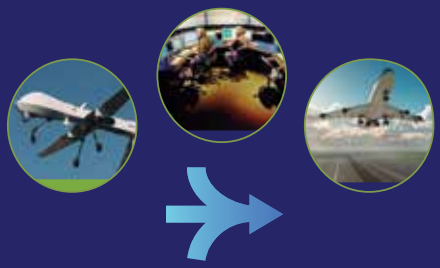
32nd DASC Digital Avionics Systems Conference



TRANSFORMING AIR TRANSPORTATION

A Safety and Efficiency Collaboration

DoubleTree by Hilton Syracuse - Syracuse, NY

6 -10 October 2013

IEEE AESS AIAA DATC

Welcome to the 32nd Digital Avionics Systems Conference

Welcome to Syracuse and the Finger Lakes region of the state of New York. This is truly a beautiful part of the country and we're sure your stay will be enjoyable. My view on these events is that they should be interesting and informative, but also fun! To that end, we've added a few non-conventional opportunities. You can fly a vintage flight simulator, see a Reaper unmanned aircraft up close, watch an IMAX movie, and enjoy a jazz-infused dinner with friends and colleagues at a local science museum. Of course, we'll also continue the DASC tradition of highlighting the latest trends in digital avionics through technical presentations, professional education courses, and exhibits.

The 32nd DASC maintains its dual focus on onboard avionics and the infrastructures that provide air navigation services. Within these domains, we will discuss and learn many emerging research, development, and analysis advances related to avionics equipage, aircraft interoperability, and ground-/space-based system capabilities.

This year's theme pays specific attention to the challenge of simultaneously achieving safety and efficiency improvements as we transform aerospace operations. As we all study, create, field, and maintain the complex systems and interfaces that enable aerospace transportation, outcomes must be coordinated. New and emerging capabilities should be utilized that expose more information on system performance, validating or invalidating requirements. We can measure, monitor, and model system behavior as never before and feed this back to affect positive change more quickly. Our theme is intended to be thought-provoking, so please consider it, as it relates to your work, and as you interact with colleagues during the week. How can we best tighten collaboration to achieve challenging safety and efficiency design goals, rather than viewing them as competing or necessary trade-offs?

On behalf of the AIAA Digital Avionics Technical Committee and the IEEE Aerospace Electronics Systems Section, I thank you for participating in this year's DASC. Through your participation, you can help to influence the future directions of industry, government, and academia as we all work together to transform flight.

Steve Young
32nd DASC General Chair

Welcome to Syracuse!

Syracuse is strategically located in the heart of New York State commonly referred to as the Central New York region. The region boasts a combination of charm and character, culture, higher education, recreation, and sports.

Syracuse offers recreational and cultural activities that few cities of this size can boast. Syracuse's first-class natural resources include more than 50 state, county and city parks. The area's abundant waterways continue to draw national, regional and statewide athletic events. In addition to its many outdoor parks, the Greater Syracuse area is home to more than 40 golf courses, and many museums and galleries including the Museum of Science & Technology and the nationally known I.M. Pei designed Everson Museum of Art. Syracuse Opera is the only Central New York year round professional opera company, and the Syracuse Stage is the region's premier professional theatre. Syracuse is home to the Great New York State Fair, Rosamond Gifford Zoo and numerous festivals along with a great local music scene. We can't forget our sports. Most notable is Syracuse University Division I basketball, football and lacrosse. Syracuse also has a first rate baseball stadium with an AAA baseball team and a professional hockey team. There is a lot to do in and around Syracuse!

Parking
On-site parking is free.

Breaks/Refreshments
Coffee, tea, water, and soft drinks will be available each day, complimentary to registered attendees just outside the Grand Ballroom.

Speakers Breakfast
On Tuesday, Wednesday, and Thursday, breakfast will be held from 7:00-8:00 a.m. for speakers who are scheduled to present in a technical or plenary session that day. Speakers are required to attend this breakfast to prepare for their session with their session chair.

Local Dining and Area Attractions
A list will be available at our Registration Desk or you may contact the Hotel concierge.

Special Event (Thursday, 6:00 - 9:00 p.m.)

Join us Thursday evening from 6:00 – 9:00 p.m. for a buffet dinner at the Milton J. Rubenstein Museum of Science and Technology. Dinner will be accompanied by live music by the local jazz band, Soul Mine. Following dinner, guests may tour the museum or enjoy the breath-taking and immersive experience of an IMAX movie. The 45-minute movie "Top Speed" explores the pursuit of human excellence and what it takes for individuals to achieve their personal bests. Join five-time Olympic medalist Marion Jones, mountain biking champ Marla Streb, racecar sensation Lucas Luhr, and high performance automobile designer Stephen Murkettt.

The museum is located in Armory Square of Downtown Syracuse. Buses will depart the hotel at 5:30 and return by 10:00.

32nd DASC Week at a Glance

Sunday 10/6/13	Monday 10/7/13	Tuesday 10/8/13	Wednesday 10/9/13	Thursday 10/10/13
9:30 - 5:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 4:30 Registration Open
9:30 - 11:30 Register for Tutorials	8:00 - 11:00 Tutorials Session MM	8:30 - 11:30 Plenary Session Exhibits Open 11:00 – 4:30	8:00 - 11:30 Technical Session B 9:30 - 10:00 Break Exhibits Open 9:00 – noon	8:00 - 11:30 Technical Session D 9:30 - 10:00 Break
11:30 - 2:30 Tutorials Session SL (Lunch Provided)	11:30 - 2:30 Tutorials Session ML (Lunch Provided)	11:30 - 1:30 Lunch in Exhibit Hall	11:30 - 1:30 Awards Luncheon (Harbour Ballroom)	11:30 - 1:30 UAS Luncheon Presentation (Harbour Ballroom)
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 (Sponsored by LRDC Systems, LLC)	3:00 – 3:30 Break	3:00 – 3:30 Break
Open Evening	6:00 - 8:00 Exhibits Open Social Event in Exhibit Hall	5:30 - 7:00 Exhibits Open Reception in Exhibit Hall	Open Evening	6:00 – 9:00 Dinner and IMAX Movie (Milton J. Rubenstein Museum of Science and Technology)

Awards Luncheon

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

Each year, the DASC recognizes significant accomplishments of selected individuals and organizations in the field of digital avionics. At this year's conference, we will be presenting the Distinguished Institution Award, the AIAA Dr. John C. Ruth Digital Avionics Award, the David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award for the 31st DASC, and the Best of Track and Best Student Paper Awards for the 32nd DASC.

Distinguished Institution Award

The Distinguished Institution Award is presented each year to an organization "for generous support to the success of the AIAA DATC and the annual DASC." The 2013 winner is:

German Aerospace Center (DLR)

2013 Dr. John C. Ruth Digital Avionics Award

This year's winner is recognized "for significant contributions to the avionics field through outstanding educational endeavors, publications, research and development as well as services."

Dr. Albert D. Helfrick

Professor, Electrical, Computer, Software and Systems Engineering
Embry-Riddle Aeronautical University

David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award, 31st DASC

Each year, the DASC Awards Chair forms a selection committee made up of AIAA DATC members and leads them through a thorough review process that considers all papers winning Best of Track Awards at the previous conference. This committee selects the Best of Conference paper based on technical content, application to the real world, and effective presentation of the paper. The award is sponsored by MITRE/CAASD and is presented this year to *Hugh Blair-Smith* of Down to the Metal, for his paper entitled "Data Convergence for Efficiency: A Holistic Rethink of the Passenger Experience."

UAS Luncheon Presentation

Thursday, 11:30 - 1:30

UAS Luncheon Presentation and Afternoon Field Trip

Our guest speaker for Thursday's luncheon will be Major General Robert Knauff, chief executive officer of the Northeast UAS Airspace Integration Research Alliance, Inc. (NUAIR), a New York non-profit corporation leading a coalition of New York and Massachusetts aerospace industry and academic institutions working together to establish a site for the testing and certification of unmanned aircraft systems (UAS) and the training of their operators.

A 1975 graduate of the United States Air Force Academy, General Robert Knauff is a resident of Manlius, New York. He completed undergraduate pilot training in 1976 and in his 33-year U.S. Air Force career, he undertook a series of flying and command assignments culminating with his assignment as commander of the 6,000-member New York Air National Guard and deputy commander of the 17,000 men and women of the New York Army and Air National Guard. He commanded the 174th Fighter Wing at Hancock Field, Syracuse from 1996 to 2003, prior to becoming chief of staff of the New York Air National Guard and then its commander. In addition, he served as the Air National Guard assistant to the commander, U.S. Air Force Special Operations Command. He is a combat veteran with more than 3,900 flying hours.

As commander of the New York Air National Guard, General Knauff put New York's air units at the heart of the Global War on Terrorism and humanitarian support operations throughout the United States and around the globe. Under his leadership, New York deployed thousands of airmen as part of designated deployments worldwide, including domestic security operations in the years following the 2001 World Trade Center attacks and combat operations in Iraq and Afghanistan. General Knauff's awards include the Legion of Merit, the Meritorious Service Medal, the Air Force Commendation Medal, Combat Readiness Medal, Air Force Outstanding Unit Award, National Defense Service Medal, Air Force Overseas Ribbon, and Global War on Terrorism Medal, the Armed Forces Reserve Medal, the New York State Conspicuous Service Medal, and the New York State Defense of Liberty Medal.

