29th DASC

29th Digital Avionics Systems Conference

Improving Our Environment through Green Avionics and ATM Solutions

Hilton Salt Lake City Center
Salt Lake City, Utah
October 3-7, 2010

www.dasconline.org

IEEE AIAA The World's Forum for Aerospace Leadership aes DATC AIAA Digital Avionics Technical Committee

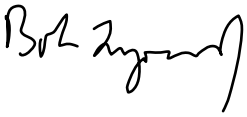
Welcome to the 29th DASC

Conference General Chair
Bob Lyons, Jr.
Xcelsi Group, LLC

I would like to personally welcome you to the Hilton Salt Lake City Center and the 29th Digital Avionics Systems Conference (DASC). This is a joint conference co-sponsored by the American Institute of Aeronautics and Astronautics (AIAA) Digital Avionics Technical Committee (DATC) and the Institute of Electrical and Electronics Engineers Aerospace and Electronics Systems Society (IEEE AESS). The DASC brings together hundreds of technical experts from the commercial and government sectors for five days of presentations, professional education courses, exhibits, and special events on the theme of "Improving Our Environment through Green Avionics and ATM Solutions." Cleaning up the air, abating noise pollution, and reducing harmful materials in design, production, repair, and disposal of aerospace systems are only some of the environmental and legal issues advanced digital avionics can help resolve. Being "green" is also becoming a product selection criterion as important as cost and performance in many systems across the world…and out into space. Digital avionics provide enabling technologies for green aerospace systems, on the ground, in the air and space, and the 29th DASC will provide just the forum to share our thinking on the way ahead. Therefore, our dual-facet theme of the 29th DASC will continue the approach we used in the 28th DASC to cover the full spectrum of air (including space) and ground avionics with two major theme tracks: "Green" Airborne Systems and "Green" Ground Systems.

The DASC kicks off on Sunday with our Professional Education Program, which offers 23 tutorials over two days. These tutorials are presented by both educators and practicing professionals. All professional education sessions will offer Continuing Education Units (CEUs) through IEEE. On Tuesday, the Plenary Session kicks off the Technical Program, which is the heart of the 29th DASC. The Technical Program will host technical paper presentations, an interactive workshop and a lunch panel that focus on the conference theme. The Technical Program will also address other topics important to the avionics community. On Thursday evening, I hope that you will join us to close the 29th DASC with a special social event at Hill Aerospace Museum.

The DASC continues to reach out to aviation leaders and technologist worldwide with a passion for advancing the state of digital avionics and the complimentary ground systems that must operate seamlessly in today's global airspace. I personally invite you to meet and network with professionals from around the globe to build new relationships that will allow us to shape the future of the aerospace industry. I also hope that in addition to gaining new insights and relationships, you have a lot of fun as well! Thank you for attending the 29th DASC and welcome to Salt Lake City!



Bob Lyons, Jr.
29th DASC General Chair

General Information

Welcome to Salt Lake City!

Nestled in the heart of the downtown business and entertainment district and only eight miles from the Salt Lake International Airport, the Hilton Salt Lake City Center enjoys the most convenient location in the Salt Lake Valley. This AAA Four Diamond full-service hotel is loaded with amenities and is perfectly situated within three city blocks of over 60 restaurants, two shopping malls, the EnergySolutions Arena (Home of the Utah Jazz), historic Temple Square, the Genealogy Research Center, and is across the street from the Salt Palace Convention Center. Check-in time is 3:00 p.m. and check-out is 12:00 p.m.

Parking

Self parking is $13/day and valet parking is $16.00/day with in/out privileges.

Message Center

There will be a message center at the DASC Registration Desk. When calling the Hilton Salt Lake City Center at 801-328-2000, 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 in the Exhibit area, complimentary to registered attendees.

Speakers Breakfast

On Tuesday, Wednesday, and Thursday, breakfast will be held in Alpine Ballroom West 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 29th DASC. The current agenda includes:

Tuesday
9 a.m.: Leave for Thanksgiving Point (Garden — $6-10, Museum — $8-12, Shopping)
Noon: Lunch either at Thanksgiving Point or Temple Square
1 p.m.: Temple Square

Wednesday
9 a.m.: Leave for tour of Mrs. Cavanaugh's Chocolates
Noon: Lunch in Park City
1 p.m.: Shopping in Park City

Thursday
8:30 a.m.: Leave for 9:00 tour of Utah State Capitol
11 a.m.: Clark Planetarium (3D Movie Under The Sea -- $6)
Noon: Lunch
1 p.m.: Shopping at Gateway

Visit the DASC Registration Desk for more information. Participation in the Guest Program is $50, which includes three breakfasts and two exhibit receptions. Attending the Special Event at the Hill Aerospace Museum is $50.

Special Event: Hill Aerospace Museum

Thursday, 6:00-9:30 p.m.

Please join us Thursday evening at Hill Aerospace Museum for the 29th DASC Special Event. The Museum exhibits more than 90 military aircraft, missiles, and aerospace vehicles on the grounds and inside the Major General Rex A. Hadley Gallery and the Lindquist Stewart Fighter Gallery. The collection also includes a wide variety of ordnance and munitions, an assortment of aerospace ground equipment, military vehicles, uniforms, and thousands of other historical artifacts. DASC guests will dine among the exhibits and will also have access to the Flight Line Museum Store that evening. Buses will depart the hotel 5:00-5:45 with a buffet dinner at 6:45. Buses will depart from the Museum 8:45-9:30. The bus ride to the Museum is approximately one hour.

Week at a Glance

Sunday 10/3/10	Monday 10/4/10	Tuesday 10/5/10	Wednesday 10/6/10	Thursday 10/7/10
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
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)	11:30 - 1:30 Lunch in Exhibit Hall	11:30 - 1:30 Awards Luncheon	11:30 - 1:30 Green Aviation and Ham 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 1:30 – 5:00 Green Aviation Solutions Workshop 3:00 – 3:30 Break	1:30 - 4:30 Technical Session E 3:00 - 3:30 Break
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	Open Evening	Special Event Hill Aerospace Museum 6:00 – 9:30 (Buses leave hotel 5:00-5:45)

Plenary Session, Tuesday 8:30 - 11:30 a.m.

John W. Borghese
Vice President
Advanced Technology Center
Rockwell Collins

"The Challenges of Green Aircraft in the NAS"

J.W. (John) Borghese is Vice President of the Rockwell Collins Advanced Technology Center, a position he has held since 2005. Prior to his current position, Mr. Borghese served as Vice President and General Manager of Kaiser Aerospace & Electronics, a Rockwell Collins company. Mr. Borghese has been involved with the development of integrated avionics systems for more than 15 years. Throughout this time, the complexity of avionics systems has risen dramatically. Recognizing this trend and the importance to Rockwell Collins' businesses, Mr. Borghese works with government, industry, and university partners to provide trustworthy solutions. Under his direction, the Advanced Technology Center continues to improve the maturity and scalability of using Formal Methods in reducing the cost of developing and certifying complex avionics systems. In addition to the use of Formal Methods, the Advanced Technology Center develops innovative technology solutions in information assurance; communication, navigation, and surveillance systems; and in enhanced flight vision systems that increase situational awareness for pilots.

Concerned with the future capacity needs of the national airspace system, John provided testimony regarding FAA's Next Generation Air Transportation System (NextGen) to the States Aerospace Association in Congress. His testimony was in support of the vital importance of NextGen to the future needs of the US aviation transportation system. Mr. Borghese earned a bachelor of science degree in electrical engineering from the University of Southern California and a master's degree in business administration from Boston University.

Mr. Borghese is a private pilot, a member of the Air Transport Committee of the Aerospace Industries Association (AIA), a member of the Innovation Leadership Advisory Board of the College of Engineering at the University of Illinois and is on the Industrial Executive Board for the National Science Foundation's Cyber Physical Systems Initiative.

Susan D. Opp
President & Chief Operating Officer
L-3 Communications Corporation
Communication Systems Group

President & General Manager
L-3 Communications Corporation
Communication Systems-West

"L-3 Communications: Data Links, Going Green in a Multi-Spectral Environment"

Susan D. Opp is the President and Chief Operating Officer for the Communication Systems Group of L-3 Communications Corporation, which is comprised of Communication Systems-East, Communication Systems-West, Engineering and Technical Services, Nova Engineering, and PHOTONICS. With over 5,000 employees in at least seven states, the Communication Systems Group provides a wide variety of communications and encryption products and services for the U.S. and foreign militaries. Products range from the size of a dime to over 60 racks of radio room equipment for a naval installation.

Ms. Opp has direct experience with engineering, new business development, new product launch, program management and general management. Her greatest love is to see new products go from "viewgraphs" to mission success in the field.

Ms. Opp has a bachelor of science in Electrical Engineering from the South Dakota School of Mines and Technology in Rapid City, South Dakota. She also received her master's degree in Business Administration from the University of Utah.

L-3 Communications is a leading provider of Intelligence, Surveillance and Reconnaissance (ISR) systems, secure communications systems, aircraft modernization, training and government services and is a merchant supplier of a broad array of high technology products. Its customers include the Department of Defense, Department of Homeland Security, selected U.S. Government intelligence agencies, and aerospace prime contractors.

