31st DASC Digital Avionics Systems Conference

1903

PROJECTING 100 YEARS OF AEROSPACE HISTORY INTO THE FUTURE OF AVIONICS

Crowne Plaza Williamsburg
Williamsburg, VA
14-18 October 2012

AIAA AESS IEEE DATC

Airplane image credit: NASA/MIT/Aurora Flight Sciences

Welcome to the 31st Digital Avionics Systems Conference

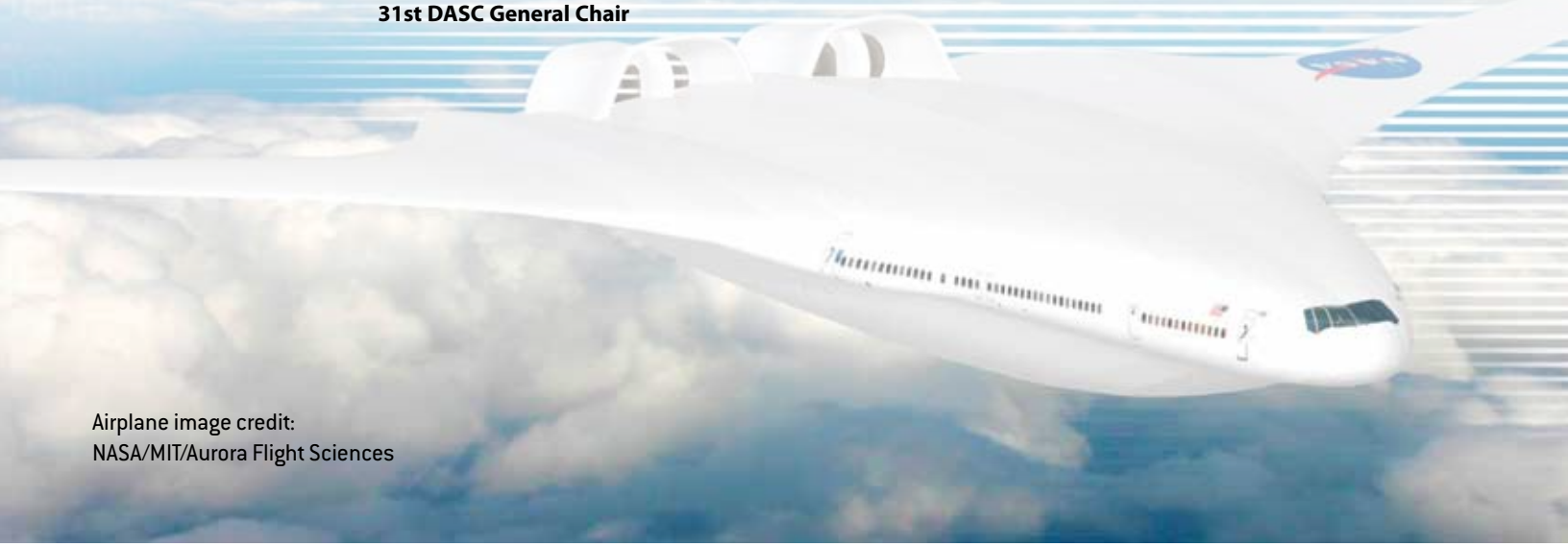
For the 31st DASC this year in Williamsburg, Virginia, we'll enjoy various aspects of flight in and around Virginia's historic tidewater area while conjuring imagery of preceding centuries.

Aviation has seen amazing changes since 1912. What will it look like in 2112? Our strategy is to review and reflect on significant events in aerospace electronics history while building a case for how we see avionics projecting out to future generations. As in past DASC successes, we will continue to host exhibitors, highlight our conference sponsors, and provide an avenue for publishing. Besides the over 200 papers in our Technical Program, we'll have senior and acknowledged experts in our Plenary Session, Lunch Panel, Workshop, and Tutorial Program. The interactive workshop will be different in that a systems engineering model will be used and a product will be developed. We have renamed our Tutorial Program in memory of Cary R. Spitzer, the popular and long-time presenter, who passed since the last DASC. New in 2012, we've introduced a high school student competition "Engineering Our Aerospace Future," which has several interesting and thought-provoking submissions.

Williamsburg, the 17th Century capital of the Virginia Colony of the United States, is ideal for us this year. Historic Yorktown and Jamestown are nearby. Williamsburg not only sets a historic context of aviation but is also close to Langley Air Force Base, Naval Station Norfolk, and NASA's Langley Research Center. Each is within an hour of the hotel, and tours are available in your free time. As a special event, we will have dinner at the Virginia Air and Space Center in Hampton, VA, where the famous retired Air Force Historian and author, Richard (Dick) Hallion will speak to us.

The AIAA/DATC, IEEE/AESS, and the DASC committee are certain that if you are involved in any aspect of aviation or aerospace electronics you will help influence industry, academia, and government by your active participation in this year's DASC.

Roger Oliva
31st DASC General Chair



Airplane image credit:
NASA/MIT/Aurora Flight Sciences

Welcome to Williamsburg!

Step back in time at the Crowne Plaza Williamsburg situated on the Fort Magruder battleground site. Located on Pocahontas Trail and a mile walk to historic Williamsburg, the hotel offers visitors and business travelers state-of-the-art amenities with a hint of 17th and 18th century life. Hotel features include high-speed Internet, fully equipped fitness room, indoor and outdoor pool, and much more. The spacious and cheerful lobby is the perfect setting to relax, connect with conference attendees, or glimpse into the revolutionary days of yore at the lobby display. Whether it's work, golf, outlet shopping, amusement parks, a visit to the Jamestown Settlement or to Colonial Williamsburg, there's something for everyone.

Parking

On-site parking is free.

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 Stuart's Redoubt 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 should attend.

Spouse Program

Tuesday, October 16

Colonial Williamsburg. We'll depart the Crowne Plaza Hotel at 9:00 a.m. and walk 1.2 miles to historic Williamsburg. One-day tickets are $39.95, which allow you access to all historic area sites including 35 exhibition sites, 16 trade shops, more than 100 gardens, museums use of historic area shuttle buses, and regular programs. The Williamsburg Trolley (50 cents) is available outside of the historic district. We'll have lunch at the **Kings Arms Tavern,** which is on Second Street in the historic area and features such items as peanut soup, various salads, sandwiches, entrees, and desserts. Drinks are of the fortified and non-fortified variety as well as beers and lagers. After lunch, we can shop at **Merchant's Square,** which is an 18th-Century style retail village with over 40 shops and restaurants or returning to the historic district. We will be free to return to the hotel on an individual basis.

Wednesday, October 17

Tour of historic Jamestown. After meeting in the hotel lobby at 9:00 a.m., we'll take a taxi to the Williamsburg Visitors Center to catch the Historic Triangle Shuttle to Jamestown. The bus trip is free and tickets to tour the Jamestown Settlement and Historic Jamestown are $10.00. The tour includes a walk through the Jamestown Settlement and Historic Jamestown. Lunch will be at the Jamestown Café or our choice. We will take the Shuttle back to the Visitors Center and a taxi back to the hotel.

Thursday, October 18

Vote for your choice:

Williamsburg Winery – We will leave the hotel at 11:30 a.m. and taxi to the winery for lunch, tour, and tasting. Lunch will be at the Gabriel Archer Tavern overlooking the vineyards. A glass of wine is included with lunch along with a main course, dessert, and coffee or tea. A tour of the winery and tasting will follow lunch and you will keep a complimentary wine glass from the tasting. The cost of this package is $30.00 and takes approximately 2 hours. We will return to the hotel via taxi.

Premium Outlets – Stores open at 10:00 a.m. We will take a taxi to the outlet for a wonderful shopping experience and pick one of the restaurants to have lunch and return to the hotel by taxi at 3:00 p.m.

31st DASC Week at a Glance

Sunday 10/14/12	Monday 10/15/12	Tuesday 10/16/12	Wednesday 10/17/12	Thursday 10/18/12
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	8:00 - 11:30 Technical Session B	8:00 - 11:30 Technical Session D
11:30 - 2:30 Tutorials Session SL (Lunch Provided)	11:30 - 2:30 Tutorials Session ML (Lunch Provided) Workshop 1:00 – 5:00	Exhibits Open 11:00 – 4:30	9:30 - 10:00 Break Exhibits Open 9:00 – noon	9:30 - 10:00 Break
		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	1:30 - 5:00 Technical Session C	1:30 - 5:00 Technical Session E
3:00 - 6:00 Tutorials Session SA	3:00 - 6:00 Tutorials Session MA	3:00 - 3:30 Break	3:00 – 3:30 Break	3:00 – 3:30 Break
Open Evening	6:00 - 8:00 Exhibits Open High School Student Design Competition in Exhibit Hall Social Event in Exhibit Hall	5:30 - 7:00 Exhibits Open Reception in Exhibit Hall	Open Evening	6:00 – 10:00 Special Event Virginia Air & Space Center

Special Event: Virginia Air and Space Center

Thursday, 6:00-10:00 p.m.

Join us Thursday evening from 6:00-10:00 p.m. for a buffet dinner at the Virginia Air & Space Center. Located in Hampton, Virginia, the Virginia Air & Space Center features interactive aviation exhibits spanning 100 years of flight, more than 30 historic aircraft, a hands-on space gallery, unique space flight artifacts, and more! Your imagination will soar as you launch a rocket, pilot a space shuttle, program Mars rovers for a mission, become an air traffic controller, fly an airplane, and climb aboard a WWII bomber! Come face to face with the Apollo 12 Command Module that went to the moon, a Mars meteorite, a three-billion-year-old moon rock, a DC-9 passenger jet, a replica 1903 Wright Flyer, and more! We will have full access to the Space Center. In addition to the buffet dinner, the famous retired Air Force Historian and author, Richard (Dick) Hallion will be speaking to our group. Buses depart the hotel at 5:30 p.m.

Interactive Workshop

Monday, 1:00 – 5:00 p.m.

Engineering the Future of Aerospace Flight Beyond Information Management

Co-Chairs: Jay Prueitt, GE and Ken Davidian, FAA

The past 100 years of electronics and flight have brought us express worldwide delivery, new perspective on our planet from upper altitudes and space, and has been instrumental through a couple of world wars, a cold war, and many regional conflicts. There is ample information supporting the accurate historical perspective on how various initial paths diverged, converged, and which paths eventually led to operational systems. Throughout the conference, we will see these stories unfold for us from the people that either witnessed them first-hand or have made it their life's work to know. We do have the knowledge behind the evolution of avionics over the past 100 years. These electronics include systems for communications, navigation, radar, remote sensing, flight and environmental controls. Also, what do future-material dynamicists say? While mindful of the systems, everything we do in this Workshop will have safety as the underpinning core value. Our goal will be to wisely define today's avionics programs and base this on what we think the electronics associated with air and space flight will look like in 2112. The workshop will be an excellent opportunity to share your views and perspectives on this important and challenging subject.

DASC Student Competition

Monday, 6:00 – 8:00 p.m.

While professionals from government, industry, and academia review the history of avionics and envision the technology of future avionics, our next generation talents, students from high schools, will also "fly us into the future" through their poster presentation, **Avionics System Design Competition.** This competition is an exclusive and creative event targeting high school students. The competition inspires the students to come up with innovative and originative ideas on the topic, **INDIVIDUAL AIR TRAVEL IN 2112**. The posters presented here are selected from entries worldwide. We encourage you to stop by the student competition in the Exhibit Hall, check the innovative concepts, and talk to those next generation talents.