General Knauff will provide attendees with his unique perspectives on the evolution of unmanned aircraft systems (UAS), particularly as applied by the 174th Fighter Wing, and the U.S. DoD.

Following General Knauff's presentation, for those who signed up during pre-registration, there will be a field trip to visit the Air National Guard Base. Visit the Registration Desk for bus information for this tour.

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.

Plenary Session

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

Dr. Karlin Toner

Director, Joint Planning and Development Office
FAA

As Director of the JPDO, Dr. Karlin Toner manages an interagency initiative charged with facilitating and coordinating the development of the Next Generation Air Transportation System (NextGen). Dr. Toner also serves as the Senior Staff Advisor to the Secretary of Transportation for NextGen, a role she has held since January 2009.

From August 2006 to December 2008, she served as Director of the Airspace Systems Program at NASA Headquarters in Washington, DC. Prior to this, Dr. Toner held several key positions in aerospace and aeronautical planning and research while working at the NASA Ames Research Center in Moffett Field, California. From July 2005 to August 2006, Dr. Toner was the Associate Director for Aeronautics, charged with developing long-range technical and resource plans for aeronautical projects. Prior to that assignment, she established and managed the Aerospace Operations Modeling Branch. This organization provided a focal point for the modeling and simulation of air traffic operations within NASA.

Dr. Toner was a lecturer in the Aerospace Engineering Department at San Jose State University from 1991 to 1994. Her technical publications include papers on aircraft aerodynamics and design, computational physics, and the analysis of air traffic systems. Dr. Toner earned a NASA Exceptional Achievement Medal and is an Associate Fellow of the American Institute of Aeronautics and Astronautics. In 2011, Dr. Toner received the University of Florida's Department of Mechanical & Aerospace Engineering Outstanding Alumnus Award and the Distinguished Alumni Award from Indiana University of Pennsylvania.

Dr. Karlin Toner holds doctoral and master's degrees in Aerospace Engineering from the University of Florida and a bachelor's degree in Applied Mathematics from Indiana University of Pennsylvania.

Dr. Sandra H. Magnus

Executive Director,
American Institute of Aeronautics and Astronautics

Dr. Sandra H. "Sandy" Magnus is the Executive Director of the American Institute of Aeronautics and Astronautics (AIAA), the world's largest technical society dedicated to the global aerospace profession, with more than 35,000 individual members in 79 countries.

Born and raised in Belleville, Ill., Dr. Magnus attended the Missouri University of Science and Technology, graduating in 1986 with a degree in physics and in 1990 with a master's degree in electrical engineering. She also holds a Ph.D. from the School of Materials Science and Engineering at Georgia Tech (1996).

Selected to the NASA Astronaut Corps in April, 1996, Dr. Magnus flew in space on the STS-112 shuttle mission in 2002, and on the final shuttle flight, STS-135, in 2011. In addition, she flew to the International Space Station on STS-126 in November 2008, served as flight engineer and science officer on Expedition 18, and returned home on STS-119 after four and a half months on board. Following her assignment on Station, she served at NASA Headquarters in the Exploration Systems Mission Directorate. Her last duty at NASA, after STS-135, was as the deputy chief of the Astronaut Office.

While at NASA, Dr. Magnus worked extensively with the international community, including the European Space Agency (ESA) and the National Space Development Agency of Japan (NASDA), as well as with Brazil on facility-type payloads. She also spent time in Russia developing and integrating operational products and procedures for the International Space Station.

Before joining NASA, Dr. Magnus worked for McDonnell Douglas Aircraft Company from 1986 to 1991 as a stealth engineer. While at McDonnell Douglas, she worked on internal research and development and on the Navy's A-12 Attack Aircraft program, studying the effectiveness of radar signature reduction techniques.

Dr. Magnus has received numerous awards, including the NASA Space Flight Medal, the NASA Distinguished Service Medal, the NASA Exceptional Service Medal, and the 40 at 40 Award (given to former collegiate women athletes to recognize the impact of Title IX).

Roger D. Connor

Curator, Aeronautics Department, Smithsonian Institution

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 Ph.D.

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33rd DASC
Digital Avionics System Conference

Designing an Air Transportation System with Multi-Level Resillience

5 - 9 October 2014
Antlers Hilton, Colorado Springs, CO
www.dasconline.org

General Chair:
Benjamin Levy

Technical Program Chairs:
Art Tank
Erik Blasch

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 32nd 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: Transforming Air Transportation – A Safety and Efficiency Collaboration.

This year we are offering 22 separate tutorials, including 7 new or updated ones. All tutorials are organized into tracks to allow attendees to easily identify those educational opportunities that align most closely with their areas of interest. Most courses have been selected to directly complement the topics that will be presented in the technical program, from Avionics Design and Genesis, Design Assurance, Systems Engineering and Communication Systems to Spacecraft Avionics, AIS/MET and NextGen concepts. Some of these short courses directly address the theme of the conference relating the transformation of air transportation in the various digital avionics system disciplines.

All DASC tutorials will provide a real-time interactive discussion with the presenters and have well-defined learning objectives and learning outcomes to help focus the course on the needs of attendees. DASC tutorials are affordable and offer an excellent opportunity to learn directly from experts in the field. Again this year, we are offering Continuing Education Units (CEU) for all courses. In short, no matter what your educational goals are, the professional development program of the 32nd DASC is sure to provide a valuable learning experience.

We hope you will take full advantage of the educational program and will benefit both technically and professionally from your participation in the 32nd DASC.

	Sunday, October 6		Monday, October 7			
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 **Adams Room**	Systems Engineering and Systems Thinking in Aviation	Fault-Tolerant Avionics Systems	Ethernet Networking for Critical Embedded Systems	UML2.0/SysML Based Systems Engineering Using a Model Driven Development Approach	GNSS-Based Applications for NextGen Operations	Communications, Systems Engineering, and NextGen **Adams Room**
Instructor	SL1: Simons	SA1: Hitt	MM1: Steiner/Jakovljevic	ML1: Hoffman	MA1: Farrell/Uijt de Haag	Instructor
Integrated Modular Avionics **Bushnell Room**	ARINC 653 - A Detailed Exploration	Multicore and Safety Certification in Avionics	Synthetic and Enhanced Vision Systems	Avionics Genesis, Lineage, and Evolution - Part 1	Avionics Genesis, Lineage, and Evolution - Part 2	Avionics Genesis and Displays **Bushnell Room**
Instructor	SL2: Kinnan	SA2: Kinnan	MM2: Theunnissen/ Uijt de Haag	ML2: Hitt/Redling	MA2: Hitt/Redling	Instructor
Surveillance, AIS and MET **Dewitt Room**	AIS/MET Data Link Services	Surveillance and Collision Avoidance for NextGen	The Modular Open Systems Approach in Defense Acquisition	Digital Avionics	Modern Avionics Architectures	Avionics Design and Systems Engineering **Dewitt Room**
Instructor	SL3: Evans	SA3: Uijt de Haag/Farrell	MM3: Logan	ML3: Helfrick	MA3: Logan	Instructor
Spacecraft Avionics **Sacketts Room**	Part I – Spacecraft Avionics Systems Engineering Fundamentals	Part II – Spacecraft Avionics Subsystem Systems Engineering	Understanding and Applying DO-178C	Current Approaches to DO-254	Design Approval via the TSO/ETSO Processes	Design Assurance **Sacketts Room**
Instructor	SL4: Andrew	SA4: Andrew	MM4: Ferrell	ML4: Ferrell/Ferrell	MA4: Ferrell/ Ferrell	Instructor
				Formal Methods in RTCA DO-178C	Insights into the Airworthiness Security Process	Design Assurance and Security **Canal Room**
Instructor				ML5: Joyce/Fabre	MA5: Fabre/Joyce	Instructor

Tutorial Descriptions

Sunday, October 6th

Session 1 – Systems Engineering

SL1: Systems Engineering and Systems Thinking in Aviation

J. Mark Simons, MITRE/CAASD

This tutorial provides an introduction to 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 tutorial will explore systems engineering from the perspective of an enterprise, a system of systems, and single systems. This interactive tutorial will 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 different types of faults including 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. There are too many cases 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 6th

Session 2 – Integrated Modular Avionics

SL2: ARINC 653 - A Detailed Exploration

Larry Kinnan, Wind River

This tutorial provides an in-depth look at the history behind ARINC 653 and Integrated Modular Avionics (IMA). The session will provide a detailed explanation of the ARINC 653, Part 1 API set and usage as well as the optional Part 2 API set and an overview of the current 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: Multicore and Safety Certification in Avionics

Larry Kinnan, Wind River

With the availability of multicore processors for use in avionics systems and their reduced space, weight and power (SWaP) properties driving adoption, numerous certification challenges have emerged. In order to implement a solution on a multicore platform, the developer will be confronted with significant implementation and certification issues that are not present in unicore or discrete multiple processor designs. These issues involve tradeoffs between deployment configurations (SMP vs. AMP), hardware features and software technologies, which directly impact certification requirements. This tutorial will provide clarity to the developer on what the certification impacts of multicore design are as well as suggestions on how to best minimize the time, cost, effort and risk of RTCA/DO-178C certification for multi-core silicon.