Plenary Session, Tuesday 8:30 - 11:30 a.m.

Debra A. Pool
Associate Director
System Operations, Safety and Performance
MITRE/CAASD

Angie L. Tymofichuk
Director of Engineering
Ogden Air Logistics Center
Hill AFB, Utah

"FAA and Industry Environmental Initiatives: Integrating Aircraft, Airspace, and Operational Procedures for NextGen"

Debra A. Pool is an Associate Director of The MITRE Corporation's Center for Advanced Aviation System Development (CAASD). CAASD supports the FAA and international civil aviation authorities in addressing operational and technical challenges to meet aviation's capacity, efficiency, safety, and security needs. Ms. Pool has over 30 years of experience working in the aviation sector and is currently the Associate Director for System Operations, Safety, and Performance. Her responsibilities include oversight and leadership for MITRE/CAASD's work for the FAA in the areas of airspace and procedure design for terminal, en route, and oceanic; national airspace systems analysis; system capacity and performance assessment modeling and analysis; economic and policy analysis; and international work in airport and airspace design.

Since joining MITRE in 1979, she has worked on a wide variety of FAA projects including the development of future operational concepts, development of decision support tools for controllers and traffic managers, development of Air Traffic Management/Communications, Navigation, and Surveillance real-time human-in-the-loop simulations, airspace and procedure design, and performance analysis of the national airspace system.

Ms. Pool has a master's degree in computation and optimization from the University of Illinois, and a bachelor's degree in mathematics from the University of Vermont.

Angie L. Tymofichuk, a member of the Senior Executive Service, is the Director of Engineering, Ogden Air Logistics Center, Hill Air Force Base, Utah. She is responsible for the development, implementation, and oversight of the technical policies and processes as well as the overall scientific and engineering expertise for the ALC. She is the center's senior engineering manager and provides executive leadership and technical direction to an engineering and scientific workforce of more than 1,078 science and engineering professionals supporting the center's mission.

Ms. Tymofichuk began her career in 1990 as a Palace Acquire intern at the Air Force Research Laboratory at Wright-Patterson AFB, Ohio, where she worked as a physicist in the Nonlinear Optics Laboratory. She later moved to Kirtland AFB, N.M., where she teamed with NASA and other Air Force laboratories to develop leading edge optical coating technologies. While at Kirtland AFB she became a test manager for the Airborne Laser Program and oversaw the development of that program's integrated test plan, and its test and evaluation master plan. She also served as a crew member on a Congressionally-mandated deployment to the Middle East to determine the potential atmospheric effects on laser characteristics and propagation. In 2001, Ms. Tymofichuk returned to Wright-Patterson AFB to serve as the transition manager responsible for organizing and establishing a new program office for the Loitering Electronic Warfare Killer Advanced Concept Technology Demonstrator.

Ms. Tymofichuk has a bachelor of science degree in physics and mathematics from Northern Kentucky University, a master's degree in optical science from the University of Arizona, and a master's degree in national resource management from the Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C.

Awards Luncheon
Wednesday, 11:30 am - 1:30 pm

Each year at the DASC, 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, AIAA's Sustained Service Award, David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award for the 28th DASC, 29th Best of Track, and Student Best Paper Awards.

The 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 28th DASC based on technical content, application to the real world, understandability, and effective presentation. The award is sponsored by The MITRE Corporation's Center for Advanced Aviation System Development (CAASD). This year's award will be presented by Debra Pool of The MITRE Corporation/CAASD to: "Implementing Logical Synchrony In Integrated Modular Avionics"

Abdullah Al-Nayeem
University of Illinois at Urbana Champaign

Darren D. Cofer
Rockwell Collins

Jose Meseguer
University of Illinois at Urbana Champaign

Steven P. Miller
Rockwell Collins

Lui Sha
University of Illinois at Urbana Champaign

Green Aviation and Ham Panel Lunch
Thursday, 11:30 am - 1:30 pm

This year's theme of Green Avionics encompasses the entire industry of the aviation world, from flying optimally to conserve fuel (Trajectory-Based Operations) to flying more accurately in the airspace for increased capacity (RNP RNAV). Please bring your questions to our panelists and enjoy the luncheon.

I could not, would not, in a plane.
I would not, could not, in the rain.
I would not fly them with a pilot,
I would fly them with an autopilot.
I would not, could not, use them often.
I do not want my landings softened.
I would not fly them here or there.
I would fly them with an FMS anywhere.
I would not, could not, make less noise
That bothers all those girls and boys
I would not fly old avionics or flight plan...
But I would enjoy more Green Aviation and ham!

Moderator:
Art Tank, Lockheed Martin.
Panelists:
Joel Klooster, Senior Engineer, Air Traffic Management, GE Aviation
Michelle Bailey, Director of Avionics, Aerospace Sector, Northrop Grumman, Chip Meserole, Director of Advanced Air Traffic Management, Boeing Research and Technology.

Workshop
Wednesday, 1:30 - 5:00 pm

What Drives Green Aviation Solutions?


Art Tank


John Mazurowski

What drives companies to provide green aviation solutions? Social responsibility? Customer demand? Lower cost, efficient operations? Government mandates? Green taxes? The workshop is an open forum – all you need to do is attend. At the workshop, we will discuss this topic in detail and document the opinions of the attendees. The product of the workshop will be a white paper that contains the notes from the meeting and will be distributed along with the post-conference proceedings. The workshop is an open forum discussion, as opposed to a presentation or a panel discussion. We will arrange the workshop so that we hear from diverse viewpoints; think about this and bring your opinions!

Some items to think about and discuss:
- Views from business and technical personnel – There are dramatic differences between the ways these two groups think about issues. What business and technical traits stimulate action in this area?
- Life-cycle cost management – Is there a correlation to action?
- Social responsibility – Can the cost versus benefit be measured?
- Disposal costs – Who is the customer and who pays?
- Exposure to hazardous substances – How do we measure risk?
- How does the military's approach to green solutions differ from the commercial industry?

29th DASC Tutorials Tutorial Schedule

Professional Education Chair
Maarten Uijt de Haag
Ohio University

It is my pleasure to welcome you to the Professional Educational Program for the 29th 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 23 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 attendees. 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 29th 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 29th DASC.

	Sunday, October 3		Monday, October 4			
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 [Alpine Ballroom E]		Life Cycle Systems Engineering Part I	Systems Engineering for Fault Tolerant Net Centric Avionics Part II	Introduction to Security for Integrated Modular Avionics	Multiple Independent Levels of Safety and Security: High Assurance Architecture for Integrated Modular Systems	Systems Engineering and Integrated Modular Avionics [Alpine Ballroom E]
Instructor		SA1: Hitt	MM1: Hitt	ML1: Uchenick	MA1: Uchenick	Instructor
Avionics [Topaz]		ARINC 653 - A Detailed Exploration	Advanced System Integration: Ethernet Networking for Critical Embedded Systems	Principles of Avionics Part I	Principles of Avionics Part II	Avionics and Networking [Topaz]
Instructor		SA2: Kinnan	MM2: Steiner/Jakovljevic	ML2: Helfrick	MA2: Helfrick	Instructor
NextGen [Canyon A]	GPS-based Applications for NextGen Operations	NowGenNext: Industry Consensus on ATM Operational Capabilities through 2018	Digital Avionics Systems	UML 2.0/SysML Based Systems Engineering Using a Model Driven Development Approach	Modern Avionics Architectures	Avionics Design and Systems Engineering [Canyon A]
Instructor	SL3: Uijt de Haag	SA3: Fearnsides	MM3: Spitzer	ML3: Hoffmann	MA3: Spitzer	Instructor
Spacecraft Avionics [Canyon B]	Spacecraft Avionics Systems Engineering Fundamentals Part I	Spacecraft Avionics Subsystem Systems Engineering Part II	Software Design Assurance: DO-178B & DO-278	Advanced Topics in Software Design Assurance: DO-178B & DO-278	Complex Electronics Hardware Design Assurance: DO-254	Design Assurance [Canyon B]
Instructor	SL4: Andrew	SA4: Andrew	MM4: Ferrell	ML4: Ferrell	MA4: Ferrell	Instructor
Open Systems and Communications [Canyon C]	FANS Basics	The Modular Open Systems Approach in Defense Acquisition	Introduction to Digital Avionics Fiber Optics Technology	Applying Formal Methods to Airborne Software	Formal Methods in RTCA DO-178C	Avionics Design and Formal Methods [Canyon C]
Instructor	SL5: Heinke	SA5: Logan	MM5: Beranek	ML5: Ghafari	MA5:Joyce	Instructor

Tutorial Overview

Sunday, October 3
Session 1 – Systems Engineering

SA1: Life-Cycle Systems Engineering - Part I
Ellis Hitt, StratSystems Solutions, Inc.
This first of two tutorials focuses on the systems engineering tasks, processes, and tools used in the life cycle of a system that controls critical functions whose failure could impact the safety of people depending on the correct operation of that system. Each of the phases of a system's life cycle will be described starting with pre-concept definition and ending with system disposal. The DoD 5000 Acquisition/Life Cycle Model, phases, and processes for each phase will be discussed. Evolutionary acquisition using incremental development is increasing with multiple design/test/modify phases. The development of acquisition documents and data packages will be presented. Preparation of the Systems Engineering Plan will be discussed. The analysis and mapping of a statement of work to investment costs and life cycle costs estimates will be demonstrated

Sunday, October 3
Session 2 – Avionics

SA2: ARINC 653 - A Detailed Exploration
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 proposal before the ARINC committee for the Part 4 Minimal Profile and how it fits into the mix of IMA and federated avionics systems. An overview of the Part 3 Conformity Test Specification will also be provided.

