34th DASC

Digital Avionics Systems Conference

13-17 September 2015

Corinthia Hotel, Prague, Czech Republic

Impact of Global Mandates on Avionics Research and Development

AIAA The World's Forum for Aerospace Leadership

IEEE

AESS

DATC AIAA Digital Avionics Technical Committee

Welcome to the 34th Digital Avionics Systems Conference

Greetings! For forty years, the Digital Avionics Systems Conference (DASC) has been held within the United States of America, and while the authors and attendees were from around the world, the conference appeared to be a USA conference because of the locations and organizing committees. Two years ago, the DASC Executive Committee decided that it was time to embrace the international community of our attendees and to recognize the major aeronautics companies, universities and technology that is being developed throughout the world. We concluded that the best way to recognize the international interests of DASC was to take the conference outside of the USA.

Thus, I am very pleased and honored to welcome you to Prague, the capital city of the Czech Republic for the 34th Digital Avionics Systems Conference, the first held outside of the USA!! This year we have more accepted papers than the past ten-plus years, which indicates that you agree with the organizing committee that it was time to take the conference outside of the USA, or you agree with me that Prague is a beautiful city that was on your wish list of places to see. I can assure you that both the technical program and the city will live up to your expectations.

The theme of this year's conference, the Impact of Global Mandates on Avionics Research and Development, builds on our international venue. Within the technical program and the topics listed in the call for papers are many relevant topics that build on the interplay between mandates and innovations to consider. Through your participation, you can help to influence the future directions of industry, government, and academia as we all work together to transform flight.

Additionally, we have arranged several events for your entertainment, to meet old friends, to make new friends, and to discuss work in less formal environments. Conference attendees are invited to join us for a welcome reception at the Brewery and Restaurant U Fleků, one of the most famous and most visited Czech cultural sites, housed in a building dating from 1499 and laid out in the true European beer hall style. The Awards Dinner will be at Francouzská Restaurace located in the Municipal House building; and, we have arranged tickets to attend a classical music concert at the Klementinum in the beautiful Mirror Chapel. Founded in 1232, the Klementinum is the largest and most historic complex of buildings in the Old Town. On Friday of conference week we are offering an optional day trip to Cesky Krumlov, where the entire city center is a World UNESCO Heritage Site. There are not many locations in the world where we can hold events in such historic places, and I know they will give you a great appreciation of Prague.

Thus, on behalf of the AIAA Digital Avionics Technical Committee, the IEEE Aerospace Electronics Systems Society, the many people on the conference organizing committee, and the great people of Prague, I thank you for attending the 34th DASC and welcome you to Prague.

Denise Ponchak
34th DASC General Chair

Conference Committee

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Conference Proceedings will be sent out by 18 October 2015
The conference proceedings will be delivered to all conference registrants after the conference. This allows us to include content generated at the conference.

Welcome to the 34th DASC in Prague

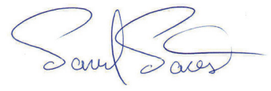
It is my pleasure to welcome all of you to Prague for 34th Digital Avionics Systems Conference. It is the first time the conference is being held outside of the USA and the first time to be hosted in Europe, the Czech Republic, Prague, the city of a hundred spires and an UNESCO monument.

Prague is a relatively small and compact city where everything is close! The 34th DASC is being held in Corinthia Hotel Prague, which provides breath-taking views over Prague center on one side and Vysehrad fortress on the other. I recommend you visit Vysehrad outlook, which is just 300 meters away from the hotel and offers great views over the Vltava River. Take friends and a bottle of vine with you. The Corinthia Hotel is directly next to the Vysehrad Metro station. We have a very precise and reliable public-transport system that allows you to travel from any place of the city to another. Go to Wenceslav Square, Prague Castle, Old Town Square (the historic hearth), Petrin Hill, or buy a ticket for the Opera. All these options are 20 minutes away by metro and in case you get lost ask young people for advice; they speak English very well.

DASC 2015 joins aerospace scientists and engineers from all around the word and offers a unique opportunity to share the latest achievements in the area of electronics for aerospace among people from different organizations. The impact of global mandates is crucial for all of us and our conference provides the opportunity to share ideas, solutions, and establish new collaborations.

On behalf of the local organizing and conference committees, I welcome you to 34th DASC in Prague. I will be happy if we make the conference a memorable scientific and personal event together.