Sunday, October 6th

Session 3 – Surveillance, AIS and MET

SL3: AIS/MET Data Link Services

Tom Evans, NASA Langley Research Center

This tutorial provides a look at standards for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services developed by RTCA Special Committee 206. These services are envisaged to be implemented within the next decade as communication with aircraft moves increasingly from voice to data link. SC-206 was established in 2005 at the request of the FAA to develop standards for data link as the normal means of cockpit receipt of information. SC-206 documents to be discussed include:

- DO-308 Operational Services and Environment Definition for AIS and MET Data Link Services (Dec 2007)
- DO-324 Safety and Performance Requirements for AIS and MET Data Link Services (Dec 2010)
- DO-340 Concept of Use for AIS and MET Data Link Services (Sept 2012)
- DO-xxx AIS and MET Delivery Architecture Recommendations (draft, Dec 2013)
- DO-xxx Minimum Aviation Safety Performance Standards for Providing AIS and MET Data Link Services for Decision Support (draft, Dec 2014).

SA3: 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 Air Transportation System (NextGen) 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)

Tutorial Descriptions

such as conflict detection and enhanced visual acquisition as described in, for example, DO317. 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.

Sunday, October 6th

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. Covered will be: the requirements at the mission level and derived requirements at the subsystem level; trade studies; configuration management; documentation, risk management; safety; schedule; and cost. Managers, Systems Engineers, or details designers interested in learning more about the Avionics Systems Engineering process should register for this tutorial. Combined with Part II – Spacecraft Avionics Subsystem System Engineering, participants will attain a greater level of depth and understanding of how the Systems Engineering process is so vital and important to the success of any Spacecraft Avionics Program or Project.

SA4: Part II – Spacecraft Avionics Subsystem Systems Engineering

George Andrew, GNA Aerospace Consulting Group, Inc.

This session provides a detailed look at basic spacecraft subsystem avionics systems level design and engineering requirements required to develop the Avionics System and Subsystem Level Architecture. The session will detail how to derive Avionics System Level requirements from higher Mission Level Requirements and documentation required to conceptualize and develop Avionics Subsystem Architectures. Combined with Part I – Spacecraft Avionics Systems Engineering Fundamentals, participants will attain a greater level of depth and understanding of how the Avionics Subsystem Systems Engineering process is so vital and important to the success of any Spacecraft Avionics Program or Project.

Monday, October 7th

Session 1 – Communications, Systems Engineering, and NextGen

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

Wilfried Steiner and Mirko Jakovljevic, TTTech

Ethernet is a mature technology developed for best-effort communication in high-volume and consumer applications, but its capabilities are considered to impose limitations on design of fault-tolerant, time-critical, safety-critical, and mission-critical systems.

This tutorial will provide participants with an understanding of Ethernet operation in 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: UML2.0/SysML Based Systems Engineering Using a Model-Driven Development Approach

Hans-Peter Hoffmann, Ph.D., Rational Software

Successfully delivering complex systems requires the development of optimal designs on time, within budget and meeting quality standards. But even the best-detailed design cannot compensate for a poor system architecture. Systems engineering is not just a technical activity in the lifecycle; it determines the commercial viability of the entire project. The state-of-the-art answer to these challenges is Model-based Systems Engineering (MbSE). This tutorial gives an introduction to the IBM Rational Best Practices for Model-based Systems Engineering.

Using the UML/SysML as a paradigm-independent modeling language, these practices support the elaboration and verification/validation of system requirements as well as the design synthesis through model execution. But modeling is not the solution alone. The key for a successful application of the MbSE paradigm is the up-front definition of the underlying workflow, i.e., where systems engineering stops and what artefacts are to be handed off to the hardware, software and test engineers. From these pre- and post-conditions the necessary intermediate artifacts – and supporting best practices – that are needed to elaborate the agreed hand-off, are derived. This tutorial describes an exemplary systems engineering workflow covering the requirements analysis, system functional analysis, and design synthesis phases plus the essential tasks, associated work products and supporting best practices. Collaborative aspects of the systems engineering life cycle, that is requirements engineering and change management, will also be addressed.

MA1: GNSS-based Applications for NextGen Operations

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

The Global Positioning System (GPS) has evolved from its military roots to a system that is being used in a wide variety of applications in today's society. GPS will form an important part of the NextGen navigation aid infrastructure. This course briefly describes the basic operation of GPS and other Global Navigation Satellite Systems (GNSS), their error sources and modes of operation and the state of art in GPS technology. Next, we will discuss the aviation specific applications of GPS including standalone GPS, the Space-Based Augmentation System (SBAS), Ground Based Augmentation System (GBAS), Automatic Dependent Surveillance – Broadcast (ADS-B), and the integration of GPS with inertial navi-

Tutorial Descriptions

gation systems. Finally, we will address the role of GPS-based applications in NextGen operations.

Monday, October 7th

Session 2 – Avionics Genesis and Displays

MM2: 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.

Next, display generation, graphics processors, 3-D engines and topics such as anti-aliasing and texturing will be covered to provide an better insight in the EVS/SVS technology enablers and constraints. Regarding SVS software, API's and rapid prototyping tools will be addressed.

Finally, this course will address methods to 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.

ML2: Avionics Genesis, Lineage, and Evolution – Part 1

Ellis Hitt, StratSystems, Inc.
Tom Redling, Vice-Chair AIAA DATC

From the beginning of aviation, pilots needed to know where they were, where they were going, and the integrity of the aircraft that they were flying. This tutorial presents the beginning of avionics (or "aviation electronics"), the products, the companies and the evolution from the early 1900s to the present. Avionics described include both the aircraft onboard avionics and the ground and satellite systems now used for communications, navigation, surveillance and air traffic management. Sometimes the broader term vetronics is used to describe "vehicle electronics," for land, sea, space, or air vehicles. 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 modern digital avionics that process, integrate, and present information on flat panel displays for the integrated control of flight. Discover the beginning of aircraft computers and the evolution from analog computers used in World War II to the embedded processors in each avionics subsystem and systems. Follow the evolution from dead reckoning to radio to inertial to integrated navigation systems. Follow the elaborate history of mergers and acquisitions that led to the large airlines and manufacturer we see today. Join us while we pursue the integration of sensors and sensor signal processing by humans to integrated fused imagery.

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

Ellis Hitt, StratSystems, Inc.
Tom Redling, Vice-Chair AIAA DATC

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Tutorial Descriptions

Monday, October 7th

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 (MOSA) has been a Department of Defense (DoD) initiative for well over 15 years. This tutorial covers the motivation, policies, concepts and practical applications behind the DoD's approach to leverage commercial 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: Digital Avionics

Albert B. Helfrick, Embry-Riddle Aeronautical University

This tutorial is an updated version of Cary Spitzer's long-running course of the same name. The tutorial is an overview of modern digital avionics systems with special emphasis on system architecture, environment, interconnects and intercommunications. Regulatory and international standards-setting organizations are introduced and their role in modern avionics design.

Safety analysis as a part of the design process is covered with examples of hardware, software and system safety assessment processes and the standards that govern them including DO-178 and DO-254. The role of safety assessment in the aircraft certification process is presented.

Human factors involving crew interfaces including displays, controls and automation are discussed and the strengths and weaknesses of human vs. automation are discussed citing examples of aircraft accidents.

Avionics environments both civilian according to RTCA DO-160 and the military standard MIL-810 are reviewed.

In addition to the usual temperature, pressure, vibration, shock, etc., some of the more demanding and important environmental factors, particularly for digital systems subject to upset, such as high intensity radiated fields, HIRF, and direct and indirect effects of lightning are covered.

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 the F-22 are examined. These architectures have been carefully chosen to cover a spectrum of 1) aircraft types, 2) federated and integrated designs, 3) line replaceable unit vis-à-vis modular packaging, and 4) non-essential to flight critical applications. The hardware and functions of each architecture are discussed.

The architectures of the A-380 and the B-787 are briefly discussed.

Monday, October 7th

Session 4 – Design Assurance

MM4: Understanding and Applying DO-178C

Uma Ferrell, Ferrell and Associates Consulting

DO-178B/ED-12B has served as the basic tool for accomplishing software design assurance for the civil aerospace industry for over twenty years. This tutorial is intended to serve as an introduction to its successor version, DO-178C/ED-12C, along with the supporting/extending technical supplements. Starting with the broader regulatory context (e.g., FARs, CS', ACs, AMJ, etc.), this course is intended to give participants a 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. Changes to the core document along with the contents of the Model Based Development (DO-331), Object Oriented Technology (DO-332), and Formal Methods (DO-333) supplements will be outlined. The new standalone treatment of tool qualification (DO-330) will be covered including transitioning legacy tools to the new framework. Finally, this tutorial will address approaches for dealing with some of the most recent challenges to emerge with respect to DO-178C's application. These include: planning for multiple supplement use, upgrading the development baseline from DO-178B to C, and addressing the new objectives associated with configuration data (i.e., Parameter Data Items). The tutorial will conclude with the latest status on both FAA and EASA guidance associated with this family of new publications.

ML4: Current Approaches to DO-254

Tom Ferrell, Ferrell and Associates Consulting

RTCA DO-254/ED-80, Design Assurance Guidance for Airborne Electronic Hardware, has led the industry to develop rigorous and demonstrable approaches for their embedded hardware. Increasingly, the aerospace industry is having to adopt novel approaches to deal with high levels of complexity in programmable devices and other COTS components employed in modern avionics design. This tutorial will review the objectives and data requirements of DO-254/ED-80, as well as the activities that need to be performed during development to show compliance with regulatory guidance. The various guidance that discuss both showing and finding compliance will be discussed including the relevant FAA and EASA publications (e.g., advisory circulars, orders, and certification memoranda). An overview of industry efforts related to maturing DO-254 demonstration including work done by the DO-254 User's Group and AVSI will be provided. Process topics discussed include planning for DO-254/ED-80 compliance, derived requirement validation, advanced verification techniques including assertion-based verification, and tool chains/qualification. Challenges associated with emerging complex hardware such as multi-core, System-on-chip, and COTS IP will be discussed. Finally, specific techniques for assuring safe operation of complex hardware will be reviewed including Single Event Effects (SEE) mitigation, Clock Domain Crossing (CDC) treatment, and the use of Triple Modular Redundancy (TMR). The tutorial will conclude with a discussion on the latest efforts to update DO-254/ED-80.