Competition Highlights

- Transportation vehicles and their energy source in 2112
- Aircraft avionics systems
- Ground or space based avionics systems that support flight
- Air traffic management systems

Join us in the Exhibit Hall and vote for your favorite designs! For more information, please contact Leihong Li, student.actitivties.chair@das-conline.org.

Awards Luncheon

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

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 2012 IEEE/AESS Pioneer Award, the David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award for the 30th DASC, Cary R. Spitzer Professional Education Program Presentation, 31st Best of Track, and Student Best Paper Awards.

2012 IEEE/AESS Pioneer Award

This award will be presented for seminal and pioneering contributions to the development and commercialization of aerospace electronic systems to Dr. Asad Madni, President, Chief Operating Officer & CTO (Retired), BEI Technologies Inc.

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 30th 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 "Collision Avoidance for General Aviation," Thomas B. Billingsley, Mykel J. Kochenderfer, James P. Chryssanthacopoulos, MIT Lincoln Laboratory.

Cary R. Spitzer Professional Education Program Presentation

In honor of Cary R. Spitzer, for over 30 years of outstanding support, initiation, and development of the DASC Professional Education Program, the program has been renamed the Cary R. Spitzer Professional Education Program. This is by unanimous decision by the DASC Executive Committee consisting of representatives of the AIAA Digital Avionics Technical Committee (DATC), the IEEE Aerospace and Electronic Systems Society (AESS), and the 31st DASC Committee. The plaque will be presented to Cary Spitzer's wife.

Panel Lunch

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

Defining the Future, Now

The Moderator:

Art Tank

Lockheed Martin Aeronautics

The Panelists are:

George Finelli

Director for Aeronautics Research, NASA Langley Research Center

Dr. Wilson Felder

Director of FAA's William J. Hughes Technical Center

Bruce McKay

Director, Lockheed Martin Aeronautical Systems

Dr. Thomas Christian

Director of Air Force Center for Systems Engineering, Air Force Institute of Technology (invited)

Mike Mena

Director, Advanced Cockpit Programs, Gulfstream Aerospace

Dr. Christopher J. Hegarty

Director of CNS Engineering & Spectrum, The MITRE Corporation

Mindful of our rich flight history, our Panelists will review our evolution and vision of the future. Through an avionics focus, they will provide thought provoking near term reminders of what people are doing to plan for aviation and space transportation 100 years from now. The Panel will give a good encapsulation of what the DASC Technical Program, Workshop, and Plenary Sessions have put forward while concurrently offering their professional perspective.

Plenary Session

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

Roger D. Connor

Museum Specialist,
Instruments and Vertical Flight
Smithsonian National Air and Space Museum

"Historical Perspectives on Avionics Innovation"

Less than a decade after the Wright brothers first flew, military and civilian innovators and entrepreneurs were exploring the enhancement of aircraft performance and capabilities with new systems of communication, navigation, and flight control. By mid-century, avionics were the cutting-edge of American technological endeavor. This presentation seeks to delineate historical themes of success in the field to enable a better understanding of present-day challenges.

Roger Connor began his aeronautical career as fixed-wing flight instructor and a designated examiner for the UK CAA, with nearly 4,000 hours of dual instruction given. He began working for the National Air and Space Museum in 2000, where he curates the vertical flight (helicopters, gyroplanes, and VTOL aircraft), instrument and avionics, radar, air traffic control, gunsights and bombsights, and navigational infrastructure. He is co-curating a major new permanent exhibition on the history of navigation. Roger holds a Masters in Museum Studies from The George Washington University and a Masters in History from George Mason University, where he is now currently completing his PhD.

Buz Carpenter

SR-71 Instructor Pilot

"Amazing Achievement – Visionary Tight Leadership – The SR-71 Story"

Hailing from Oakland, California, Buz Carpenter graduated from the USAF Academy in June 1967 and then completed pilot training at Williams AFB, AZ Sept 1968. He retired as a Colonel after serving as the 2nd Air Force vice commander. 2nd AF was responsible for all the USAF Intelligence, Surveillance and Reconnaissance flying assets. Currently, Mr. Carpenter is a Docent at The Udvar-Hazy Center of the National Air & Space Museum at Dulles airport.

Aircraft Flown

- C-141 worldwide airlift as an Aircraft Commander – 1350 hours
- RF-4C in Vietnam combat with 150 combat hours and later in Japan, served as Flight Commander and Instructor Pilot – 1150 hours
- SR-71 Flown worldwide as an aircraft commander and later Instructor Pilot with over 60+ operational missions accruing 777 hours
- T-38 Companion Trainer & Instructor Pilot – 500+ hours
- USAF Blackworld programmer in Pentagon involving programs such as F-117, B-2 Bomber, F-22 and others
- F-4E Fighter Squadron Commander – 450+ hours Converted squadron into F-16 A/Bs
- Wing commander in Europe at Ramstein AB, Germany during the Gulf War – Desert Shield & Desert Storm
- U-2 flights as staff officer – 12 + hours.

Douglas A. Rohn

Director, Aviation Safety Program
NASA

"Technical Challenges in Aviation Safety"

As director of the Aviation Safety Program Office at NASA Headquarters, Douglas Rohn is responsible for the overall planning, management and evaluation of the directorate's research efforts to improve the overall safety of aircraft that fly today in U.S. airspace and those that will fly in the U.S. system for tomorrow. In addition, he supports the associate administrator in a broad range of mission directorate activities, including strategic and program planning, budget development, program review and evaluation, and external coordination.

Mr. Rohn has been a part of NASA's Aviation Safety Program since 1998. Previously he was deputy program director, providing strategic management of technical product across multiple projects within the program. Prior to coming to Headquarters, Mr. Rohn was project manager at NASA's Glenn Research Center in Cleveland for the Aircraft Aging and Durability project and an engineering program manager for the Aero Project Implementation Office. In addition, Mr. Rohn has been a project manager on physics-based design and manufacturing, accident mitigation, and aviation security research projects.

His awards include the NASA Medal for Exceptional Service in 2003, the Structures Division Best Paper Award in 1985, and the NASA Tech Brief Award in 1979. He has also been awarded several NASA Group Achievement Awards and NASA Special Act or Service Awards. Mr. Rohn earned a Bachelor's degree in mechanical engineering from Cleveland State University and a Master's degree in mechanical engineering from the University of Toledo.

Brant Dahlfors
President, U.S. Sales
Bombardier Aerospace

"Leading the Way"

Bombardier will share the latest Aircraft Market Forecast presenting a 20-year outlook. The 20-year time horizon reflects a long-term vision of the market and better matches the life-cycle of aircraft programs. The forecast also includes an in depth look at the market drivers in the major regions of the world.

Brant Dahlfors is Bombardier Aerospace's President, U.S. Sales for new Business Aircraft, which includes the three premier brands, Learjet, Challenger, and Global Express jets. In this Capacity, he is responsible for developing and managing a long-term growth strategy in the U.S. and Canada. Additionally, Mr. Dahlfors is an active member on the Management Review Committee of Bombardier's fractional aircraft unit, FLEXJET and serves as President of Bombardier's U.S. entity Bombardier Aerospace Corporation.

With over 33 years' experience in private aviation, Mr. Dahlfors has held various sales, marketing, and senior management positions with Beech Aircraft, Mooney Aircraft, TBM North America and Aerospatiale General Aviation, before joining Bombardier Aerospace in 1995 as its Learjet Sales Director in the Pacific Northwest.

Mr. Dahlfors received degrees in accounting and marketing from Wright State University in Dayton, Ohio and is also a commercial/instrument rated pilot with over 3,000 hours.

John W. Borghese
Vice President, Advanced Technology Center
Rockwell Collins

"Avionics Reality Check: A History and 21st Century Challenges"

As avionics systems become increasingly integrated and software complexity continues to grow, there are three key challenges to overcome: Addressing the rising cost of DO-178 software development and certification, certifying avionics systems on multicore processors, and protecting against cyber threats. Potential solutions, some controversial, that address these three problems will be proposed.

J.W. (John) Borghese is Vice President of Rockwell Collins Advanced Technology Center (ATC), a position he has held since 2005. Prior to his current position, John served as Vice President and General Manager of Kaiser Aerospace & Electronics, a Rockwell Collins company.

During his professional career, Mr. Borghese has held positions in general management, program management, business development, and engineering. These include president of Kaiser Electronics and director of Automatic Test Systems & Avionics Systems Business at Allied-Signal (Honeywell). His engineering experience is in avionics, flight control, and airborne sonar systems.

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.

John J. Hickey
Deputy Associate Administrator for Aviation Safety
FAA

As Deputy Associate Administrator, John Hickey assists the Associate Administrator in providing oversight and direction for the certification, production approval, and continued airworthiness of aircraft; the certification of pilots, mechanics, flight attendants, and others in safety-related positions; the certification of all operations and maintenance enterprises in domestic civil aviation; development of regulations; and the certification and safety oversight the U.S. commercial airlines and air operators. These programs have a direct impact on every facet of domestic and international civil aviation and are the heart of the Nation's aviation safety efforts.

Before being named the Deputy Associate Administrator, Mr. Hickey served as the Director of the Aircraft Certification Service (AIR) since October, 2000. As the Director, he was responsible for the design certification, production approval, and continued airworthiness of the U.S. civil aircraft fleet, and was directly involved in the development and implementation of several significant safety and security actions, including Fuel Tank Safety, the Aging Airplane Program and Flight Deck Door Security initiatives.

Prior to joining FAA, John worked for The Boeing Company for 10 years on the Aerodynamics Staff of the Engineering Division. He first became involved in aircraft certification in 1984 on the Boeing 737-300 program, and subsequently served as certification lead for aerodynamics performance on the 737-400, 737-400HGW, and 737-500 programs. While at Boeing, John was a designated engineering representative (DER) for FAA.

Mr. Hickey earned a bachelor's degree in aerospace engineering from Boston University.

Cary R. Spitzer Professional Education Program

Professional Education Chair
Maarten Uijt de Haag
Ohio University

It is my pleasure to welcome you to the Cary R. Spitzer Professional Educational Program for the 31st DASC named in memory of Cary R. Spitzer, long-time tutorial instructor for our digital avionics short courses. We are pleased to offer educational opportunities that are tailored to support this year's theme: Projecting 100 Years of Aerospace History into The Future of Avionics.

This year we are offering 20 separate tutorials, including 7 new or updated ones. All tutorials are organized into tracks, allowing attendees to easily identify educational opportunities that align most closely with their areas of interest. Most courses have been selected to complement the topics that will be presented in the technical program, ranging from Avionics Design and Genesis, Design Assurance, Systems Engineering and Communication Systems to Spacecraft Avionics and NextGen concepts. Some of the short courses directly address the conference theme, relating the history of aeronautics to the future of avionics 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 outcomes to help focus the course on the needs of attendees. DASC tutorials are affordable and offer an excellent opportunity to learn 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, the professional development program of the 31st DASC is sure to provide a valuable learning experience.

We hope you will take advantage of the educational program and will benefit technically and professionally from your participation in the 31st DASC.