Pavel Paces
34th DASC Local Arrangements Chair



Welcome to Prague!

Welcome to the beautiful and enchanting city of Prague, venue for the 34th Digital Avionics Systems Conference (DASC) and the first international DASC. Positioned at the peak of one of the nine Prague hills, the Corinthia Hotel Prague offers unrivalled views overlooking the city that has inspired countless artists for centuries and earned the UNESCO World Heritage Site status. The city center is within minutes using the nearby metro links, and the oldest castle in Prague is just three minutes by foot from the hotel. The Corinthia Hotel Prague provides top class dining with a choice of five restaurants for lunch and evening meals. Your hotel reservation includes a breakfast buffet each morning. The top floor Apollo Day Space offers a fully-equipped gym, indoor swimming pool with panoramic city views, sauna, steam room, and solarium.

Conference Welcome at U Fleků Brewery

(Complimentary but must sign up and pick up your Ticket at the DASC Registration Desk)

Monday, 7:00 - 9:00

Conference attendees are invited to join us at the Brewery and Restaurant U Fleků, one of the most famous and most visited Czech cultural sights. It's housed in a building dating from 1499 and laid out in the true European beer hall style. It's the only brewery in Central Europe which has been brewing continuously for over 500 years and is a pilgrimage site for all beer lovers, both Czech and foreign. Be sure to sign up and pick up your ticket for this dining experience at the DASC Registration Desk.

Optional Masters of Classical Music at the Klementinum

(Sign up at the DASC Registration Desk and pick up your Ticket)

Wednesday, 6:00 – 8:00

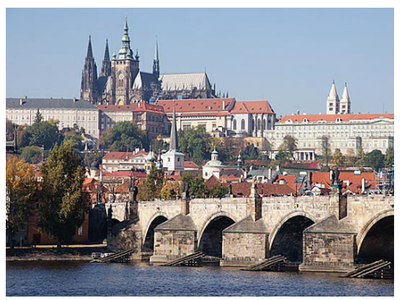
Reservations have been made for us to enjoy a classical concert in the Mirror Chapel of the Klementinum on Wednesday evening. Founded in 1232, the Klementinum is the largest and most historic complex of buildings in the Old Town. It covers over four acres, and is located close to the Vltava River near Charles Bridge. The Mirror Chapel is a truly beautiful and unique chapel built in 1724, with extensive frescos and carvings. Houses two 18th century organs, one played by Wolfgang Amadeus Mozart on his visits to the Klementinum. Tickets are limited and will be sold for $30 on a first come basis. Please sign up for this event and purchase your ticket at the DASC Registration Desk.

Guest Program

Spouses, families, and guests are encouraged and invited to accompany attendees to the 34th DASC. The program includes day trips and three evening events:

Monday – Welcome at U Fleků Brewery
Tuesday – Castle (arrive in time for changing of the guards), Lunch on the terrace of the Lobkowicz Place Cafe, Charles Bridge, Old Town (Clock, Church), Walk to Vaclavske Square, Easter Egg Shop, Exhibitor's Reception at the hotel
Wednesday – Troya Summer Chateau, Lunch nearby, Botanické zahradě Prague, optional shopping or back to hotel
Thursday – Karlštejn Castle, Souvenir shopping, Nativity Scene, Lunch at Hotel Koruna. Return to hotel or optional shopping on Paris Street or Jewish Quarter. Awards Dinner at Francouzská Restaurace.

Lunch and admission to day trips are not included. Sign up for this program on the online Registration form or at the Registration Desk at the conference. This itinerary is subject to change.



Awards Banquet at Francouzská Restaurace

(Complimentary but must sign up and pick up ticket at the DASC Registration Desk)

Thursday, 6:30 – 10:00

This year's Awards presentations will be held Thursday evening at one of the most beautiful Art Nouveau restaurants in the world, Francouzská Restaurace. The restaurant is located in the Municipal House building. To attend this special dinner event, please sign up at the DASC Registration Desk and pick up a ticket. Sign-up for vegetarian option is available. Jackets suggested. This Awards Banquet is sponsored by Honeywell Aerospace.

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, AIAA Dr. John C. Ruth Digital Avionics Award, the David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award for the 33rd DASC, 34th Best of Track and Student Best Paper Awards.

Distinguished Institution Award
The Distinguished Institution Award is presented to an organization in recognition of outstanding achievements and invaluable contributions to the development and transfer of critical technologies that address international priorities through research, technology development, and systems integration.