MA4: Design Approval via the TSO/ETSO Processes

Tom and Uma Ferrell, Ferrell and Associates Consulting

In recent years, both the FAA and EASA have made significant changes in how individual products, articles, and parts design approvals are granted. This tutorial is intended to provide a detailed introduction to the current TSO and ETSO processes. This will include explanations of the regulatory frameworks that exist in the U.S. and Europe for granting such design approvals, as well as the means by which equipment approved in one country may be accepted by another. The tutorial will review the relationships between the various supporting design assurance documents (e.g., DO-160G, DO-178C, and DO-254) and the technical requirements for which compliance must be demonstrated (e.g., Minimum Operational Performance Standards [MOPS]). Typical data package submittals will be discussed along with the required compliance statements (e.g., FAA compliance letter, the EASA Declaration of Design and Performance [DDP]). Deviations to TSO requirements and the handling of non-TSO functions will also be discussed. A number of unique TSO/ETSO situations will be discussed including differing content between the TSO and ETSO, the differing treatment of IMA by the FAA and EASA (i.e., TSO C153 issues), and equipment classes for which no TSO/ETSO exists (e.g., Enhanced Flight Vision Systems [EFVS], Electronic Flight Bags [EFBs]). The tutorial will conclude with a discussion of current efforts underway to improve and extend the TSO/ETSO system.

Monday, October 7th

Session 5 – Design Assurance and Security

ML5: Formal Methods in RTCA DO 178C

Jeffrey Joyce and Laurent Fabre, Critical Systems Labs

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

MA5: Insights into the Airworthiness Security Process

Laurent Fabre and Jeffrey Joyce, Critical Systems Labs

The increasingly integrated nature of electronic systems and network-intensive technologies in airborne systems, and the connection of these systems with ground-based systems, demands the use of effective processes to ensure that the assessment of airworthiness hazards takes sufficient account of information security threats. RTCA DO 326, Airworthiness Security Process Specification, augments previously existing guidance for aircraft certification to handle the information security threat to aircraft safety. This tutorial provides an overview of RTCA DO 326 as well as insights about expected revisions to this standard now being considered by RTCA SC 216.

Conference Proceedings delivered by November 8, 2013

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

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Technical Program

Benjamin Levy
SAAB Sensis Corporation

Thank you for participating in the 32nd DASC! We gather in Syracuse, NY, where we will exchange ideas, developments, and research findings among and across a broad sector of aerospace industry experts, government leaders and researchers, and the scholars of academia. This year's technical program complements our conference theme by maintaining its dual focus on onboard avionics and infrastructures that provide air navigation services, and by challenging participants to consider how safety and efficiency improvements can be simultaneously achieved. Findings here can be significant drivers for both NextGen and SESAR roadmaps, but only if exposed in venues such as DASC.

Technical Sessions: The technical sessions that will be held Tuesday, October 8th through Thursday, October 10th will include over 205 technical presentations from 26 different countries. The presentations will take place in 7 parallel tracks: Air Traffic Management, Avionics and Flight-Critical Systems, Communication, Navigation, and Surveillance Systems, New Network and Surveillance Technologies, Human Interaction in ATC and in the Cockpit, Emerging Technologies and Systems, and Software Design and Evaluation for Complex Systems. In addition, a poster track will be included again this year, allowing one-on-one interaction with authors on special topics. We will host a tour to a local facility to see a real-life UAV and we will hold a competition to see who can best fly a course using analog avionics on a rebuilt vintage blue-box Link Trainer.

Conference Proceedings CD-ROM: The 32nd 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 plenary speakers. We expect to mail the proceedings to registered attendees by 8 November 2013.

Thanks again for coming. We hope you truly enjoy the event as well as the opportunity to explore Salt City (Syracuse) and nearby the Finger Lakes region of Central New York.

Benjamin Levy

Technical Program

The technical program for the 32nd DASC will present over 200 papers in 8 parallel tracks. This year's theme is "Transforming Air Transportation -- A Safety and Efficiency Collaboration." Any questions about the technical program should be directed to the Technical Program Chair, Benjamin Levy, at technical.chair@dasconline.org. The following schedule, dates, and times are subject to change:

	Tuesday, October 8	Wednesday, October 9		Thursday, October 10	
	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 **Air Traffic Management** Co-Chairs: Bernd Korn, DLR and Wolfgang Schuster, Imperial College London Adams Room	**Arrival Management** Chair: Hunter Kapold, MITRE/CAASD and Elida Smith, MITRE/CAASD	**Surface and Departure Management** Chair: Aditya Saraf, Saab Sensis Corporationand and Alexander Kuenz, DLR	**Performance Analysis** Chair: Mary Ellen Miller, Mosaic ATM and Art Tank, Lockheed-Martin	**Airspace Design** Co-Chairs: Tom Becker, MITRE/CAASD and Bill Bateman, MITRE/CAASD	**Transition to Future ATM Operations** Co-Chairs: Patricia Glaab, NASA and Ralf H. Mayer, MITRE/CAASD
Track 2 **Avionics and Flight-Critical Systems** Chair: Al Herndon, MITRE/CAASD Bushnell Room	**Advanced Concepts** Chair: Forrest Colliver, MITRE/CAASD	**Paths and Trajectories** Chair: Mark Simons, MITRE/CAASD	**Next Generation** Chair: Denise Ponchak, NASA Glenn Research Center	**Communications/Navigation** Chair: Liling Ren, GE Aviation	**Integrated Modular Avionics** Chair: Justin Littlefield, GE Aviation
Track 3 **CNS Systems** Chair: Aloke Roy, Honeywell Dewitt Room	**Communications – Physical Layer Characterization & Analysis** Chair: Steve DeHart, Saab Sensis Corporation	**CNS System Studies** Chair: Jeff Beyer, Clarius	**Navigation** Chair: Michael Brychcy, Boeing	**Special Topics in CNS** Chair: Lou Knotts, CalSpan	**Military & Autonomous Flights** Chair: Douglas Abernathy, Lockheed-Martin
Track 4 **New Networks and Surveillance** Chair: Jonathan Lee, U.S. Department of Transportation Canal Room	**Airborne Cyber-Security** Co-Chairs: Radha Poovendran, University of Washington and Krishna Sampigethaya, Boeing	**Datalink Technologies** Chair: Robert Kerczewski, NASA Glenn Research Center	**Avionics Design: A Systems Perspective** Chair: Ryan Wu, Saab Sensis Corporation	**Alternative Position, Navigation,and Timimg** Chair: Michael Schnell, German Aerospace Center (DLR)	
Track 5 **Human Interaction in ATC and in the Cockpit** Co-Chairs: Todd Lovell, Raytheon and Scott Crawford, Raytheon Sacketts Room	**Human-Machine Interface in ATC and in the Cockpit** Chair: Erik Blasch, Air Force Research Lab	**Surface and Tower Operations** Chair: Paul Kostek, Air Direct Solutions	**Workload and Terminal Area Flow** Chair: Joseph Post, FAA	**Systems Performance and Air Traffic Management** Chair: Wilfried Steiner, TTTech	
Track 6 **Emerging Technologies and Systems** Chair: Cynthia DeBisschop, CNA Champlain Room	**System-Wide Issues in Separation Management** Chair: Timothy Waldron, Saab Sensis Corporation	**New Tools for Cockpit Desision Support** Chair: Liehong Li, Georgia Tech University	**Safety Technologies and Analytical Methods** Chair: Vince Socci, On Target Technology	**Unmanned Systems** Chair: Sherif Ali, GE Aviation	**Re-Imaging Systems Design for UAS** Chair: Cynthia DeBisschop, CNA
Track 7 **Software Design and Evaluation in Complex Systems** Chair: Phil Smith, Ohio State University Superior Room	**Advances in Software Development Processes I** Chair: Natasha Neogi, National Institute of Aerospace	**Certification and System Safety** Chair: Pavel Paces, Czech Technical University in Prague	**Software Design, Verification and Validation** Chair: Chris Wargo, Mosaic ATM	**Software Architecture and System Integration** Chair: Mauricio Castillo-Effen, GE Aviation	**Advances in Software Development Processes II** Chair: Yosef Gavriel Tirat-Gefen, Castel Research
Track 8 **Poster Papers** Chair: Al Helfrick, Embry-Riddle University Grand Ballroom, Pre-Function	**Poster Papers** Chair: Al Helfrick, Embry-Riddle University	**Poster Papers** Chair: Tom Redling, L-3 Communications	**Poster Papers** Chair: Al Helfrick, Embry-Riddle University		