	Sunday, October 14		Monday, October 15			
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 (Grant's Redoubt)	Systems Engineering and Systems Thinking in Aviation*	Fault-Tolerant Avionics Systems *	Advanced System Integration: Ethernet Networking for Critical Embedded Systems*	Long-Term Evolution: Review of the 3GPP's LTE System*	Future Air Navigation System 1/A (FANS 1/A)	Communication and Networking (Lee's Redoubt)
Instructor	SL1: Simons	SA1: Hitt	MM1: Steiner/Jakovljevic	ML1: Matolak	MA1:Heinke	Instructor
Integrated Modular Avionics (Lee's Redoubt)	ARINC 653 - A Detailed Exploration (Lecture Session)	ARINC 653 - A Detailed Exploration (Hands On Lab Session)	Avionics Genesis, Lineage, and Evolution - Part 1*	Alternative Positioning Navigation and Timing (APNT) for NextGen and SESAR*	Avionics Genesis, Lineage, and Evolution - Part 2*	Avionics Genesis and NextGen (Jackson's Redoubt)
Instructor	SL2: Kinnan	SA2: Kinnan	MM2: Hitt, Redling,Oishi	ML2: Pelgrum	MA2: Hitt, Redling,Oishi	Instructor
NextGen and Avionics Displays (Jackson's Redoubt)	Surveillance and Collision Avoidance for NextGen*	Synthetic and Enhanced Vision Systems*	The Modular Open Systems Approach (MOSA) in Defense Acquisition	Cary Spitzer's Digital Avionics	Modern Avionics Architectures	Avionics Design and Systems Engineering (Grant's Redoubt)
Instructor	SL3: Uijt de Haag/Farrell	SA3: Theunissen/Uijt de Haag	MM3: Logan	ML3: Helfrick	MA3: Logan	Instructor
Spacecraft Avionics (Davis Amphitheater A)	Part I – Spacecraft Avionics Systems Engineering Fundamentals	Part II – Spacecraft Avionics Subsystem Systems Engineering	Aviation Software Design Assurance – The Fundamentals	Futureproofing Your Software Development – Understanding DO-178C and its Associated Supplements*	DO-254 – Complex Electronic Hardware – Lessons from the Trenches	Design Assurance (Davis Amphitheater A)
Instructor	SL4: Andrew	SA4: Andrew	MM4: Ferrell	ML4: Ferrell/Ferrell	MA4: Ferrell	Instructor

*is a new or updated tutorial

Tutorial Descriptions

Sunday, October 14
Session 1 – Systems Engineering

SL1: Systems Engineering and Systems Thinking in Aviation

J. Mark Simons, MITRE/CAASD

This tutorial introduces the fundamentals of systems engineering and systems thinking in the context of aviation system development using the techniques from basic functional analysis and the Systems Modeling Language (SysML). This interactive tutorial will explore systems engineering from the perspective of an enterprise, a system of systems, and single systems. It will also address the definition of system boundaries, actors, their associated roles and responsibilities, and their functions. The tutorial will also examine system development from the conceptual, engineering, and operational stages of the traditional system lifecycle.

SA1: Fault-Tolerant Avionics Systems

Ellis Hitt, StratSystems, Inc.

This tutorial will present design methods for fault tolerant avionics and validation methods to determine the ability of an avionics system to tolerate faults. The tutorial addresses hardware-software design faults, hardware manufacturing faults, software coding and integration faults, system integration faults (including testing faults that fail to detect malicious software threats), training faults, and human-system operation faults. Complex systems require that the human operator be trained to take the correct action when a fault occurs. Too many cases are attributed to "crew error" that really are design and training errors, or errors with "outside" contributors. ("What we have here is a failure to communicate!") 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 14
Session 2 – Integrated Modular 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 straw-man 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 14
Session 3 – NextGen and Avionics Displays

SL3: Surveillance and Collision Avoidance for NextGen

Maarten Uijt de Haag, Ohio University
James L. Farrell, Vigil Inc.

This short course will discuss current and planned surveillance systems for the Next Generation (NextGen) Air Transportation System and Europe's Single European Sky Air Traffic Management Research (SESAR), and methods to assure aircraft separation and avoid midair collisions. Surveillance systems will play an important role in detecting, validating, and characterizing cooperative and non-cooperative air vehicles in and approaching the National Airspace System (NAS). This course will discuss independent non-cooperative (i.e., primary surveillance radar), independent cooperative (i.e., secondary surveillance radar and multi-lateration), and dependent cooperative systems such as ADS-B and TIS-B. Much focus will be placed on the role of the latter systems in Aircraft Surveillance Application Systems (ASAS), such as conflict detection and enhanced visual acquisition as described in, for example, DO-317. Furthermore, this course will address aircraft collision avoidance systems (ACAS), such as the Traffic Alert and Collision Avoidance System (TCAS) II, and discuss the future use of improved surveillance through ADS-B for ACAS (i.e., DO-337).

SA3: Synthetic and Enhanced Vision Systems

Erik Theunissen, Delft University of Technology
Maarten Uijt de Haag, Ohio University

Synthetic vision is regarded as a means to increase both safety and operational capabilities. The design of a synthetic vision system presents the designer with questions regarding which data needs to be presented; how the data should be represented; and how the representation should be mapped onto the display.

To provide an understanding of the design options and constraints for SVS/EVS-type displays, the tutorial will address the representation of terrain- and trajectory data and non-physical constraints. Topics covered comprise the selection of the projection method, viewpoint, viewing direction, field of view (FOV), the use of color-coding and textures to control visual fidelity and spatial frequency, the use of specific object shapes to provide temporal range information and exploit specific emergent features, and concepts for display augmentation to enable a range of control strategies.

In addition, display generation, graphics processors, 3-D engines and topics such as anti-aliasing and texturing will be covered to provide better insight in the EVS/SVS technology enablers and constraints. Regarding SVS

Tutorial Descriptions

software, API's and rapid prototyping tools will be addressed.

Finally, this course will discuss methods that guarantee the quality or required performance (i.e., accuracy, integrity, availability and continuity) of the data represented on the SVS and EVS displays. Topics will include terrain database quality standards and integrity monitors and traffic tracking algorithms with built-in integrity monitors.

Sunday, October 14

Session 4 – Spacecraft Avionics

SL4: 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. Topics covered include: 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 understanding of how the Systems Engineering process is vital to the success of any Spacecraft Avionics Program or Project.

SA4: Part II – Spacecraft Avionics Subsystem Systems Engineering

George Andrew, GNA Aerospace Consulting Group, Inc.

This session provides a detailed look at basic spacecraft avionics subsystem systems' level design and engineering requirements that are needed 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 what documentation is needed to conceptualize and develop Avionics Subsystem Architectures. Combined with Part I – Spacecraft Avionics Systems Engineering Fundamentals, the participant will attain a greater understanding of how the Avionics Subsystem Systems Engineering process is vital to the success of any Spacecraft Avionics Program or Project.

Monday, October 15

Session 1 – Communications and Networking

MM1: Advanced System Integration: Ethernet Networking for Critical Embedded Systems

Wilfried Steiner and Mirko JakovIjevic, 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.

ML1: Long-Term Evolution: Review of the 3GPP's LTE System

David Matolak, Ohio University/University of South Carolina

This tutorial will provide participants with knowledge of the latest 4th-generation (4G) cellular wireless system, denoted the 3rd-Generation Partnership Project's (3GPP's) Long-Term Evolution, or LTE. The LTE system is aimed at higher data rates (100 Mbps downlink) than ever before to a larger and more mobile user population. The system also aims at reduced latency, allows for scalable bandwidths, and increased spectral efficiency. In this course, we cover the following general outline:

- Overview of the LTE system
- Downlink Description
- Uplink Description
- Physical Layer Procedures.

We will also provide some review of orthogonal frequency division multiple access (OFDMA) used in the competing WiMAX scheme (a derivative of which is being standardized for airport surface use). Overall network architecture, resource allocation, and multiple-input/multiple-output (MIMO) techniques are also described.

MA1: 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. Exciting new data link systems are discussed, such as IridiumNext, Inmarsat SwiftBroadband and FANS-over-Iridium. 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 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 sub-network. 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.

Tutorial Descriptions

Monday, October 15

Session 2 – Avionics Genesis and NextGen

MM2: Avionics Genesis, Lineage, and Evolution – Part 1

Ellis Hitt, StratSystems, Inc.
Tom Redling, Vice-Chair AIAA DATC
Roy Oishi, Retired Chair of AEEC

From the beginning of aviation, pilots needed to know where they were and the status of the aircraft they were flying. This visual tutorial presents the beginning of avionics, the products, and companies, and the evolution from the early 1900s to the present. Avionics described include both the aircraft onboard avionics (military and civil) and the ground and satellite systems now used for communications, navigation, surveillance, and air traffic management. This tutorial is presented in two sessions. The first session covers the period from the Wright Flyer (1903) to the mid-1950s.

Session 1 – The Early Years of Aviation Through The Beginning of The Jet Age

Did you ever wonder how avionics were developed and introduced into aircraft? Alternative products necessitated development of standards (interface and signal) and procedures for ensuring the safe flight of the aircraft. Learn how the pioneers of aviation and their companies developed these standards and the ongoing effort to achieve the full capability that can be provided by modern avionics in a global air transport environment. The tutorial will take you from the fundamental, stand-alone early flight instruments that required pilots to integrate the information from each instrument to the analog avionics used up to the beginning of the jet age.

ML2: Alternative Positioning Navigation and Timing (APNT) for NextGen and SESAR

Wouter Pelgrum, Ohio University

GNSS play an essential role in NextGen and SESAR's intended PBO, TBO, and surveillance functions. For example, the vulnerability of GNSS to interference, solar activity, and also system anomalies warrants the development of an "Alternative Positioning, Navigation, and Timing" (APNT) system.

This course will start with a brief overview of NextGen and SESAR, the envisioned APNT CONcept Of Operations (CONOPS), and the resulting APNT performance requirements in terms of Accuracy, Integrity, Availability, Capacity, and Coverage.

Various APNT architectures are considered, with different levels of complexity, performance, and required investments for the provider and user. The course discusses these architectures in detail as well as their enabling technologies.

The capabilities and shortcomings of current "legacy" navigation solutions, consisting of (a mix of) NDB, VOR, DME, and IRU are discussed first in the context of APNT. Next, an upgraded DME-DME system is considered that fully leverages the advances that have been made on DME interrogator and transponder equipment performance. More revolutionary performance enhancements of DME are possible with novel techniques such as DME carrier phase, broadcasting of a "beat" signal, multipath bounding, the combination of one-way and two-way ranging, and DME passive ranging. These novel techniques will be discussed in detail, including recent flight test results.

Another candidate for APNT that is covered in this course is spread-spectrum passive ranging, using terrestrial "pseudolites" broadcasting in the 960-1215 MHz protected ARN band. These transmissions could be dedicated either for navigation and timing, or part of an existing communication system, such as UAT or for example, the proposed future LDACS1 system. Finally, the APNT solution can be determined on the ground, rather than in the air, using Wide Area Multilateration (WAM) using a synchronized network of terrestrial Mode-S ES and UAT receivers.

Various proposed APNT architectures rely on robust time and frequency synchronization between ground stations. Different synchronization methods, such as GPS, two-way satellite, and low-frequency time and frequency transfer are discussed in the context of APNT, including their expected performance levels and required infrastructure.

MA2: Avionics Genesis, Lineage, and Evolution – Part 2

Ellis Hitt, StratSystems, Inc.
Tom Redling, Vice-Chair AIAA DATC
Roy Oishi, Retired Chair of AEEC

From the beginning of aviation, pilots needed to know where they were and the status of the aircraft they were flying. This visual tutorial presents the beginning of avionics, the products, and companies, and the evolution from the early 1900s to the present. Avionics described include both the aircraft onboard avionics (military and civil) and the ground and satellite systems now used for communications, navigation, surveillance, and air traffic management. This tutorial is presented in two sessions.