Sunday, October 3
Session 3 – NextGen

SL3: GPS-based Applications for NextGen Operations
Maarten Uijt de Haag, Ohio University
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 – 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.

SA3: NowGenNext: Industry Consensus on ATM Operational Capabilities Through 2018
Jack Fearnsides, MJF Strategies, LLC
This tutorial will provide an in-depth analysis of the initiatives now underway in the U.S. and Europe to transform the Air Traffic Management (ATM) systems to accommodate predicted demand. We will begin by detailing the goals of the U.S. Next Generation ATM (NextGen) and the Single European Sky ATM Research (SESAR) initiatives, proceeding to a description of the roadmap of operational improvements planned in each program, and analyzing the risks and benefits associated with these improvements. Finally, we will focus on the concept of trajectory-based operations and examine its implications both for the ground-based ATM infrastructure and for new avionics technologies as well as dramatic changes in the roles of pilots and controllers.

Sunday, October 3
Session 4 – Spacecraft Avionics

SL4: Spacecraft Avionics Systems Engineering Fundamentals – Part I
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.

SA4: Spacecraft Avionics Subsystem Systems Engineering – Part II
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.

Tutorial Overview

Sunday, October 3

Session 5 – Open Systems and Communications

SL5: FANS Basics

Ann Heinke, Overlook Consulting, Inc.

This tutorial introduces communications concepts and vocabulary for Air Traffic Services communications. It describes the OSI model (upon which ATN and FANS were based). It describes the Aeronautical Data Communications applications (CPDLC, ADS-C and AFN) as well as the protocol stacks (ACARS and ATN). It also includes a brief description of the various data links being used by the FANS applications.

SA5: The Modular Open Systems Approach (MOSA) in Defense Acquisition

Glen Logan, The Research Associates

This tutorial covers the motivation, policies, and concepts behind the Department of Defense's intent to leverage commercial technology and developments to effect the transition to a modular open systems approach for weapons system acquisition.

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.

The tutorial includes summaries of current Joint Service and individual Service initiatives (e.g., Navy 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 concludes with a discussion of the impacts of the 2009 Weapons Systems Acquisition Reform Act (WSARA) on application of open architecture.

Monday, October 4

Session 1 – Systems Engineering and Integrated Modular Avionics

MM1: Systems Engineering for Fault Tolerant Net-Centric Avionics - Part II

Ellis Hitt, StratSystems, Inc.

This second tutorial focuses on applying systems engineering to systems such as net-centric avionics that control critical functions whose failure due to faults in the design, manufacturing, and operation phases could result in loss of those functions. Industry and government must determine the most affordable method of migrating from current systems to a system of systems architecture that enables the net-centric data/information flow needed to achieve the required capabilities while ensuring that the safe operation of these systems is not compromised. Systems engineering processes are essential to cost effectively select an avionics architecture (hardware and software) that minimizes the need for complete rewiring of an existing aircraft to complete rewrite of the various operational flight programs and systems management software. This tutorial teaches the attendees how to determine the required net-centric capabilities for avionics, assess the capabilities and determine the total ownership cost of the currently installed avionics, identify the capability deficiencies, define alternatives for achieving the required capabilities, the process of analysis of these alternatives to ascertain whether an alternative satisfies the required capability, and the process of determining the total life-cycle system cost of each alternative, and yearly funding required to develop, acquire, install, operate, and maintain the alternative.

ML1: Introduction to Security for Integrated Modular Avionics

Gordon Uchenick, Objective Interface Systems

Our everyday experiences on the Internet teach us that information security is a serious concern for all of the data that we constantly use in our personal lives. Moreover, the avionics system designer is required by regulations to address security requirements when the information processed by an IMA component is sensitive or classified. Unfortunately, security is defined by the Information Assurance community in complex and obscure language. This tutorial is an introduction to security that starts with a simple foundation: "Why do we need security?" From that point, knowledge is built in clear and understandable terms that will familiarize the attendee with the basic concepts of security, evaluations, certifications, accreditations, and international recognition.

MA1: Multiple Independent Levels of Safety and Security: High Assurance Architecture for Integrated Modular Systems

Gordon Uchenick, Objective Interface Systems

The Multiple Independent Levels of Security/Safety (MILS) architecture greatly reduces the amount of privileged separation enforcement code while simultaneously making that code more effective. By providing extremely robust Data Isolation and Control of Information Flow, MILS enables system protection to be layered among a kernel, middleware, and applications. Robust protection of the low-level kernel and strong separation among partitions facilitate verification that multiple applications do not interfere with each other. The greatly reduced amount of critical code makes it more practical to mathematically prove that all separation enforcement is Non-bypassable, Evaluatable, Always Invoked, and Tamperproof (NEAT).

Monday, October 4

Session 2 – Avionics and Networking

MM2: Advanced System Integration: 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 criti-

Tutorial Overview

cal 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.

ML2: Principles of Avionics – Part I
Albert B. Helfrick, Embry-Riddle
This tutorial covers the early need for and design of electronic-based navigation and communications systems for aircraft. Through the evolution of electronic navigation, various navigation principles and terms will be introduced. The development of airways, navigation error terms, landing procedures and the electronic systems that supported those procedures will be discussed. Surveillance systems will be discussed through the development of collision avoidance. The course is about the signals, physics and science of these systems with an understanding of the applications.

MA2: Principles of Avionics – Part II
Albert B. Helfrick, Embry-Riddle
This tutorial is a continuation of Part I and begins with fundamentals of the Global Positioning System, which will be covered in detail. The basic operation of GPS will be discussed as well as augmentation systems including wide area and local area augmentation. Blended navigation solutions using GPS and inertial navigation will also be discussed. As in Part I, the tutorial is about the science and physics of the GPS-based systems.

Monday, October 4

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:

- Avionics organizations
- Defining the avionics requirements
- Data buses
- Displays
- Hardware and software assessment and validation
- 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: UML 2.0 / SysML Based Systems Engineering Using a Model Driven Approach
Hans-Peter Hoffmann, Ph.D., Telelogic
Increasingly, systems engineers are turning to the System Modeling Language (SysML) to specify and structure their systems. SysML's advantages include providing verifiability and easily sharing information with other engineering disciplines, particularly software. This tutorial teaches a SysML-based process that systems engineers can use to capture requirements and specify architecture. The process uses SysML exclusively for the representation and specification of system characteristics. Essential SysML artifacts include requirements diagrams, use case diagrams, sequence diagrams, activity diagrams, statechart diagrams, and structure diagrams. The process is function-driven and is based heavily on the identification and elaboration of operational contracts: a message-based interface communication concept. The process has been applied successfully at various customer sites.

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 1) aircraft types, 2) federated and integrated designs, 3) line replaceable unit vis-à-vis modular packaging, and 4) non-essential to flight critical applications. The hardware and functions of each architecture are discussed as well as the architectures of the A-380 and the B-787 are briefly discussed.

Monday, October 4

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 topics. Even if you have some familiarity with DO-178B, this session will help reinforce and deepen your understanding of its content and intent.
Note: RTCA SC-205/EUROCAE WG-71 is working on updates to DO-178B, DO-248B, and DO-278. We will be providing current status of this effort in this tutorial.

ML4: Advanced Topics in Software Design Assurance: DO-178B & DO-278
Tom and Uma Ferrell, Ferrell & Associates Consulting
RTCA DO-178B is often regarded as an overly rigid standard, best suited for large programs using a strict waterfall methodology and out-

Tutorial Overview

dated programming languages. This tutorial is intended to show both practitioners and managers how DO-178B can be used with even the most modern software engineering practices, languages, and tools. Different life cycles, and distributed and subcontracted software development will be discussed as will the application of DO-178B on software maintenance projects. Other topics include handling independence in small teams, making SQA a value-added function, and creating/using traceability effectively. Finally, key topics that often cause confusion or lead to excessive cost will be addressed, including robustness testing, tool qualification, control categories, and designing for verification. This tutorial has been designed for those who want to make DO-178B work for your organization to efficiently develop better, safer software, rather than it being just another compliance document that adds cost.

Note: RTCA SC-205/EUROCAE WG-71 is working on updates to DO-178B, DO-248B, and DO-278. There will be a discussion of changes that are being proposed.