Technical Session A

Tuesday, October 8

A	**Track 1:** Air Traffic Management [Adams Room]	**Track 2:** Avionics and Flight-Critical Systems [Bushnell Room]	**Track 3:** CNS Systems [Dewitt Room]	**Track 4:** New Networks and Surveillance [Canal Room]
	Arrival Management	Advanced Concepts	Communications – Physical Layer Characterization & Analysis	Airborne Cyber-Security
1:30	1A1 Evaluation of the Terminal Area Precision Scheduling and Spacing System for PBN Arrivals Jaewoo Jung ***NASA Ames Research Center***	2A1 An Operational Safety and Certification Assessment of a TASAR EFB Application Stefan Koczo ***Rockwell Collins***	3A1 Powerline Communication with Non-Continuous Interferometry OFDM Chao Zhang ***School of Aerospace, Tsinghua University***	4A1 Generic and Autonomous System for Airborne Networks Cyber-Threat Detection Silvia Gil Casals ***LAAS-CNRS, Univ. de Toulouse and THALES Avionics***
2:00	1A2 Evaluation of the Terminal Sequencing and Spacing System for Performance-Based Navigation Arrivals Jane Thipphavong ***NASA Ames Research Center***	2A2 Usability of EFBs for Viewing NOTAMs and AIS/MET Data Link Messages Emory Evans ***NASA Langley Research Center***	3A2 Research on the Wireless Data Bus for Intra-Vehicle Communications Li Zhou ***Center for Space Science and Applied Research,Chinese Academy of Sciences***	4A2 Secure, Usable and Reliable Method for Avionics Software and Database Upgrade Over the High Speed Wireless Broadband Connection Using GSE Over DVB-S2 ACM Satish Kumar Rajendran ***Honeywell Technology Solutions pvt ltd. BANGALORE, INDIA***
2:30	1A3 Time-Based Arrival Management Concept with Mixed FMS Equipage Johan De Prins ***Boeing Research & Technology Europe***	2A3 Atmospheric Radiation Single Event Effects Testing with Reusable Test Framework Laura Dominik ***Honeywell***	3A3 Channel Quality Estimation with Convolution Code for Airborne Communications Tao Chen ***Aviation Industry of China (AVIC)***	4A3 Candidate Security Solutions for TTEthernet Wilfried Steiner ***TTTech Computertechnik AG***
3:00	**Break**			
3:30	1A4 Integrated Arrival and Departure Weather Avoidance Routing within Extended Terminal Airspace Jit-Tat Chen ***Metron Aviation***	2A4 Preference and Operational Acceptability of Interval Management Flightdeck Information Avionics Alternatives Kara Latorella ***NASA Langley Research Center***	3A4 A Cognitive Radio Enabled Wireless Aircraft Cabin Management System Christoph Heller ***EADS Innovation Works***	4A4 Securing Integrated Modular Avionics Computers Anthony Dessiatnikoff ***LAAS-CNRS***
4:00	1A5 Improved Throughput With Cooperating Futuristic Airspace Management Components Patricia Glaab ***NASA Langley Research Center***		3A5 Evaluation of the Electromagnetic Environment for Intra-Aircraft Wireless Safety-Critical Data Communications Oroitz Elgezabal Gómezi ***Rolls-Royce Deutschland Ltd & Co KG***	4A5 Information for Cyber Security Issues Related to Aircraft Systems Rev-A Peter Skaves ***DOT / FAA***
4:30			3A6 Deterministic Digital WDM LAN for Controlled Configurations John Mazurowski ***Pennsylvania State University Electro-Optics Center***	4A6 Assessing Dual Use Embedded Security for IMA Thomas Gaska ***Lockheed Martin MST Owego***

A	**Track 5:** Human Interaction in ATC and in the Cockpit [Sacketts Room]	**Track 6:** Emerging Technologies and Systems [Champlain Room]	**Track 7:** Software Design and Evaluation in Complex Systems [Superior Room]	**Track 8:** Poster Papers [Grand Ballroom, Pre-Function]
	Human-Machine Interface in ATC and in the Cockpit	System-Wide Issues in Separation Management	Advances in Software Development Processes I	
1:30	5A1 Human Factors Investigation of Manual and Loadable Data Comm. Messages in NextGen Emmanuel Letsu-Dake ***Honeywell International***	6A1 Initial Safety Evaluation of the Unified Departure Operation Spacing (UDOS) Standard Concept Ralf H. Mayer ***The MITRE Corporation***	7A1 Automated Software Design and Synthesis for Distributed Control of Aircraft Fuel Systems Carlos C. Insaurralde ***Heriot-Watt University***	8A1 Wireless Asynchronous Transfer Mode Based Fly-by-Wireless Avionics Network Chao Zhang ***Tsinghua University***
2:00	5A2 Energy Based Flight Displays Karol Rydlo ***Brno University of Technology***	6A2 A Conflict Avoidance Approach Based On Memetic Algorithm Under 4D-Trajectory Operation Concept Ji Lv ***School of Electronic and Information Engineering, Beihang University***	7A2 A Reference Method for Airborne Software Requirements Johnny Marques ***Brazilian Aeronautics Institute of Technology/ EMBRAER***	8A2 Reliability Analysis on Real-Time Avionics Networks Changxiao Zhao ***Airworthiness Certification Technologies Research Center, Civil Aviation University of China***
2:30	5A3 Motion-Based Piloted Flight Simulation Test Results for a Realistic Weather Environment Taumi Daniels ***NASA Langley Research Center***	6A3 A Speed Ratio-Based Optimization Method for Implicit Coordination Pengfei Duanl ***Ohio University***	7A3 Prototyping Framework for Digital Flight Control System Petr Dittrich ***Brno University of Technology***	8A3 A Research on Formation Mechanism of Complex Air Traffic Situation Wei Cong ***Nanjing University of Aeronautics & Astronautics***
3:00	**Break**			
3:30	5A4 How Modeling and Simulation Could Improve the Requirement Engineering for the Human-Machine Interfaces Jean-Philippe Oudet ***ETS Montreal***	6A4 Preliminary Safety Assessment for a Sectorless ATM Concept Bettina Birkmeier ***German Aerospace Center (DLR)***	7A4 Knowledge-Based Engineering to Support Electric and Electronic System Design and Automatic Control Software Development Fengnian Tian ***Delft University of Technology***	8A4 Implementation of Visual Features on Image Generators with OpenSceneGraph Ki-Il Kim ***Gyeongsang National University***
4:00	5A5 Flight Deck Weather Avoidance Decision Support: Implementation and Evaluation Shu-Chieh Wu ***San Jose State University/NASA Ames Research Center***	6A5 From Spatial Conflict Probes to Spatial/ Temporal Conflict Probes: Why and How Erik Theunissen ***Netherlands Defence Academy***	7A5 Knowledge-Driven Software Development for Distributed Aircraft Fuel Management Carlos C. Insaurralde ***Heriot-Watt University***	8A5 Airport Surface Management Strategies to Balance Throughput, Taxi Times and Predictability in Dynamic Weather Scenarios Kristen Weaver ***The Ohio State University***
4:30	5A6 Investigation of HCI Issues with Touch Screen Interfaces in the Flight Deck and Empirically Derived Model to Predict Selection Times with Soft Keyboard in the Flight Deck Sridher Kaminani ***Iowa State University and Rockwell Collins***		7A6 An Approach Based on Models to the Design of Display in the Cockpit Jianmin Wu ***China National Aeronautical Radio Electronics Research Institute***	8A6 Avionics Software Requirement Analysis Based on Case-based Reasoning Min Zhang ***China National Aeronautical Radio Electronics Research Institute***

Technical Session B

Wednesday, October 9

B	**Track 1:** Air Traffic Management [Adams Room]	**Track 2:** Avionics and Flight-Critical Systems [Bushnell Room]	**Track 3:** CNS Systems [Dewitt Room]	**Track 4:** New Networks and Surveillance [Canal Room]
	Surface and Departure Management	Paths and Trajectories	CNS Systems Studies	Datalink Technologies
8:00	1B1 Key Performance Issues in Surface Collaborative Decision Making William Hall ***Mosaic ATM, Inc.***	2B1 Knowledge-Based Trajectory Control for Engine-Out Aircraft Hongying Wu ***CAUC, Tian Jin, China***	3B1 Real-Time Aeronautical Channel Simulator Chao Zhang ***Labs of Avionics, School of Aerospace, Tsinghua Univ.***	4B1 Fiber-Wireless Cabin Mobile Communications on Civil Aircraft Chao Zhang ***Labs of Avionics, School of Aerospace, Tsinghua Univ.***
8:30	1B2 Assessing the Impacts of the JFK Ground Management Program Steven Stroiney ***Saab Sensis Corporation***	2B2 What's New in ARINC 818 Supplement 2 Paul Grunwald ***Great River Technology***	3B2 Reliable Aeronautical Services Protocol: Laboratory Testing and Verification Muhammad Muhammad ***German Aerospace Center (DLR)***	4B2 AFDX Performance Improvement Based on Re-Profiling Pusik Park ***Korea Electronics Technology Institute/Korea Aerospace University***
9:00	1B3 On-Time Performance Under the Departure Metering Program at JFK Airport Michael Carpenter ***Saab Sensis Corporation***	2B3 Image Processing in Airborne Applications Using Multicore Embedded Computers Carlos Sanchez ***EADS Innovation Works***	3B3 SANDRA Flight Trials – Concept, Validation, and Results Simon Plass ***German Aerospace Center (DLR)***	4B3 LISP: A Novel Approach Towards a Future Communication Infrastructure Multilink Service Wolfgang Kampichler ***Frequentis AG***
9:30	**Break**			
10:00	1B4 Trajectory Based Ground Movements and Their Coordination with Departure Management Meilin Schaper ***German Aerospace Center (DLR)***	2B4 Dynamic Inversion of a Flight Critical Actuator for Fault Diagnosis Alexandre Bobrinskoy ***Thales Systèmes Aéroportés***	3B4 Modeling and Simulation of VDL Mode 2 Subnet for CPDLC in El Dorado Airport Leonardo Gomez ***National University of Colombia***	4B4 Application of STANAG 4586 Standard for Turkish Aerospace Industries UAV Systems Baris Kayayurt ***Turkish Aerospace Industries***
10:30	1B5 Ground Control Support to Evaluate Runway Sequence Modifications: Design and Evaluation Joris Koeners ***Delft University of Technology***	2B5 Enhanced and Synthetic Vision Systems Development Based on Integrated Modular Avionics for Civil Aviation Oleg Vygolov ***Federal State Unitary Enterprise "State Research Institute of Aviation Systems"***	3B5 Future Advanced Communication Analysis for Aviation Denise Ponchak ***NASA Glenn Research Center***	4B5 DataComm Trial Automation Platform Frank Matus ***Thales ATM***
11:00	1B6 NextGen Surface Trajectory-Based Operations: Contingency-Hold Clearances Deborah Bakowski ***San Jose State University***		3B6 Stochastic Characterization of Aircraft Digital Avionics Electromagnetic Vulnerability: A Statistical Electromagnetics Approach Andrew Drozd ***ANDRO Computational Solutions, LLC***	4B6 Air to Ground Sensor Data Distribution using IEEE802.11n Wi-Fi Network Florian Boehm ***University of the Bundeswehr Munich***