We also recognize their generous support to the success of the AIAA Digital Avionics Technical Committee (DATC); the Integrated Communications, Navigation, and Surveillance Conference (ICNS); and the Digital Avionics Systems Conference (DASC). Denise Ponchak will be presenting this award.

The 2015 winner is:
Honeywell Aerospace

2015 Dr. John C. Ruth Digital Avionics Award
This award is given for "Outstanding achievement in technical management and/or implementation of digital avionics in space or aeronautical systems to include system analysis, design, development or application."

This year's winner is Rafael D. Apaza of NASA Glenn Research Center and he is receiving the award: For the conception, formulations and development of the Aeronautical Mobile Airport Communications System (AeroMACS), the world's first standardized wireless communications system for airport critical operations use. Tom Smith will be presenting this award.

David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award
The Conference Awards Chair forms a selection committee made up of AIAA DATC members. This committee selects the David Lubkowski Memorial for Advancement in Digital Avionics Best Paper Award of the 33rd 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. Stephane L. Mondoloni of MITRE/CAASD to Steven H. VanderLeest of DornerWorks Ltd. and Calvin College, Grand Rapids, MI for his paper "Taming Interrups: Deterministic Asynchronicity in an ARINC 653 Environment."

Optional Day Trip to Český Krumlov

(Sign up at the DASC Registration Desk)

Friday, 7:45 a.m. – 7:00 p.m.

After breakfast we will meet our guide and the bus by the hotel at 7:45 a.m. to depart for the full day trip to the UNESCO protected town Český Krumlov, which is located about 100 miles from Prague. Český Krumlov is an outstanding example of a central European small town dating from the Middle Ages that owes the structure and buildings of its historic core to its economic importance and relatively undisturbed organic development over some five centuries. Our trip includes entrance to Krumlov Castle and a tour of the center of the city as well as a guide who will be with us the entire time. Meals will be on your own. Tickets are limited and will be sold for $50 on a first come basis. Please sign up for this event and purchase your ticket at the DASC Registration Desk.

34th DASC Week at a Glance

Sunday 9/13/2015	Monday 9/14/2015	Tuesday 9/15/2015	Wednesday 9/16/2015	Thursday 9/17/2015	Friday 9/18/2015
Breakfast for Hotel Guests in Let's Eat	Breakfast for Hotel Guests in Let's Eat	Breakfast for Hotel Guests in The Grill	Breakfast for Hotel Guests in The Grill	Breakfast for Hotel Guests in The Grill	Breakfast for Hotel Guests in Let's Eat
9:30 - 6:00 Registration Open	7:30 - 6:00 Registration Open	7:30 - 5:00 Registration Open	7:30 - 3:00 Registration Open	7:30 - 1:30 Registration Open	7:45 am – 7:00 pm Optional Day Trip at Český Krumlov
	8:00 - 11:00 Tutorials	8:00 - 12:30 Executive Plenary Session	8:00 – 9:00 Plenary Session		
			9:00 – 12:30 Technical Sessions	9:00 – 12:30 Technical Sessions	
		Exhibits Open 1:00 – 7:00	Exhibits Open 9:00 – 5:30	Exhibits Open 9:00 – 3:30	
11:30 - 2:30 Tutorials	11:30 - 2:30 Tutorials	12:30 - 1:30 Lunch in The Grill	12:30 - 1:30 Lunch in The Grill	12:30 - 1:30 Lunch in The Grill	
3:00 - 6:00 Tutorials	3:00 - 6:00 Tutorials	1:30 - 5:00 Technical Sessions	1:30 - 5:00 Technical Sessions	1:30 - 5:00 Technical Sessions	
	7:00 – 9:00 Conference Welcome U Fleků Brewery	5:00 – 6:30 Exhibitor's Reception in Hotel	6:00 - 8:00 Optional Music Concert at the Klementinum	6:30 - 10:00 Awards Banquet Francouzská Restaurace	

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.

Executive Plenary Session Keynote Speaker

Tuesday, 8:00 – 12:30

Janet L. Kavandi

Astronaut and Deputy Director at the National Aeronautics and Space Administration's Glenn Research Center

Janet L. Kavandi serves as the Deputy Director at the National Aeronautics and Space Administration's Glenn Research Center. In this position, she shares with the Center Director responsibility for planning, organizing and managing the programs and projects assigned to the Center. The Glenn staff consists of more than 3,200 civil service and support contractor employees and has an annual budget of approximately $581 million.