MA4: Complex Electronics Hardware Design Assurance: DO-254

Tom Ferrell, Ferrell & Associates Consulting

RTCA DO-254/ED-80 (Design Assurance Guidance for Airborne Electronic Hardware) was released in April 2000 and is designed to fill the gap for developmental assurance for complex electronic hardware including programmable logic devices (PLDs) and application specific integrated circuits (ASICs). Since its release, the document has generated considerable interest in the topic of hardware design assurance and more than a little bit of controversy. This tutorial is intended to provide a detailed overview of DO-254, what it is, what it is not, and how to apply it. In addition to explaining the guidelines, the tutorial illustrates the parallels between DO-254 and DO-178B, the predominant standard for design assurance of software, and includes a discussion of the tradeoffs between implementing in hardware versus software. The tutorial will conclude with a summary of current activities in industry shaping the evolution of developmental assurance for complex hardware including an overview of related regulatory efforts.

Note: DO-254 has been controversial since the document's publication. The FAA has published an advisory circular AC 20-152 on the use of DO-254. This AC limits the use of DO-254, which is not well understood especially by the defense community when an equivalent level of safety is imposed on complex electronic hardware development.

Monday, October 4

Session 5 – Avionics Design and Formal Methods

MM5: Introduction to Digital Avionics Fiber Optics Technology

Mark Beranek, Naval Air Systems Command

The aerospace industry has made great strides in recent years deploying fiber optics and photonics technology on commercial and military platforms. This trend will continue to grow as avionics fiber optic system architectures, networking schemes, and components evolve and mature. Digital avionics fiber optics technology enables high-speed data and video communication onboard military and commercial aircraft. If used smartly, fiber optics technology can effectively future-proof avionics architectures. This tutorial will provide an introduction to fiber optics technology with emphasis on military/aerospace fiber optic and photonic components and systems. In particular, the tutorial will teach the basics physics of light and the application of fiber optics in avionics networks. Technical characteristics of fiber optic cables, connectors, transmitters and receivers will be described. Life-cycle cost elements that drive system requirements and qualification testing will also be taught. A bibliographic listing of relevant references and standards organizations will be given. The course concludes with a briefing on future research and development directions for avionics.

ML5: 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 participate in the complementary tutorial "Formal Methods in RTCA DO 178C," which considers how formal methods might be used towards certification of airborne software.

MA5: 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 include 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.

Technical Program Co-Chairs

Chris Watkins
GE Aviation Systems

Tom Redling
L-3 Communications ComCept Division

We welcome you to the 29th DASC Technical Program! This is where the aerospace industry's experts and innovative minds meet each year to discuss issues related to avionics and the Air Traffic Management (ATM) system. The technical program consists of over 150 technical presentations that have been organized into five Presentation Tracks plus one Poster Paper Track. This is a place where new technologies are born, reviewed, critiqued and applied to applications within the aerospace industry. The technical program is the central focus of the DASC conference, and will continue the DASC tradition of highlighting the key issues and technologies in the aerospace industries.

Technical Program Theme
This year, our program focuses on "Improving Our Environment through Green Avionics and ATM Solutions." There is a track dedicated to this central theme. We also have tracks focused on ATM, Communications/Navigation/Surveillance (CNS), Human Factors + Special Topics, and Avionics Design and Applications + UAS. The poster sessions include papers that span topics across all of these tracks. The author's poster presentation will be on display at the poster sessions and the authors will be available for one-on-one interaction. As you are selecting paper presentations to attend, please look for the technical sessions listed in the final program, on the website, or on the posters placed outside the breakout rooms.

Workshop
The workshop was an exciting addition to the technical program last year, so we have brought it back. Please join us on Wednesday afternoon for this half-day, open forum that will be focused on the main question of "What drives Green Aviation Solutions?" This will be led by Art Tank of Lockheed Martin Aeronautics Company and John Mazurowski of Penn State Electro-Optics Center. The workshop will support interactive discussion groups, as opposed to a "presentation" style event such as our lunch and Plenary Panel discussions. Attendees are encouraged to bring their ideas and opinions. The product of the workshop will be a white paper that contains the notes from the meeting and is distributed along with the conference proceedings.

Lunch Panel
We will also host a technical, panel-oriented event on Thursday during lunch. This panel will be chaired by Art Tank of Lockheed Martin Aeronautics Company. The panel consists of senior-level engineers and will discuss various aspects associated with the Green Aviation Solutions. The panel members will provide brief presentations and then accept questions from the audience.

Conference proceedings CD ROM
The 29th DASC is producing post-conference proceedings so that it can include content generated at the conference. We expect to mail you the proceedings by 12 November 2010.

We hope that you will take full advantage of the technical program and networking opportunities. We believe that you will enjoy and professionally benefit from your participation in the 29th DASC.

Hope to see you during the conference,

Chris and Tom

Conference Proceedings to be delivered by November 12, 2010

The conference proceedings will be delivered to all conference registrants after the conference. This allows us to include content generated at the conference.

29th DASC Technical Program Schedule

Our technical program contains a dual focus on Green Aerospace Solutions for both Avionics and Air Traffic Management (ATM). There are over 150 papers scheduled in 6 parallel tracks. Green Aviation Solutions Workshop will be held in Alpine Ballroom E, 1:30-5:00 p.m., during Session C. The DASC proceedings will be post-conference produced.

	Tuesday, October 5	Wednesday, October 6		Thursday, October 7	
	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 - 4:30 pm
Track 1 Green Aerospace Solutions Co-Chairs: Jay Pruiett, GE Aviation and Jim Dieudonne, MITRE/CAASD	Optimizing Overall Operations Co-Chairs: Mauricio Castillo-Effen Ph.D., GE Global Research Center and Thomas Feuerle, Technische Universitaet Braunschweig	Optimizing Surface and Departure Operations Chair: Mike Castle, Aurora Sciences, LLC	Modeling, Simulation, and Analysis Techniques for Optimizing Operations Co-Chairs: Jim Dieudonne, MITRE/CAASD and Sean McCourt, MITRE/CAASD	Optimization via New Control Algorithms and Equipment Co-Chairs: Thomas A Becher, MITRE/CAASD and Seamus McGovern, U.S. Dept. of Transportation	Optimizing Approach and Arrival Operations Co-Chairs: Cary Feldstein, MDA Corporation and Frederick Wieland, Intelligent Automation, Inc.
Track 2 Evolving to the NextGen ATM System Co-Chairs: Suzanne Porter, MITRE/CAASD and Michael Burkle, Lockheed Martin	Improving Terminal and Airport Operations Co-Chairs: Chris Brinton, Mosaic ATM and Katie Klein, MITRE/CAASD	Reducing Convective Weather Impact Co-Chairs: Dr. Yosef Gavriel Tirat-Gefen and Liling Ren, Georgia Institute of Technology	Aircraft Spacing and Sequencing Co-Chairs: John McCarron, FAA and Jonathon Lee, Volpe Center	Traffic Conflict Management and Flow Management Co-Chairs: Brian Holguin, FAA and Adan Vela, Georgia Institute of Technology	Aircraft Equipage and Behavior for NextGen ATM Co-Chairs: Dieter Eier, Frequentis USA and Seamus McGovern, U.S. Dept. of Transportation
Track 3 Communications, Navigation, Surveillance (CNS) Chair: Leihong Li, Georgia Institute of Technology	NextGen Surveillance Co-Chairs: Anup Katake, StarVision Technologies Inc. and Chris Daskalakis, Volpe Center	Collision Avoidance Chair: Dr. Wolfgang Schuster, Imperial College London	Datalink for Air Traffic Management Co-Chairs: Brian Butka, Embry Riddle Aeronautical University & Chris Wargo, Mosaic ATM	Communications Co-Chairs: Michael Schnell, German Aerospace Center (DLR) and Brent Phillips, FAA	Datalink Infrastructure + Nav Chair: Susan Cheng, Boeing Avionics
Track 4 Human Factors + Special Topics Co-Chairs: Elly Smith, MITRE/CAASD and Kenneth Allendoerfer, FAA	Safety, Security and Situation Awareness Chair: Paul Krois, FAA	Human Factors Methods, Models, and Perspectives - I Chair: Jeff Guell, Boeing	Human Factors Methods, Models, and Perspectives - II Chair: Christian Pschierer, Jeppesen	Pilot Human Factors Chair: Al Herndon, MITRE/CAASD	Special Topics Co-Chairs: Elly Smith, MITRE/CAASD and Mike Brychcy, Boeing
Track 5 Avionics Design and Applications + Uninhabited Aircraft Systems (UAS) Chair: Justin Littlefield, GE Aviation	Avionics Systems Chair: Al Helfrick, Embry-Riddle University	Avionics Networks Co-Chairs: Chunpeng Xiao, Intec Telecommunication Systems, Inc. and Mirko Jakovlyevic, TTTech	Uninhabited Aircraft Systems (UAS) Chair: Terry Schmidt, Boeing	Uninhabited Aircraft Systems (UAS) - Airspace, Navigation, and Performance Co-Chairs: Bernd Korn, German Aerospace Center and Douglas Abernathy, Lockheed Martin	Integrated Modular Avionics Co-Chairs: Steven H. VanderLeest, Ph.D., DornerWorks, Ltd. and Larry Kinnan, Wind River
Track 6 Poster Papers Co-Chairs: Rafael DeLeon, Parker and Sameer Alam, Australian Defence Force Academy	Green Aerospace Solutions + Uninhabited Aircraft Systems (UAS) Co-Chairs: Rafael DeLeon, Parker and Sameer Alam, Australian Defence Force Academy	Air Traffic Management (ATM) Co-Chairs: Rafael DeLeon, Parker and Sameer Alam, Australian Defence Force Academy	Communications, Navigation, Surveillance (CNS) Co-Chairs: Rafael DeLeon, Parker and Sameer Alam, Australian Defence Force Academy	Human Factors + Special Topics Co-Chairs: Rafael DeLeon , Parker and Sameer Alam, Australian Defence Force Academy	Avionics Design and Applications Co-Chairs: Rafael DeLeon, Parker and Sameer Alam, Australian Defence Force Academy

