30th Digital Avionics Systems Conference

30th DASC

Closing the Generation Gap

Increasing capability for flight operations among legacy, modern and uninhabited aircraft

Renaissance Seattle Hotel, Seattle, WA
October 16-20, 2011

IEEE AESS AIAA DATC

www.dasconline.org

Avionics Systems . . . Air Traffic Management

Welcome to Seattle! We are excited to bring you the 30th Digital Avionics Systems Conference!

Conference General Chair
Chris Watkins
Gulfstream Aerospace

We have reached an exciting milestone! We celebrate the 30th assembly of the avionics industry's great minds and respected leaders at the premier avionics conference: DASC.

This year we gather to address the theme of "Closing the Generation Gap: Increasing capability for flight operations among legacy, modern and uninhabited aircraft." This is a timely topic. The industry is moving to adopt the next generation Air Traffic Management (ATM) system that safely supports a diverse set of aircraft spanning many generations. The great minds at our conference will also be addressing other important topics that are driving the future of aircraft avionics and the ATM system.

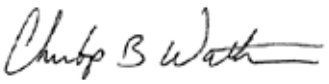
In the spirit of "Closing the Generation Gap," I am excited to present a Student Expo at the conference. This is a brand new event that will highlight the astounding accomplishments that students in grade school and college have achieved in the Aerospace industry. These students represent the next generation of talent that will "fly us into the future."

I encourage you to take advantage of all the opportunities here at the DASC. Increase your industry knowledge at the professional education program. Learn from each other's technical presentations. Join the conversation at the Workshop and Q/A panels. Discover innovative products in the exhibit hall. Network with colleagues at the social events. Enjoy the Seattle area, including a special DASC tour at the Boeing Everett factory (home to the 747, 767, 777, and 787).

I would like to thank the DASC conference committee for their hard work over this past year. They have volunteered considerable time to provide you with this excellent opportunity to come together. More importantly, I thank you, the conference participants. You share your brilliant research, insightful questions and thought-provoking ideas. Your participation is what truly makes the DASC a premier avionics event!

The aviation and aerospace industry is built upon passion. Without question, the DASC is evidence of this inner drive of human kind to take to the skies. In closing I would like to share one of my favorite quotes whose words surely connect to everyone at the DASC:

> *When once you have tasted flight you will always walk the earth with your eyes turned skyward: for there you have been and there you will long to return. – Henry Van Dyke*



Chris Watkins
30th DASC General Chair

Welcome to Seattle!

The luxurious Renaissance Seattle Hotel, located on Madison Street, just minutes from Pike Place Market and upscale shopping, is the venue for the 30th DASC. The newly-renovated hotel is conveniently located in downtown Seattle, boasting easy access to major freeways and the Sea-Tac International Airport. Relax in spacious Seattle accommodations that feature stunning views of Puget Sound, the mountains, and city skyline. From the colorful lobby displaying paintings by local artists to the fully equipped fitness center, indoor pool, and high-speed Internet, this hotel in Seattle has it all. Discover our elegant hotel that seamlessly combines comfort and technology into an unforgettable experience. Check-in is 4:00 p.m. and check-out is 12:00 p.m.

Parking

On-site parking is $10 hourly or $30 daily. Valet parking is $36 daily.

Message Center

There will be a message center at the DASC Registration Desk. When calling the Renaissance Seattle Hotel at 206-583-0300, ask for the DASC. Messages will be taken and posted on the DASC Bulletin Board.

Breaks/Refreshments

Coffee, tea, water, and soft drinks will be available each day, complimentary to registered attendees.

Speakers Breakfast

On Tuesday, Wednesday, and Thursday, breakfast will be held at Visions on the 28th Floor from 7:00 – 8:00 a.m. for the Technical speakers scheduled to present that day. Speakers are required to attend in order to plan for their session with their session's chair. Only authors scheduled to make their paper presentations that day are invited.

Guest Program

Spouses, families, and guests are encouraged and invited to accompany attendees to the 30th DASC. We have tentatively scheduled the following activities:

Tuesday
Pioneer Square (birthplace of Seattle)
Smith Tower (one of world's first skyscraper)
Seattle Waterfront (shopping and food)

Wednesday
Pike Place Market
First Starbucks Coffee House
Shopping

Thursday
Ride the Ducks (Seattle Tour using WWII landing craft)
Seattle Center (including Space Needle)
Afternoon shopping

Special Event: Tillicum Village Salmon Bake and Cruise

Thursday, 4:30-9:00 p.m.

Join us Thursday evening for a unique experience! We will be taking a cruise to Blake Island State Park where we'll enjoy a salmon dinner cooked over alder-wood fire and a live Native American show. Your four-hour adventure begins with an Argosy cruise on Puget Sound to Blake Island State Park. Tillicum staff will greet you with steaming mugs of clams and nectar while you take in the amazing view of Mt. Rainier, the city skyline and Puget Sound. Take time to wander into the longhouse foyer and gather round the fire where you can watch whole salmon being cooked on cedar stakes over an alder-wood fire in the traditional Northwest Coast Indian Style. Staff will lead you into the longhouse where you take a seat for the performance and your fabulous buffet meal. As you finish, the lights will dim while the myth and magic come to life in a spellbinding performance. The new 25-minute show keeps to the authenticity of the Coast Salish tribes, while simultaneously bringing dramatic 21st century video film effects to a live theater set. After the show, you'll have free time to stroll the grounds and gift shop before the 45-minute return to Seattle. A cash bar will be available on the cruise and at dinner.

We will be ending our Technical Program at 3:30 p.m. on Thursday to allow attendees to prepare and travel to Pier 55. Be sure to wear comfortable walking shoes for the six-block walk to the boat and stroll around the island. City buses are available to and from the pier. To walk to the boat, head West down Madison St. until you reach Alaskan Way. Turn right and walk one block. Pier 55 will be on the left. Allow 30 minutes for travel time. Board the boat between 4:00-4:15 p.m. We sail promptly at 4:30 p.m. Buses will be available to take you back to the hotel at 9:00 p.m.

Pick up your boarding pass at the DASC Registration Desk.

Week at a Glance

Boeing Everett Tour

Friday, 10:00 a.m.-12:00 p.m.

30th DASC attendees are invited to participate in a special Boeing Everett Tour on Friday. Everett, WA is located 25 miles north of Seattle and is home to the 747, 767, 777, and 787 Dreamliner production lines. Visitors will get a walking tour along the factory floor, which the Guinness Book of World Records acknowledges as the largest building in the world by volume. While inside the factory, visitors will witness firsthand the various stages of how wide-body airplanes are manufactured, assembled and tested for airline customers around the world. This tour is available at no extra cost to registered attendees.

Please wear appropriate footwear: feet completely covered with wide low heels (i.e., no sandals, high heels, open toes/heels.) No recording devices of any sort (cameras, cell phone cameras, videos, etc.) will be permitted.

You will need to register at the DASC Registration Desk if you wish to participate, listing your company affiliation and citizenship. Be sure to bring a photo ID. Transportation will be provided between the hotel and the Boeing factory.

There will be two tours, 10:00-11:30 a.m and 10:30 a.m.-12:00 p.m. Buses will depart the hotel at 9:00 and 9:30, respectively, returning at 12:30 and 1:00, respectively.

Sunday 10/16/11	Monday 10/17/11	Tuesday 10/18/11	Wednesday 10/19/11	Thursday 10/20/11	Friday 10/21/2011
9:30 - 5:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 4:30 Registration Open	Boeing Everett Tour 10:00 – 12:00 (Tour 1: Board bus at 8:45. Bus departs hotel at 9:00 and returns at 12:30) (Tour 2: Board bus at 9:15. Bus departs hotel at 9:30 and returns at 1:00)
9:30 - 11:30 Register for Tutorials	8:00 - 11:00 Tutorials Session MM	8:30 - 11:30 Plenary Session Exhibits Open 11:00 – 4:30	8:00 - 11:30 Technical Session B 9:30 - 10:00 Break Exhibits Open 9:00 – noon	8:00 - 11:30 Technical Session D 9:30 - 10:00 Break	
11:30 - 2:30 Tutorials Session SL (Lunch Provided)	11:30 - 2:30 Tutorials Session ML (Lunch Provided) Workshop 1:00 – 5:00	11:30 - 1:30 Lunch in Exhibit Hall	11:30 - 1:30 Awards Luncheon	11:30 - 1:30 Panel Lunch	
2:30 - 3:00 Break	2:30 - 3:00 Break	1:30 - 5:00 Technical Session A 3:00 - 3:30 Break	1:30 - 5:00 Technical Session C 3:00 – 3:30 Break	1:30 - 3:30 Technical Session E	
3:00 - 6:00 Tutorials Session SA	3:00 - 6:00 Tutorials Session MA				
Open Evening	6:00 - 8:00 Exhibits Open Social Event in Exhibit Hall	5:30 - 7:00 Exhibits Open Reception in Exhibit Hall	Student Panel 5:00 – 6:30	Tillicum Village Cruise 4:30 – 9:00 (Board boat 4:00 – 4:15 at Pier 55)	

Plenary Session

Tuesday 8:30 - 11:30 a.m.

Jeffrey S. Brody

Deputy General Manager and
Vice President
Business Operations
AAI/Textron Systems

Jeff Brody joined Textron (NYSE: TXT) in April 2011. He is the Deputy General Manager and Vice President, Business Operations of Textron's Unmanned Aerial Solutions business. Prior to Textron, he spent over four years with Alliant Techsytems (NYSE: ATK) in Baltimore and Salt Lake City where he was responsible for the creation of a new unit within ATK and the transformation of the Aerospace business to post Shuttle operations. Previously, he spent 18 years with Northrop Grumman in a re-engineering P&L role and integrating the IT business after Northrop's acquisition of Litton Industries. Jeff also had stints with two high technology, venture capital (GTCR and Benchmark Capital) backed start-up companies during a two-year sabbatical. He also worked for Baxter Healthcare Corporation and The Johns Hopkins Hospital at the start of his career.

Mr. Brody has a Juris Doctor, Master of Arts in Organizational Development, and a Bachelor of Science in Industrial Relations from Concord Law School, the University of Maryland University College, and the University of North Carolina-Chapel Hill, respectively. He has completed executive education coursework at Harvard, the University of Pennsylvania Wharton Business School, and the University of California, Los Angeles. Additionally, Mr. Brody has taught as an adjunct professor at the George Mason University and guest lecturer at the University of Maryland. He was also appointed as a Visiting Executive Lecturer at the University of Virginia's Darden School of Business and has taught a Post Merger Integration case study for the past eight years.

Sarah P. Dalton

Director
Airspace and Technology at
Alaska Airlines

Sarah Dalton is currently the Director, Airspace and Technology for Alaska Airlines. She leads a team of engineers and pilots to implement flight deck improvements and flight procedures that increase the safety and efficiency of flight operations. Her 27 years in the aviation industry includes airline, airport management, and FAA experience. She currently serves on the RTCA's Integrated Capabilities Working Group, the ATA's Airline Operations Committee, and the FAA's Performance-Based Navigation Aviation Rulemaking Committee.

Ms. Dalton is a Certified Member of American Association of Airport Executives and a private pilot. She has a Bachelor of Science in Human Factors Engineering from Tufts University, Bachelor of Science in Civil Engineering from University of Washington, and a Masters Degree in Public Administration from University of Montana.

Thomas L. Hendricks

Senior Vice President of Safety,
Security, and Operations
Air Transport Association

Tom Hendricks was named senior vice president of safety, security, and operations for the Air Transport Association (ATA) in February 2011. In this role, he is responsible for technical and operational functions of ATA, developing and shaping ATA member positions on flight operations, safety, engineering, air traffic management, and security.

Mr. Hendricks joined ATA as vice president, operations and safety in April 2010 after 23 years of airline industry experience as a chief pilot and then director of line operations at Delta Air Lines. A retired Air Force Reserve colonel, he also served as a U.S. Navy officer.