Prior to being named Deputy Director, Dr. Kavandi served as the Deputy Director of the Health and Human Performance Directorate at NASA's Johnson Space Center in Houston where she was responsible for the NASA flight surgeons and human research investigations on the International Space Station. She also served as both the Director and Deputy Director of Flight Crew Operations at Johnson, where she was responsible for the Astronaut Corps and aircraft operations at Ellington Field near Johnson.

Dr. Kavandi was selected as an astronaut in December 1994. During her time in the Astronaut Office, she supported payload integration for the International Space Station, Capsule Communications, Robotics, and served as Deputy Chief of the Astronaut Office. She is a veteran of three space flights, serving as a mission specialist on STS-91 in 1998, STS-99 in 2000, and STS-104 in 2001. Dr. Kavandi has logged more than 33 days in space, traveling more than 13.1 million miles in 535 Earth orbits.

Born in Springfield, Missouri, Dr. Kavandi earned a Bachelor of Science degree in chemistry from Missouri Southern State College in Joplin, a Master of Science degree in chemistry from the University of Missouri in Rolla, and her Doctorate in analytical chemistry from the University of Washington in Seattle.

Dr. Kavandi has been recognized with a Presidential Rank Award, two NASA Outstanding Leadership Medals, two Exceptional Service Medals and three NASA Space Flight Medals.

35th DASC
Digital Avionics Systems Conference

Enabling Avionics for UAS/UTM (UAS Traffic Management)

25-29 September 2016
Hyatt Regency Sacramento
Sacramento, CA

General Chairs:

Dr. Erik Blasch, IEEE Aerospace & Electronic Systems Society

Dr. Kathleen Kramer, University of San Diego

Technical Program Chairs:

Mr. Aloke Roy, Honeywell International

Dr. Wolfgang Schuster, Imperial College London

Photo by photosbyflick

Executive Plenary Session

Tuesday, 8:00 – 12:30

Executive Plenary Session Chair
Bernd Korn
DLR German Aerospace Center

Pierre Andribet
Head of Research and SESAR contribution

Pierre Andribet is currently in charge of all R&D activities within EUROCONTROL and managing the contribution of EUROCONTROL within SESAR, which represents one-third of the SESAR Work Program.

Mr. Andribet started his career at EUROCONTROL Brussels in 1997 when he became Head of Unit "Support to States."

In 1999 he moved to the EUROCONTROL Experimental Centre (EEC), located in Brétigny-sur-Orge (France), to take over the position of EEC Deputy Director, managing the Research Program of the EEC.

Prior to joining EUROCONTROL, Mr. Andribet started his career with the French Ministry of Transport (DGAC/STNA) as Head of division "Systèmes CAUTRA." Later he joined THOMSON-CFS/AIRSYS – ATM Business Unit – where he was first responsible for the ATM Center Product Line and then responsible for European Program.

Mr. Andribet graduated from "Ecole Polytechnique" of Paris and "Ecole Nationale de l'Aviation Civile" (ENAC) of Toulouse.

Michele Merkle
Director of NAS Systems Engineering and Integration Services for the Federal Aviation Administration

Michele Merkle is the Director of NAS Systems Engineering and Integration Services for the Federal Aviation Administration. Her organization is responsible for architecting the evolution of the National Airspace System (NAS) and providing systems engineering leadership in delivering the future aviation system.

Ms. Merkle has spent over 25 years providing systems engineering and human factors expertise in the development and evaluation of air traffic control systems and concepts. She has worked on major FAA acquisition programs and directed the development and assessment of advanced air traffic operational concepts. She currently works on the Next Generation Air Transportation System, NextGen.

Ms. Merkle has a Master's degree in Industrial Engineering & Operations Research from Virginia Tech and a Bachelor of Science degree in Industrial and Systems Engineering from the University of South Florida.

Dirk Kuegler
Director of the Institute of Flight Guidance at DLR German Aerospace Center

Dirk Kuegler is the Director of the Institute of Flight Guidance at DLR German Aerospace Center in Braunschweig since 2008 as well as a full professor for air traffic management at the Technische Universitaet Braunschweig, Germany. He is involved in research in air traffic management both on-ground and on-board.

His personal area of interest is the future design of the ATM system and CNS technology. He is focusing on airborne collision avoidance and future surveillance technologies as well as navigation applications.