Technical Session A - Tuesday, October 5

A	Track 1: Green Aerospace Solutions [Seminar Theater]	Track 2: Evolving to the NextGen ATM System [Topaz]	Track 3: Communications, Navigation, Surveillance [Canyon A]	Track 4: Human Factors + Special Topics [Canyon B]	Track 5: Avionics Design and Applications + Uninhabited Aircraft Systems [Canyon C]	Track 6: Poster Papers [Grand Ballroom A/B]
	Optimizing Overall Operations	Improving Terminal and Airport Operations	NextGen Surveillance	Safety, Security and Situation Awareness	Avionics Systems	Green Aerospace Solutions + Uninhabited Aircraft Systems
1:30	1A1 Fuel Efficient Strategies for Reducing Contrail Formations in United States Airspace Banavar Sridhar ***NASA Ames Research Center***	2A1 Integrated Management of Airport Surface and Airspace Constraints for Departures: An Operational Sequence Alicia Borgman ***Ohio State University***	3A1 ADS-B Feasibility Study for Commercial Space Flight Operations Pengfei Duan ***Ohio University***	4A1 A Comparative Study of Air Carrier and Business Jet TCAS RA Experiences Jessica Olszta ***MIT Lincoln Laboratory***	5A1 The Challenges of Graphics Processing in the Avionics Industry Marcus Dutton ***L-3 Communications***	6A1 Flow Management as a Contribution to Airport's Efficiency & Pollution Control Eike Rehwald ***Institute of Flight Guidance, Technische UniversitÃ¤t Braunschweig***
2:00	1A2 Use of Influence Diagram Techniques to Understand the Influences and Assess the Environmental Impact of ATM Laurent Tabernier ***EUROCONTROL***	2A2 Toward System Oriented Runway Management Stephen Atkins ***Mosaic ATM, Inc.***	3A2 Stochastic Analysis of ADS-B Integrity Requirements Jonathan Hammer ***MITRE***	4A2 TCAS Operational Performance Assessment in the U.S. National Airspace Wesley Olson ***MIT Lincoln Laboratory***	5A2 Power-over-Ethernet for Avionic Networks Christoph Heller ***EADS Innovation Works, Munich, Germany***	6A2 Search and Rescue Optimization for Unmanned Aerial Vehicles using Spiral Technique Raghu Menon ***Amrita University***
2:30	1A3 Trajectory Synchronization and Negotiation in Trajectory Based Operations Joel Klooster ***General Electric Aviation Systems***	2A3 Probabilistic Forecasting of Airport Capacity George Hunter ***Sensis Corporation***	3A3 Visualization & Assessment of ADS-B Security for Green ATM Krishna Sampigethaya ***The Boeing Company***	4A3 Human/Automation Interaction Accidents: Implications for UAS Operations Doug Glussich ***University of Waterloo***	5A3 Mixed-Criticality Networks For Adaptive Systems Wilfried Steiner ***TTTech Computertechnik AG***	6A3 Avionics System Design of a Mini VTOL UAV Mustafa Ilarslan ***Turkish Air Force Academy***
3:00	Break					
3:30	1A4 Selecting Conflict Resolution Maneuvers Based on Minimum Fuel Burn Aisha Bowe ***NASA Ames Research Center, Aviation Systems Division***	2A4 Flow Management as a Contribution to Airport's Efficiency & Pollution Control Eike Rehwald ***Institute of Flight Guidance, Technische Universität Braunschweig***	3A4 An Investigation of the Benefits of Automatic Dependent Surveillance – Broadcast in Soaring Robert Strain ***MITRE***	4A4 Airspace Structure, Future ATC Systems, and Controller Complexity Reduction Jonathan Histon ***University of Waterloo***	5A4 Extending ARINC 818: The Development of an ARINC 818 Switch Architecture Tim Keller ***Great River Technology***	6A4 UAV Autopilot Integration on Discrete Control Implementation Chin Lin ***National Cheng Kung University***
4:00	1A5 Topologically Based Decision Support Tools for Aircraft Routing Patricio Vela ***Georgia Institute of Technology***	2A5 Design of an Optimal Terminal Route Structure Using Stochastic, Enhanced-FCFS Scheduler Seongim Choi ***University Affiliated Research Center***	3A5 Multiple Source Navigation Signal Receiver Petr Bojda ***University of Defence, CZE***	4A5 Pilot and Controller Workload and Situation Awareness with Three Traffic Management Concepts Kim-Phuong Vu ***CSU Long Beach***	5A5 Integration of Platform Systems Engineering and System Security Engineering Johnathan Lewis ***Rockwell Collins***	6A5 World Space Industry has Changed than it had in the Previous Decade: Most Reliable & Lowest Possible Costs Mariagrazia Spada ***University of Rome "La Sapienza"***
4:30			3A6 Integration of a 2.5D Radar Simulation in a Sensor Simulation Suite Niklas Peinecke ***DLR (German Aerospace Center)***	4A6 SKPP Conformance – Activities and Considerations to Achieve Certification Patrick Huyck ***Green Hills Software, Inc.***	5A6 On-the-Fly Healing of Race Conditions in ARINC-653 Flight Software Ok-Kyoon Ha ***Gyeongsang National University***	6A6 Air-to-Air Surveillance for Future ATM Systems Juan Besada ***Universidad Politécnica de Madrid***

Technical Session B - Wednesday, October 6

B	**Track 1:** Green Aerospace Solutions [Seminar Theater]	Track 2: Evolving to the NextGen ATM System [Topaz]	Track 3: Communications, Navigation, Surveillance [Canyon A]	Track 4: Human Factors + Special Topics [Canyon B]	Track 5: Avionics Design and Applications + Uninhabited Aircraft Systems [Canyon C]	Track 6: Poster Papers [Grand Ballroom A/B]
	Optimizing Surface and Departure Operations	Reducing Convective Weather Impact	Collision Avoidance	Human Factors Methods, Models, and Perspectives - I	Avionics Networks	Air Traffic Management
8:00	1B1 A Statistical Learning Approach to the Modeling of Aircraft Taxi Time Richard Jordan ***MIT Lincoln Laboratory***	2B1 Airport Delay Prediction Using Weather-Impacted Traffic Index (WITI) Model Alexander Klein ***Air Traffic Analysis, Inc.***	3B1 Collision Avoidance for Airport Traffic Simulation Evaluation Denise Jones ***NASA Langley Research Center***	4B1 Diagnosticity of an Online Query Technique for Measuring Pilot Situation Awareness in NextGen Thomas Z. Strybel ***California State University, Long Beach***	5B1 Reliable Burst Protocol - Deterministic Streaming Data Transport Tyler Wilson ***Rockwell Collins, Inc.***	6B1 Designing a Functional Ground Architecture for Automated Trajectory Based Operations Jose Miguel Canino-Rodriguez ***University of Las Palmas De Gran Canaria***
8:30	1B2 Improving Efficiency with Surface Trajectory-Based Operations and Conformance Monitoring Kathryn Klein ***MITRE***	2B2 Convective Weather Forecast Accuracy Analysis at Center and Sector Levels Yao Wang ***NASA Ames Research Center***	3B2 Effect of Conflict Resolution Maneuver Execution Delay on Losses of Separation Andrew Cone ***NASA***	4B2 Increase Productivity for Global Aircraft Engineering Developments by Embracing Cultural Differences Christopher Watkins ***GE Aviation Systems***	5B2 Streaming Ports - ARINC 653 API Extension for Reliable Data Transport Tyler Wilson ***Rockwell Collins, Inc.***	6B2 Design and Implementation of Flight Object Concept Verification Prototype Li Li ***Technical Centre of Air Traffic Management Bureau, CAAC***
9:00	1B3 A Comparison of Aircraft Trajectory-based & Aggregate Queue-based Control of Airport Taxi Processes Hanbong Lee ***Massachusetts Institute of Technology***	2B3 Preliminary NextGen Collaborative Air Traffic Management Analysis George Hunter ***Sensis Corporation***	3B3 Robustness of Optimized Collision Avoidance Logic to Modeling Errors Mykel Kochenderfer ***Massachusetts Institute of Technology***	4B3 Human-in-the-Loop Simulation of Area Navigation Visual Approach Procedures at Atlanta International Airport Justin Ferrante ***MITRE***	5B3 Ethernet Protocol Services for Critical Embedded Systems Applications Mirko Jakovljevic ***TTTech Computertechnik AG***	6B3 Test and Integration Mechanism for Flight Critical Systems – Simulation, Methods and Automation Ananda CM ***National Aerospace Laboratories***
9:30	Break					
10:00	1B4 Field Test Results of Collaborative Departure Queue Management Chris Brinton ***Mosaic ATM, Inc.***	2B4 Operational Dynamic Configuration Analysis Chok Fung Lai ***University of California, Santa Cruz***	3B4 TCAS Surveillance Performance Analysis Charles Rose ***Massachusetts Institute of Technology***	4B4 A Pairing Algorithm for Landing Aircraft to Closely Spaced Parallel Runways Amir Farrahi ***University of California, Santa Cruz***	5B4 Interoperability Within Optical Networks in Aerospace Platforms John Mazurowski ***Pennsylvania State University Electro-Optics Center***	
10:30	1B5 The Surface Operations Data Analysis and Adaptation (SODAA) Tool: Innovations and Applications Chris Brinton ***Mosaic ATM, Inc.***	2B5 Airport Configuration Planning with Uncertain Weather and Noise Mitigation Procedures Leihong Li ***Georgia Institute of Technology***	3B5 Next-Generation Conflict Detection and Resolution for Airport Traffic Timothy Waldron ***Sensis Corporation***	4B5 A Network Based Approach for Analyzing Air Traffic Controller Dynamics Yanjun Wang ***Telecom ParisTech***	5B5 Modeling & Simulating Power Line Communications on Civil Aircraft: First Steps Oroitz Elgezabal ***German Aerospace Center (DLR)***	6B5 Optimization of the Crossing Waypoints in Air Route Network Kai-quan Cai ***School of Electronic Information Engineering, BeiHang University, Beijing,China***
11:00	1B6 Approach to Departure Route Assurance in the Tower Flight Data Manager Nathan Doble ***Metron Aviation***		3B6 Intelligent Air Traffic Control System (IATCS): A Case Study in - The Ethiopian Civil Aviation Authority (ECAA) Girmay Haile Gebreselassie ***Addis Ababa University***	4B6 Guidance at Changing Propulsion Between Vertical and Horizontal Tatsuo Minohara ***Chiba University of Commerce***	5B6 Cloud Computing for Aircraft Data Networks Nagaraja Thanthry ***Wichita State University***	6B6 An ATM Simulation Environment for the Development of HMI Technologies Sebastian Bode ***Institute of Flight Guidance, Technische Universitaet Braunschweig***