A native of Fairfield, Ohio, Mr. Hendricks graduated from The Citadel in Charleston, S.C. with a Bachelor of Arts in mathematics with secondary emphasis in business administration.

Awards Luncheon

Wednesday, 11:30 a.m. - 1:30 p.m.

Dennis E. Roberts
Director, FAA ATO Mission Support Services
Airspace Services Directorate

Dennis Roberts was appointed Director, Airspace Services for ATO's Mission Support in December 2010. In this capacity, he is responsible for Airspace Rules and Regulation, Airspace Redesign/Management Programs, NAS Integration of Unmanned Aircraft Systems, Performance-Based Navigation Procedures, Obstruction Evaluation/Airport Airspace Analysis and Optimization of Airspace and Procedures in Metropolitan Areas.

Previously, Mr. Roberts was Director, FAA's Office of Flight Services Program Operations in Washington, DC, responsible for delivery of Flight Service Station (FSS) products in the lower 49 states and Puerto Rico through a performance-based contract with Lockheed Martin Flight Services (LMFS); one of the government's largest A-76 outsourced programs. Additionally, he led the FAA's in-house delivery of all flight services across the State of Alaska.

In 2006, Mr. Roberts was appointed Regional Administrator for the Northwest Mountain Region. His responsibilities included representing the Administrator in the region's seven states and the Air Traffic Organization's (ATO) Western Service Area (WSA).

Prior to relocating to Seattle, Mr. Roberts was Director of the FAA's Office of Airport Planning and Programming (APP-1) in Washington, DC. A 1,200-hour instrument-rated, commercial pilot, Mr. Roberts is a native of Excelsior Springs, Missouri, a member of the FAA's Senior Executive Service (SES) and holds a Bachelor's Degree in Aviation Management and a Master's Degree in Aviation Safety from Central Missouri State University.

Scott Pelton
Director of Airplane Systems
Boeing Commercial Airplanes

Scott Pelton is the Boeing Commercial Airplanes (BCA), Director of Airplane Systems. He has held this position since April 2009. In this capacity, his responsibility includes the product definition and product integrity for Avionics, Flight Controls, Environmental Controls, Hydraulics, Flight Deck, Cabin Systems, Electrical Systems, and Electrical Wiring for all Boeing commercial airplanes and services.

Mr. Pelton's previous assignment was the Boeing Commercial Airplanes Director of Technology.

For the past 21 years, Mr. Pelton has held various management assignments in the Systems and Interiors areas, all within BCA. From 1981 through 1990, he worked as an Avionics and Flight Controls engineer in BCA. Over the course of his career, he has supported the 737, 747, 757, 767, 777, and 787 airplane programs.

Mr. Pelton did his undergraduate studies at the University of Washington. He earned two Bachelor's Degrees in 1980: one in mechanical engineering and one in mathematics. He attended graduate school at Stanford University, earning a Master's degree in Aeronautics and Astronautics in 1981.

Each year, significant accomplishments of certain individuals in the field of digital avionics are recognized. At this year's conference, we will be presenting the Distinguished Institution Award, the AIAA John Ruth Digital Avionics Award, the IEEE/AESS M. Barry Carlton Award for Excellence in Technical Communications, the David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award for the 29th DASC, 30th Best of Track, and Student Best Paper Awards.

AIAA John Ruth Avionics Award
This year's winner is "For Outstanding Lifetime Achievement in the Area of GPS Navigation"
Dr. Frank Van Graas, Ohio University

IEEE/AESS M. Barry Carlton Award for Excellence in Technical Communications
This award will be presented for their Best Paper in the 2008 IEEE/AESS Transactions: "Position Error Bound for UWB Localization in Dense Cluttered Environments"
Damien B. Jourdan, Rockwell Collins
Davide Dardari, University of Bologna, Italy
Moe Z. Win, Massachusetts Institute of Technology

David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award
The Awards Committee of the Digital Avionics Technical Committee of the AIAA forms a selection committee made up of AIAA and IEEE members. This committee selects the David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award of the 29th DASC based on technical content, application to the real world, and effective presentation. The award is sponsored by MITRE/CAASD and will be presented by Dr. Christopher J. Hegarty of MITRE/CAASD to "3D-New Concepts for a Decentralized, Self-Organizing Air-to-Air Radio Link"
Nico Franzen, German Aerospace Center
Dr. Michael Schnell, German Aerospace Center
Michael Walter, German Aerospace Center

Interactive Workshop

Interactive Workshop on Alternate Position, Navigation, and Timing (APNT)

Co-Chairs: Jeff Williams, Senior Vice President, Aviation Management Services, Tetra Tech – AMT and Leo Eldredge, GNSS Group Manager, Federal Aviation Administration

Monday, 1:00 – 5:00 p.m.

The DASC will include an interactive workshop to be held on October 17th in the afternoon on the emerging topic of Alternate Position, Navigation, and Timing (APNT). APNT aims to close the gap between legacy and new generation aircraft and technologies by leveraging existing and emerging systems. In order to address emerging APNT needs, a program is being initiated by the United States (U.S.) Federal Aviation Administration (FAA) to research various alternative strategies to support the U.S. National Airspace System's transition to the Next Generation Air Transportation System. With the FAA investigating Distance Measuring Equipment (DME) enhancements as a near-term APNT strategy, the workshop will discuss legacy as well as advanced APNT alternatives to meet the operational needs of the future. Topics of the workshop will cover APNT strategy, operational needs/requirements, infrastructure support, and industry perspectives. In concert with the legacy systems and associated infrastructure, we also plan to discuss aging VHF Omnidirectional Range (VOR) infrastructure and the planned migration to a VOR Minimum Operational Network (MON). The workshop will be an excellent opportunity to share your views and perspectives on this important and challenging subject in an interactive environment.

Expert Lunch Panel

Rise of the Machines!

Thursday 11:30 a.m. – 1:30 p.m.

This year's Thursday Lunch Panel will have short presentations from Altera, Microsemi (formerly Actel), Xilinx, Mentor Graphics, and Lockheed Martin Aeronautics, discussing some of the new capabilities now found in Complex Electronic Hardware (CEH). These capabilities allow tremendous flexibility in Avionics and add new trade space that System Architects will have to accommodate. Please come listen and learn about the CEH of today and how they will enable you to increase the capabilities of your aircraft tomorrow.

DASC Student Expo

Wednesday 5:00 – 6:30 p.m.

The Student Expo is a special event designed for students in K-12 and collegiate aerospace programs. The objectives of this event are:

- Create a forum that brings together students to highlight their successful efforts.
- Provide a platform for the students to communicate with aviation experts from the worldwide industry.

The program will bring in teachers and students from several local Seattle area schools. The list of invited schools includes:

- Key Peninsula Middle School a NASA Explorer School.
- Aviation High School – A unique school offering students the opportunity to focus on the aerospace/aviation industry while pursuing their high school degree. (http://www.aviationhs.org/about_us.htm)
- Washington Aerospace Scholars – A State-wide program that offers high school juniors the opportunity to learn about Science, Technology, Engineering, and Math (STEM). Up to 280 students participate via distance learning for five months. The top 160 students are selected to spend a week at the Museum of Flight working with engineers and educators as they complete a design project, tour engineering facilities, receive briefings, and compete in hands-on engineering challenges.
- Green River Community College – At this school, students can focus on areas such as Air Traffic Control, pilot training, and Air Transportation as they pursue an AS degree. (http://www.instruction.greenriver.edu/aviation/)
- South Seattle Community College – Has both an AS degree in aerospace engineering and an aircraft maintenance degree. (http://www.southseattle.edu/programs/academ/aerospace.pdf)
- University of Washington – The UW has a leading Aerospace and Astronautics department offering degrees at the BS, MS, and PhD levels. (http://www.aa.washington.edu/)

Each participant will make a presentation on their school and highlight a student project. The Expo will provide an opportunity for interaction among the students and professionals.

This event is made possible through the generous sponsorship of the Boeing Company (Prime Sponsor) and IEEE Seattle Section.

For more information, contact Paul Kostek at p.kostek@ieee.org.

Tutorials

Professional Education Chair
Maarten Uijt de Haag
Ohio University

It is my pleasure to welcome you to the Professional Educational Program for the 30th DASC. We are pleased to offer educational opportunities that are tailored to support this year's theme: Improving Our Environment through Green Avionics and ATM Solutions.

This year we are offering 21 separate tutorials, including 4 new ones. All tutorials are organized into tracks to allow attendees to easily identify those educational opportunities that align most closely with their areas of interest. Most courses have been selected to directly complement the topics that will be presented in the technical program, from *Avionics Design, Software Safety, and Systems Engineering to Communication Systems and NextGen* concepts. Some of these short courses address the application of Green Avionics and ATM Solutions in the various digital avionics system disciplines.

All DASC tutorials will provide a real-time interactive discussion with the presenters, and have well-defined learning objectives and learning outcomes to help focus the course on the needs of attendee's. DASC tutorials are affordable and offer an excellent opportunity to learn directly from experts in the field. Again this year, we are offering Continuing Education Units (CEU) for all courses. In short, no matter what your educational goals are, the professional development program of the 30th DASC is sure to provide a valuable learning experience.

We hope you will take full advantage of the educational program and will benefit both technically and professionally from your participation in the 30th DASC.

	Sunday, October 16		Monday, October 17			
Sunday's Session	**11:30 - 2:30**	**3:00 - 6:00**	**8:00 - 11:00**	**11:30 - 2:30**	**3:00 - 6:00**	**Monday's Session**
Systems Engineering [Seneca]	**Systems Thinking and Engineering in Aviation***	**Fault Tolerant Avionics Systems Design and Validation***	**An Efficient DO-254 Flow Utilizing Modern Methods and Tools***	**Applying Formal Methods to Airborne Software**	**Formal Methods in RTCA DO-178C**	**Avionics Design and Formal Methods [Seneca]**
Instructor	**SL1: Simons**	**SA1: Hitt**	**MM1: Lange/Huynh**	**ML1: Ghafari**	**MA1: Joyce**	**Instructor**
Avionics [Spring]	**ARINC 653 - A Detailed Exploration (Lecture Session)**	**ARINC 653 - A Detailed Exploration (Hands On Lab Session)**	**DO-160F: Understanding the Aircraft Environment - Part 1**	**DO-160F: Understanding the Aircraft Environment - Part 2**	**Ethernet Networking for Critical Embedded Systems**	**Avionics and Networking [Spring]**
Instructor	**SL2: Kinnan**	**SA2: Kinnan**	**MM2: Helfrick**	**ML2: Helfrick**	**MA2: Steiner/ Jakovljevic**	**Instructor**
Spacecraft Avionics [James]	**Part I – Spacecraft Avionics Systems Engineering Fundamentals**	**Part II – Spacecraft Avionics Subsystem Systems Engineering**	**Digital Avionics Systems**	**Future Air Navigation System 1/A (FANS 1/A)**	**Modern Avionics Architectures**	**Avionics Design and Systems Engineering [James]**
Instructor	**SL3: Andrew**	**SA3: Andrew**	**MM3: Spitzer**	**ML3: Heinke**	**MA3: Spitzer**	**Instructor**
NextGen and Open Systems [Marion]	**GPS-based Applications for NextGen Operations**	**The Modular Open Systems Approach in Defense Acquisition**	**Software Design Assurance: DO-178B & DO-278**	**DO-178C – The New Core Document and the Technical Supplements***	**DO-254 – Complex Electronic Hardware – Lessons from the Trenches***	**Design Assurance [Marion]**
Instructor	**SL4: Uijt de Haag/ Helfrick**	**SA4: Logan**	**MM4: Ferrell**	**ML4: Ferrell/Ferrell**	**MA4: Ferrell**	**Instructor**
			TRIZ: The Ultimate Tool for Problem Solving in Innovation*			**Problem Solving Methods [Columbia]**
			MM5: Royzen			**Instructor**

*is a new or updated tutorial

Tutorial Overview

Sunday, October 16
Session 1 – Systems Engineering

SL1: Systems Thinking and Engineering in Aviation
J. Mark Simons, MITRE/CAASD
This tutorial provides an introduction to the fundamentals of systems thinking and systems engineering in the context of aviation. This interactive tutorial will address the definition of system boundaries, actors, roles and responsibilities, and policies and procedures, within the multi-layered context of the aviation community. Using basic concepts from the Unified Modeling Language (UML) and Integrated Definition (IDEF) methodologies, this tutorial will explore these systems topics from the perspective of enterprise engineering, system of systems engineering, and systems engineering. The tutorial will also examine system development from the conceptual, engineering, and operational stages of the traditional system life-cycle.