In 1995, Prof. Dr. Kuegler received a doctorate degree (Dr.-Ing.) on the potential of airborne collision avoidance system on board civil aircraft, and a diploma degree as Diplom-Ingenieur (Dipl.-Ing.) in electrical engineering, communication, data and high-frequency engineering from Technische Universitaet Braunschweig (TU Braunschweig), Germany in 1990.

Prior to his assignment to DLR and TU Braunschweig, he spent ten years with DFS Deutsche Flugsicherung GmbH (German Air Navigation Service Provider), Langen, Germany.

In his last position, he was Director of the Technical Coordination and Planning Division. He was the DFS Liaison Officer at FAA-HQ in Washington, DC in 2005/2006 as well as Director of the Business Unit Consulting from 2002 to 2005.

Prof. Dr. Kuegler is a member of the executive board of the German Institute of Navigation (DGON) as well as head of the air navigation commission of DGON.

He is a fellow (FRIN) to the Royal Institute of Navigation (RIN).

John Cavolowsky
Director, Airspace Operations and Safety Program
NASA Aeronautics Research Mission Directorate (ARMD)

John Cavolowsky is responsible for the overall planning, management and evaluation of the directorate's efforts in foundational air traffic management (ATM) and operational safety research that enables development of revolutionary improvements to, and modernization of, the National Airspace System. Research includes exploring the introduction of new systems for vehicles whose operation can take advantage of the improved, modern ATM system, and works in close partnership with the Federal Aviation Administration and the aviation community to enable and extend the benefits of Next Generation Air Transportation System, or NextGen, to meet evolving user needs.

He also supports the ARMD associate administrator in a broad range of mission directorate activities, including strategic planning and external coordination.

Previously, he was director of the Airspace Systems Program, where he provided strategic management of technical product across multiple projects within the program, and supported the former Joint Planning and Development Office in the ongoing development of NextGen. He was also the deputy program director and associate program manager for the Airspace Systems Program, and the project manager for the Human Measures and Performance Project.

Dr. Cavolowsky began his career at NASA Ames in 1989 as a project manager for aerothermodynamics addressing research and development challenges in hypersonic propulsion and thermal protection systems. He also served as a technical manager for aerospace programs in the Office of the Center Director at Ames.

Dr. Cavolowsky received the Gene Zara Award for outstanding contributions as a national team member to the National Aerospace Plane program, as well as a number of agency achievement awards. He has published more than 25 technical papers. He has a bachelor's of science degree in mechanical engineering from the Massachusetts Institute of Technology, and master's and doctoral degrees in mechanical engineering from the University of California at Berkeley.

Patrick Lelievre
Head of Air Traffic Management Development and SESAR Aircraft WP Leader, Airbus

Patrick Lelièvre is the Head of Air Traffic Management Development at Airbus. As such he proposes, monitors and controls a multi-annual program covering all ATM activities in Airbus and promotes Airbus ATM vision and achievements externally towards worldwide ATM stakeholders and internally towards Airbus Programs.

In the SESAR Program, he represents Airbus in relevant boards and manages the Aircraft Systems Work Package and coordinates contributions from avionics suppliers and other A/C manufacturers.

Being involved in Cockpit and CNS-ATM related research and development for more than fifteen years, he has developed a recognized expertise in ATM concepts and related system enablers with a specific focus on the development of air-ground operational concepts and procedures as well as the development of cockpit systems from early research phases up to full certification and deployment.

Besides concepts and systems he has demonstrated along the years a full capability for leading large programs including the direct management of small central program teams and full accountability of Time, Cost, Quality and Performance.

Stéphane Marché
Architects, Honeywell Aerospace – Advanced Technology Toulouse

Stéphane Marché is leading the Architects department at Advanced Technology Europe and acts as the technical lead of Honeywell contribution to SESAR.

Prior to joining Honeywell Aerospace in 2008, Mr. Marché spent 8 years at Airbus design office where he held various positions such as ADS-B in Project Manager and ATM Research Coordinator. Before working at Airbus, he held positions as system designer and project leader during 12 years, mostly in the area of data communications and Air Traffic Control.