Green Aviation Solutions Workshop will be held in Alpine Ballroom E, 1:30 - 5:00 p.m., during Session C.

Technical Session C - Wednesday, October 6

C	Track 1: Green Aerospace Solutions [Seminar Theater]	Track 2: Evolving to the NextGen ATM System [Topaz]	Track 3: Communications, Navigation, Surveillance [Canyon A]	Track 4: Human Factors + Special Topics [Canyon B]	Track 5: Avionics Design and Applications + Uninhabited Aircraft Systems [Canyon C]	Track 6: Poster Papers [Grand Ballroom A/B]
	Modeling, Simulation & Analysis Techniques for Optimizing Operations	Aircraft Spacing and Sequencing	Datalink for Air Traffic Management	Human Factors Methods, Models, and Perspectives - II	Uninhabited Aircraft Systems	Communicatins, Navigation, Surveillance
1:30	1C1 Determination and Ranking of Trajectory Accuracy Factors Sergio Torres ***Lockheed Martin IS&GS - Civil***	2C1 Air Traffic Maximization for the Terminal Phase of Flight Under FAA's NextGen Framework Philip Twu ***Georgia Institute of Technology***	3C1 ESA Iris Programme: Design Options for the Satellite Communication Sub-Network of the European Air Traffic Management System Catherine Morlet ***European Space Agency***	4C1 A Graph Theoretic Approuch Towards Establishing the Minimum Workload Controller Adan Vela ***Georgia Institute of Technology***	5C1 The SamarEye: a Biologically Inspired Autonomous Vehicle Christopher Hockley ***Embry-Riddle Aeronautical University***	6C1 A New Geographical Routing Protocol for Aircraft Ad Hoc Networks SeUng Hyeon ***Gyeongsang National University***
2:00	1C2 Control of Holding Patterns for Increased Throughput and Recovery of OperationsPath Integration Adan Vela ***Georgia Institute of Technology***	2C2 Evaluation of Separation Performance with ADS-B at the Philadelphia Key Site Michael Castle ***Aurora Sciences, LLC***	3C2 Characterisation of the Data Link Communication Air Traffic for the European Airspace Catherine Morlet ***European Space Agency***	4C2 A Flexible Resource Sharing Framework for Integrating Hierarchical Real-Time Components Kyong Hoon Kim ***Gyeongsang National University***	5C2 UAS Sensor Autonomy Achieved via Market-Based Optimization Methods Brandon Parker ***L-3 Communications: ComCept Division***	6C2 On-the-Fly Healing of Race Conditions in ARINC-653 Flight Software Ok-Kyoon Ha ***Gyeongsang National University***
2:30	1C3 High-Performance Trajectory Prediction for Civil Aircraft Wolfgang Schuster ***Imperial College London, United Kingdom***	2C3 A Departure Regulator for Closely Spaced Parallel Runways Isaac Robeson ***Georgia Institute of Technology***	3C3 A Performance-Aware Public Key Infrastructure For Next Generation Connected Aircrafts Mohamed Slim Ben Mahmoud ***French Civil Aviation University (ENAC)***	4C3 Evaluating the Impact of Sensor Data Uncertainty and Maneuver Uncertainty in a Conflict Probe Jochum Tadema ***Netherlands Defence Academy***	5C3 Intelligent UAS Situation Awareness and Information Delivery Qian Hu ***MITRE***	6C3 Growing Up with GNSS Applications in Transports, Technical and Legal Increasing Needs Mariagrazia Spada ***University of Rome "La Sapienza"***
3:00	Break					
3:30	1C4 Prediction of Noise Exposure Levels Using Simulated Flight Trajectories Barbara Jandl ***University of Salzburg***	2C4 Curved Approaches and Airborne Spacing for efficient Closely Spaced Parallel Runway Operations in IMC Bernd Korn ***DLR, Institute of Flight Guidance***	3C4 Protocol Architecture Analysis for Internet Connectivity in Aeronautical Ad Hoc Networks Felix Hoffmann ***German Aerospace Center (DLR)***	4C4 An Evaluation of Human Factors Associated with Using Data Communications to Manage Tailored Arrival Operations Ronald Chong ***MITRE***	5C4 The NASA Langley Research Center's Unmanned Aerial System Surrogate Research Aircraft Charles Howell ***NASA Langley Research Center***	6C4 ADS-B and Multi-radar Asynchronous Track Fusion with Prediction-based IMM Estimator Fei Huang ***Beihang University***
4:00	1C5 Analysis of the Impacts of Fuel Prices & Slot Controls on Airfares & Market Demand John Ferguson ***George Mason University***	2C5 Design of a Parallel Time-Based Arrival Scheduling Simulation System Daniel Mulfinger ***NASA Ames Research Center***	3C5 Co-Site Interference Mitigation for VHF Com Voice and Datalink Operations Bradley Baker ***Rockwell Collins, Inc.***	4C5 Warning, Runway Occupied: An Evaluation of Tower Controller Behavior When Maintaining Runway Safety Ronald K. Stevens ***MITRE***	5C5 Novel Multiple Access Scheme for Wireless Sensor Network Employing Unmanned Aerial Vehicle Dac Tu Ho ***Waseda University, Japan***	6C5 Integration of a 2.5D Radar Simulation in a Sensor Simulation Suite Niklas Peinecke ***DLR (German Aerospace Center)***
4:30		2C6 Impact of ADS-B Surveillance Data Communication Limitations on Airborne Separation Performance Zahra Khan ***Engility Corporation***				6C6 Multiple Source Navigation Signal Receiver Petr Bojda ***University of Defence, CZE***
						6C7 Development of Secondary Surveillance Radar Mode S with Network Coordination Function Tadashi Koga Kazuhiko Uejima ***Electronic Navigation Research Institute***