SA1: Fault Tolerant Avionics Systems Design and Validation
Ellis Hitt, StratSystems, Inc.
This tutorial will present design methods for fault tolerant avionics and validation methods to determine the ability of an avionics systems to tolerate faults. The tutorial will address different types of faults, including system-hardware-software design faults, hardware manufacturing faults, software coding and integration faults, system integration faults, and human-system operation faults. Different methods of detecting faults, isolating faults, and recovering from faults will be presented. Systems of systems (e.g., air transportation systems, fault tolerance) will be discussed with attendees participating in identifying types of faults that should be tolerated, and methods of identifying faults and the events that trigger the faults. Methods of validating the degree of fault tolerance of an existing system will be presented.

Sunday, October 16
Session 2 – Avionics

SL2: ARINC 653 - A Detailed Exploration (Lecture Session)
Larry Kinnan, Wind River
This tutorial provides an in-depth look at the history behind ARINC 653 and Integrated Modular Avionics (IMA). The session will provide a detailed explanation of the ARINC 653, Part 1 API set and usage as well as the optional Part 2 API set and an overview of the current strawman proposal before the ARINC committee for the Part 4 Minimal Subset and how it fits into the mix of IMA and federated avionics systems.

SA2: ARINC 653 - A Detailed Exploration (Hands On Lab Session)
Larry Kinnan, Wind River
This session will provide the student with a hands-on lab session using Wind River's VxWorks 653 product to develop, debug, and modify an ARINC 653 application. It will show how to modify the behavior of an application through use of the ARINC 653 Part 1 APIs as well as the XML configuration of the platform. The student will also be able to run and debug the sample application to better understand the operation of an ARINC 653 application.

Sunday, October 16
Session 3 – Spacecraft Avionics

SL3: Part I – Spacecraft Avionics Systems Engineering Fundamentals
George Andrew, GNA Aerospace Consulting Group, Inc.
This session pertains to the full life-cycle of the Systems Engineering of the Avionics system. Covered will be the requirements at the mission level and derived requirements at the subsystem level; trade studies; configuration management; documentation, risk management; safety; schedule; and cost. Managers, systems engineers, or details designers interested in learning more about the Avionics Systems Engineering process should register for this tutorial. Combined with "Part II – Spacecraft Avionics Subsystem System Engineering," the participant will attain a greater level of depth and understanding of how the Systems Engineering process is so vital and important to the success of any Spacecraft Avionics program or project.

SA3: Part II – Spacecraft Avionics Subsystem Systems Engineering
George Andrew, GNA Aerospace Consulting Group, Inc.
This session provides a detailed look at basic spacecraft subsystem avionics systems level design and engineering requirements required to develop the Avionics System and Subsystem Level Architecture. The session will detail how to derive Avionics System Level requirements from higher Mission Level Requirements and documentation required to conceptualize and develop Avionics Subsystem Architectures. Combined with "Part I – Spacecraft Avionics Systems Engineering Fundamentals," the participant will attain a greater level of depth and understanding of how the Avionics Subsystem Systems Engineering process is so vital and important to the success of any Spacecraft Avionics program or project.

Sunday, October 16
Session 4 – NextGen and Open Systems

SL4: GPS-based Applications for NextGen Operations
Maarten Uijt de Haag, Ohio University
Albert B. Helfrick, Embry-Riddle
The Global Positioning System (GPS) has evolved from its military roots to a system that is being used in a wide variety of applications in today's society. GPS will form an important part of the NextGen navigation aid infrastructure. This course briefly describes the basic operation of GPS, its error sources and modes of operation, and the state of art in GPS technology. Next, we will discuss the aviation-specific applications of GPS, including stand-alone GPS, the Wide Area Augmentation System (WAAS), the Local Area Augmentation System (LAAS), Automatic Dependent Surveillance –

Tutorial Overview

Broadcast (ADS-B), and the integration of GPS with inertial navigation systems. Finally, we will address the role of GPS-based applications in NextGen operations.

SA4: The Modular Open Systems Approach (MOSA) in Defense Acquisition
Glen Logan, The Research Associates
The Modular Open Systems Approach (MOSA) has been a Department of Defense (DoD) initiative for well over 15 years. This tutorial covers the motivation, policies, concepts, and practical applications behind the DoD's approach to leverage commercial technology and developments to transform defense system acquisitions.

The tutorial highlights the role of open systems in the series of recent Under Secretary of Defense for Acquisition, Technology, and Logistics implementation directives entitled "Better Buying Power - Obtaining Greater Efficiency and Productivity in Defense Spending," and discusses the impacts of the 2009 Weapons Systems Acquisition Reform Act (WSARA) on application of open architecture.

The tutorial provides detailed examples of the many life-cycle cost savings, cycle time reductions, and enhanced interoperability benefits of open systems through several practical applications—from avionics technology and risk reduction demonstrations, pilot programs and consensus-based standards development, and system-of-systems architecture principles.

Also included are summaries of Joint Service and individual Service initiatives such as Naval Open Architecture, an overview of the MOSA Program Assessment and Review Tool (PART), the Naval Air Systems Command (NAVAIR) Key Open Subsystems (KOSS) methodology, and the emerging Openness Readiness Levels under development by a NAVAIR-led industry working group.

Monday, October 17

Session 1 – Avionics Design and Formal Methods

MM1: An Efficient DO-254 Flow Utilizing Modern Methods and Tools
Michelle Lange, Mentor Graphics Corporation, Buu Huynh, Mentor Graphics Corporation
DO-254, the standard for design assurance of airborne electronic hardware, is nothing new to the aviation industry. Companies serving this industry have been complying with it for over five years. The cost of complying with the standard is also well known. What some companies do not realize is that newer methods and tools can significantly help reduce the cost of these programs. From requirements management, to code checking, to more effective verification methods, to modern synthesis capabilities—and even connection to system level analysis and testing—employing these methods can drive down the cost of these programs (and typically enhance the quality of the end product). This tutorial will provide an overview of the standard, discuss key challenges throughout the flow, and introduce methods and tools that can support automation (and reduced cost) of key objectives of DO-254 programs. This tutorial will introduce the following tools and methodologies: ReqTracer for requirements management, validation, and traceability; HDL Designer for managing the HDL development process, including HDL code checking; Questa for verification, including simulation (basic directed tests through assertion-based flows), code coverage, clock-domain crossing analysis, and other advanced methods; Precision Hi-Rel for FPGA synthesis with design assurance features, including automated SEU mitigation methods; and a brief introduction to the Expedition toolset for board-level DO-254 compliance.

ML1: Applying Formal Methods to Airborne Software
Dr. Naghmeh Ghafari, Critical Systems Labs
This tutorial provides an introduction to formal methods in the context of developing and verifying airborne software. The tutorial covers general approaches to formal methods, including theorem-proving and model-checking. Tutorial participants will gain a general understanding of how these approaches may be applied at different levels of development, including high-level software requirements, low-level software requirement, and source code. Various tools and techniques will be demonstrated during the tutorial. This tutorial is oriented to a technical audience, but does not assume any prior knowledge of formal methods. Participants in this tutorial may also wish to participant in the complementary tutorial "Formal Methods in RTCA DO 178C," which considers how formal methods might be used toward certification of airborne software.

MA1: Formal Methods in RTCA DO-178C
Dr. Jeff Joyce, Critical Systems Labs
This tutorial provides an overview of a document approved by RTCA SC205 and EUROCAE WG71 on the use of formal methods to create certification data in compliance with RTCA DO-178C/ EUROCAE ED 12C. As a member of the subgroup that developed this document, the tutorial presenter will share insights about this guidance and its use by the digital avionics community. Although the tutorial material includes some illustrative examples of how formal methods may be used, the tutorial will focus on strategies for satisfying specific objectives of RTCA DO-178C/ EUROCAE ED 12C, especially objectives that arise from Section 6 (Verification) of DO-178C.

Monday, October 17

Session 2 – Avionics and Networking

MM2: DO-160F: Understanding the Aircraft Environment – Part 1
Albert B. Helfrick, Embry-Riddle
This is part one of a two-part course covering the environment we all need to tolerate if we design systems for aircraft use. The course explains the basis for the specifications outlined in DO-160F; the aircraft conditions that produce the extremes of the environment of

Tutorial Overview

DO-160F, normal, abnormal, and emergency. Test procedures and test equipment for certifying avionics to DO-160F are covered. Design techniques for electrical hardware, and mechanical hardware and software to insure compliance to DO-160F will be discussed. All 23 categories of environmental conditions will be covered. Other subjects such as nameplate marking, testing labs, and other matters required for TSO compliance will be covered.

ML2: DO-160F: Understanding the Aircraft Environment – Part 2

Albert B. Helfrick, Embry-Riddle

This is part two of a two-part course covering the environment we all need to tolerate if we design systems for aircraft use. The course explains the basis for the specifications outlined in DO-160F; the aircraft conditions that produce the extremes of the environment of DO-160F, normal, abnormal, and emergency. Test procedures and test equipment for certifying avionics to DO-160F are covered. Design techniques for electrical hardware, and mechanical hardware and software to insure compliance to DO-160F will be discussed. All 23 categories of environmental conditions will be covered. Other subjects such as nameplate marking, testing labs, and other matters required for TSO compliance will be covered.

MA2: Ethernet Networking for Critical Embedded Systems

Wilfried Steiner and Mirko Jakovljevic, TTTech

Ethernet is a mature technology developed for best-effort communication in high-volume and consumer applications, but its capabilities are considered to impose limitations on design of fault-tolerant, time-critical, safety-critical, and mission-critical systems. This tutorial will provide participants with an understanding of Ethernet operation in critical embedded systems, and a comparison of novel Ethernet-based standards such as ARINC664, TTEthernet (SAE AS6802), IEEE AVB and IEEE DCB, and various Real-Time Ethernet modifications. We will address key Ethernet mechanisms and challenges for design of critical embedded networks and discuss approaches to resolving those challenges. Finally, we will relate this discussion to system architecture design and advanced system integration using Ethernet in avionics, vetronics, and unmanned systems.

Monday, October 17

Session 3 – Avionics Design and Systems Engineering

MM3: Digital Avionics Systems

Cary Spitzer, AvioniCon

This tutorial presents a systems level overview of the fundamentals of design, construction, assessment, and validation of digital avionics systems. Topics include:

1. Avionics organizations
2. Defining the avionics requirements
3. Data buses
4. Displays
5. Hardware and software assessment and validation
6. Electromagnetic interference

Emphasis will be given to selected topics that are frequently misunderstood or not fully appreciated, such as data buses, and the precise meaning of commonly misused terms.

ML3: Future Air Navigation System 1/A (FANS 1/A)

Ann Heinke, Overlook Consulting, Inc.

This tutorial provides a technical and operational description of the FANS 1/A package. An operational scenario is included to pull together all of the components of the end-to-end data communications system and depict the flight crew interface experience. You will learn the history of FANS 1/A, the related standards activity, the technical features of the application processes (ADS-C, CPDLC and AFN), the ARINC 622 SNDCF process, the aircraft architecture components, and the OSI model. Also included are differences between FANS 1/A and ATN communications, which is especially important today as we attempt to deploy data communications in the NAS (NextGen) and in domestic core Europe (SESAR). An overview of the FANS 1/A subnetworks is provided, and Required Communications Performance attributes that need to be satisfied by a subnetwork. This tutorial is intended for all audiences and is key for developers, operators, ANSPs, and service providers who wish to have a basic understanding of the complete air/ground system.