Session 2 – The History and Future of Modern Digital Avionics

The transition from analog to digital avionics started with the replacement of analog computers with digital computers and the introduction of data buses to facilitate the processing, integration, and presentation of information on flat panel displays for the integrated control of flight. This session covers the development of early digital avionics, including the timeline of the technologies that led from the early ARINC and MIL-STDs to the current networked avionics and air traffic management systems. Avionics communication has evolved from early radios for voice communication with the ground to sophisticated networked communication both among avionics units and to ATC and the Internet. Software implementation and integration of avionics functions provide reliable, maintainable, crew centered systems.

Monday, October 15

Session 3 – Avionics Design and Systems Engineering

MM3: The Modular Open Systems Approach (MOSA) in Defense Acquisition

Glen Logan, The Research Associates

The Modular Open Systems Approach

Tutorial Descriptions

(MOSA) has been a Department of Defense (DoD) initiative for more than 15 years. This tutorial covers the motivation, policies, concepts and practical applications behind the DoD's approach to leverage commercial tech¬nology 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 applica-tion of open architecture.

The tutorial provides detailed examples of the many life-cycle cost savings, cycle time reduc¬tions 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) meth¬odology and the emerging Openness Readiness Levels under development by a NAVAIR-led industry working group.

ML3: Cary Spitzer's Digital Avionics

Albert B. Helfrick, Embry-Riddle Aeronautical University

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 (e.g., data buses) and the precise meaning of commonly misused terms.

MA3: Modern Avionics Architectures

Glen Logan, The Research Associates

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 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 14

Session 4 – Design Assurance

MM4: Aviation Software Design Assurance – The Fundamentals

Uma Ferrell, Ferrell & Associates Consulting

Using DO-178B as a guide, this tutorial introduces the fundamentals of software design assurance. Topics covered include the importance of planning the details of the software development process, accomplishing rigorous and well-documented peer reviews, ensuring the overall software architecture and design is consistent with software and system safety, and understanding the details of software testing. In addition, establishment of efficient configuration management and a robust software quality organization will be addressed. Finally, the current regiment of software-related certification guidance will be discussed, including the FAA's software approval guidelines and EASA's software-related Certification Memos. The focus of this updated DO-178B course is to ensure participants have a good understanding of "why" various activities are required for approval of the SW in a safety-related system and how evidence of those activities can be demonstrated in a cost-effective and efficient way. Finally, this tutorial will address approaches for dealing with some of the most recent challenges to emerge with respect to DO-178B's application. Examples include incremental and/or prototype-driven development, COTS-based systems, post-certification maintenance, and outsourced SW development activities.

ML4: Futureproofing Your Software Development – Understanding DO-178C and its Associated Supplements

Tom and Uma Ferrell, Ferrell & Associates Consulting

RTCA has recently published updates to DO-178, DO-248, and a series of new Technical Supplements intended to extend SW design assurance to modern SW engineering methods. The FAA and EASA are in the process of reviewing and updating their associated guidance to recognize these new documents. This tutorial will provide a detailed look at the new documents, how they should be applied, and what it means for software development assurance going forward. Starting with changes contained in the core DO-178C, the tutorial will address new objectives, activities, and data likely to be part of any new avionics program once the guidance is officially recognized by the various regulatory authorities. The individual supplements for formal methods, object-oriented technology, model-based development, and tool qualification will be addressed. The tutorial will conclude with the latest status on both FAA and EASA guidance associated with this family of new publications.

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 the 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) continues to be one of the aerospace industries biggest challenges for new avionics certification efforts. The tools marketplace, associated regulatory guidance, and even the scope of application are evolving. This tutorial will provide a comprehensive look at the contents of DO-254, how that content is currently being interpreted by the regulatory authorities and major airframers, and how to go about setting up a fully compliant DO-254 process infrastructure. Special emphasis will be given to establishing a rigorous review process for hardware data, the proper balance between simulation and board-level testing, and how to deal with the more incremental approach to FPGA design in the context of the required development review cycle. The tutorial will also discuss design considerations for safety-critical development, including considerations for a solid HDL coding standard, addressing various timing challenges, various reset architectures; single-event upset mitigation, and the use of safe state machines. Finally, the tutorial will address how to affectively address the requirements for additional design assurance at levels A and B (i.e., DO-254 Appendix B topics).

Honoring Cary R. Spitzer

Cary Spitzer's career included many distinguished contributions to the advancement of avionics. Cary defined avionics as "anything on the airplane or spacecraft that has an active device in it and consumes electrons." Cary was a key contributor at NASA Langley in his work on the Viking program, and the Advanced Transport Operating System Office where he took part in the testing of the Microwave Landing System (MLS), GPS, and digital communications. While working at NASA, Cary began organizing and teaching tutorials at the Digital Avionics Systems Conference (DASC). After his retirement from NASA in 1994, he taught short courses at UCLA, and companies world-wide.

Cary was a prolific writer and wrote papers, including the **Digital Avionics Systems, Principles and Practice** text book. He wrote and organized the publication as Editor-in-Chief the Avionics Handbook, published by CRC Press.

In 1992, Cary led a group of industry experts in visits to European avionics and aircraft companies for NASA. **The Assessment of Avionics Technologies in European Aerospace Organizations** report provided insight on the development of avionics for the next generation of aircraft.

Cary was awarded the IEEE Centennial Medal, an IEEE Millennium Medal, and the Digital Avionics Award. He was a Fellow of the IEEE, President of the IEEE AESS, and the IEEE United States Activities Aerospace Policy Committee. Cary was an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA).

Technical Program

Technical Program Chair
Steve Young
NASA Langley Research Center

WELCOME: Thank you for participating in the 31st DASC! We gather in Williamsburg, VA, this year to exchange ideas, developments, and research findings among and across a broad sector of aerospace industry experts, government leaders and researchers, and the inquisitive scholars of academia. This year's technical program complements our conference theme by providing a retrospective look at the past of digital avionics, a glimpse of the future, and highlights of the community's most recent and innovative avionics advancements and research outcomes.

TECHNICAL SESSIONS: The technical sessions that are held Tuesday through Thursday will include over 200 technical presentations from 19 different countries. The presentations will take place in 10 parallel tracks: Flight Deck Systems; Air Traffic Management (ATM); Communications, Navigation and Surveillance (CNS); Unmanned Aircraft Systems (UAS); Systems and Software Engineering; Information Management, Networks, and Architecture; and Verification and Validation of Complex Systems. In addition, a poster track will be included again this year, allowing one-on-one interaction with authors on special topics.

OPPORTUNITIES TO LEARN OUR HISTORY: A full session of unique presentations will be given on significant events in avionics history – events and developments that have shaped the avionics world and helped to set our vision for the future. Our Thursday evening event will be held at the nearby Virginia Air and Space Center, with noted aerospace historian, Dr. Richard "Dick" Hallion, as a guest speaker. Also, be sure to visit our exhibits at the conference; several will be displaying interesting avionics artifacts to remind us of how much we can, and should, always be learning from our past.

CONFERENCE PROCEEDINGS CD-ROM: The 31st DASC is producing post-conference proceedings this year so that it can include not only the technical papers, but also the presentations given by the authors, and results of our workshop and lunch panel discussions. We expect to mail everyone the proceedings by 26 November 2012.

Thanks again for coming. We hope you truly enjoy the event as well as the opportunity to explore historic Williamsburg and the nearby Tidewater and Chesapeake Bay regions of Virginia.

Steve Young

The technical program for the 31st DASC will include 35 technical sessions organized into 10 tracks. Each session includes six 30-minute presentations summarizing technical papers to appear in the conference proceedings. The following schedule, dates, and times are subject to change:

	Tuesday, October 16	Wednesday, October 17		Thursday, October 18	
	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 - 5:00 pm
Track 1 **Our History, Our Future** Co-Chairs: Al Helfrick, Embry-Riddle Aeronautical University and Eric Theunissen, Delft University of Technology	**Special Topics in Avionics History** Co-Chairs: Al Helfrick, ERAU and Erik Theunissen, Delft University of Technology				
Track 2 **Flight Deck Systems** Co-Chairs: Bernd Korn, DLR and Al Herndon, MITRE		**Terrain Awareness and Collision Avoidance** Co-Chairs: Todd Lovell, Raytheon and Art Tank, Lockheed Martin	**Operations and Procedure Design** Co-Chairs: Christian Pschierer, Jeppesen and Colleen Donavon, FAA	**Advanced Displays** Co-Chairs: Erik Theunissen, Delft University of Technology and Divya Chandra, U.S. DOT / Volpe Center	**System Design and Simulation** Co-Chairs: Randy Bailey, NASA Langley Research Center and Mike Brychcy, Boeing
Track 3 **Air Traffic Management - 1** Co-Chairs: Elly Smith, MITRE and Liling Ren, GE Aviation	**Arrival Management Optimization** Chair: Craig Johnson, MITRE	**Arrival Management: Operations and Benefits** Chair: Leihong Li, Georgia Tech	**TBO: Measurement and Effect of Uncertainties** Chair: Travis Gaydos, MITRE	**TBO Modeling** Chair: Douglas Sweet, Saab Sensis Corporation	**Traffic Flow Management** Chair: Bernd Korn, DLR
Track 4 **Air Traffic Management - 2** Co-Chairs: Suzanne Porter, MITRE and John Moore, Boeing	**Benefits/Performance Analysis Through Simulation** Co-Chairs: Tom Becher, MITRE and Dan Howell, MCI	**Optimization of Procedures** Co-Chairs: William Johnson, NASA Langley Research Center and Ian Levitt, FAA	**Separation and Safety 1** Co-Chairs: Jonathan Lee, U.S. DOT / Volpe Center and Stephen Mackey, U.S. DOT / Volpe Center	**Separation and Safety 2** Co-Chairs: Ralf Mayer, MITRE and Mykel Kochenderfer, MIT Lincoln Lab	**Surface Management** Co-Chairs: Mary Ellen Miller, Mosaic ATM and Benjamin Levy, Saab-Sensis
Track 5 **Communications, Navigation, and Surveillance** Co-Chairs: Wolfgang Schuster, Imperial College London and Robert Kerczewski, NASA Glenn Research Center	**Navigation 1** Chair: Wouter Pelgrum, Ohio University	**Navigation 2** Chair: Chris Hegarty, MITRE	**Surveillance 1** Chair: Chris Daskalakis, Aurora Fight Sciences	**Surveillance 2 / Communications 1** Chair: Benjamin Levy, Saab-Sensis	**Communications 2** Chair: Michael Schnell, DLR
Track 6 **Systems and Software Engineering** Co-Chairs: Susan Cheng, Boeing and Justin Littlefield, GE Aviation	Certification/Safety Chair: Pavel Paces, Czech Technical Univeristy	**Integrated Modular Avionics - 1** Chair: Larry Kinnan, Wind River	**Integrated Modular Avionics - 2** Co-Chairs: William Johnson, NASA Langley Research Center and Chunpeng Xiao, Georgia Tech	**Modeling/Simulation** Co-Chairs: Jonathan Lee, U.S. DOT / Volpe Center and Vince Orlando, U.S. DOT/Volpe Center	**Systems** Chair: Scott Crawford, Raytheon
Track 7 **Avionics Information Management, Networks, and Architecture** Co-Chairs: Paul Miner, NASA Langley Research Center and Peter Skaves, FAA	**Onboard Networks and IMA** Chair: Wilfried Steiner, TTTech	**Cyber-Security** Co-Chairs: Radha Poovendran, Univ. of Washington and Krishna Sampigethaya, Boeing	**Information and Health Management** Chair: Cynthia DeBisschop, CNA	**Architecture & Design Methods** Chair: Kurt Woodham, NASA Langley Research Center	**Novel Network Topics** Chair: Mahyar Malekpour, NASA Langley Research Center
Track 8 **Unmanned Aircraft Systems and Automation** Co-Chairs: Terry Morris, NASA Langley Research Center and Denise Ponchak, NASA Glenn Research Center	**UAS Sense and Avoid** Co-Chairs: Kevin Clark, U.S. DOT / Volpe Center and Jim Griner, NASA Glenn Research Center	**Management of UAS Resources** Co-Chairs: Maurico Castillo-Effen, GE and Gib Winter, Verizon Federal Network Systems	**Human-Automation Functional Allocation** Co-Chairs: Dave Matolak, University of South Carolina and Stephen Pledgie, Mosaic ATM		
Track 9 **Verification and Validation of Complex Systems** Co-Chairs: Paul Miner, NASA Langley Research Center and Peter Skaves, FAA				**Assurance of On-Board Systems - Network Assurance and Testing Techniques** Chair: Natasha Neogi, National Institute of Aerospace	**Uncertainty in NextGen - Trajectory Models and Visualization** Chair: Eric Feron, Georgia Tech
Track 10 **Posters** Chair: Steve Young, NASA Langley Research Center		**Special Topics**	**Special Topics**		