Chip Meserole
Director of Airspace and Operational Efficiency, Boeing Research and Technology Division

Chip Meserole is Director of Airspace and Operational Efficiency in the Boeing Research and Technology division. His group's responsibility is to advance new capabilities in air traffic management that enhance system capacity and efficiency globally. This group executes the company's contracts with the FAA, NASA, and SESAR in this domain; creates flight optimization business concepts for Boeing Commercial Aviation Services; and conducts R&D in air-ground integration and network-enabled operations. It has activities in Seattle, in the Washington D.C. area and at company sites in Spain, Australia, Brazil, and China.

His team was a partner with the FAA in the early work to define system wide information management, and it pioneered tailored arrivals at San Francisco using oceanic FANS data communications. More recently it has been instrumental in establishing the practicality of using FANS in the current Data Communications Integrated Systems program. He leads Boeing's cooperative research and development agreement with the William J. Hughes Technical Center, and his group developed Boeing InFlight Direct Routes and Wind Updates, a pair of new commercial services for airlines. Boeing participation in international committees for standards development in data communications, airborne separation assurance, trajectory operations, and aviation weather is under his direction.

Dr. Meserole joined Boeing in 1984 and held several positions in space systems and launch vehicles development before moving into its air traffic management initiative in 2001. Early in his career he worked in R&D in the fields of aircraft propulsion, wind energy, and robotics. He is an associate fellow of the American Institute of Aeronautics and Astronautics and is a current member of its Digital Avionics Technical Committee. He has a B.S.E. degree from Princeton University, an M.S. from Cornell University, and a Ph.D. from MIT in aerospace and mechanical engineering.

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 34th 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: Impact of Global Mandates on Avionics Research and Development.

This year we are offering 18 separate tutorials, including 6 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, Design Assurance, Systems engineering, Communications and Air Traffic Management to Spacecraft Avionics and UAS. Some of these short courses directly address the theme of the conference: the impact of global mandates on avionics research and development.

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 34th 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 34th DASC.

	Sunday, September 13		Monday, September 14			
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**
Navigation [Douro]	GNSS and Inertial for Autonomous and Remotely Piloted Aircraft Systems	Performance-Based Navigation for Aviation: RNP, SBAS and GBAS	Surveillance and Collision Avoidance for NextGen	4D Trajectory Design Algorithms with Applications to Air Traffic Management	How to Increase Efficiency of Process Certification	**ATM and Process Certification [Volga]**
Instructor	SL1: Uijt de Haag	SA1: Dautermann	MM1: Schuster/Uijt de Haag	ML1: Delahaye/ Puechmorel	MA1: Gallina	**Instructor**
Sensor Fusion and Navigation [Amstel]	Overview of Information Fusion Theory, Models, and Representations	Navigation Algorithms, Sensor Data Processing and Fusion	Multicore in Avionics – Current Usage Patterns and a Systems Level Approach to Certification	Exploring Multicore in an ARINC 653 Environment – A Hands-on Tutorial using Simics and VxWorks 653 Multicore Edition	Safety MCUs/SoC for Safety-Critical Applications	**Hardware Design and Design Assurance [Amstel]**
Instructor	SL2: Blasch	SA2: Paces	MM2: Kinnan	ML2: Kinnan	MA2: Jakovljevi	**Instructor**
Spacecraft Avionics [Danube]	Part I – Spacecraft Avionics Systems Engineering Fundamentals	Part II – Spacecraft Avionics Subsystem Systems Engineering	Advanced System Integration: Ethernet Networking for Critical Embedded Systems	Digital Avionics	Modern Avionics Architectures	**Avionics Systems and Architectures [Danube]**
Instructor	SL3: Andrew	SA3: Andrew	MM3: Jakovljevi	ML3: Uijt de Haag	MA3: Logan	**Instructor**
			Software Design Assurance: Moving from DO-178B to DO-178C	DO-178C – Tool Qualification and the Techncial Supplements	DO-254 – Complex Electronic Hardware – Lessons from the Trenches	**Design Assurance [Douro]**
			MM4: Ferrell	ML4: Ferrell	MA4: Ferrell	**Instructor**

Tutorial Descriptions

Sunday, September 13th
Session 1 – Navigation

SL1: GNSS and Inertial for Autonomous and Remotely Piloted Aircraft Systems
Maarten Uijt de Haag, Ohio University
Global Navigation Satellite Systems (GNSS) such as the Global Positioning System (GPS) are being used in a wide variety of applications in today's society and are already an enabling function on many Unmanned Aerial Systems (UAS) or Remotely Piloted Aircraft Systems (RPAS). This course will first introduce the various UAS/RPAS application domains and operational environments. Then, this tutorial will describe the basic operation of GPS and other GNSSs, their error sources and modes of operation and the state of art in GPS technology. Next, we will discuss the UAS-specific applications of GNSS for the various operational environments and applications including standalone GNSS, differential and relative GNSS, and the use of GNSS in precise surveillance. Finally, augmentation methods will be addressed with a focus on inertial measurements (IMUs) to enable a guaranteed required navigation performance in, especially, GNSS-challenged environments.