MA3: Modern Avionics Architectures

Cary Spitzer, AvioniCon

Architectures from seven civil and military aircraft, including the B-757/767, A330/340, MD-11, B-777, F 16 C/D, C-17, and the F-22 are examined. These architectures have been carefully chosen to cover a spectrum of aircraft types, federated and integrated designs, line replaceable unit vis-à-vis modular packaging; and non-essential to flight critical applications. The hardware and functions of each architecture are discussed. The architectures of the A-380 and the B-787 are briefly discussed.

Monday, October 17

Session 4 – Design Assurance

MM4: Software Design Assurance: DO-178B & DO-278

Uma Ferrell, Ferrell & Associates Consulting

RTCA DO-178B (Software Considerations in Airborne Systems and Equipment Certification) is the industry standard for governing the development, verification, and the certification aspects related to software for civil avionics. Two additional RTCA documents – DO-248B and DO-278 – have both clarified and extended DO-178B's reach to ground and space-based systems. In addition, DO-178B has been applied in the automotive industry for safety-critical development and is one of the standards recognized by the Food and Drug Administration for use in life-critical medical devices. This tutorial is intended to provide a detailed overview of DO-178B, what it is, what it is not, how to apply it, and pitfalls to avoid in its application. In addition to explaining the guidelines, the tutorial will discuss the practical application of RTCA DO-178B. The tutorial will conclude with a summary of relevant Federal Aviation Administration guidance associated with the application of software design assurance and current research activities on related top-

Tutorial Overview

ics. Even if you have some familiarity with DO-178B, this session will help reinforce and deepen your understanding of its content and intent.

ML4: DO-178C – The New Core Document and the Technical Supplements
Tom and Uma Ferrell, Ferrell & Associates Consulting
RTCA DO-178B has been under active revision for the last five years. The result, due out soon, consists of a new core document and four additional publications addressing formal methods, object-oriented technology, model-based development, and tool qualification. This tutorial will provide a detailed look at the new guidance, how it is meant to be applied, and what it means for software development assurance going forward. Starting with changes in the systems-software boundary, including linkages to the new ARP 4754A, this tutorial will walk through changes approved to date using a notional life cycle. Emphasis will be placed on how to integrate the various technical supplement areas into project planning, the development process, and the impacts to the four integral processes of verification, configuration management, quality assurance, and certification liaison. New data items associated with tool qualification and modeling, as well as parameter data and trace data, will be discussed in detail.
Note: As it is unlikely that publication will be complete by the time this session is offered, participants should be aware that information presented is subject to change. The presenters will do their best to indicate maturity of the topics presented, based on how long the draft material has been stable within RTCA SC-205's deliberations.

MA4: DO-254 – Complex Electronic Hardware – Lessons from the Trenches
Tom Ferrell, Ferrell & Associates Consulting
RTCA DO-254/ED-80 (Design Assurance Guidance for Airborne Electronic Hardware) was released in April 2000 and has steadily gained ground, now being applied throughout the civilian and military avionics industries. This tutorial, a complete update to prior DASC tutorials on this topic, will provide a top to bottom introduction of DO-254. Emphasis will be placed on how to apply DO-254 in a traditional hardware development group where there is no prior history of process-based development assurance. Technical topics to be discussed include hardware description language (HDL) standards, timing verification (pre/post place and route), demonstrating coverage, and tool assessment/qualification. Process topics include getting planning right, demonstrating traceability, validating derived requirements, creating a hardware configuration index, and expanding the role of traditional quality assurance to include development processes. In addition, current guidance from both the FAA and EASA related to DO-254 application will be reviewed. Even if you have some familiarity with DO-254, this session will help reinforce and deepen your understanding of its content and intent.

Monday, October 17

Session 5 – Problem Solving Methods

MM5: TRIZ: The Ultimate Tool for Problem Solving in Innovation
Zinovy Royzen, TRIZ Consulting, Inc.
This course provides overview of all TRIZ problem-solving methods for all classes of creative problems in product and process development, including the algorithm for resolving conflicts between product or process parameters while minimizing product changes and costs. Even the most difficult problems with contradictions involved could be routinely solved. The course would enhance your logical, critical, and analytical thinking.

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Technical Program

Technical Program Chair
Suzanne Porter
The MITRE Corporation, Center for Advanced Aviation System Development

WELCOME: Thank you for participating in the 30th DASC! We gather in Seattle, a true technology mecca, to exchange innovation and research among aerospace industry's experts and academia's inquisitive minds. Even in this volatile economic environment, innovation and research are thriving both domestically and abroad! The technical program is the "heart and soul" of the DASC legacy, and we will continue the DASC tradition of highlighting the key challenges and research in aerospace. This year's technical program theme is closing the generation gap between legacy and new generation aircraft, allowing safe coexistence and interoperability.

TECHNICAL SESSIONS: The technical sessions that are held Tuesday, October 18th through Thursday, October 20th will include over 225 technical presentations from 16 different countries. The presentations will take place in eight parallel tracks: Closing the Generation Gap; Air Traffic Management (ATM) Efficiency Improvements; ATM Capacity Improvements; Communications, Navigation, and Surveillance (CNS); Unmanned Aircraft Systems (UAS); Human Factors (HF) and Synthetic Vision Systems (SVS); Avionics Design; and Advanced Avionics.

POSTER PRESENTATIONS: Poster presentations will be included again this year that allow one-on-one interaction with authors of technical papers on topics that span across aerospace and avionics design. Poster presentations will be on display during the technical sessions and breaks, where the authors will be available for one-on-one interaction.

WORKSHOP: The DASC will include an interactive workshop to be held on Monday, October 17th in the afternoon on the emerging topic of Alternate Position, Navigation, and Timing (APNT). Led by Jeff Williams, Senior Vice President of Aviation Management Services at Tetra Tech – AMT and Leo Eldredge, GNSS Group Manager at the FAA, this workshop will be an excellent opportunity to share your views and perspectives on this important and challenging subject in an interactive environment. APNT aims to close the gap between legacy and new generation aircraft and technologies by leveraging existing and emerging systems. In order to address emerging APNT needs, the workshop will focus on technologies of today (DME, VOR) and strategies for tomorrow's Next Generation Air Transportation System.

LUNCH PANEL: This year's Thursday Lunch Panel is cleverly entitled, "Rise of the Machines" and will feature stimulating presentations on Complex Electronic Hardware (CEH) from industry leaders Altera, Microsemi (formerly Actel), Xilinx, Mentor Graphics, and Lockheed Martin Aeronautics. CEH is a leading edge approach to enabling tremendous flexibility in Avionics and adding new trade space that System Architects will need to accommodate. Please come listen and learn about the CEH of today and how they will enable you to increase the capabilities of your aircraft tomorrow.

CONFERENCE PROCEEDINGS CD-ROM: The 30th DASC is producing post-conference proceedings so that it can include content generated at the conference. We expect to mail you the proceedings by November 21, 2011.

Show up early for the events to make sure you get a good seat. And enjoy Seattle's finest coffee over a stimulating conversation with colleagues during our breaks!

Suzanne Porter

Conference Proceedings delivered by November 21, 2011
The conference proceedings will be delivered to all conference registrants after the conference. This allows us to include content generated at the conference.

Technical Program

Our technical program will present over 200 papers in 8 parallel tracks and 1 poster track. The Interactive Workshop on Alternate Position, Navigation, and Timing (APNT) will be held Monday, 1:00-5:00 p.m. The following schedule, dates, and times are subject to change.

	Tuesday, October 18	Wednesday, October 19		Thursday, October 20	
	Technical Session A 1:30 pm - 5:00 pm	Technical Session B 8:00 am - 11:30 am	Technical Session C 1:30 pm - 5:00 pm	Technical Session D 8:00 am - 11:30 am	Technical Session E 1:30 pm - 3:30 pm
Track 1 Closing the Generation Gap Co-Chairs: Susan Cheng, Boeing and Bruce DeCleene, FAA	**Bridging from Legacy and Traditional Avionics** Chair: Wolfgang Schuster, Imperial College London	**Future Concepts and Forward Thinking** Co-Chairs: Steve Fulton, GE and Don Porter, Tetratech-AMTI	**Cybersecurity** Co-Chairs: Radhakrishna Sampigethaya, Boeing and Radha Poovendran, University of Washington	**Collision Avoidance Systems** Co-Chairs: Liling Ren, GE Global Research and Mauricio Castillo-Effen, GE Global Research	**Trajectories of the Future** Chair: Tom Becher, MITRE
Track 2 ATM Capacity Improvements Co-Chairs: Mike Burkle, Lockheed Martin and Al Herndon, MITRE	**Separation, Spacing, and Merging** Chair: Deiter Eier, Frequentis USA, Inc.	**Surface CDM and Capacity** Chair: Chris Brinton, Mosaic ATM	**Surface Management and Automation** Chair: Ben Levy, Sensis	**Scheduling, Metering, and Delivery** Co-Chairs: Jonathon Lee, Volpe Center, and Jason Glameuski, Volpe Center	**Capacity and Efficiency** Chair: Seamus McGovern, U.S. Dept. of Transportation
Track 3 Tools and Procedures for Improved ATM Efficiency Co-Chairs: John Moore, Boeing and Mark Weber, Lincoln Lab	**Airspace** Chair: Yosef Gavriel Tirat-Gefen Castel Research Inc.	**Conflict Detection and Conformance Monitoring** Co-Chairs: Katie Shepley, MITRE and Ray Stanley, MITRE	**Flow Management** Co-Chairs: John McCarron, FAA and Lixia Song, MITRE	**DST/Trajectory Optimization** Chair: Adan Vela, GA Tech	**Trajectory Prediction** Chair: Bernd Korn, DLR
Track 4 Communications, Navigation, Surveillance (CNS) Co-Chairs: Wolfgang Schuster, Imperial College London and Dave Nakamura, Boeing	**Navigation 1** Chair: Denise Ponchak, NASA Glenn	**Navigation 2** Chair: Chris Hegarty, MITRE	**Communication** Chair: Steven Young, NASA Langley Research Center	**Communication/Surveillance** Co-Chairs: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, FAA	**Surveillance** Chairs: Chris Daskalakis, Volpe
Track 5 UAS Co-Chairs: Rose Mooney, AAI/Textron and Bob Smith, WPAFB	**Airspace Integration** Chair: John Walker, John Walker Group	**Sense and Avoid 1** Chair: Rick Sward, MITRE	**Sense and Avoid 2** Co-Chairs: Mauricio Castillo-Effen, GE Global Research and Liling Ren, GE Global Research	**UAS Control** Co-Chairs: Robert Kerczewski, NASA Glenn Research Center and Dr. Sharif Ali, GE Aviation	**UAS Applications** Chair: Kevin Clark, Volpe
Track 6 Human Factors and Synthetic Vision Systems Co-Chairs: Elly Smith, MITRE and Kenneth Allendoerfer, FAA	**Concepts and Flight Deck HF** Chair: Divya Chandra, Volpe	**Flight Deck HF and Collision Avoidance** Chair: Colleen Donovan, FAA	**HF in Airspace and Procedures** Chair: Dan Boyle, Boeing	**ATC Tools and Procedures with Workload Considerations** Chair: Todd Lovell, Raytheon	**SVS and Surface Applications** Co-Chairs: Ben Willems, FAA and Atul Deshmukh, Hi-Tec Systems
Track 7 Avionics Design Chair: Justin Littlefield, GE Aviation	**Integrated Modular Avionics** Chair: Larry Kinnan, Wind River	**Networks** Chair: Wilfried Steiner, TTTech	**Safety and Certification Applications** Co-Chairs: Mike DeWalt, FAA and Ted Bayruns, Boeing	**Systems** Chair: Ralf Mayer, MITRE	**Software Applications** Chair: Will Johnson, NASA
Track 8 Advanced Avionics Chair: Peter Skaves, FAA	**Space** Chair: Zheng Tao, MITRE	**Human Machine Interface Applications** Chair: Tom Yochum, Universal Avionics	**Surveillance and Alerting Applications** Chair: Mary Ellen Miller, Mosaic ATM	**General Aviation Applications** Co-Chairs: Worth Kirkman, MITRE and Kevin Gormley, MITRE	**Surface Guidance Applications** Chair: Kirk Baker, FAA
Track 9 Posters Co-Chairs: Brennan Haltli, MITRE and Sean McCourt, MITRE					