Technical Session A

Tuesday, October 16

A	**Track 1:** Our History, Our Future [Jackson's Redoubt]	**Track 2:** Flight Deck Systems	**Track 3:** ATM 1 [Grant's Redoubt]	**Track 4:** ATM 2 [Lee's Redoubt]	**Track 5:** CNS [Jeff Davis Amphitheater A]	**Track 6:** Systems and Software Engineering [Longstreet's Redoubt]
	Special Topics in Avionics History		Arrival Management Optimization	Benefits/Performance Analysis Through Simulation	Navigation 1	Certification/Safety
1:30	1A1 From Basic Instruments to Decision Support: History, Trends and (Missed) Opportunities Erik Theunissen ***Delft University of Technology***		3A1 Dynamic Route Optimization For Extended Terminal Airspace Arash Yousefi ***Metron Aviation Inc.***	4A1 Exploring Tactical Interaction between Dynamic Airspace Configuration and Traffic Flow Management (DAC-TFM) Alexander Klein ***Air Traffic Analysis, Inc.***	5A1 Implementation of the GPS-C/A Tracking Loops in FPGA Bac Nghia Vu ***University of Defence, Czech Republic***	6A1 Reusing Certified, Safety-Critical Avionics Software Tim King ***DDC-I***
2:00	1A2 From Captain Jeppesen's Little Black Book to the iPad and Beyond Christian Pschierer ***Jeppesen***		3A2 A Comparative Study of Interval Management Control Law Capabilities Bryan Barmore ***NASA Langley Research Center***	4A2 Global Time-Based Conflict Solution: Towards the Overall Optimum Alexander Kuenz ***Institute of Flight Guidance, DLR Braunschweig***	5A2 The Hardware Platform for the Tests and Evaluation of the Airborne GNSS Receiver Algorithms Adam Novotny ***University of Defence, Czech Republic***	6A2 Avionics Hard Real-Time Systems' Design Concerning Fault Tolerance Denis Loubach ***Brazilian Aeronautics Institute of Technology***
2:30	1A3 TRN History, Trends and the Unused Potential Airspace Daniela Vaman ***Delft University of Technology***		3A3 Development & Evaluation of the Terminal Precision Scheduling and Spacing System for Off-Nominal Condition Operations Harry Swenson ***NASA Ames Research Center***	4A3 Jaguar: Time Shifting Air Traffic Scenarios Using a Genetic Algorithm Bryan Petzinger ***Federal Aviation Administration***	5A3 NextGen Aircraft and Mixed Equipage Capabilities Sean McCourt ***MITRE/CAASD***	6A3 Realizing DO-178's Value by Using New Technology: OOT, MBDV, TQC & FM Luc Marcil ***Presagis***
3:00	**Break**					
3:30	1A4 Aircraft Radio Corporation and their Role in the Development of Avionics Albert Helfrick ***Embry-Riddle Aeronautical University***		3A4 Modeling Off-Nominal Events and Mitigation Strategies for Super Density Operations Jit-Tat Chen ***Metron Aviation***	4A4 Combined Performance/ Evironmental Analysis of Q-Routes Ankit Tyagi ***Intelligent Automation, Inc.***	5A4 LDACS1 for APNT – Planning and Realization of a Flight Measurement Campaign Dmitriy Shutin ***German Aerospace Center (DLR)***	6A4 Civil Certification of MIL-STD-1553B Tobias Schneider ***CASSIDIAN***
4:00	1A5 WWII Avionics Finds a New Home After the War Albert Helfrick ***Embry-Riddle Aeronautical University***		3A5 Benefits of Precision Scheduling and Spacing for Arrival Operations Shannon Zelinski ***NASA Ames Research Center***	4A5 An Improved Methodology for ARN Crossing Waypoints Location Problem Chen Jin ***School of Electronic and Information Engineering, Beihang University, China***	5A5 Hybrid APNT Architecture Using DME/DME and Multilateration Euiho Kim ***SELEX Systems Integration***	6A5 Integrating the Quantitative and Qualitative Aspects of Safety Assessment John Knight ***University of Virginia***
4:30	1A6 Data Convergence for Efficiency: A Holistic Rethink of the Passenger Experience Hugh Blair-Smith ***Down to the Metal***		3A6 Effects of Weather Condition on Aircraft Emissions in Climb Phase Gabriella Serafino ***Selex Galileo***	4A6 Concept and Benefits of a Unified Departure Operation Spacing Standard Ralf Mayer ***MITRE/CAASD***	5A6 APNT Architecture Study: Concepts, Implementation, and Flight-Test Results Wouter Pelgrum ***Ohio University***	6A6 Is the Current DO-254 Verification Process Adequate for the Future? Brian Butka ***Embry-Riddle Aeronautical University***

A	**Track 7:** Avionics Information Management, Networks, and Architecture [Hooker's Redoubt]	**Track 8:** Unmanned Aircraft Systems and Automation [Early's Redoubt]	**Track 9:** Verification and Validation of Complex Systems
	Onboard Networks and IMA	UAS Sense and Avoid	
1:30	7A1 Comparison of IEEE AVB and AFDX Stefan Schneele ***EADS Innovation Works, Munich, Germany***	8A1 Simulation and Flight Test Capability for Testing Prototype Sense and Avoid System Elements Charles Howell ***NASA Langley Research Center***	
2:00	7A2 Maximizing Fault Tolerance in a Low-SWaP Data Network Kevin Driscoll ***Honeywell International Inc.***	8A2 GDTI: A Ground Station Display of Traffic Information for Sense and Avoid Steven Bell ***MITRE/CAASD***	
2:30	7A3 Towards Optimal Design of Avionics Networking Infrastructures Oscar Acevedo ***Southern Illinois University***	8A3 Flight Guardian: A Common Avionics Architecture for Collision Avoidance and Safe Emergency Landing for UAS Luis Mejias Alvarez ***Queensland University of Technology, ARCAA***	
3:00		**Break**	
3:30	7A4 Ensuring Robust Partitioning in Multicore Platforms for IMA Systems Xavier Jean ***Thales Avionics***	8A4 Computing Risk for Unmanned Aircraft Self Separation with Maneuvering Intruders Jason Adaska ***Numerica Corporation***	
4:00	7A5 Incremental Functional Certification for Avionic Functions Reuse & Evolution Stéphanie Gatti ***Thales Airborne Systems SAS***	8A5 Modeling Unmanned Aircraft System Conflicts Resolution Based on a Real-time Services Approach Inaldo Capistrano Costa ***Technological Institute of Aeronautics***	
4:30	7A6 Research on Resource Fusion for Integrated Modular Avionics System Qingfan GU ***China National Aeronautical Radio Electronics Research Institute***		

The organizers of DASC ask that you respect the privacy of our presenters. While video recordings or other media captures of presentation content are forbidden, Session Chairs and Presenters may authorize it. Re-sale or posting of this media for public use is also forbidden without express prior AIAA/IEEE approval. Material approved for release will be made available in the conference proceedings, internet, and social media, as appropriate.

32nd DASC

Transforming the Air Transportation System – A Safety and Efficiency Collaboration

6-10 October 2013
Double Tree by Hilton, Syracuse, NY
www.dasconline.org

General Chair:
Steve Young

Technical Program Chair:
Benjamin Levy

Technical Session B

Wednesday, October 17

B	**Track 1:** Our History, Our Future	**Track 2:** Flight Deck Systems [Jackson's Redoubt]	**Track 3:** ATM 1 [Grant's Redoubt]	**Track 4:** ATM 2 [Lee's Redoubt]	**Track 5:** CNS [Jeff Davis Amphitheater A]	**Track 6:** Systems and Software Engineering [Longstreet's Redoubt]
		Terrain Awareness and Collision Avoidance	Arrival Management: Operations and Benefits	Optimization of Procedures	Navigation 2	Integrated Modular Avionics - 1
8:00		2B1 A400M Tactical Ground Collision Avoidance System (T-GCAS) Roland Goerke ***Cassidan***	3B1 NASA'S ATM Technology Demonstration-1: Integrated Concept of Arrival Operations Brian Baxley ***NASA Langley Research Center***	4B1 Optimization of Aircraft Arrival Procedures in TMA: Proposal of a Method Based on a New Concept of Airspace Structure Vincent Kapp ***DSNA***	5B1 IMU Aiding Using Two AHRS Units Pavel Paces ***Czech Technical University in Prague***	6B1 An Overview of ARINC 653 Part 4 Tim King ***DDC-I***
8:30		2B2 Modeling Terrain Awareness and Warning Systems for Airspace and Procedure Design Jason Lee ***MITRE/CAASD***	3B2 A Functional Analysis of Integrated Arrival, Departure, and Surface Operations in Nextgen Mark Simons ***MITRE/CAASD***	4B2 A Graph-Based Approach to Nominal Terminal Routing Shannon Zelinski ***NASA Ames Research Center***	5B2 FMC Field Observations Trials: Standard Instrument Departure with Radius-to-Fix Path Terminators Albert Herndon ***MITRE/CAASD***	6B2 Multi-Objective Mapping Optimization for Distributed Integrated Modular Avionics Bjoern Annighoefer ***Hamburg University of Technology***
9:00		2B3 Influence of Pilot's Demographics on Compliance to TCAS Resolution Advisories Leihong Li ***Georgia Institute of Technology***	3B3 Use of Near-Term Terminal Automation Capabilities for Meeting an Evolving Operating Environment Simon Heitin ***MITRE/CAASD***	4B3 Optimized Vertical Separation in Europe Cyril Allignol ***ENAC***	5B3 Curved Approach Procedures Enabled by a Ground Based Augmentation System Robert Geister ***German Aerospace Centre***	6B3 The COTS Based IMA Prototype for Hosted Applications Development Yunsheng Wang ***School of Computer Science and Engineering, UESTC; CETC Avionics***
9:30				**Break**		
10:00		2B4 Design of a Pilot-Centered Visual Decision-Support System for Airborne Collision Avoidance Emre Koyuncu ***Istanbul Technical University, Controls and Avionics Laboratory***	3B4 Air Traffic Controller Usage of Terminal Area Speed Advisories Joey Mercer ***San Jose State University / NASA Ames Research Center***	4B4 An Improved Multi-Objective Particle Swarm Optimizer for Air Traffic Flow Network Rerouting Problem Miao Zhang ***Beihang University***	5B4 Alternative Terminal Navigation Based on Modified Airport Multilateration System Ryan Wu ***Saab Sensis Corporation***	6B4 ARINC 653 and Multi-Core Microprocessors - Considerations and Potential Impacts Patrick Huyck ***Green Hills Software***
10:30		2B5 Implicit Maneuver Coordination: Issues and Potential Solutions Maarten Kastelein ***Delft University of Technology***		4B5 A New Geographical Routing Protocol for Heterogeneous Aircraft Ad Hoc Networks Khan Saifullah ***Gyeongsang National University***	5B5 Human Factors Research on Performance-Based Navigation Instrument Procedures for NextGen Divya Chandra ***U.S. DOT Volpe Center***	6B5 Small Aircraft Flight Safety Increasing Using Integrated Modular Avionics Tomáš Levora ***Czech Technical University in Prague, Faculty of Electrical Engineering***
11:00		2B6 Pilot Ability To Detect Conflicts in the Presence of Articulated Trajectories Patrick Martin ***412th Test Wing, Edwards Air Force Base***			5B6 TCAS-Aided Multilateration for Terminal Surveillance with Improved Accuracy Ryan Wu ***Saab Sensis Corporation***	6B6 Rapid Prototyping Enhanced IMA System Design and Verification Jian Min Wu ***China National Aeronautical Radio Electronics Research Institute***