B	**Track 5:** Human Interaction in ATC and in the Cockpit [Sacketts Room]	**Track 6:** Emerging Technologies and Systems [Champlain Room]	**Track 7:** Software Design and Evaluation in Complex Systems [Superior Room]	**Track 8:** Poster Papers [Grand Ballroom, Pre-Function]
	Surface and Tower Operations	New Tools for Cockpit Decision Support	Certification and System Safety	
8:00	5B1 Data Mining for Understanding and Improving Decision-Making Affecting Ground Delay Programs Deepak Kulkarni ***NASA Ames Research Center***	6B1 Wake Vortex Detection, Prediction and Decision Support Tools in SESAR Program Frederic Barbaresco ***Thales Air Systems***	7B1 Modelling Malicious Entities in a Robotic SWARM Ian Sargeant ***Royal Holloway, University of London***	
8:30	5B2 A Market Approach to Real-Time Departure Runway Scheduling Justin Montoya ***NASA Ames Research Center***	6B2 Automated Conflict Resolution for Airport Traffic Using Graduated Intervention Timothy Waldron ***Saab Sensis Corporation***	7B2 Architectural Considerations for Certification of Real-Time Multi-Core Systems Patrick Huyck ***Green Hills Software***	
9:00	5B3 Development of a Database for Strategic Route Planning Considering Noise Protection Areas and Meteorological Conditions Christina Schilke ***Technische Universitaet Braunschweig, Institute of Flight Guidance***	6B3 Visible Volcanic Ash: Setting the Limit or Not? Ruzica Vujasinovic ***German Aerospace Center (DLR)***	7B3 Reducing Certification Granularity to Increase Adaptability of Avionics Software Martin Rayrole ***Thales Avionics***	
9:30	**Break**			
10:00	5B4 Non-Speech Audio to Communicate Runway Status Raymond Stanley ***The MITRE Corporation***	6B4 Analysis of Potential Mode and Energy State Awareness Issues When Flying Schedule-Matching Descents Shivanjli Sharma ***SGT/NASA AMES***	7B4 A Safe and Secure ARINC 653 Hypervisor Steven VanderLeest ***Calvin College and DornerWorks, Ltd.***	8B1 One Small Step and One Short Word Hugh Blair-Smith ***Down to the Metal*** (Awards Luncheon Presentation)
10:30	5B5 Automatic Speech Semantic Recognition and Verification in Air Traffic Control Daniel Johnson ***Federal Aviation Administration***	6B5 A Software Tool for Objective Evaluation of Pilot's Ability to Determine Potentially Dangerous Flight Situations Pavel Paces ***Czech Technical University in Prague***	7B5 COTS Implementation of Future Airborne Capability Environment (FACETM) Transport Services Segment for DO178C Certification William Antypas ***RTI, Inc.***	
11:00		6B6 Pilot Compliance to TCAS Resolution Advisories Amy Pritchett ***Georgia Tech***	7B6 Certification-Cognizant Real-time Scheduling for Mixed-Criticality Tasks in Avionics System Yao Chen ***Beihang University***	

Technical Session C

Wednesday, October 9

C	**Track 1:** Air Traffic Management [Adams Room]	**Track 2:** Avionics and Flight-Critical Systems [Bushnell Room]	**Track 3:** CNS Systems [Dewitt Room]	**Track 4:** New Networks and Surveillance [Canal Room]
	Performance Analysis	Next Generation	Navigation	Avionics Design: A Systems Perspective
1:30	1C1 Air Traffic System Modeling Approach Based on OO, Image-Moment & Self-Adaptive Clustering Chen Zhang ***East China Regional ATM Bureau***	2C1 Incentivizing Avionics Equipage for the Next Generation Air Transportation System (NextGen) Forrest Colliver ***The MITRE Corporation***	3C1 Navigation with the Broadband MIMO-NCI-OFDM Air-to-Ground Communications Network Chao Zhang ***School of Aerospace, Tsinghua University***	4C1 A Structured Problem-Solving Approach for System Integration Issues Using Root-Cause and Corrective-Action Analysis Vince Socci ***On Target Technology***
2:00	1C2 Large-Scale Data-Based Collaborative Air Traffic Optimization for Congestion Management Aude Marzuoli ***Georgia Institute of Technology***	2C2 IC Components Reliability Concerns for Avionics End-Users Didier Regis ***Thales Airborne Systems***	3C2 The Last 200 Feet - - A Low-Cost Approach to Landing Aircraft in Zero-Zero Conditions William McDevitt ***The Pennsylvania State University***	4C2 An AADL-Based Design For Dynamic Reconfiguration of DIMA Qing Zhou ***China National Aeronautical Radio Electronics Research Institute***
2:30	1C3 Analysis of Deficiencies in Terminal Operations Simon Heitin ***The MITRE Corporation***	2C3 Time and Energy Management During Descent: Human vs. Automated Response Paul de Jong ***Delft University of Technology***	3C3 Pilot Navigation for Emergency Events in Ultra-Light Aircrafts Tomáš Levora ***Czech Technical University in Prague***	4C3 Performance Estimation of a FDI function for Flight Critical Systems: Application to a Sensor Acquisition System Romain Martin ***THALES Systèmes Aéroportés***
3:00	**Break**			
3:30	1C4 Assessment of Imperfect Weather Forecasts on Airline and Passenger Planning Frederick Wieland ***Intelligent Automation, Inc.***	2C4 Patents for Technological Trajectories Understanding: the Avionics Case Study Aurelie Beaugency ***THALES AVIONICS***	3C4 An Optimization Design Method for Control Law of Lateral Navigation Chengzhi Chi ***China National Aeronautical Radio Electronics Research Institute***	4C4 Experimental Investigation of Aircraft Wires and Cables Defects Petr Makula ***University of Defence***
4:00	1C5 Strategic Airspace Constraint Analysis and Environmental Impact of Dynamic Weather Routes Kapil Sheth ***NASA Ames Research Center***	2C5 Flexible Platform Approach for Fly-by-Wire Systems Simon Goerke ***Institute of Aircraft Systems / University of Stuttgart***	3C5 Optimal Trajectory Generation for Next Generation Flight Management Systems Yancy Diaz-Mercado ***Georgia Institute of Technology***	4C5 Pressure Based Reference System for Aircraft Attitude Measurement Jan Popelka ***Czech Technical University in Prague***
4:30	1C6 An Assessment of Flight Delay Caused by En Route Weather James DeArmon ***The MITRE Corporation***	2C6 MADEQ: A Model for Avionics Device Qualification Caio Silva ***Brazilian Aeronautics Institute of Technology***	3C6 LDACS1 Ranging Performance - An Analysis of Flight Measurement Results Dmitriy Shutin ***German Aerospace Center (DLR)***	