Technical Session A

Tuesday, October 18

A	**Track 1:** Closing the Generation Gap [Seneca]	**Track 2:** ATM Capacity Improvements [North Room]	**Track 3:** Tools and Procedures for Improved ATM Efficiency [West Room]	**Track 4:** Communications, Navigation, Surveillance (CNS) [South Room]	**Track 5:** Unmanned Aircraft Systems [James]	**Track 6:** Human Factors and Synthetic Vision Systems [Marion]
	Bridging from Legacy and Traditional Avionics	Separation, Spacing, and Merging	Airspace	Navigation 1	Airspace Integration	Concepts and Flight Deck HF
1:30	1A1 TBD Steve Fulton ***GE Aviation***	2A1 Integrating and Sequencing Flows in Terminal Maneuvering Area by Evolutionary Algorithms Catya Zuniga ***Universitat Autonoma de Barcelona (UAB)***	3A1 Comparing Methods for Dynamic Airspace Configuration Shannon Zelinski ***NASA Ames Research Center***	4A1 Analysis of Advanced Flight Management Systems (FMS), Flight Management Computer (FMC) Field Observations Albert Herndon ***MITRE/CAASD***	5A1 Traffic State Uncertainty and Self-Separation Jochum Tadema ***Netherlands Defence Academy***	6A1 Integrating Human Factors Principles into Systems Engineering Zarrin Chua ***Georgia Institute of Technology***
2:00	1A2 A Passive Bistatic Radar for Detection of Aircraft Using Spaceborne Transmitters William Barott ***Embry-Riddle Aeronautical University***	2A2 Performance of Airborne Precision Spacing Under Realistic Weather Conditions Frederick Wieland ***Intelligent Automation, Inc.***	3A2 Initial Validation of a Convective Weather Avoidance Model (CWAM) in Departure Airspace Mikhail Rubnich ***MIT Lincoln Laboratory***	4A2 Position Validation Strategies Using Partially Observable Markov Decision Processes Mykel Kochenderfer ***MIT Lincoln Laboratory***	5A2 Implications of UAS Operations in Controlled Airspace Jill Kamienski ***MITRE/CAASD***	6A2 Trading Energy for Knowledge: Outside the NextGen Box Hugh Blair-Smith ***Down to the Metal***
2:30	1A3 Hazard Analysis for ADS-B Backup Performance in Non-Radar and Peripheral Radar Airspace Anthony Warren ***Unaffiliated***	2A3 Analysis of a Wind Compensation Tool for the Relative Position Indicator (RPI) Joseph Hopper ***MITRE/CAASD***	3A3 Trajectory-Based Complexity (TBX): A Modified Aircraft Count to Predict Sector Complexity during Trajectory-Based Thomas Prevot ***NASA Ames Research Center***	4A3 Localizer Flight Technical Error Measurement and Uncertainty Timothy Hall ***John A. Volpe National Transportation Systems Center***	5A3 The NEO Spiral II Program: An FAA/Industry Exploration of Unmanned Aircraft System Integration in the National Airspace Samet Ayhan ***The Boeing Comapny***	6A3 Human Factors Considerations in Prototyping an En Route Data Communications Human Computer Interface Ben Willems ***Federal Aviation Administration***
3:00	**Break**					
3:30	1A4 Developing a Signal Processing Algorithm for an FMCW Radio Altimeter Mohandas Amarnathan ***Honeywell Technology Solutions***	2A4 Relative Position Indicator for Merging Mixed RNAV and Vectored Arrival Traffic Stephen Atkins ***Mosaic ATM***	3A4 User Selection Criteria of Airspace Designs in Flexible Airspace Management Hwasoo Lee ***San Jose State University / NASA Ames Research Center***	4A4 Anomaly Detection in Onboard-Recorded Flight Data Using Cluster Analysis Lishuai Li ***Massachusetts Institute of Technology***	5A4 Integrating the UAS Intelligent Analyzer for Lost Link Comm into a UAS Testbed Ricky Sward ***The MITRE Corporation***	6A4 Using Neural Networks to Assess Human-Automation Interaction Katlyn Sullivan ***Georgia Institute of Technology***
4:00	1A5 An Expanded Concept of a Single Unified Global CNS/ATM System Requiring ADS-B Greg Gardner ***Global Solutions Group IT***	2A5 A Separation Standard for Departures Transitioning from Terminal to En Route Control Ralf H. Mayer ***MITRE/CAASD***	3A5 Massively Parallel Processing for Dynamic Airspace Configuration Bart Gallet ***Mosaic ATM, Inc.***	4A5 Complex Navigation Signal Generator Petr Bojda ***University of Defence***	5A5 Tailored Airworthiness Standards for Unmanned Aircraft Systems Stephen Cook ***MITRE/CAASD***	6A5 Piloting Changes to Changing Aircraft Dynamics: What Do Pilots Need to Know? Anna Trujillo ***NASA Langley Research Center***
4:30	1A6 Overcoming the Generation Gap in Aircraft Designs with Executable Specifications Nils Fischer ***Hamburg University of Applied Sciences***	2A6 TBD Dieter Eier ***German Aerospace Center (DLR)***	3A6 Performance Analysis of Terminal Area Arrival Management Concepts Janet King ***The Boeing Company***	4A6 Toward Performance-Based Navigation-Enabled Separation Standards Ralf Mayer ***MITRE/CAASD***	5A6 Modeling Conflicts Resolution of Unmanned Aircraft System Using a Lightweight Duration Calculus Diogo Branquinho Ramos ***Aeronautics Institute of Technology (ITA)***	6A6 Wake Turbulence Avoidance Automation: Evaluation of Feasibility and Impact Steven Estes ***MITRE/CAASD***

A	**Track 7:** Avionics Design [Spring]	**Track 8:** Advanced Avionics [Columbia]	**Track 9:** Poster Papers [Madison Ballroom]
	Integrated Modular Avionics	Space	
1:30	7A1 Integrated Modular Avionics Onboard of Small Airplanes - Fiction or Reality Pavel Paces ***Czech Technical University in Prague***	8A1 Time and Space Partitioning Security Components for Spacecraft Flight Software James Windsor ***European Space Agency***	9A1 Antenna Array for Doppler Cancellation in Aircraft Chao Zhang ***School of Aerospace, Tsinghua University***
2:00	7A2 Model Driven Early Exploration of IMA Execution Platform Michaël Lafaye ***Thales Avionics***	8A2 IMA for Spacecraft - User Requirements, Architecture & Role Definition James Windsor ***European Space Agency***	9A2 Modeling & Compensation for Thermally Induced Bias Drift of Strapdown Inertial Navigation System with Fiber Optic Gyroscope Zhang Tong ***Northwestern Polytechnic University***
2:30	7A3 A Versatile Input Interface for Avionic Computers Antoine Canu ***Thales Avionics***	8A3 A Probe of Concept for Femto-Satellites Based on Commercial Off-the-Shelf Joshua Tristancho ***UPC Barcelona Tech***	9A3 Evaluating ASR-9 Azimuth Error Models Through Analysis of Targets of Opportunity Colin Mayer ***MIT Lincoln Laboratory***
3:00	**Break**		
3:30		8A4 A Synthetic Aperture Antenna for Femto-Satellites Based on Commercial Off-the-Shelf Enric Fernandez-Murcia ***UPC Barcelona Tech, Barcelona, Spain***	
4:00		8A5 Next Generation of Sensors for Femto-Satellites Based on Commercial Off-the-Shelf Luis Izquierdo ***Nebrija University, Madrid, Spain***	
4:30		8A6 The Necessity of Functional Analysis for Space Exploration Programs Allan Morris ***NASA Langley Research Center***	

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Technical Session B

Wednesday, October 19

B	**Track 1:** Closing the Generation Gap [Seneca]	**Track 2:** ATM Capacity Improvements [North Room]	**Track 3:** Tools and Procedures for Improved ATM Efficiency [West Room]	**Track 4:** Communications, Navigation, Surveillance (CNS) [South Room]	**Track 5:** Unmanned Aircraft Systems [James]	**Track 6:** Human Factors and Synthetic Vision Systems [Marion]
	Future Concepts and Forward Thinking	Surface CDM and Capacity	Conflict Detection and Conformance Monitoring	Navigation 2	Sense and Avoid 1	Flight Deck HF and Collision Avoidance
8:00	1B1 Integrated Aircraft Environment Surveillance System for Large Civil Aircraft Gang Xiao ***School of Aeronautics and Astronautics, Shanghai Jiaotong University***	2B1 Valuating Surface Surveillance Technology for Collaborative Multiple-Spot Control of Airport Departure Operations Pierrick Burgain ***Metron Aviation***	3B1 Role of the Controller in an Integrated Pilot-Controller Study for Parallel Approaches Savita Verma ***NASA Ames Research Center***	4B1 Integration of the "Constant Radius Arc to a Fix" (RF) Navigation Leg Type into NEXTGEN Sam Miller ***MITRE/CAASD***	5B1 Development of Simulator for Aircraft Ad Hoc Networks Ki-Il Kim ***Gyeongsang National University, Jinju, Republic of Korea***	6B1 Use and Understanding of the Proximate Status Indication in Traffic Displays Michael Zuschlag ***Volpe National Transportation Systems Center***
8:30	1B2 Operational Preferences for ATC Data Link Equipped Aircraft: Severe Weather Reroutes Kevin Gormley ***MITRE/CAASD***	2B2 Departure Flow Control Through Takeoff Sequence Optimisation: Setup and Results of Trials at Athens Airport Meilin Schaper ***German Aerospace Center (DLR)***	3B2 Evaluation of a Genetic Algorithm that Modifies Air Traffic Data for Conflict Probe Testing Bryan Petzinger ***Federal Aviation Administration***	4B2 CAT II / OTS CAT II Operations Using Existing CAT I Ground-Based Augmentation System Ferdinand Behrend ***Technische Universität Berlin, Department of Aeronautics and Astronautics***	5B2 An Automated General Aviation Protection System for Manned and Unmanned Aircraft Richard Baumeister ***CSIRO Mathematics, Informatics and Statistics***	6B2 Flight Deck Interval Management and Delegated Separation for Equivalent Visual Operations Lawrence Prinzel ***NASA Langley Research Center***
9:00	1B3 Allocation of Functions Between Humans and Automation in a Far-Term Air Traffic Control Environment Jeffrey Homola ***San Jose State University***	2B3 Airport Surface Management as a Distributed Supervisory Control Task Philip Smith ***Ohio State University***	3B3 Modeling the Controller's Conflict Detection Task Using Fast Time Simulation Nicolas Durand ***DSNA***	4B3 State of the Art in Airport Navigation Audrey Guilloton ***Thales Avionics***	5B3 Obstacle Detection and Tracking Using Airborne Optical Sensors for Unmanned Aerial Systems Collision Avoidance Jiaqi Gong ***Shanghai Jiao Tong University***	6B3 A New Traffic-Alert Algorithm Based on Automatic Dependent Surveillance – Broadcast (ADS-B) Information Leihong Li ***Georgia Institute of Technology***
9:30	**Break**					
10:00	1B4 Filling the FAA Guidance and Policy Gap for Systems Integration and Safety Assurance Kirk Baker ***Federal Aviation Administration***	2B4 A Refined Model for Identifying Unavoidable Portion of the Impact of Weather and Other Factors on Airport Alexander Klein ***Air Traffic Analysis, Inc.***	3B4 Integration of Weather Avoidance and Traffic Separation Maria Consiglio ***NASA Langley Research Center***	4B4 TRN Revisited: A Systematic Design of a GPS-Inspired Adaptive Tracking Loop Daniela Vaman ***Delft University of Technology***	5B4 Autonomous Collision Avoidance Based on Aircraft Performances Estimation Marco Melega ***Cranfield University***	6B4 Control Theoretic Concept for Intuitive Guidance of Pilots During Taxiing Steffen Haus ***TU Darmstadt, Institute of Flight Systems and Automatic Control***
10:30	1B5 Computational Air Traffic Management Marc Anthony Azzopardi ***Cranfield University, Bedfordshire, UK***	2B5 Improving Departure Taxi Time Predictions Using ASDE-X Surveillance Data Amal Srivastava ***MITRE/CAASD***	3B5 Converging Runway Display Aid in the NAS: Challenges, Successes, and Outlook Anand Mundra ***MITRE/CAASD***	4B5 Toward Higher Levels of Automation in Taxi Guidance: Using GBAS Terminal Area Path (TAP) Messages for Transmitting Taxi Routes Thomas Ludwig ***German Aerospace Center (DLR)***	5B5 Environment Modeling for Sense and Avoid Sensor Safety Assessment John Griffith ***Massachusetts Institute of Technology Lincoln Laboratory***	6B5 Human Computer Interaction Issues with Multi-touch Screen Interfaces in the Flight Deck Sridher Kaminani ***Rockwell Collins & Iowa State University***
11:00	1B6 Safety and Capacity Trade-Off Analysis for NextGen Automated Airspace Concepts Arash Yousefi ***Metron Aviation Inc.***	2B6 A Probabilistic Airport Capacity Prediction Model for Improved Planning of Ground Delay Programs Christopher Provan ***Mosaic ATM, Inc.***			5B6 Ground Control Station Avionics Software Development in ANKA UAV Barış Kayayurt ***Turkish Aerospace Industries***	6B6 Integrating Vector Overlay Information into Naval Digital Map Systems Marvin Roe ***Naval Research Laboratory***