Technical Session D- Thursday, October 7

D	Track 1: Green Aerospace Solutions [Seminar Theater]	Track 2: Evolving to the NextGen ATM System [Topaz]	Track 3: Communications, Navigation, Surveillance [Canyon A]	Track 4: Human Factors + Special Topics [Canyon B]	Track 5: Avionics Design and Applications + Uninhabited Aircraft Systems [Canyon C]	Track 6: Poster Papers [Grand Ballroom A/B]
	Optimization via New Control Algorithm and Equipment	Traffic Conflict Management and Flow Management	Communications	Pilot Human Factors	Uninhabited Aircraft Systems -- Airspace, Navigation and Performance	Human Factors + Special Topics
8:00	1D1 Advanced Aircraft Performance Modeling for ATM: Analysis of BADA Model Capabilities Damir Poles ***EUROCONTROL***	2D1 Prediction of Descent Trajectories Based on Aircraft Intent Eduardo Gallo ***Boeing Research & Technology Europe (BR&TE)***	3D1 New Concepts for a Decentralized, Self-Organizing Air-to-Air Radio Link Michael Walter ***German Aerospace Center (DLR)***	4D1 NextGen Flow Corridors Initial Design, Procedures, and Display Functionalities Arash Yousefi ***Metron Aviation Inc.***	5D1 Altitude Measurement using Three Circular Marks Hyeon-Cheol Lee ***Korea Aerospace Research Institute***	6D1 Multipurpose Low-Cost Synthetic Vision System Petr Frantis ***University of Defense***
8:30	1D2 Tom Swift and His Electric Airship Hugh Blair-Smith ***Down To The Metal***	2D2 Parametric Study of Aircraft Response Due to Wake Vortex Encounter Seamus McGovern ***U.S. DOT National Transportation Systems Center***	3D2 A New Generation of High Frequency Receivers for Civil Aeronautics Communications Bob Lombardi ***Rockwell Collins, Inc.***	4D2 Flight Simulator Evaluation of an Airport Surface Display with Indications and Alerts (SURF IA) Jeff Lancaster ***Honeywell International***	5D2 Study of Unmanned Aircraft Systems Procedures: Impact on Air Traffic Control Jill Kamienski ***MITRE***	6D2 Design of OpenGL SC Emulation Library over the Desktop OpenGL 1.3 Nakhoon Baek ***Kyungpook National University***
9:00	1D3 Benefits Analysis of a Routing Aid for New York Area Departures James DeArmon ***MITRE***	2D3 A Ground Holding Model for Aircraft Deconfliction Nicolas Durand ***DSNA***	3D3 Transmission Control Optimization for Aeronautical Air-Ground Access Networks Chunpeng Xiao ***Intec Telecom System***	4D3 Pilot Response to Off-Nominal Conditions in Merging and Spacing Operation Nhut Ho ***California State University, Northridge***	5D3 Closing the ISR-Navigation Loop Eric Theunissen ***Delft University of Technology***	6D3 A Flexible Resource Sharing Framework for Integrating Hierarchical Real-Time Components Kyong Hoon Kim ***Gyeongsang National University***
9:30	Break					
10:00	1D4 A Differential Flat Approach for Trajectory Noise Assessment Felix Mora-Camino ***ENAC France***	2D4 Enhancement in Realism of ATC Simulations by Improving Aircraft Behaviour Models Sophie Gillet ***EUROCONTROL***	3D4 Quality of Service IP Cabin Infrastructure Emanuel Heidinger ***EADS Innovation Works***	4D4 Management of Continuous Descent Approach during Interval Management Operation Walter Johnson ***National Aeronautics and Space Administration***	5D4 Maximizing Vertical Maneuver Space for Conflict Prevention and Resolution: Richard Rademaker ***Delft University of Technology***	6D4 New Modeling Algorithm for Improving Accuracy of Weapon Launch Acceptability Region Kun Su Yoon ***Korea Aerospace Industries, Ltd.***
10:30		2D5 Sectorless ATM and Advanced SESAR Concepts: Complement not Contradiction Bettina Birkmeier ***German Aerospace Center, DLR***	3D5 Spacecraft Communication System Performance Analysis with Integration of High Power Electric Propulsions Shian Hwu ***Barrios Technology/ESCG***	4D5 A Cockpit Display Based Procedure for Approaches to Closely Spaced Parallel Runways Anand Mundra ***MITRE***	5D5 Failure Modes Effects Test for Flight Control System Sung-Jo Seo ***Korea Aerospace Industries***	6D5 ARINC 653 Interface in Oasis Omar Kermia ***CEA LIST***
11:00			3D6 Moving Object Detection Using Active Contour Model and Modified Optical Flow Based Method Swarnalatha Anumula ***Madras Inistitute of Technology***	4D6 Vector Overlay Implementation Issues in Naval Integrated Digital Map Systems Michael Trenchard ***Naval Research Laboratory***		6D6 Acquisition & Integration Activities of Ground Support Hardware Items in Terms of System Engineering Process Alper Pahsa ***HAVELSAN***
						6D7 Guidance at Changing Propulsion Between Vertical and Horizontal Tatsuo Minohara ***Chiba University of Commerce***

Technical Session E - Thursday, October 7

E	Track 1: Green Aerospace Solutions [Seminar Theater]	Track 2: Evolving to the NextGen ATM System [Topaz]	Track 3: Communications, Navigation, Surveillance [Canyon A]	Track 4: Human Factors + Special Topics [Canyon B]	Track 5: Avionics Design and Applications + Uninhabited Aircraft Systems [Canyon C]	Track 6: Poster Papers [Grand Ballroom A/B]
	Optimizing Approach and Arrival Operations	Aircraft Equipage and Behavior for NextGen ATM	Datalink Infrastructure + Nav	Special Topics	Integrated Modular Avionics	Avionics Design and Applications
1:30	1E1 Green Approaches without Trade-Off: Final Results from the FAGI-Project Alexander Kuenz ***DLR Germany Aerospace Center***	2E1 Conflict Rate Prediction Based on Flows Modeling Adan Vela ***Georgia Institute of Technology***	3E1 Analysis of Advanced Flight Management Systems, Field Observations Trials, SIDs Albert Herndon ***MITRE***	4E1 System Integration Problems In Apollo 11 Hugh Blair-Smith ***Down To The Metal***	5E1 Applying Virtualization to Avionics Systems - the Integration Challenges Thomas Gaska ***Lockheed Martin MS2-Owego***	6E1 Integrated Model Driven Design Development (IMDD) for Software and System Engineering Ananda Challaghatta Muniyappa ***CSIR-National Aerospace Laboratories***
2:00	1E2 Analysis of Flight Management System Predictions of Idle-Thrust Descentss Laurel Stell ***NASA Ames Research Center***	2E2 NextGen Equipage Interoperability Ronald Stroup ***FAA***	3E2 An Adaptive Security Architecture for Future Aircraft Communications Mohamed Slim Ben Mahmoud ***French Civil Aviation University (ENAC)***	4E2 Mathematical Formulation of a Fast-Time Geometric Heading Navigation Model Seamus McGovern ***U.S. DOT National Transportation Systems Center***	5E2 ARINC 653 Hypervisor Steven H. VanderLeest ***DornerWorks, Ltd.***	6E2 Model-Based Development Framework for Distributed Embedded Control of Aircraft Fuel Systems Carlos C. Insaurralde ***DACYA - Universidad Comlutense de Madrid***
2:30	1E3 Terminal Area Arrival Management Concepts Using Tactical Merge Management Techniques Aslaug Haraldsdottir ***Boeing***	2E3 Statistical Analysis of Area Navigation Standard Instrument Departure Operational Errors Chris Devlin ***MITRE***	3E3 L-DACS1 Laboratory Demonstrator Development and Compatibility Measurement Set-Up Michael Schnell ***German Aerospace Center (DLR)***	4E3 High-Intensity Radiated Field Fault-Injection Experiment for a Fault-Tolerant Distributed Communication System Amy Yates ***National Aeronautics and Space Administration***	5E3 How to Address Certification for Multi-Core Based IMA Platforms: Current Status and Potential Solutions Rudolf Fuchsen ***SYSGO AG***	6E3 Model-Driven Development of ARINC 653 Configuration Tables Akos Horvath ***Budapest University of Technology and Economics***
3:00	Break					
3:30	1E4 Tailored Arrivals Help Reduce Aviation's Environmental Impact Suzanne Meador ***Boeing***	2E4 Optimization of the Crossing Waypoints in Air Route Network Kai-quan Cai ***BeiHang University***	3E4 How the L-DACS2 Radio-Frequency Signals Modulation Affects the DME Performance Najett Neji ***SUPELEC-DRE, France***	4E4 Architecting HD Full Motion Video into Military Avionics Infrastructures C. Stephen Kuehl ***Raytheon Technical Services Company, LLC***	5E4 The FAA Handbook on Microprocessor Selection and Evaluation in Airborne Systems Jason Lee ***Texas A&M University***	6E4 Modeling and Analysis of Integrated Avionics Processing Systems Xinying li ***Beihang University***
4:00	1E5 A Dynamic Continuous Descent Approach Methodology for Low Noise and Emission Sameer Alam ***Defence & Security Applications Research Centre, University of New South Wales, Australian Defence Force Academy***	2E5 An ATM Simulation Environment for the Development of HMI Technologies Sebastian Bode ***Institute of Flight Guidance, Technische Universitaet Braunschweig***		4E5 The Impact of Background Atmospheric Radiation on Semiconductor Devices and Avionics Systems Kenneth Vranish ***KVA Engineering, Inc.***	5E5 Exploring the Design Space of IMA System Architectures Richard Bradford ***Rockwell Collins***	6E5 Development of Test Automation Framework for Testing Avionics Systems Ashutosh Kumar Jha ***Goodrich Aerospace Services Pvt Ltd***
						6E6 Failure Modes Effects Test for Flight Control System Sung-Jo Seo ***Korea Aerospace Industries***

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Seattle, WA
October 16-20, 2011

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ABSTRACT DETAILS

Authors are invited to submit abstracts of 750 words begining 4 October 2010 through 1 March 2011 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.