B	**Track 7:** Avionics Information Management, Networks, and Architecture [Hooker's Redoubt]	**Track 8:** Unmanned Aircraft Systems and Automation [Early's Redoubt]	**Track 9:** Verificationn and Validation of Complex Systems	**Track 10:** Poster Papers [Jeff Davis Amphitheater B]
	Cyber-Security	Management of UAS Resources		Special Topics
8:00	7B1 MILS-Based Information Flow Control in the Avionic Domain: A Case Study on Compositional Architecture and Verification Kevin Mueller ***EADS Innovation Works***	8B1 Earliest Deadline First Scheduling Algorithm and Its Use in ANKA UAV Erhan Okuyan ***TAI Inc.***		10B Efficient Data Transmission Scheme for Real-Time Operation of Mission Computer Yong Ho Moon ***Gyeongsang National University***
8:30	7B2 Lessons Learned from an Active Cyber Defense Deployment Pilot Program Paul Perkins ***Raytheon***	8B2 Implementing Control and Mission Software of UAV by Exploiting Open Source Software-Based ARINC 653 Hyun-Chul Jo ***Konkuk University***		10B Design of Multi-Source and Multi-Dimension Information Fusion of Avionics System Zhiying Mou ***China National Aeronautical Radio Electronics Research Institute***
9:00	7B3 Addressing the Need for Robust Non-GNSS Time and Frequency for Alternate PNT Systems Mitch Narins ***FAA***	8B3 Cognitive UAV Ressource Management Allowing Task-based Mission Execution under Data Link Limitations Florian Böhm ***Universität der Bundeswehr Munich***		10B Miniaturization and Sensor Fusion of a Measurement Unit for a Trailing Bomb Jan Popelka ***Czech Technical University***
9:30		**Break**		
10:00	7B4 A Flight Data Storage System with Efficient Compression and Enhanced Security Yong Ho Moon ***Gyeongsang National University***	8B4 Hardware Implementation of Autonomous Unmanned Aerial Vehicle for Target Geo-Localization Mahadeeswara Yadav ***Anna University***		10B Passive Optical Network For Integrated Modular Avionics Xiaomin Liu ***Beihang University***
10:30	7B5 Privacy of General Aviation Aircraft in the NextGen Krishna Sampigethaya ***Boeing Research & Technology***	8B5 NASA UAS Communication Project Overview Jim Griner ***NASA Glenn Research Center***		10B Smart Sensor Data Processing for Aerospace Applications in Education Illustrated by Small Satellite Platform Demonstrator Pavel Paces ***Czech Technical University***
11:00	7B6 A Key Agreement Scheme for Avionics Communications Security Dahai Du ***Beijing University of Aeronautics and Astronautics***			10B Standalone Trailing Bomb Probe for Aero Metrical Measurements Pavel Paces ***Czech Technical University***

Note:
All posters in a session will remain on display, with the authors available to discuss them, during the entire session.

Technical Session C

Wednesday, October 17

C	**Track 1:** Our History, Our Future	**Track 2:** Flight Deck Systems [Jackson's Redoubt]	**Track 3:** ATM 1 [Grant's Redoubt]	**Track 4:** ATM 2 [Lee's Redoubt]	**Track 5:** CNS [Jeff Davis Amphitheater A]	**Track 6:** Systems and Software Engineering [Longstreet's Redoubt]
		Operations and Procedure Design	TBO: Measurement and Effect of Uncertainties	Separation and Safety 1	Surveillance 1	Integrated Modular Avioncs - 2
1:30		2C1 Flying Schedule-Matching Descents to Explore Flight Crews' Perceptions of Their Load and Task Feasibility Lynne Martin ***San Jose State University***	3C1 Analysis of S-Turn Approaches at John. F. Kennedy Airport Sebastian Timar ***Saab Sensis Corporation***	4C1 Phase-2 Evaluation of a Tactical Conflict Detection Tool in the Terminal Area Thomas Kozon ***University of California, Santa Cruz***	5C1 Transmitting Raw GNSS Measurements as Part of ADS-B: Why, How, and Flight Test Results Pengfei Duan ***Ohio University***	6C1 Allocation of Avionics Communication Using Boolean Satisfiability Daniela Cristina Carta ***EMBRAER S.A.***
2:00		2C2 Human Centered Design of an In-Trail Procedures (ITP) System Ratan Khatwa ***Honeywell International***	3C2 Automated Arrival Management: Effects of Descent Trajectory Prediction Errors on Metering Conformance Epifanio Munoz ***NASA Ames Research Center***	4C2 Safety Analysis Tool for Automated Airspace Concepts (SafeATAC) Arash Yousefi ***Metron Aviation Inc.***	5C2 Wind Analysis in Aviation Applications Christopher Wynnyk ***MITRE/CAASD***	6C2 A Feasibility Study for ARINC 653 Based Operational Flight Program Development Sungshin Lim ***Korea Aerospace Industries, Ltd.***
2:30		2C3 Development and Flight Evaluation of Airborne Weather Information System Tomoko Iijima ***JAXA***	3C3 Prediction of Weather Impacted Airport Capacity Using RUC-2 Forecast Yao Wang ***NASA Ames Research Center***	4C3 An Initial Examination for Verifying Separation Algorithms by Simulation Allan White ***NASA Langley Research Center***	5C3 Technical Standard Order Authorization and Airworthiness Approval Considerations for Aircraft Weather Radar System Lee Nguyen ***FAA, Avionics Systems Branch***	6C3 A Fault-Tolerant Temporal Partitioning Scheme for Safety-Critical Mission Computers Jongsoo Hyun ***Korea Aerospace Industries, Ltd.***
3:00				**Break**		
3:30		2C4 General Aviation Landing Assistance Using Formal Methods-Based System Design Wolfgang Pointner ***Johannes Kepler University Linz***	3C4 Aircraft Time-2D Longitudinal Guidance Based on Spatial Inversion of Flight Dynamics Hakim Bouadi ***ENAC, Toulouse, France***	4C4 Safety Net For A Sectorless Air Traffic Management Concept Bettina Birkmeier ***DLR (German Aerospace Center)***	5C4 ADS-B based Next Generation Air Traffic Control: Security Concerns Rajesh R ***TATA ELXSI Limited***	6C4 ARINC 653 API and Its Application — An Insight into Avionics System Case Study Ananda Challaghatta Muniyappa ***CSIR - National Aerospace Laboratories***
4:00		2C5 Standards and Requirements for Synthetic, Enhanced, and Combined Vision Systems - Status of RTCA SC-213 Activities Tim Etherington ***Rockwell-Collins, Inc.***	3C5 Planning Considerations for Developing Automated Advisory Solution Concepts for Meeting the Meter Schedule Travis Gaydos ***MITRE/CAASD***	4C5 Improving General Aviation Safety Using Low-Cost Iridium Devices Michael J. Glasgow ***Lockheed Martin***		6C5 Full Virtualizing Micro Hypervisor for Spacecraft Flight Computer Hyungshin Kim ***Chungnam National University***
4:30		2C6 Rotary Wing Autopilot Flight Computer Test-Bed for Advanced Control Algorithms Orkun Hasekioglu ***Turkish Airlines Technic***		4C6 Tower Controller Response to Runway Safety Alerts Elida Smith ***MITRE/CAASD***		6C6 Filling the Gap Between IMA Development and Safety Assessment through Safety-Driven Model-Based System Engineering Dajiang Suo ***Tsinghua University***

C	**Track 7:** Avionics Information Management, Networks, and Architecture [Hooker's Redoubt]	**Track 8:** Unmanned Aircraft Systems and Automation [Early's Redoubt]	**Track 9:** Verification and validation of Complex Systems	**Track 10:** Poster Papers [Jeff Davis Amphitheater B]
	Information and Health Management	Human-Automation Functional Allocation		Special Topics
1:30	7C1 Architecture and Technical Alternatives for Connecting Cockpits to FAA Data Claude Speed ***The Aviation Data Connection***	8C1 Expanding AirSTAR Capability for Flight Research in an Existing Avionics Design Sean Laughter ***NASA Langley Research Center***		10C Vision-based Autonomous Landing of an Unmanned Aerial Vehicle Gireesh Kumar R N ***Madras Institute of Technology Campus, Anna University***
2:00	7C2 Cyber-Physical Integration in Future Aviation Information Systems Krishna Sampigethaya ***Boeing Research & Technology***	8C2 Exploring Opportunities for an Evolutionary Integration of Level 3 Conflict Awareness Support into ATC/C2 Systems Tom Verboon ***TU Delft***		10C A Rotor Blade Aeroelastic Response and Loads Identification Test-Bed for Advanced Flight Control Algorithms Orkun Hasekioglu ***Turkish Airlines Technic***
2:30	7C3 Archival Service in the Aviation Domain Samet Ayhan ***The Boeing Company***	8C3 Integrating UAS Into NextGen Automation Systems Nathan Paczan ***The MITRE Corporation***		10C Acoustic Analysis of Unmanned Air Vehicle Using Acoustic Vector Sensor A. Saravanakumar ***Madras Institute of Technology Campus, Anna University***
3:00		**Break**		
3:30	7C4 Semi-Supervised Learning of Decision Making for Parts Faults to System-Level Failures Diagnosis in Avionics System Wei Yin ***China National Aeronautical Radio Electronics Research Institute***	8C4 Automated Return-To-Route Maneuvers for Unmanned Aircraft Systems Chi Kin Lai ***Cranfield University***		10C Development of Checkout Software (KHOJ) for Chace Payload Onboard Moon Impact Probe (MIP) of Chandrayaan-1 P Sreelatha ***Vikram Sarabhai Space Centre***
4:00	7C5 A Novel Aircraft Fault Diagnosis and Prognosis System Based on Support Center Machine ZeFeng Wang ***Sorbonne Universities***	8C5 On the Transition and Migration of Flight Functions in the Airspace System Terry Morris ***NASA Langley Research Center***		
4:30	7C6 Integration Technology for Avionics System Wang Guoqing ***China National Aeronautical Radio Electronics Research Institute***	8C6 Design and Evaluation of Operator Support Functions for the CSHIELD Platform Eric Theunissen ***Netherlands Defence Academy***		