SA1: Performance-Based Navigation for Aviation: RNP, SBAS and GBAS
Thomas Dautermann, DLR Braunschweig
This tutorial will cover several aspects of the Performance-Based Navigation (PBN) concept as set forth by ICAO. First, we investigate the requirements described by relevant annexes to the convention of Chicago and the PBN manual ICAO Doc 9613. Next, we quickly recapitulate the principles of GNSS operation and receiver autonomous integrity monitoring (RAIM), which is required for the PBN implementation called required navigation performance or short RNP. Within RNP, the tutorial covers also RNP AR and the new advanced RNP concept.

From an entirely aircraft-based navigation solution, we progress to augmentation systems such as provided via satellite link (such as the WAAS and EGNOS system) or ground stations (called GBAS or LAAS). For each of those systems the tutorial covers the principles of operation, computation of the augmented position solution and their implementation in operational use and associated benefits.

Sunday, September 13th
Session 2 – Sensor Fusion and Navigation

SL2: Overview of Information Fusion Theory, Models, and Representations
Erik P. Blasch, AFRL Information Directorate
Over the past decade, the information fusion community has put together special sessions, panel discussions, and concept papers to capture the methodologies, directions, needs, and grand challenges for practical system designs. This tutorial brings together the contemporary concepts, models, and definitions to give the attendee a summary of the state-of-the-art in information fusion systems designs that emphasizes examples in aviation. Analogies from low-level information fusion (LLIF) of object tracking (e.g., navigation) are extended to the high-level information fusion (HLIF) concepts of situation/impact assessment and process/user refinement. HLIF theories (operational, functional, formal, cognitive) are mapped to representations (semantics, ontologies, axiomatics, and agents) with contemporary issues of modeling, testbeds, evaluation, and human-machine interfaces. Discussions with examples of search and rescue, cyber analysis, and airport efficiency are presented. The attendee will gain an appreciation of HLIF through the topic organization from the perspectives of numerous authors, practitioners, and developers of information fusion systems. The tutorial is organized as per the recent text: E. P. Blasch, E. Bosse, and D. A. Lambert, High-Level Information Fusion Management and Systems Design, Artech House, April 2012, of (1) HLIF theories, (2) HLIF representations in information fusion testbeds, and (3) HLIF supporting elements of human-system interaction, scenario-based design, and HLIF evaluation.

SA2: Navigation Algorithms, Sensor Data Processing and Fusion
Pavel Paces, Czech Technical University
Navigation systems developed from gimbaled platforms to strap-down technology equipped by different sensors and data processing algorithms. In this course principles of sensors and navigation algorithms are described together with problems, which are caused by characteristics of the sensors and structure of the navigation equation solution. Covered topics include: bias and scale factor stability and calibration, inertial sensors and their characteristics, navigation solution for Inertial Navigation System (INS) and Attitude Heading and Reference Systems (AHRS), Schuler tuning, data fusion algorithms including complementary and Kalman filters (KF) to merge data from inertial sensors, GPS and pressure measurements (altitude and speed). The course topics are explained on live experiments performed during the lecture with help of remotely controlled inertial measurement units.

Sunday, September 13th
Session 3 – Spacecraft Avionics

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

Tutorial Descriptions

SA3: Part II – Spacecraft Avionics Subsystem Systems Engineering

George Andrew, GNA Aerospace Consulting Group, Inc.

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

Monday, September 14th

Session 1 – ATM and Process Certification

MM1: Surveillance and Collision Avoidance for NextGen

Wolfgang Schuster, Imperial College London
Maarten Uijt de Haag, Ohio University

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) such as conflict detection and enhanced visual. 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.