C	**Track 5:** Human Interaction in ATC and in the Cockpit [Sacketts Room]	**Track 6:** Emerging Technologies and Systems [Champlain Room]	**Track 7:** Software Design and Evaluation in Complex Systems [Superior Room]	**Track 8:** Poster Papers [Grand Ballroom, Pre-Function]
	Workload and Terminal Area Flow	Safety Technologies and Analytical Method	Software Design, Verification and Validation	
1:30	5C1 TCAS Compatibility of Advanced Airborne Separation Assurance System Operations Helge Lenz ***German Aerospace Center, Institute of Flight Guidance***	6C1 Risk Analysis Process Tool Enhancements for Loss of Separation Events Eric Chang ***The MITRE Corporation***	7C1 Integrating Test and Proof in the Verifiable SPARK Language using Contracts and SMT Solvers Tucker Taft ***AdaCore***	8C1 Modeling and Reliability Evaluation of Avionics Clouds Based on AADL and GSPN Xiaojie Tu ***Beihang University***
2:00	5C2 Exploring the Relationship Between Airspace Complexity and Air Traffic Controller Workload Jeffrey Homola ***San Jose State University/NASA Ames Research Center***	6C2 A Methodology for Estimating the Probability of Potential Secondary Conflicts John Shortle ***George Mason University***	7C2 Elaboration of Safety Requirements Kristina Forsberg ***Saab AB***	8C2 Effect of Simulator Training on Airport Ground Vehicle Operators' Positional Awareness Katarina Morowsky ***Tufts University***
2:30	5C3 Case Study: Analyzing Influences on Traffic Scenario Difficulties for Human-in-the-Loop Simulations Nancy Bienert ***San Jose State University/NASA Ames Research Center***	6C3 Applying Automatic Speech Recognition Technology to Air Traffic Management Hunter Kopald ***The MITRE Corporation***	7C3 Evolution Assisted Flight Control System Design Jan Vlk ***Brno University of Technology, Faculty of Information Technology***	8C3 Inserting a High-Performance Graphic Engine in an Avionic System Jean-Philippe Oudet ***ETS Montreal***
3:00	**Break**			
3:30	5C4 A Comparison of NextGen Airspace Operations in Three Successive Timeframes Nancy Smith ***NASA Ames Research Center***	6C4 Reliably Generating Traffic Conflicts in Human-in-the-Loop Experiments Amy Pritchett ***Georgia Institute of Technology***	7C4 Study of Formal Method on Functional Integration of IMA Lisong Wang ***Nanjing University of Aeronautics and Astronautics***	8C4 Analysis of the Airspace Design Trade Space Antoine Genton ***Georgia Institute of Technology***
4:00		6C5 Economic Impact of Next Generation Aircraft on Safety Standards Joel Langston ***Georgia Institute of Technology***	7C5 Automated Generation of Test Cases for Critical Systems Based on MC/DC Criteria Mateus Almeida ***Instituto Tecnológico de Aeronáutica (ITA)***	8C5 Performance Evaluation of Two Altimeters Intended for Euler Angles Measurement Pavel Paces ***Czech Technical University in Prague***
4:30				

Technical Session D

Thursday, October 10

D	**Track 1:** Air Traffic Management [Adams Room]	**Track 2:** Avionics and Flight-Critical Systems [Bushnell Room]	**Track 3:** CNS Systems [Dewitt Room]	**Track 4:** New Networks and Surveillance [Canal Room]
	Airspace Design	Communications/Navigation	Special Topics in CNS	Alternative Position, Navigation, and Timing
8:00	1D1 Airspace Design with Explicit Utilization of Convective Weather Forecast Data for Reduced Traffic Flow Management Actions Irina Kostitsyna ***Stony Brook University***	2D1 Investigation EMC Compliance with Aircraft Communication System and Switch-Mode Power Supplies Jan Leuchter ***University of Defence***	3D1 Privacy-Friendly Skies: Models, Metrics, and Solutions for Privacy of Airspace Users Krishna Sampigethaya ***Boeing Research & Technology***	4D1 Enhancing DME/N Multipath Rejection with Tightened Pulse Waveform Variation Euiho Kim ***SELEX Systems Integration, Inc.***
8:30	1D2 Robust Airspace Design Methods for Uncertain Traffic and Weather Arash Yousefi ***Metron Aviation Inc.***	2D2 Organizing Aircraft Navigation System as Real Time Reference Model Architecture Khaled Ibrahim ***Al Jouf University***	3D2 Computer Vision Based Surveillance Concept for Airport Ramp Operations Sai Vaddi ***Optimal Synthesis Inc.***	4D2 Alternative DME/N Pulse Shape for APNT Euiho Kim ***SELEX Systems Integration, Inc.***
9:00	1D3 A Method to Design a Tie-Point-Based Optimized Profile Descent (OPD) Solution Christian Grabow ***Boeing Research & Technology Europe***	2D3 On the Characterization of the Wireless Channel for Aeronautic Mobile Telemetry in C-Band Christoph Heller ***EADS Innovation Works***	3D3 Analyses Supporting Surveillance Requirements for a Category I Paired Approach Procedure Robert Eftekari ***The MITRE Corporation***	4D3 Airspeed Estimation Using Servo Current and Aircraft Model Suvo Ganguli ***Honeywell***
9:30	**Break**			
10:00	1D4 Scheduling and Separating Departures Crossing Arrival Flows In Shared Airspace Eric Chevalley ***San Jose State University / NASA Ames Research Center, Moffett Field***	2D4 Neural Network Based Architecture for Fault Detection and Isolation in Air Data Systems Luca Garbarino ***Italian Aerospace Research Centre - CIRA***	3D4 A Robust BFSK Signal Demodulator Using Orthogonal Decomposer Rangarao Kaluri ***Jawaharlal Nehru Technological University***	4D4 Performance Analysis of Different Navigation Estimators in RNAV-1 Environment Petr Bojda ***University of Defence***
10:30	1D5 A Template-Based Approach to Dynamic Airspace Configuration in Presence of Weather Panta Lucic ***CSSI, Inc.***	2D5 A Hardware Prototype for Integration, Test and Validation of Avionic Networks José-Philippe Tremblay ***École Polytechnique de Montréal***	3D5 Neurovision®; the Way to Merge Visual Reality with Advanced Navigational Systems Hector Gomez-Acevedo ***Metamathics***	
11:00	1D6 Design Considerations for Shortcut Path-Based Time Recovery Shannon Zelinski ***NASA Ames Research Center***		3D6 A Particle Filter for Mutistatic Radar Tracking Alaa El-Din Hafez ***Alexandria University***	

D	**Track 5:** Human Interaction in ATC and in the Cockpit [Sacketts Room]	**Track 6:** Emerging Technologies and Systems [Champlain Room]	**Track 7:** Software Design and Evaluation in Complex Systems [Superior Room]	**Track 8:** Poster Papers [Grand Ballroom, Pre-Function]
	Systems Performance and Air Traffic Management	Unmanned Systems	Software Architecture and System Integration	
8:00	5D1 Analysis of Advanced FMSs, FMC Field Observations Trials, SID / Optimized Profile Descent Albert Herndon ***The MITRE Corporation***	6D1 Architecture Issues and Challenges for the Integration of RPAs in Non-Segregated Airspace Raúl Cuadrado ***Barcelona Tech***	7D1 A Software Approach for Managing Shared Resources in Multicore IMA Systems Xavier Jean ***Thales Avionics, Telecom ParisTech***	
8:30	5D2 Accuracy Impact of Trajectory Sampling and Representation for TBO Sergio Torres ***Lockheed Martin***	6D2 Unmanned Aircraft System Demand Generation and Airspace Performance Impact Prediction Sricharan Ayyalasomayajula ***Intelligent Automation, Inc.***	7D2 Avionics R&D Platform Based on "Engineering Middleware" Technology Lei Zhang ***Sysware Technology Co., Ltd.***	
9:00	5D3 Implementing System Wide Information Management for ATM Systems using a Distributed MILS Architecture Wilfried Steiner ***TTTech Computertechnik AG***	6D3 Enhanced Air Operations Using JView for an Air-Ground Fused Situation Awareness UDOP Erik Blasch ***AFRL/RIEA***	7D3 Grain-Oriented Computer Architectures for Dynamically-Reconfigurable Avionics Systems Carlos C. Insaurralde ***Heriot-Watt University***	
9:30	**Break**			
10:00	5D4 Flexible RTA Accuracy Management in the Future ATM Michal Polansky ***Honeywell, Advanced Technology Europe***	6D4 Influence of UAS Pilot Communication and Execution Delay on Controller's Acceptability Ratings of UAS-ATC Interactions Kim-Phuong Vu ***California State University, Long Beach***	7D4 Economical Memory Management for Avionics Systems Yair Wiseman ***Israel Ministry of Transport***	
10:30	5D5 Cloud Computing for Air Traffic Management – Framework Analysis Liling Ren ***GE Global Research***	6D5 Frequency Spectrum for Integration of Unmanned Aircraft Robert Kerczewski ***NASA Glenn Research Center***	7D5 2nd Generation IMA: Extended Embedded Virtualization Capabilities for Optimized Architectures Mirko Jakovljevic ***TTTech***	
11:00	5D6 A Terminal Area Analysis of Equipage Priority Scheduling to Incentivize Advanced Avionics Adoption Daniel Mulfinger ***NASA***	6D6 Towards the Automation of the UAS Mission Management Pablo Royo ***Barcelona Tech***	7D6 Research on Distributed Integrated Modular Avionics System Architecture Design and Implementation Guoqing Wang ***China National Aeronautical Radio Electronics Research Institute***	