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Technical Session D

Thursday, October 18

D	**Track 1:** Our History, Our Future	**Track 2:** Flight Deck Systems [Jackson's Redoubt]	**Track 3:** ATM 1 [Grant's Redoubt]	**Track 4:** ATM 2 [Lee's Redoubt]	**Track 5:** CNS [Jeff Davis Amphitheater A]	**Track 6:** Systems and Software Engineering [Longstreet's Redoubt]
		Advanced Displays	TBO Modeling	Separation and Safety 2	Surveillance 2 / Communications 1	Modeling/Simulation
8:00		2D1 Review of Visual Clutter and Its Effects on Pilot Performance: A New Look at Past Research Philippe Doyon-Poulin ***École Polytechnique de Montréal***	3D1 Genetic Algorithm and Support Vector Machine Based Aircraft Intent Inference Algorithm in Terminal Area Yang Yang ***Beihang University***	4D1 Design and Evaluation of NextGen Aircraft Separation Assurance Concepts Nhut Ho ***California State University, Northridge***	5D1 Comparison of Coordinated and Uncoordinated PHY/MAC Schemes for Beaconing Nico Franzen ***German Aerospace Center (DLR)***	6D1 HIL Simulation of a Light Aircraft Flight Control System Peter Chudy ***Brno University of Technology***
8:30		2D2 Evaluating a De-Cluttering Technique for NextGen RNAV and RNP Charts Abhizna Butchibabu ***Massachusetts Institute of Technology***	3D2 A Predictive Aircraft Landing Speed Model Using Neural Network Ousmane Diallo ***NASA Ames Research Center***	4D2 The Search For Effective Algorithms For Recovery From Loss of Separation Ricky Butler ***NASA Langley Research Center***	5D2 Aeronautical Relay Network Performance for Several Duplexing, Multiplexing, and Multiple Access Schemes Qian Zhang ***Ohio University***	6D2 Terminal Area Visualization Tool For Approach Analysis Alexander Buchholz ***MITRE/CAASD***
9:00		2D3 Touch Screen Technology In Flight Deck, How Far Is It Helpful? Sridher Kaminani ***Rockwell Collins & Iowa State University***	3D3 Fixed RTA Fuel Optimal Profile Descent Based on Analysis of Trajectory Performance Bound Sang Gyun Park ***Georgia Institute of Technology***	4D3 An Improved Ant Colony Optimization Approach for Multi-aircraft Horizontal Escape Maneuvers Gang Xiao ***Shanghai Jiaotong University***	5D3 Airport Traffic Conflict Detection and Resolution Algorithm Evaluation Denise Jones ***National Aeronautics and Space Administration***	6D3 Visual Demonstrations of Performance Characteristics of Surface Surveillance Raymond Stanley ***MITRE/CAASD***
9:30				**Break**		
10:00		2D4 Motion-Base Simulator Evaluation of an Aircraft using an eXternal Vision System Lynda Kramer ***NASA Langley Research Center***	3D4 Airborne 4-Dimensional Trajectory Management Bohumil Honzík ***Honeywell, Advanced Technology Europe***	4D4 Detection of Human-Initiated Aircraft Maneuvers via Noisy Radar Data Adan Vela ***MIT Lincoln Labs***	5D4 SURF IA Conflict Detection and Resolution Algorithm Evaluation Denise Jones ***National Aeronautics and Space Administration***	6D4 The EDICT Tool Platform for Model Based Architecture Modeling and Analysis Chris Walter ***WW Technology Group***
10:30		2D5 Synthetic and Enhanced Vision Systems (SEVS) for Nextgen Simulation and Flight Test Performance Evaluation Kevin Shelton ***NASA Langley Research Center***	3D5 How to Compute a Slot Marker – Calculation of Controller Managed Spacing Tools for Efficient Descents with Precision Scheduling Thomas Prevot ***NASA Ames Research Center***	4D5 Assessing the Operational Benefits of Automated Conformance Monitor for RNP-to-Final Operations Ronald Chong ***MITRE/CAASD***	5D5 Using TCAS Surveillance to Enable Legacy ADS-B Transponder Use for In-Trail Procedures Christine Haissig ***Honeywell***	
11:00		2D6 Energy Based Flight Displays Peter Chudy ***Brno University of Technology***	3D6 A Practical Approach for Optimizing Aircraft Trajectories in Winds Hok Kwan Ng ***University of California, Santa Cruz***	4D6 Management of Dynamic Airborne Network Using Cloud Computing Xiaojie Tu ***Beihang University***	5D6 Modeling System Latency Ian Levitt ***Federal Aviation Administration, ANG-C3***	

D	**Track 7:** Avionics Information Management, Networks, and Architecture [Hooker's Redoubt]	**Track 8:** Unmanned Aircraft Systems and Automation	**Track 9:** Verification and Validation of Complex Systems [Early's Redoubt]
	Architecture & Design Methods		Assurance of Onboard Systems - Network Assurance & Testing Techniques
8:00	7D1 Optimizing an Incremental Modular Open System Approach (MOSA) in Avionics Systems for Balanced Architecture Decisions Thomas Gaska ***Lockheed Martin MS2-Owego***		9D1 Model Checking a Self-Stabilizing Synchronization Protocol for Arbitrary Digraphs Mahyar Malekpour ***NASA Langley Research Center***
8:30	7D2 Architecture Analysis and Design Language & Harmony System Engineering Process Teng-teng Zhang ***China National Aeronautical Radio Electronics Research Institute***		9D2 Model-Based Analysis of Timed-Triggered Ethernet Bruno Dutertre ***SRI International***
9:00	7D3 Designing and Testing Avionics Digital Video Bus (ARINC 818) Interfaces Tim Keller ***Great River Technology***		9D3 Verification and Validation of Distributed Flight Critical Systems Brendan Hall ***Honeywell International,Inc.***
9:30	**Break**		
10:00	7D4 Automated Software Design and Synthesis for Distributed Control of Aircraft Fuel Systems Carlos C. Insaurralde ***Heriot-Watt University***		9D4 Ground and Flight Tests of an Innovative Fuel Management System in a Twin-Engine Helicopter Carlos C. Insaurralde ***Heriot-Watt University***
10:30	7D5 Model-Based Fault Detection and Isolation Design for Flight-Critical Actuators in a Harsh Environment Alexandre Bobrinskoy ***Thales Airborne Systems***		9D5 Designing Fault-Injection Experiments for the Reliability of Embedded Systems Allan White ***NASA Langley Research Center***
11:00	7D6 Control Metrics Error Detection and Correction in IMA-based Multi-partitioned System-Analysis and Simulation Ananda CM ***CSIR National Aerospace Laboratories***		9D6 Requirements-Based FPGA Testing Method for DO-254 Louie De Luna ***Aldec / DO-254 Program Manager***

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Technical Session E

Thursday, October 20

E	**Track 1:** Our History, Our Future	**Track 2:** Flight Deck Systems [Jackson's Redoubt]	**Track 3:** ATM 1 [Grant's Redoubt]	**Track 4:** ATM 2 [Lee's Redoubt]	**Track 5:** CNS [Davis Amphitheater A]	**Track 6:** Systems and Software Engineering [Longstreet's Redoubt]
		System Design and Simulation	Traffic Flow Management	Surface Management	Communications 2	Systems
1:30		2E1 Pilot Suit with Integrated Avionics Petr Frantis ***University of Defense***	3E1 Measuring the Effects of Aborted Takeoffs and Landings on Traffic Flow at JFK Michael Carter ***The Boeing Company***	4E1 A Comparison of Two Optimization Approaches for Airport Taxiway and Runway Scheduling Hanbong Lee ***Massachusetts Institute of Technology***	5E1 Feasibility of LDACS1 Cell Planning in European Airspace Felix Hoffmann ***DLR (German Aerospace Center)***	6E1 A Systems Approach for Technology Assessment and Selection Zuhal Kale Demirkiran ***Meteksan Defense***
2:00		2E2 Trans Dimensional System for Situational Awareness and I.S.R. Hector Gomez-Acevedo ***Transdimensional***	3E2 A Spatial Database for Reroute Planning Joseph Rios ***NASA Ames Research Center***	4E2 Fast-Time Simulations of Detroit Airport Operations for Evaluating Performance in the Presence of Uncertainties Hanbong Lee ***Massachusetts Institute of Technology***	5E2 VHF Data Link Communications to Provide Air Traffic Services in Colombia Edgar Leonardo Gomez Gomez ***National University of Colombia***	6E2 Process for Diagnosis Method Selection of Flight Critical Systems Romain Martin ***ESTIA Recherche***
2:30		2E3 Terrain Rendering Algorithm Performance Analysis Lukas Polok ***Brno University of Technology***	3E3 First Results of Coupling ATM Planning Systems with Different Time Horizons Meilin Schaper ***German Aerospace Center***	4E3 Impact of Gate Assignment on Gate-Holding Departure Control Strategies Sang Hyun Kim ***Georgia Institute of Technology***	5E3 Investigation and Measurement of Aircraft Communication System Immunity Petr Makula ***University of Defence***	6E3 Exploring an Approach to Capability Maturity Assessment: Towards an Evidence-Based Framework Constance Morgan ***MITRE/CAASD***
3:00				**Break**		
3:30		2E4 A Simulation Environment for Evaluation of Integrated Alerting and Notification (IAN) Concepts Pengfei Duan ***Ohio University***	3E4 Analysis of Airspace Degradation and Optimization of En-Route Traffic Under Degraded Conditions Aude Marzuoli ***Georgia Institute of Technology***	4E4 Supporting Distributed Management of the Airport Surface Philip Smith ***Ohio State University***	5E4 Task Allocation for Integrated Tactical Data Links Changxiao Zhao ***Beihang University***	6E4 Avionics Clouds: A Generic Scheme for Future Avionics Systems Zheng Li ***Beihang University***
4:00		2E5 Creating a Realistic Weather Environment for Motion-Based Piloted Flight Simulation Taumi Daniels ***NASA Langley Research Center***	3E5 NAS-Wide Traffic Flow Management Concept Using Required Time of Arrival, Separation Assurance and Weather Routing Benjamin Boisvert ***Saab-Sensis Corporation***	4E5 Estimation of Departure Metering Benefits at Major Airports Using Queuing Analysis Husni Idris ***Engility Corporation***		6E5 Mastering the Behavior of Multi-Core Systems to Match Avionics Requirements Hicham Agrou ***Thales Avionics***
4:30		2E6 Design Considerations for a Helmet-Mounted Synthetic Degraded Visual Environment Display Niklas Peinecke ***DLR (German Aerospace Center)***	3E6 An Integrated Approach to Air Traffic Management to Achieve Trajectory Based Operations Sergio Torres ***Lockheed Martin IS&GS-Civil***	4E6 Ground Control Support Functions to Optimize Surface Traffic Flow in a CDM Environment Joris Koeners ***Delft University of Technology***		6E6 Streamlining the Development of Complex Systems through Model-based Systems Engineering Hans-Peter Hoffmann ***IBM Rational Software***