Include a short biographical sketch of the author(s), mailing address, email, telephone, and fax numbers. Final manuscripts of selected papers are due 26 August 2011.

30th DASC

CALL FOR PARTICIPATION

Technical Papers, Tutorials & Exhibits

How do Avionics and ATM Support 2-1-0 Pilot Aircraft in the Future NAS?

We welcome you to join us for the 30th Digital Avionics Systems Conference (DASC). This is an exciting milestone as we celebrate 30 sensational conferences beginning with the first DASC in 1975.

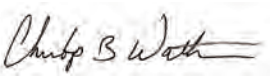
The aviation industry is embarking on a paradigm shift in terms of the pilot's role in an aircraft and the safe co-existence of various piloted and autonomous flight operations. The military is exploring use of remotely-piloted and autonomous vehicles in the National Airspace System (NAS) to fulfill their missions. The civil aviation industry is also evaluating avionics and Air Traffic Management (ATM) options to support reduced crew requirements in an effort to manage their costs. Options for reduced crew requirements on cargo flights are being explored first, but research to support passenger flights is also underway. Hybrid concepts exist in both the military and civil domains where a multitude of diverse uninhabited aircraft flying in formation could be led by an inhabited leader-aircraft (uninhabited-inhabited teaming). This conference will highlight these research areas and enlighten attendees on the status of these cutting-edge initiatives.

AVIONICS + ATM: The conference will maintain a dual focus on both the aircraft avionics and ATM System topics surrounding the 2-1-0 pilot vision. There are many emerging research areas supporting the avionics technologies used in the aircraft to realize this vision. Additionally, there are significant challenges to overcome in order to accommodate Uninhabited Aerial Systems (UAS) safely and efficiently in the NAS. These issues are significant drivers to the future of the NAS and as such are a big part of the FAA's NextGen initiative.

INDUSTRY'S QUESTIONS: The intent of DASC each year is to provide a non-partisan environment where we can discuss issues surrounding evolutionary concepts, and this year the 2-1-0 pilot concepts are being highlighted. What are the benefits of these concepts? What are the drawbacks? What technologies and initiatives drive this vision and enable co-existence? What are the human factors and procedural challenges that industry should focus on? How do we maintain safety? What standards and policies need to be addressed? How can functionality be allocated across the avionics, the humans, and the supporting ATM systems? What are the failure modes and how are the risks they present mitigated? Many organizations are beginning to address the 2-1-0 pilot vision. RTCA Special Committee 203 (SC-203) is actively working to help "assure the safe, efficient and compatible operation of UAS with other vehicles operating within the NAS." In parallel, a number of Standarization Agreement (STANAG) teams have been chartered to define military UAS standards to increase interoperability.

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, and designers who are creating the products, services, and support to enable avionics development and the NextGen ATM solution. We will hold panel discussions with noted engineering and management experts and provide multiple keynote presentations by government and industry leaders shaping our industry. We will also host an interactive workshop where you can participate in active conversations about the 2-1-0 pilot concepts. We welcome you to join us and participate in the 30th DASC as we engage in the important issues of the aviation industry!



Chris Watkins
30th DASC General Chair

IEEE AIAA The World's Forum for Aerospace Leadership AES DATC AIAA Digital Avionics Technical Committee

TECHNICAL PROGRAM

Theme Focus Areas

"2-1-0" Avionics Systems and Standards: Flight management and control systems that provide flight guidance, control, autonomy, and collaboration with other aircraft to enable future NAS operations with both inhabited and uninhabited aerial systems. Standards for avionics systems to support reduced crew requirements on commercial passenger and cargo flights, as well as general aviation and military flights. Concepts and systems to support uninhabited-inhabited teaming. Required avionics system functionality, performance levels, and certification. Role and functionality of avionics systems during failure conditions.

"2-1-0" Ground Systems and Policies: Modern flight planning, traffic flow management (TFM), and air traffic management (ATM) systems designed to accommodate a variety of inhabited and uninhabited aerial systems. Role and functionality of ground systems during failure conditions. Policies for flight procedures and airspace management that enable safe and efficient co-existence of 2-1-0 piloted vehicles. Key functionality of enabling ground systems associated with UAS operations in the NAS, as well as remotely-piloted aircraft.

Avionics Applications

Open Architectures: Open interface standards, viability of open and closed architectures, operating systems, ARINC-653, alternate software API 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, protocols, multi-protocol gateways, message routing, spectrum, and passenger communication interfaces (Internet, phone, etc.).

Integrated Avionics Security: Multiple Independent Levels of Security/Safety (MILS), physical & virtual system firewalls, data security for shared data buses, operating system security, physical security, biometric sensors, information assurance, encrypted data links, data isolation, and information flow control.

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: Issues on human interaction with automation such as mode awareness, cockpit decision aids, avoiding the presentation of hazardously misleading information, data fusion pilot and controller overload, and crew coordination.

Synthetic Vision and Situational Awareness Systems: Advanced display systems that combine multiple sources of disparate data to provide safe aircraft operation in limited visibility conditions.

Avionics Design

Systems Engineering: Optimization of the hardware and software systems development process including solutions and lessons-learned. Selection of proper processes, methods and tools. Business and program management aspects of the total system life cycle.

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

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

We always consider 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 Chairs.
For more information on the Technical Program, contact:

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We 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. Typical topics include: 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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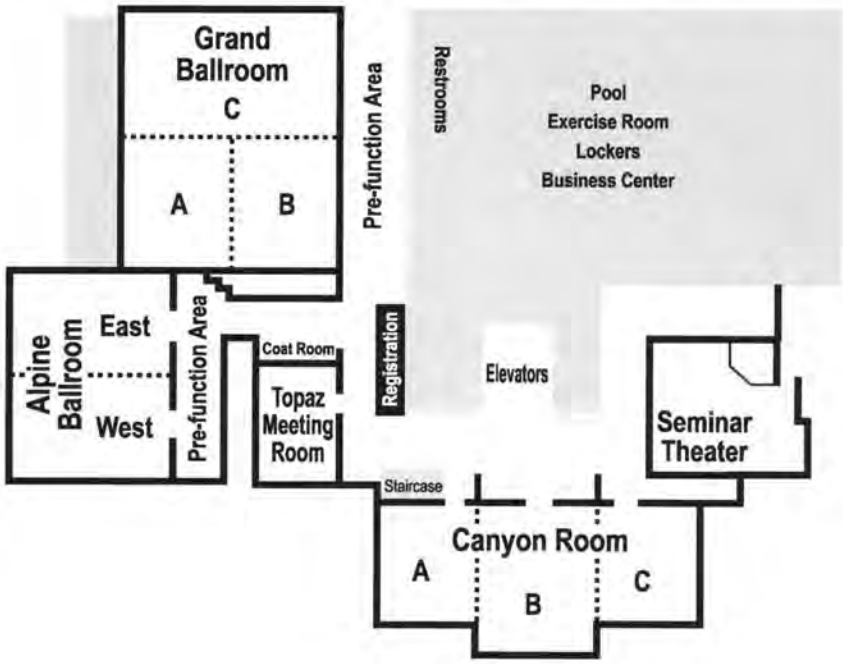

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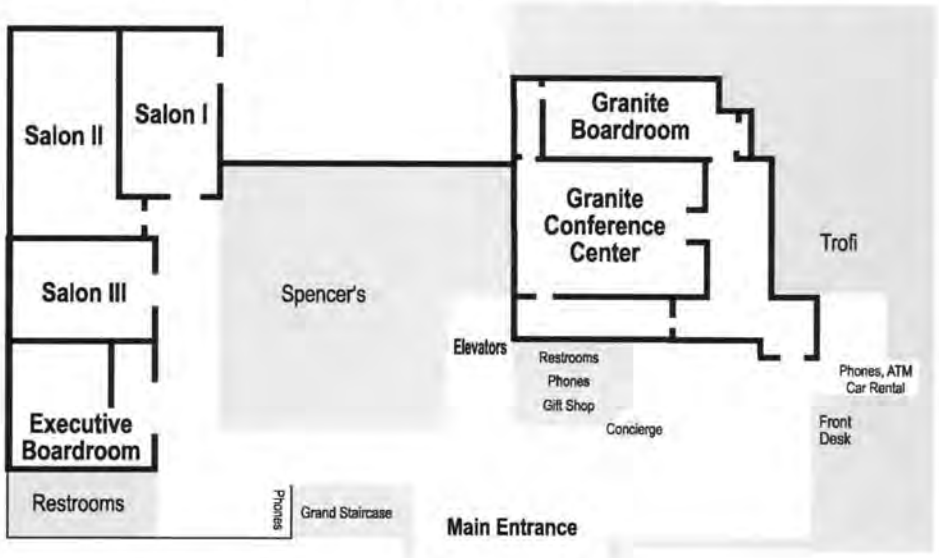

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