Technical Session E

Thursday, October 10

E	**Track 1:** Air Traffic Management [Adams Room]	**Track 2:** Avionics and Flight-Critical Systems [Bushnell Room]	**Track 3:** CNS Systems [Dewitt Room]	**Track 4:** New Networks and Surveillance [Canal Room]
	Transition to Future ATM Operations	Integrated Modular Avionics	Military and Autonomous Flights	
1:30	1E1 Individualism in Global Airspace – User-Preferred Trajectories in Future ATM Alexander Kuenz ***German Aerospace Center (DLR)***	2E1 Modeling and Optimization in Distributed Integrated Modular Avionics Chao Zhang ***School of Aerospace, Tsinghua University***	3E1 The Effects of Feedback Delays on the Next Generation Route Assessment Tool John Terceman ***California State University of Northridge***	
2:00	1E2 Accuracy Considerations of a Simple Aircraft Trajectory Prediction Model for Idle Thrust Descents Brian Zammit ***University of Malta***	2E2 Automated Selection, Sizing, and Mapping of Integrated Modular Avionics Modules Bjoern Annighoefer ***Hamburg University of Technology***	3E2 SESAR and Military: Towards ATM Integration Giovanni Antonio Di Meo ***Politecnico di Torino***	
2:30	1E3 Trajectory-Based Operations in the Presence of Trajectory Prediction Uncertainties Thomas Prevot ***NASA***	2E3 Using Multi-Link Grouping Technique to Achieve Tight Latency in Network Calculus Luxi Zhao ***Beihang University***	3E3 Conceptual Changes by Use of Near Space Mehmet Cevat Ozdemir ***Turkish Air War College***	
3:00	**Break**			
3:30	1E4 Controller Support Tools for Merging and Monitoring Guillermo Frontera ***Universidad Politecnica de Madrid***	2E4 Fault Tolerant Smart Transducer Interfaces for Safety-Critical Avionics Applications Safwen Bouanen ***École de Technologie Supérieure***	3E4 Enabling Autonomous Flight Capabilities Onboard Commercial Aircraft to Improve Safety Pritesh Narayan ***University of the West of England***	
4:00	1E5 The Metroplex Simulation Environment Brian Capozzi ***Mosaic ATM, Inc.***	2E5 DO-254 Requirements Traceability Louie De Luna ***Aldec, Inc.***		
4:30	1E6 Investigating the Complexity of Transitioning Separation Assurance Tools into NextGen Air Traffic Control Ashley Gomez ***NASA Ames / San Jose State University Research Foundation***			

E	**Track 5:** Human Interaction in ATC and in the Cockpit [Sacketts Room]	**Track 6:** Emerging Technologies and Systems [Champlain Room]	**Track 7:** Software Design and Evaluation in Complex Systems [Superior Room]	**Track 8:** Poster Papers [Grand Ballroom, Pre-Function]
		Re-imaging Systems Design for UAS	Advances in Software Development Processes II	
1:30		6E1 Autonomic Computing Management for Unmanned Aerial Vehicles Carlos C. Insaurralde ***Heriot-Watt University***	7E1 Diminishing Flight Data Recorder Size Yair Wiseman ***Israel Ministry of Transport***	
2:00		6E2 Multichannel Sense-and-Avoid Radar for Small UAVs Lei Shi ***The University of Kansas***	7E2 Graphical Visualization of Requirement Traceability for Easy Navigation, Recover, Browse, and Maintain Interlinks Effectively Satish Kumar Rajendran ***Honeywell Technology Solutions Pvt Ltd. Bangalor, India***	
2:30		6E3 Research Paper on the Topic of Different UAV Drive Train Qualification and Parameter Sets Nicolas Faundes ***EMB-LAB, Mannheim University of Applied Sciences***	7E3 Towards a Workflow to Support the Integration of Aircraft Systems' Models Guilherme Hernandes ***Instituto Tecnológico de Aeronáutica - ITA***	
3:00		**Break**		
3:30		6E4 Smart Phone Controlled Miniature Unmanned Vehicles Gajapriya T ***Madras Institute of Technology***	7E4 Towards an Agile Approach to Systems Engineering and Software Development for the National Airspace System Avinash Pinto ***The MITRE Corporation***	
4:00		6E5 Development of Low Cost Inertial Navigation System Asupathy G ***Anna University***	7E5 Applying Future Airborne Capability Environment Standard to Primary Flight Display S/W Architecture on IMA Jongsoo Hyun ***Korea Aerospace Industries, Ltd.***	
4:30		6E6 Vision Based Indoor Localization and Heading Correction for Micro Air Vehicle Jayashree T R ***Madras Institute of Technology***	7E6 A Quality-Based Design Methodology to Reduce Costs of Cockpit Systems Jean-Philippe Oudet ***ETS Montreal***	

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ABSTRACT DETAILS
Authors are invited to submit abstracts of no more than 750 words before 1 March 2014 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 29 August 2014.

33rd DASC

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Designing an Air Transportation System with Multi-Level Resilience

We welcome everyone to join us for the 33rd DASC in Colorado Springs, CO.

CONFERENCE THEME: The conference theme for the 33rd DASC is the design of air transportation systems that are resilient at different system levels. The presentations, posters, papers, and discussions that will comprise this conference build upon the theme of the 32nd DASC wherein the interplay between safety and system efficiency were explored. Participants will be challenged to show how their work helps to develop, promote, or enable resilience. Of particular interest will be perspectives that describe the use of policy and economics as tools for engineers to manage system and product life-cycle development, deployment, degradation, and decay. Talks of interest may focus on systems' failure modes, fault tree research, graceful degradation, defense-in-depth, and system alerts and recovery. An interesting assertion that should be addressed is whether designing a resilient system sub-component always contributes to an improvement in overall system resilience.

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 monitor the hazard space with adequate time-to-avoid
- Systems that can afford the safe introduction of UAS in the NAS
- Systems that can support more efficient aircraft-ATM coordination
- Providing air transportation service to under-served markets
- Defining the role for humans in an increasingly automated ATC system
- Design of safety management systems including 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 Single European Sky (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 33rd DASC as we engage in the important issues of the aviation electronics (i.e., "avionics") industry!

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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 and inter-process communication, data partitioning, protocols, multi-protocol gateways, message routing, spectrum, and passenger communication mechanisms.

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

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Professional Education

DASC will offer two full days of Professional Education sessions spanning many engineering disciplines. These tutorials will be presented by educators and practicing professionals 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:

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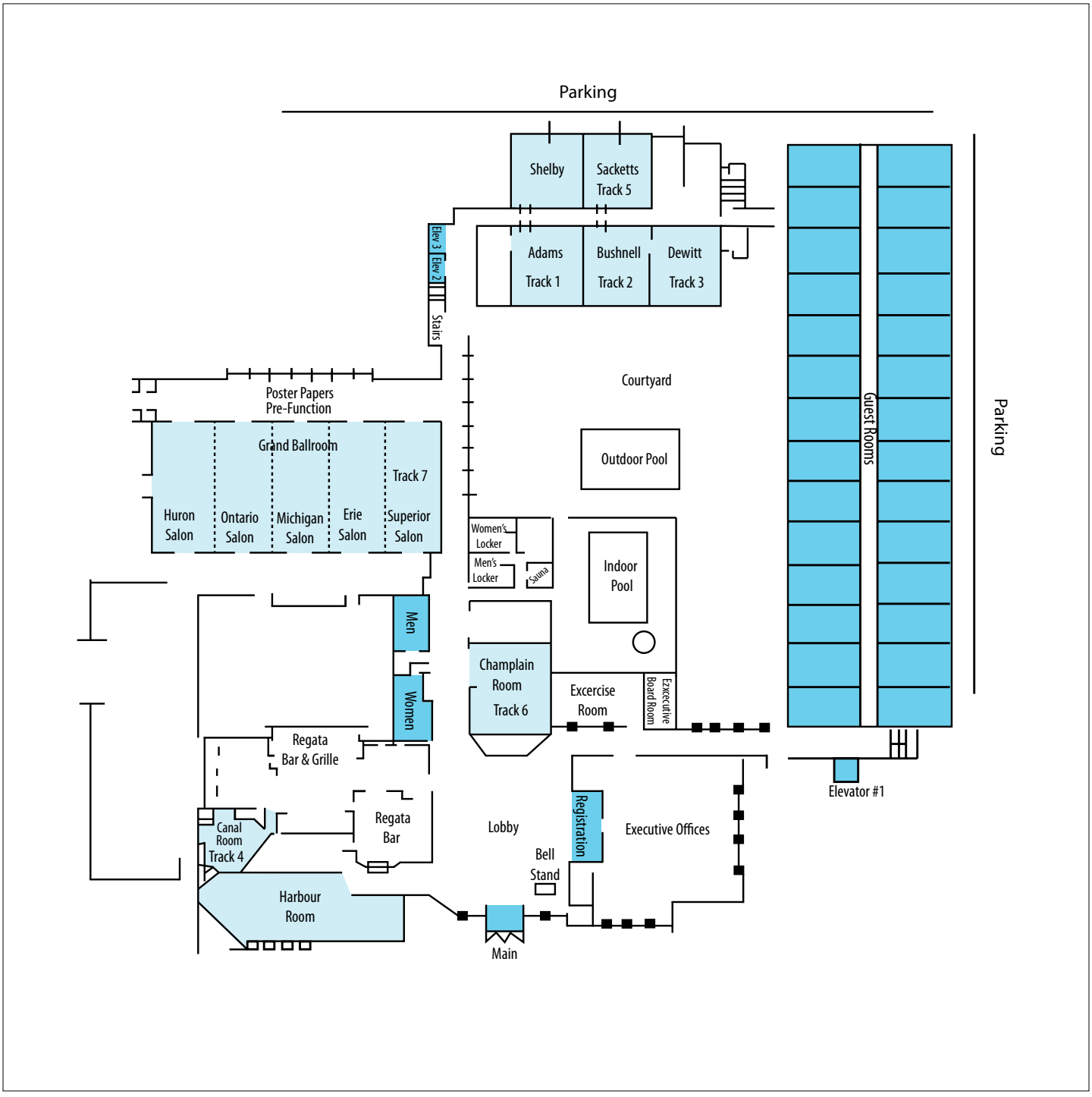

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