B	**Track 7:** Avionics Design [Spring]	**Track 8:** Advanced Avionics [Columbia]	**Track 9:** Poster Papers [Madison Ballroom]
	Networks	Human Machine Interface Applications	
8:00	7B1 New Methodology to Develop Certified Safe and Secure Aeronautical Software – An Embedded Router Case Study Antoine Varet ***Ecole Nationale de l'Aviation Civile***	8B1 MBD and Code Generation: A Cost-Effective Way to Speed Up HMI Certification Luc Marcil ***Presagis***	9B1 Study on Inter-Partition Communication in Integrated Modular Avionics Dai Jie ***Commercial Aircraft Corporation of China (COMAC)***
8:30	7B2 Military and Aerospace Standards for Digital Avionics Fiber Optic Systems Mark Beranek ***Naval Air Systems Command***	8B2 Fast Single Image Dehazing by Virtual Fusion Jun Zhang ***Shanghai Jiao Tong University, Shanghai, China***	9B2 Consideration in Integrated Modular Avionics (IMA) System Design Bo Wei ***Commercial Aircraft Corporation of China, Ltd.***
9:00	7B3 A Tight End-to-End Delay Bound and Scheduling Optimization of an Avionics AFDX Network Melhem Tawk ***Ecole Polytechnic of Montreal***	8B3 Reinventing the Past: Avionics Systems that Didn't Make it Erik Theunissen ***Delft University of Technology***	9B3 Certification Requirements Compatible Verification Process of Airborne Software Luo Huang ***Commercial Aircraft Corporation of China, Ltd.***
9:30	**Break**		
10:00	7B4 A Bifilar Approach to Power and Data Transmission Over Common Wires in Aircraft Stephen Dominiak ***Lucerne University of Applied Sciences & Arts***	8B4 Socio-Technical Framework of Hazard Identification in Trajectory-Based Operations Xidong Xu ***The Boeing Company***	9B4 A New Approach to Improve Safety of Reconfiguration in Integrated Modular Avionics Dajiang Suo ***Department of Computer Science and Technology of Tsinghua University***
10:30	7B5 TTA and PALS: Formally Verified Design Patterns for Distributed Cyber-Physical Systems Wilfried Steiner ***TTTech Computertechnik AG***	8B5 Rapid Recovery Model – A New Perspective of Project Recovery Dharam Kalyan Palani Ramamurthy ***Goodrich Aerospace***	9B5 Avionics System Development Based on System of System Methodology Wu Xun ***Shanghai***
11:00	7B6 Proximity Synchronization for Mobile Wireless Sensor Networks Michael Lingg ***Belcan Engineering and Grand Valley State University***	8B6 An Efficient Embedded System Architecture for Pilot Training Kun Su Yoon ***Korea Aerospace Industries, Ltd.***	

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Technical Session C

Wednesday, October 19

C	**Track 1:** Closing the Generation Gap [Seneca]	**Track 2:** ATM Capacity Improvements [North Room]	**Track 3:** Tools and Procedures for Improved ATM Efficiency [West Room]	**Track 4:** Communications, Navigation, Surveillance (CNS) [South Room]	**Track 5:** Unmanned Aircraft Systems [James]	**Track 6:** Human Factors and Synthetic Vision Systems [Marion]
	Cybersecurity	Surface Management and Automation	Flow Management	Communication	Sense and Avoid 2	HF in Airspace and Procedures
1:30	1C1 Leveraging MIL-STD-1553's Physical Layer for Use in Aircraft Data Networks Michael Hegarty ***Data Device Corporation***	2C1 Mining Airport Surveillance for Operational Insights Timothy Waldron ***Sensis Corporation***	3C1 Air Traffic Optimization on Data-Driven Network Flow Model Aude Marzuoli ***Georgia Institute of Technology***	4C1 AeroMACS – An Airport Communications System Max Ehammer ***University of Salzburg***	5C1 Automatic Collision Avoidance System: Design, Development and Flight Tests Salvatore Luongo ***CIRA (Italian Aerospace Research Center)***	6C1 First Findings on the Controller's Mental Model in Sectorless Air Traffic Management Bettina Birkmeier ***German Aerospace Center (DLR)***
2:00	1C2 Information for Cyber Security Issues Related to Aircraft Systems Peter Skaves ***Federal Aviation Administration***	2C2 Causality of Surface Movement Anomalies at KJFK Airport Sherry Borener ***Federal Aviation Administration***	3C2 Scheduling Algorithms for ATM Applications – Tools and Toys Hartmut Helmke ***German Aerospace Center (DLR)***	4C2 Improving the Performance of AeroMACS by Cooperative Communications Paola Pulini ***German Aerospace Center (DLR)***	5C2 Non-Cooperative Collision Avoidance Concept for Unmanned Aircraft System Using Satellite-Based Radar and Radio Ming-Shih Huang ***The Pennsylvania State University***	6C2 Identifying Functional Requirements for Flexible Airspace Management Concept using Human-in-the-Loop Paul Lee ***San Jose State University / NASA Ames Research Center***
2:30	1C3 Aircraft Systems Cyber Security Raymond De Cerchio ***Federal Aviation Administration***	2C3 Improving Taxi Traffic Flow by Real-time Runway Sequence Optimization using Dynamic Taxi Route Planning Joris Koeners ***Delft University of Technology***	3C3 A Case for Mean Field Games in Airspace Congestion Forecasting Vlad Popescu ***Georgia Institute of Technology***	4C3 L-Band Compatibility of LDACS1 Nicolas Schneckenburger ***German Aerospace Center (DLR)***	5C3 Multi-Sensor Data Fusion: A Tool to Enable UAS Integration into Civil Airspace Giancarmine Fasano ***University of Naples "Federico II"***	6C3 Enhancing Pilot Ability to Perform Continuous Descent Approach Michael LaMarr ***Systems Engineering Research Laboratory***
3:00	**Break**					
3:30		2C4 Optimal Mixed-Mode Runway Scheduling – Mixed-Integer Programming for ATC Scheduling Andrea Peter ***Friedrich-Alexander-Universität Erlangen Nürnberg, Germany***	3C4 Interaction of Airspace Partitions and Traffic Flow Management Delay Hak-Tae Lee ***University of California, Santa Cruz***	4C4 LDACS1 Data Link Layer Evolution for ATN/IPS Thomas Graüpl ***University of Salzburg***	5C4 Synthetic Vision for Remotely Piloted Aircraft in Non-Segregated Airspace Oscar Torres ***UPC - Barcelona Tech***	6C4 Soft System Analysis to Integrate Technology & Human in Controller Workstation James Poage ***JLP Performance Consulting***
4:00	1C5 Novel Near-Ground Navigation for General Aviation with Terrestrial Mobile Networks Chao Zhang ***School of Aerospace, Tsinghua University, Beijing***	2C5 The Tower Flight Data Manager Prototype System Vineet Mehta ***MIT Lincoln Laboratory***	3C5 A Human-Relatable Course of Action Planner for Air Traffic Coordinators Chris Brinton ***Mosaic ATM, Inc.***	4C5 Overview of Interference Situation and Mitigation Techniques for LDACS1 Ulrich Epple ***German Aerospace Center (DLR)***	5C5 UAS Insertion into Commercial Airspace: Europe and U.S. Standards Perspective Eric Euteneuer ***Honeywell***	6C5 Navigation System Autonomy and Integration in NextGen: Challenges and Solutions Erik Theunissen ***Delft University of Technology***
4:30	1C6 Safety Issues in the Asynchronous Control of Critical Avionics Systems Natasha Neogi ***National Institute of Aerospace***	2C6 Robustness of Two Air Traffic Scheduling Approaches to Departure Uncertainty Adrian Agogino ***University of California, Santa Cruz***	3C6 Traffic Flow Management Exploiting Increased Navigation Performance Pierrick Burgain ***Metron Aviation***	4C6 Interference Estimation in an Aeronautical Ad Hoc Network Frederic Besse ***ENAC***	5C6 UAS Behavior Modeling Based on High Level Abstraction Sonia P. Mansilla ***UPC Barcelona Tech***	6C6 Analysis of Runway Incursions and their Causal Factors Elida C. Smith ***MITRE/CAASD***

C	**Track 7:** Avionics Design [Spring]	**Track 8:** Advanced Avionics [Columbia]	**Track 9:** Poster Papers [Madison Ballroom]
	Safety and Certification Applications	Surveillance and Alerting Applications	
1:30	7C1 Autocoding Control Software with Proofs I: Annotation Translation Romain Jobredeaux ***Georgia Insitute of Technology***	8C1 Hazard Tracking with Integrity for Surveillance Applications Rajesh Bezawada ***Ohio University***	
2:00	7C2 Evolving Model-Based Design from Legacy Structural Designed Safety Critical Systems Dharam Kalyan Palani Ramamurthy ***Goodrich Aerospace***	8C2 Forward-Looking Alerting Threshold Analysis and Simulation of TAWS Based on Probability Methods Haomiao Zhang ***Shanghai Jiao Tong University***	
2:30	7C3 Automatic Safety Computation for IMA Systems Uwe Salomon ***University of Stuttgart***	8C3 Electronic Flight Bag (EFB) Policy and Guidance Peter Skaves ***Federal Aviation Administration***	
3:00	**Break**		
3:30	7C4 Using Assertions to Satisfy DO-254 Elemental Analysis David Landoll ***Mentor Graphics***	8C4 Blade-Tip Close Warning Situational Awareness Laser System For Improving Helicopter Safety Lei Zhang ***Beijing University of Aeronautics and Astronautics***	
4:00	7C5 The Integrated Hazard Analysis Management Matrix Allan Morris ***NASA Langley Research Center***	8C5 Auto GCAS for Analog Flight Control System Amy Burns ***Air Force Research Laboratory***	
4:30	7C6 Finding System-Level Failures in Flight-Critical Software Systems Misty Davies ***NASA Ames Research Center***		