E	**Track 7:** Avionics Information, Management Networks, and Architecture [Hooker's Redoubt]	**Track 8:** Unmanned Aircraft Systems and Automation	**Track 9:** Verification and Validation of Complex Systems [Early's Redoubt]
	Novel Network Topics		Uncertainty in NextGen - Trajectory Models & Visualization
1:30	7E1 The Application of Commercial Power Line Communications Technology for Avionics Systems Stephen Dominiak ***Lucerne University of Applied Sciences & Arts***		9E1 A Framework for Probabilistic Evaluation of Interval Management Tolerance in the Terminal Radar Control Area Heber Herencia-Zapana ***National Institute of Aerospace***
2:00	7E2 Spectrum Sensing for Cognitive Wireless Applications Inside Aircraft Cabins Christoph Heller ***EADS Innovation Works***		9E2 Comparison of Aircraft Models and Integration Schemes for Interval Management in the TRACON Natasha Neogi ***National Institute of Aerospace***
2:30	7E3 Network Connectivity for Permanent, Transient, Independent, and Correlated Faults Allan White ***NASA Langley Research Center***		9E3 Using Cloud Computing Resources to Streamline Test and Evaluation Jeff Beyer ***Clairus, LLC***
3:00		**Break**	
3:30	7E4 Experimental Approach to an Optical Wireless Interface for an Avionics Data Bus Javier Perez-Mato ***IDeTIC-ULPGC***		9E4 An Interactive 4D Visualization System for Air Traffic Concept Analysis Andrew Crowell ***Federal Aviation Administration***
4:00	7E5 Implementation of Optical Networks in Aerospace John Mazurowski ***Pennsylvania State University Electro-Optics Center***		9E5 Considerations in the Presentation of Evidence Kevin Schweiker ***Honeywell Aerospace***
4:30	7E6 Optimization of Multicast Light-Trees in Real-Time Avionics WDM Network Ying Xiong ***Beihang University***		9E6 Visualizing Concurrency Faults in ARINC-653 Real-Time Applications Guy Martin Tchamgoue ***Gyeongsang National University***

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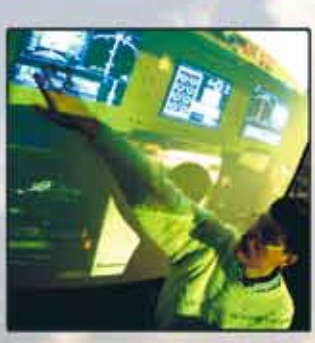

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ABSTRACT DETAILS
Authors are invited to submit abstracts of no more than 750 words before 1 March 2013, and using www.dasconline.org. Student papers and ideas for invited sessions are welcome. Please avoid the use of acronyms or abbreviations in the 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 23 August 2013.

CALL FOR PARTICIPATION
Technical Papers, Tutorials & Exhibits

Transforming the Air Transportation System – A Safety and Efficiency Collaboration

We welcome everyone to join us for the 32nd DASC in Syracuse, NY.

CONFERENCE THEME: This year's conference leverages the dedication and commitment of government agencies, industry companies, and universities to studying, creating, fielding, and maintaining the complex systems and interfaces that continually improve our Air Transportation System. Successful and efficient improvement through the pursuit of these varied and related endeavors requires coordinated advancement in system capability and resilience, without inadvertent introduction of new safety vulnerabilities. A significant contributing factor is the increased economic pressures that force difficult choices with regard to life-cycle costs and training. Yet, new and emerging capabilities can expose much more information on system performance. We can measure, monitor, and model system behavior as never before and feed this back to affect positive change more quickly. Our theme for the 2013 DASC will focus many of our discussions on how to best tighten the collaboration between safety and efficiency design goals, rather than view them as competing or necessary trade-offs.

TECHNICAL CHALLENGES REMAIN:
- Decision-support tools to improve system state awareness and predict change
- Systems that enable appropriate engagement with automated systems
- Integrated information management systems (airborne and ground-based)
- Systems that can enable the safe introduction of UAS in the NAS
- Systems that can enable more efficient aircraft-ATM coordination
- Providing air transportation service to under-served markets
- Defining the role for humans in an increasingly automated ATC system
- Safety management systems and performance metrics
- Airport operations sustainability
- Environmental impact assessment and management
- Reliable communications, navigation, and surveillance technologies.

AVIONICS AND ATM SYSTEMS: The conference will maintain a dual focus on both aircraft avionics and air traffic management systems. There are many emerging research, development, and analysis areas related to avionics equipage, aircraft interoperability, and ground-/space-based infrastructures. These issues are significant drivers for both NextGen and SESAR avionics roadmaps.

OTHER TOPICS: DASC will continue to offer opportunities to publish and present on a wide range of topics of interest to the avionics technology community (see next page)

PAPERS, PANELS, EDUCATION, AND WORKSHOPS: The Technical and Professional Education Programs will incorporate hundreds of papers and dozens of tutorials from international researchers, innovators, engineers, users, and designers. There will be panel discussions and keynote presentations by engineering, management and operational leaders that are shaping the industry. Attendees can participate in active conversations with all such colleagues who are the experts and leaders in the field. We welcome you to join us and participate in the 32nd DASC as we engage in the important issues of the aviation electronics (i.e., "avionics") industry!

32nd DASC

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TECHNICAL PROGRAM

Our theme is fundamental to the conference and will be used to frame our discussion on many topics during the technical program.

Topics of Interest Include, But Are Not Limited To:

Open Architectures: Open interface standards, viability of open and closed architectures, operating systems, ARINC-653, alternate 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 for Information Security and/or 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: Issues on human interaction with automation such as mode awareness, flight deck displays and decision support tools, methods for avoiding the presentation of hazardously misleading information, and information abstraction and conveyance concepts that enable appropriate levels of workload and crew coordination.

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 quantified confidence levels for uncovering latent design flaws or undesired performance characteristics.

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 flight critical systems.

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

Benjamin Levy
Saab Sensis Corporation
(315)-234-7920
blevy@saabsensis.com

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 who are recognized experts in their field. Topics may include for example: Basic and Advanced Avionics Systems; System Engineering; Integrated Modular Avionics; Space Systems; Surveillance and Collision Avoidance; Program Management; Synthetic Vision; Communications and Networks; Navigation Systems; Software Development, Test, and Certification (DO-178); Environmental Qualification (DO-160); System Safety; and many more. All professional education sessions will offer Continuing Education Units (CEUs) through IEEE. For more information, contact:

Maarten Uijt de Haag
Ohio University
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Sponsors and Exhibits

This year's conference will feature exhibits and product demonstrations by representatives of key avionics-related industries and institutions. To have your organization represented in our exhibit hall, please contact our Sponsors and Exhibits Chair:

Glen Logan
The Research Associates
(866) 648-0640
glen.logan@comcast.net

2013 Integrated Communication Navigation Surveillance Conference

23 - 25 April, 2013
Westin Washington - Dulles Airport
Herndon, VA

Conference General Chair:
John R. Moore
(319) 295-5987
jrmoore@rockwellcollins.com

Technical Program Chair:
Rafael D. Apaza
(216) 433-2875
Rafael.D.Apaza@nasa.gov

Diverse Aircraft in a Common Sky: ICNS Leads the Way

Conference Scope: International Aviation Conference addressing technology and policy advances in ICNS. New research, development and implementation programs and policies related to ICNS capabilities, to include 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.

ICNS

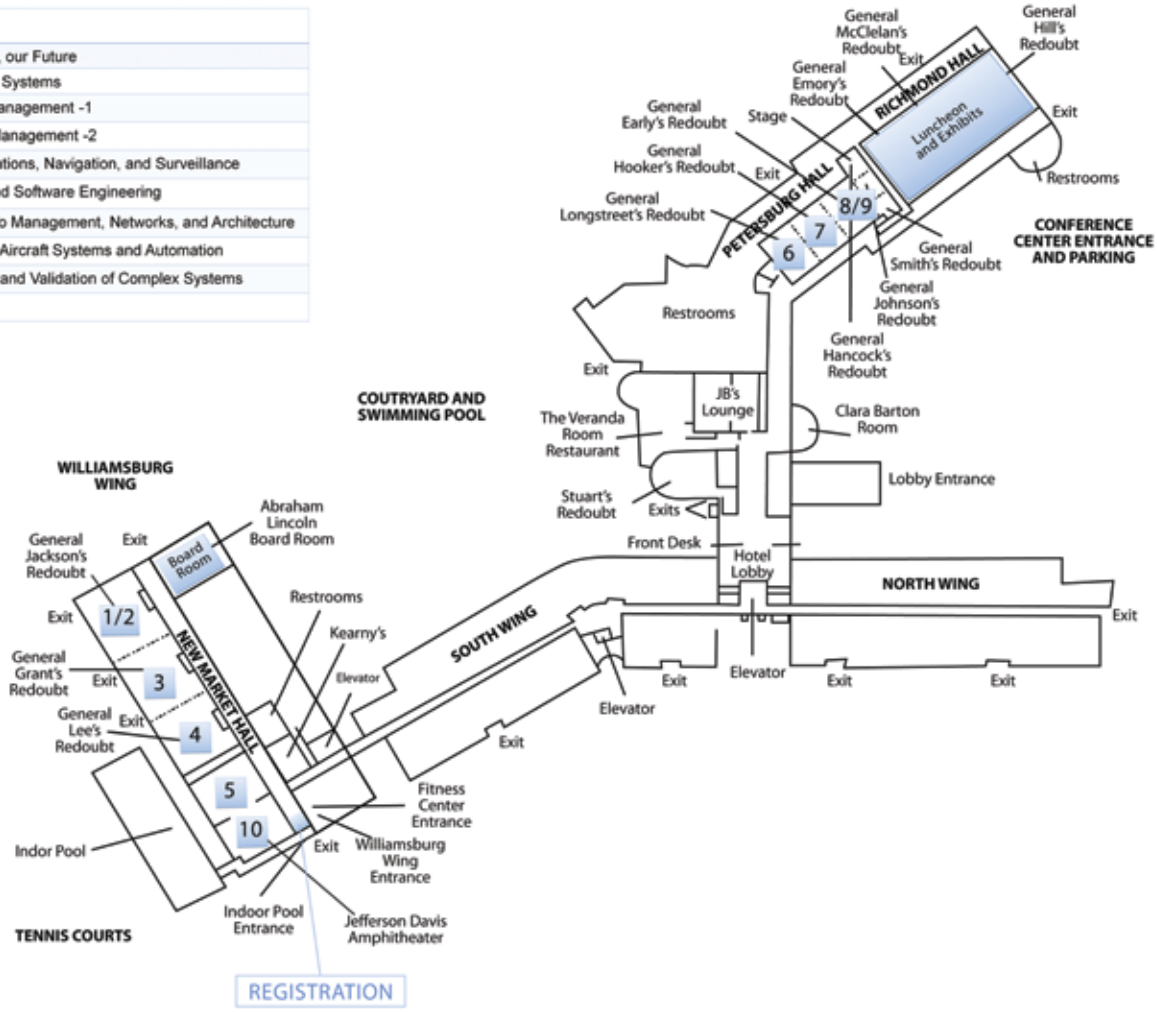
Abstract Submission Date: 1/18/2013
Notification of Acceptance: 2/08/2013
Final Paper Submission Date: 3/22/2013

www.i-cns.org

Crowne Plaza Williamsburg Hotel

October 14-18, 2012

Track
1 – Our History, our Future
2 – Flight Deck Systems
3– Air Traffic Management -1
4 – Air Traffic Management -2
5 – Communications, Navigation, and Surveillance
6 – Systems and Software Engineering
7 – Avionics Info Management, Networks, and Architecture
8 – Unmanned Aircraft Systems and Automation
9 – Verification and Validation of Complex Systems
10 – Posters



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