analysis Through Symbolic Argumentation** Dionisio de Niz, Carnegie Mellon University	**From Formal Specification to Verified Implementation** Ashlie Hocking, Dependable Computing LLC	**Logically Unified Continually Integrated Network Design Assurance (LUCINDA)** Brendan Hall, Ardent Innovation Labs

Technical Sessions - Thursday, October 3, 10:30-12:00

PDT	10:30	11:00	11:30
Arrival Operations **Chairs: Teemu Joonas Lieb, Billy Josefsson** Track 1 *Carmel*	**The Influence of Noise Minimal Aircraft Design on Noise Optimized Curved RNP** Fabian Morscheck, German Aerospace Center DLR e.V.	**Towards Fuel Efficient RNP Approaches** Ferdinand Behrend, Lufthansa Aviation Training	**Identification of Arrival Airspace Maneuvers with High Collision Risk** Sara Nikdel, George Mason University
UAM Flight Planning **Chair: Jim Chamberlain** Track 2 *Coronado A*	**Flight Test Evaluation of Autonomous Descending-Decelerating Precision Point-in-Space Approach to the Ground** David Zahn, NASA Ames Research Center	**Using Large Language Models to Automate Flight Planning Under Wind Hazards** Amin Tabrizian, George Washington University	**A Landing Display Concept with an Augmented Reality Enhanced Camera View for Advanced Air Mobility Vehicles** Michael Zintl, Technische Universität München
Navigation Without GNSS **Chair: Michael Felux** Track 3 *La Jolla*	**Lower Bounds on Magnetic Navigation Performance as a Function of Magnetic Anomaly Map Quality** Prasenjit Sengupta, SandboxAQ	**Old but Gold: Evaluating the Accuracy and Integrity of DME Based on Real-World Measurements** Markus Espen, University of Kaiserslautern-Landau	**A GPS-Free Air Vehicle On-Board Positioning Mechanism Applying Feature Matching Technique** Yu-Shun Wang, National Chung-Shan Institute of Science and Technology
Security Analysis and Modeling 2 **Chair: Chris Watkins** Track 4 *Coronado B*	**Threat Modeling and Security Improvements for Ethernet-Based Avionic Networks** Andreas Hagl, TTTech Computertechnik AG	**Secure Development of Machine Learning Against Poisoning Attacks** Garrett Jares, Southwest Research Institute	**Navigating Threats: A Vulnerability Analysis of TCAS Interaction with Other Aircraft Systems** Sakurako Kuba, Embry-Riddle Aeronautical University
UAS Special Topics **Chairs: Evan Dill, Ersin Ancel** Track 7 *Point Loma B*	**Trajectory Planning for Offshore Wind Farm Logistics with Unmanned Aircraft** Jannik Heinze, German Aerospace Center DLR e.V.	**Towards a Domain Specific Language to Support the Evaluation of Defense Systems Facing Saturation or Attacks by Swarms of Small Drones** Serge Chaumette, University of Bordeaux and IcarusSwarms	**Initial Assessment of Lost Command and Control Link Procedures** Jordan Sakakeeny, NASA Ames Research Center
Surveillance for Drones **Chair: Saswata Paul** Track 3 *Catalina*	**Distributed Visual Sensing and Fusion for Advanced Air Mobility** Federica Vitiello, Università degli Studi di Napoli Federico II	**Optimization of Radar Networks for Airspace Surveillance in UAM and AAM Scenarios** Leonardo Milone, Università degli Studi di Napoli Federico II	

Venue Maps


BAY TOWER 4TH FLOOR
CATALINA TERRACE
CATALINA BALLROOM
CATALINA FOYER
POINT LOMA
A
B
B
CORONADO
A
M
W
CORONADO FOYER


BAY TOWER LOBBY LEVEL
MONTEREY
CARMEL
GIFT SHOP
SHUTTERS
DEL MAR
LA JOLLA
NORTH
BEL AIRE BALLROOM
SOUTH
FAIRBANKS BALLROOM
A
B
C
D
FAIRBANKS FOYER
BEL AIRE FOYER
M
W
GUEST REGISTRATION
LOBBY
ENTRANCE
LINKA SHERATON CAFE
BAY TOWER LOUNGE RESTAURANT