Technical Session D

Thursday, October 20

D	**Track 1:** Closing the Generation Gap [Seneca]	**Track 2:** ATM Capacity Improvements [North Room]	**Track 3:** Tools and Procedures for Improved ATM Efficiency [West Room]	**Track 4:** Communications, Navigation, Surveillance (CNS) [South Room]	**Track 5:** Unmanned Aircraft Systems [James]	**Track 6:** Human Factors and Synthetic Vision Systems [Marion]
	Collision Avoidance Systems	Scheduling, Metering, and Delivery	DST/Trajectory Optimization	Communication/Surveillance	UAS Control	ATC Tools & Procedures with Workload Considerations
8:00	1D1 Collision Avoidance for General Aviation Thomas Billingsley ***Lincoln Laboratory, MIT***	2D1 Reinventing High Density Area Departure Traffic Management Lixia Song ***MITRE/CAASD***	3D1 Integration of Route-Specific Weather Impacts in Airport Capacity Optimization Models Dale Joachim ***MIT Lincoln Laboratory***	4D1 Statistical Distribution of Line-of-Sight and Reflected Path in the Aeronautical Channel Michael Walter ***German Aerospace Center (DLR)***	5D1 Using Formal Methods To Verify Safe Deep Stall Landing of a MAV Wolfgang Pointner ***Johannes Kepler University Linz***	6D1 Technical Requirements for Human-in-the-Loop Conflict-Detection and Resolution Decision-Support Tools Adan Vela ***Georgia Institute of Technology***
8:30	1D2 Decomposition Methods for Optimized Collision Avoidance with Multiple Threats James Chryssanthacopoulos ***Lincoln Laboratory, MIT***	2D2 Optimal Time Advance in Terminal Area Arrivals: Through-put vs. Fuel Savings Alexander Sadovsky ***NASA Ames Research Center***	3D2 Evaluating Surface Trajectory-Based Operations Concepts Through a Human-in-the-Loop Simulation Emily Stelzer ***MITRE/CAASD***	4D2 An Examination of Selected Datacom Options for the Near-term Implementation of Trajectory Based Operations Walter Johnson ***NASA***	5D2 An Advanced System for Performance Evaluation of Integrated Navigation Systems Giancarmine Fasano ***University of Naples "Federico II"***	6D2 Effects of Scheduling and Spacing Tools on Controllers' Performance and Perceptions of their Workload Lynne Martin ***San Jose State University***
9:00	1D3 A Selection Algorithm for Conflict Aircrafts and Performance Analysis Based on ADS-B Gang Xiao ***Shanghai Jiaotong University***	2D3 Trajectory Predictor Performance Experiment Using Required Time of Arrival During Descent Mike Paglione ***Federal Aviation Administration***	3D3 Trajectory Management Driven by User Preferences Sergio Torres ***Lockheed Martin***	4D3 LTE Performance in the Airport Surface Area Channel David Matolak ***Ohio University***	5D3 Three-Dimension Path Optimization for UAV Using ACO Algorithm Sathish Kumar Sidharthan ***Madras Institute of Technology***	6D3 Evaluation of the Impact of Data Communications Equipage Level on Air Traffic Controller Workload Bernardus Willems ***Federal Aviation Administration***
9:30	**Break**					
10:00	1D4 Self-Synchronization Based Air Traffic Control and Collision Avoidance System Amol Khedkar ***University of Missouri***	2D4 Seattle Required Time-of-Arrival Flight Trials Mahesh Balakrishna ***MITRE/CAASD***	3D4 Cross-Polar Aircraft Trajectory Optimization and the Potential Climate Impact Hok K. Ng ***University Affiliated Research Center, NASA Ames***	4D4 Broadband Air-to-Ground Communications with Adaptive MIMO Datalinks Chao Zhang ***School of Aerospace, Tsinghua University***	5D4 Landing a UAV on a Runway Using Image Registration Nethya Kumar ***Anna University***	6D4 Estimating the Likelihood of Success in Departure Management Strategies during Convective Weather Rich DeLaura ***MIT Lincoln Laboratory***
10:30	1D5 UAS Sense and Avoid, and TCAS Interoperability: Mini-Panel Discussion Liling Ren ***GE Global Research***	2D5 Investigating the Impact of Off-Nominal Events on High-Density 'Green' Arrivals Todd Callantine ***San Jose State University/ NASA Ames***	3D5 Trajectory Assessment and Modification Tools for Next Generation Air Traffic Management Operations Connie Brasil ***San Jose State University***	4D5 Impact of Surveillance Range and Interference Environment on Airborne Self-Separation Performance Zahra Khan ***Engility Corporation***	5D5 Vision-Based Flying Vehicle Tracking Balaji Veeraiyan ***Madras Institute of Technology***	6D5 Analyze Possible Benefits of Real-time Taxi Flow Optimization Using Actual Data Joris Koeners ***Delft University of Technology***
11:00	1D6 UAS Sense and Avoid, and TCAS Interoperability: Mini-Panel Discussion (Continued) Liling Ren ***GE Global Research***	2D6 Prediction of Weather Impacted Airport Capacity Using Ensemble Learning Yao Wang ***NASA Ames Research Center***				6D6 When Tools Collide: Human Factors Effects of Using Multiple ATM Tools in Combination Kenneth Allendoerfer ***Federal Aviation Administration***

	Track 7: Avionics Design [Spring]	Track 8: Advanced Avionics [Columbia]	Track 9: Poster Papers [Madison Ballroom]
	Systems	General Applications	
8:00	7D1 Improving Performance and Reliability Assessments of Avionics Systems Stephan Marwedel ***Airbus***	8D1 An Accurate Numerical Method for Estimating the Delay Between Two Omni-Directional Receiving Elements Rangarao Kaluri ***Jawaharlal Nehru Technological University***	
8:30	7D2 Optimizing an Incremental Modular Open System Approach (MOSA) in Avionics Systems for Balanced Architecture Decisions Thomas Gaska ***Lockheed Martin MS2 Owego***	8D2 Agent-Based Model of Aerial Ad-Hoc Network Market Potential Christopher Watkins ***Missouri University of Science and Technology***	
9:00	7D3 A Design Approach for Predictable and Efficient Multi-core Processor for Avionics Hicham Agrou ***Thales Avionics***	8D3 High-Speed Generator – Converter Set for Auxiliary Power Units Jan Leuchter ***University of Defence***	
9:30	**Break**		
10:00	7D4 Design for Testability in Embedded Software Projects Gaurav Sahay ***Goodrich Aerospace Services Pvt. Ltd.***	8D4 MEMS IMU Error Modeling and Error Analysis for Low Cost Strapdown INS Venkatramanan Alagarsamy ***Madras Institute of Technology***	
10:30	7D5 FPGA Level In-Hardware Verification for DO-254 Compliance Louie De Luna ***Aldec***	8D5 Discussing Millimeter Wave Pencil Beam Radar for Terrain Visualization Sven Schmerwitz ***German Aerospace Center (DLR)***	
11:00	7D6 Management of Control Channels Under Actuator Failure: An Optimization Approach Felix Mora-Camino ***ENAC***	8D6 Enhancing Vision for General Aviation Brennan Haltli ***MITRE/CAASD***	

Technical Session E

Thursday, October 20

E	**Track 1:** Closing the Generation Gap [Seneca]	**Track 2:** ATM Capacity Improvements [North Room]	**Track 3:** Tools and Procedures for Improved ATM Efficiency [West Room]	**Track 4:** Communications, Navigation, Surveillance (CNS) [South Room]	**Track 5:** Unmanned Aircraft Systems [James]	**Track 6:** Human Factors and Synthetic Vision Systems [Marion]
	Trajectories of the Future	Capacity and Efficiency	Trajectory Prediction	Surveillance	UAS Applications	SVS and Surface Applications
1:30	1E1 Air-Ground Trajectory Synchronization – Metrics and Simulation Results Alexander Kuenz ***GE Global Research***	2E1 Efficient Climb and Descent Benefit Pool Mary Ellen Miller ***Mosaic ATM, Inc.***	3E1 3-Dimensional Path Arrival Management Elly Smith ***MITRE/CAASD***	4E1 TCAS Surveillance Algorithm Modification for Reduced Channel Utilization Charles Rose ***Massachusetts Institute of Technology, Lincoln Laboratory***	5E1 Common Avionics System Design for Serial Unmanned Adaption RUAS Lei Zhang ***Beijing University of Aeronautics and Astronautics***	6E1 Toward a Seamless Integration of Awareness Support and Alerting Systems: Why and How Erik Theunissen ***Delft University of Technology***
2:00	1E2 Mobile Tools Prospecting the Trajectories for the Legacy Aircrafts Tatsuo Minohara ***Chiba University of Commerce***	2E2 Speed Control on RNAV OPD for Near-term ATM TRACON Operations Julien Scharl ***The Boeing Company***	3E2 Impact of Missing Longitudinal Aircraft Intent on Descent Trajectory Prediction Jesper Bronsvoort ***Airservices Australia***	4E2 Comparison of ASR-11 and ASR-9 Surveillance Radar Azimuth Error Colin Mayer ***Massachusetts Institute of Technology, Lincoln Laboratory***	5E2 Underground Metal Target Detection from UAV Janakiram Thiyagarajan ***Madras Institute of Technology***	6E2 Emergency and Precautionary Landing Assistant Petr Frantis ***University of Defense***
2:30	1E3 Trajectory Synchronization Between Air and Ground Trajectory Predictors Sergio Torres ***Lockheed Martin***	2E3 Analysis of Top of Descent (ToD) Uncertainty Craig Johnson ***MITRE/CAASD***	3E3 A Global Airspace Model for 4-D Trajectory-Based Operations Alexander Kuenz ***German Aerospace Center (DLR)***	4E3 An Algorithm for Conflict Detection in Dense Traffic Using ADS-B Maxime Gariel ***Massachusetts Institute of Technology, Lincoln Laboratory***	5E3 Avioncs Systems for Supersonic UAV Hamed Ahmadloo ***Universitat Politècnica de Catalunya***	6E3 Advanced Surface Movement Guidance and Control System: Investigation and Simulation for System Basic Functions Ting Ding ***Commercial Aircraft Corporation of China, Ltd.***
3:00	1E4 Flight Management System Execution of Idle-Thrust Descents in Operations Laurel Stell ***NASA Ames Research Center***	2E4 A Simulation-Based Method for Estimating Metroplex Capacity Leihong Li ***Georgia Institute of Technology***	3E4 Prediction of Noise Exposure Levels Using Simulated Flight Trajectories Barbara Jandll ***University of Salzburg***	4E4 A Mode S Decoding Scheme Using Equalization for Multilateration Systems Yasunori Nouda ***Mitsubishi Electric Corporation***	5E4 Design and Development of Solar-Powered UAV Arulanand Nagarajan ***MIT, Anna University, Chennai***	6E4 ADS-B Enabled CDTI Stephen Whitlow ***Honeywell***

E	**Track 7:** Avionics Design [Spring]	**Track 8:** Advanced Avionics [Columbia]	**Track 9:** Poster Papers [Madison Ballroom]
	Software Applications	Surface Guidance Applications	
1:30	7E1 Full Virtualization-Based ARINC 653 Partitioning Sanghyun Han ***Konkuk University***	8E1 Situational Awareness Through the Integration of Transient Information into Future Cockpit Taxi Guidance Nico Zimmer ***Jeppesen GmbH***	
2:00	7E2 Minimal Embedded Robustness Requirements Analysis Matt Jaffe ***Embry-Riddle Aeronautical University***	8E2 Airport Routing & Safety Nets Based on Standardized Surface Movement Description Guillermo Frontera ***Universidad Politécnica de Madrid***	
2:30	7E3 A Modular Software Framework Supporting Simulation-Driven Optimization Techniques Marco Enriquez ***MITRE/CAASD***	8E3 Design of an Airport Surface Routing Evaluation Tool David J. Martín ***Universidad Politécnica de Madrid***	
3:00	7E4 A Comparison Between Automated Generated Code Tools Using Model Based Development Guilherme Correa ***Brazilian Aeronautics Institute of Technology***	8E4 Aerodrome Mapping Databases Supporting Taxi Routing Functions Christian Pschierer ***Jeppesen***	

2012 Integrated Communication Navigation Surveillance Conference

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New research, development and implementation programs and policies related to ICNS-data link communications, ADS-B, SWIM, airport surface communications, spectrum constraints, transition to digital communications, surveillance systems integration, satellite-based navigation integration, avionics equipage, secure airborne networking, unmanned aircraft integration into the airspace, NextGen, SESAR, and the new commercial aircraft integration and operation.

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Authors are invited to submit abstracts of 750 words before 1 March 2012 on any of the topic areas listed on the back. Submit electronically through www.dasconline.org. Student papers and ideas for invited sessions are welcome. Please avoid the use of acronyms or abbreviations in the title of the paper.

With each submission, please also include a short biographical sketch of the author(s), mailing address, email, telephone, and fax numbers. Final manuscripts of selected papers are due 1 August 2012.

31st DASC

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Projecting 60 Years of Digital Avionics Progress into the Future

We welcome everyone to join us for the 31st DASC in historic Williamsburg, Virginia.

CONFERENCE THEME: From the earliest days of aviation, it was recognized how the advent of electronics could improve the safety and performance of flight. Manned rotor and fixed-wing aircraft led to unmanned aircraft systems (UAS). Space launch of satellites led to manned spaceflight. Up until the Second World War, avionics systems were analog electro-mechanical devices based on vacuum tube technology. Systems aimed at communication, navigation, and surveillance (CNS) were ruggedized, reduced as much as possible in size, weight, and power consumption, and stuffed into the fragile aircraft of the era. During and shortly after the War, turbo-jet powered aircraft that could fly higher, longer, and faster than ever before became practical. More than CNS was required of avionics and they began to play an essential role also in flight/engine control, flight management, collision avoidance, and weather sensing – still analog and with nearly all functions performed independently, with pilots serving as the integrators/arbiters. It was also during this time that two developments changed the future of electronic systems – the ENIAC, first programmable computer using binary arithmetic, and of course, the transistor, which led to the integrated circuit and the microprocessor – enabling digital computing with small size, weight, and power requirements. Based on this, the first digital avionics capabilities were conceived and tested, and new design paradigms became possible. Terms such as "Flight Systems," "Digital Fly-by-Wire," and the "Glass Cockpit" emerged and became reality. Automated and decision support systems were developed ranging from collision avoidance/alerting systems to auto-land systems. The theme of the 31st DASC provides a retrospective glimpse of the rich history of digital avionics and then focuses on the present and future. The 31st DASC highlights the community's most recent and innovative aerospace electronics advancements in commercial, military, general aviation, and space flight.

TECHNICAL CHALLENGES REMAIN:
- Displays and decision-support functions for improving situation awareness
- Systems that assure effective engagement and interaction with automated systems
- Integrated information management systems (airborne, ground-based)
- Systems that monitor an evolving hazard space and provide for adequate time-to-avoid
- Systems that enable the safe introduction of UAS in the NAS
- Systems that enable more efficient air and spacecraft traffic management coordination.

AVIONICS AND AIR TRAFFIC MANAGEMENT(ATM) SYSTEMS: The conference will maintain a dual focus on both the aerospace electronics and ATM system domains. In today's environment, these two domains are highly interdependent and forecast to be even more so. For example, there are many emerging research and analysis requirements relating to future avionics equipage and aircraft interoperability in ATM systems globally. These requirements are significant drivers of avionics development, as evidenced by published NextGen and SESAR avionics roadmaps.

OTHER TOPICS: In addition to the theme track, we will continue to offer opportunities to publish and present on a wide range of topics as described on the next page.

PAPERS, PANELS, EDUCATION, AND WORKSHOPS: The Technical and Professional Education Programs will incorporate hundreds of papers and dozens of tutorials from international researchers, innovators, engineers, users, and designers who are creating and implementing the products, services, and support to enable avionics development and the future ATM solutions. We welcome you to join us and participate in the 31st DASC as we engage in the important issues of the aviation industry

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TECHNICAL PROGRAM

Theme Focus Areas

Historic Avionics Advancements from the Past:
Over the past 60+ years, digital avionics have enabled many game-changing capabilities in aviation. Present your experiences and come learn about the experiences of your colleagues.

Recent Knowledge Discoveries and Innovations:
This theme will continue DASC's tradition of technical presentations of research results from across the community.

Avionics Challenges of the Future:
New capabilities require new forms of digital avionics and increased levels of integration and performance. Present your ideas and come learn what your industry colleagues are thinking.

Topics Include, But Are Not Limited To:

Open Architectures: Open interface standards, viability of open and closed architectures, operating systems, ARINC-653, alternate Application Program Interface solutions, communication standards, use of Commercial Off-The-Shelf (COTS) technologies; modularity vs. scalability.

IMA Design, Integration and Optimization: Allocation process and tools for Integrated Modular Avionics (IMA) system resources and performance, integration tools, verification & certification, configuration strategies, scalability, assessing system demand and resource availability, mitigation of common mode failures, system maintenance, and optimization techniques.

Avionics Communications Infrastructure: Self forming/healing networks, wireless networks, quality of service (QoS), data buses, intra-processor & inter-process communication, data partitioning, multi-protocol gateways, message routing, spectrum, and passenger communication interfaces (Internet, phone, etc.).

Integrated Avionics for Information Security and Integrity:
Multiple Independent Levels of Security/Safety (MILS), physical & virtual system firewalls, data security for shared data buses, operating system security, information monitoring and quality assurance, information management.

Communications/Navigation/Surveillance (CNS) Systems:
Communications systems, data links, satellite-based navigation and landing systems, inertial navigation, and surveillance systems for traffic and collision avoidance.

Human Factors: Methods for improving human interaction with automation and awareness of automation state and state changes, metrics for evaluating human/team performance in the aviation context, human performance modeling, and design tools.

Flight Deck Systems and Interfaces: Advanced systems, interfaces, and enabling avionics technologies that can combine multiple sources of disparate data to provide coherent and effective displays that also reduce the propensity for pilot error, confusion, or misinterpretation.

Systems Engineering, Design Methods, and Tools: Optimization of the hardware and software systems development process, including solutions and lessons-learned. Predictive capabilities with metrics for uncovering latent design flaws or undesired performance characteristics in aerospace electronics systems.

Software Engineering: Development of large-scale systems with multiple design assurance levels, including novel approaches, processes and formal methods for design, testing, V&V, and certification.

Flight Critical Systems: Methods, techniques, and tools for the definition, design, verification, integration, validation, and certification of complex and highly integrated aerospace flight critical systems.

In addition, DASC always considers ideas for sessions and papers that feature topics not covered by the above track themes. If you are interested in leading a session or track, please contact our Technical Program Chair. For more information on the Technical Program, contact:

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Professional Education

DASC will offer two full days of Professional Education sessions spanning many engineering disciplines. These tutorials will be presented by educators and practicing professionals considered to be experts in their field. In honor of this year's theme, special attention will be given to historic events and developments in digital avionics. In addition, DASC will continue to offer its traditional topics such as: Basic and Advanced Avionics Systems; System Engineering; Space Systems; Program Management; Open Systems; Electronic Warfare; Human Factors; Software Development, Test, and Certification (DO-178); Environmental Qualification (DO-160); Intellectual Property Considerations; System Safety; and many more. All professional education sessions will offer Continuing Education Units (CEUs) through IEEE. For more information, contact:

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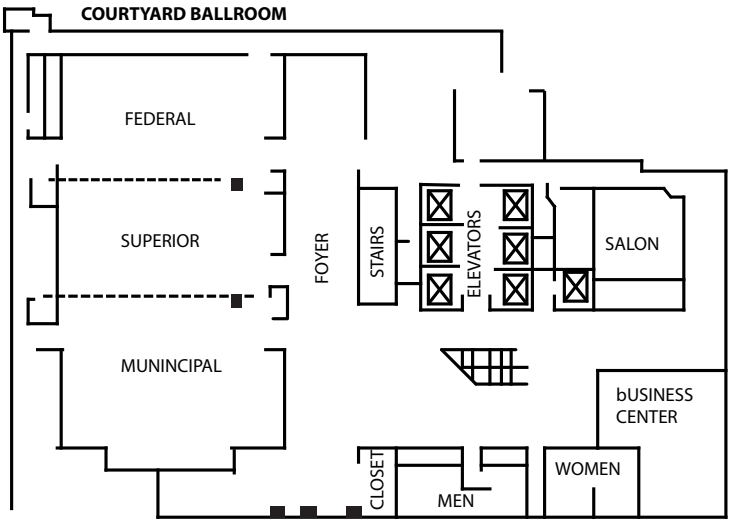
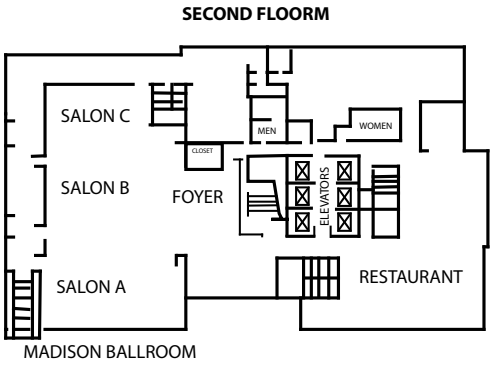
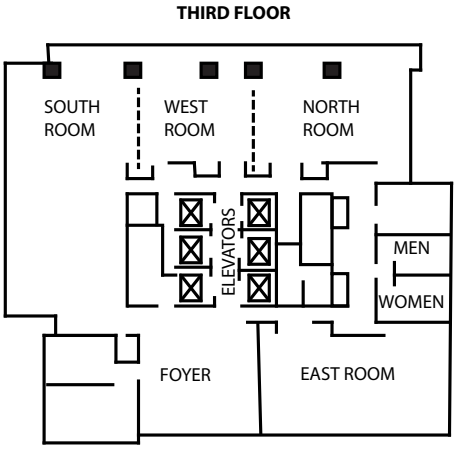
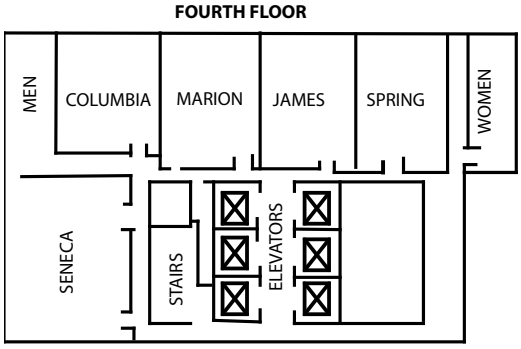
Renaissance Seattle Hotel

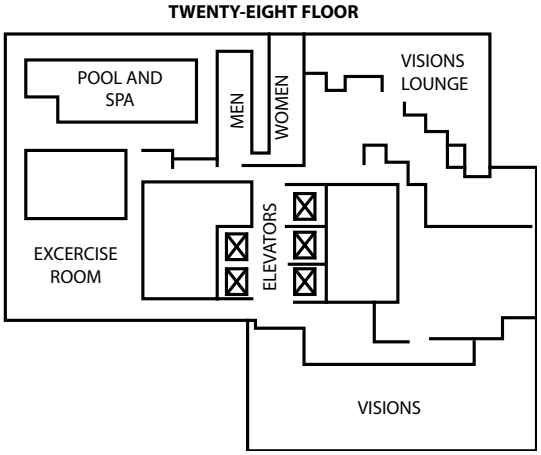
October 16-20, 2011











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