ML1: 4D Trajectory Design Algorithms with Applications to Air Traffic Management

Pr D. Delahaye, and S. Puechmorel, French Civil Aviation University

TAir traffic management ensure the safety of flight by optimizing flows and maintaining separation between aircraft. After giving some definitions, some typical feature of aircraft trajectories are presented. The naive way to address such problem is to sample trajectories at some regular points and to create a big vector of positions (and or speeds). In order to manipulate such objects with algorithms, one must reduce the dimension of the search space by using more efficient representations. Some dimension reduction tricks are then presented for which advantages and drawbacks are presented. Then, front propagation approaches are introduced with a focus on Fast Marching Algorithms and Ordered upwind algorithms. Finally, automatic control is presented.

After presentation of such design algorithms we discuss some applications in the following framework.

- Strategic large scale 4D trajectory design (continental and oceanic)
- Pre-tactical 4D trajectory design (weather or congestion avoidance, wind optimal trajectory design)
- Tactical trajectory design (automatic conflict resolution)
- SID-Star design in large Terminal Maneuvering Areas
- Emergency trajectory design with application to the Hudson River case (NY).

MA1: How to Increase Efficiency of Process Certification

Barbara Gallina, Mälardalen University, Sweden

Certification of safety-critical avionics systems is an expensive and time-consuming activity due to the necessity of providing numerous deliverables. Many of these deliverables are process-related. To reduce time and cost related to the provision of process-related deliverables, we propose to combine three approaches: the safety-oriented process line engineering approach, the process-based argumentation line approach, and the model driven certification-oriented approach. More specifically, we define how these three approaches are combined and which techniques, tools, and guidelines should be used to implement the resulting approach, called THRUST. We then apply THRUST to speed up the creation of process-related deliverables in compliance with DO-178B/C.

Monday, September 14th

Session 2 – Hardware Design and Design Assurance

MM2: Multicore in Avionics – Current Usage Patterns and a Systems Level Approach to Certification (Lecture Only

Larry Kinnan, Wind River

Use of multicore in avionics is the next leap forward for small to large platforms in the industry. This tutorial will explore this trend in the industry, the current state-of-the-art, usage patterns, and a systems level approach that can be used towards certification of these platforms.

ML2: Exploring Multicore in an ARINC 653 Environment – A Hands-on Tutorial using Simics and VxWorks 653 Multicore Edition

Larry Kinnan, Wind River

Through the use of Wind River's leading simulation product, the student will be able to build and execute ARINC 653 applications in a multicore environment. A guided tutorial will be used to help the student understand the multicore environment and its implications for configuration safe operation of a multicore platform..

MA2: Safety MCU/SoC for Safety-Critical Applications

Mirko Jakovljevic, TTTech

With decreasing fabrication geometry and increasing complexity of MCU/SoC components, caches, interconnects and internal SoC architectures, aerospace system engineers face new issues in component selection. This tutorial will present on technology issues and risks, market dynamics and certification aspects of safety MCU and SoC components.

Low-volume safety-critical applications could not dictate the design and implementation of MCUs and SoC, but the explosive growth in safety-relevant applications in automotive in industrial applications since 2010 can support the objectives of aerospace embedded engineers to use components which can simplify design, integration, verification and certification of safety-critical systems. By using new safety trends and understanding platform lifecycles in other industries, aerospace industry can minimize risks in long term programs. This presentation will cover the latest cross-industry market trends in design of safety MCUs, semiconductor industry structure and market players, and component families from TI, Infineon, Freescale/NXP, Renesas, Microchip, STM, Atmel, Spansion with technical details relevant for safety applications.

Different aspects of safety certification and safety "nets" built into safety MCUs, fabrication processes, and certification issues which might be useful for aerospace industry will be discussed. Differences and similarities in ISO26262, IEC61508 and highly complex SoC certification according to aerospace criteria will be outlined. Finally we will provide some insights on key challenges in future semiconductor technology developments, SoC design and their impact on future roadmaps, with special focus on ARM-Cortex-A,-M,-R core families.

Monday, September 14th

Session 3 – Avionics Systems and Architectures

MM3:Advanced System Integration: Ethernet Networking for Critical Embedded Systems

Mirko Jakovljevic, TTTech

Switched Full-Duplex Ethernet is a mature technology developed for best-effort communication in high-volume and consumer applications, but its communication capabilities could not support the 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 Ethernet-based standards such as ARINC664, TTEthernet (SAE AS6802), IEEE AVB/TSN and IEEE DCB and various Real-Time Ethernet modifications. We will address key Ethernet mechanisms and describe challenges in design of deterministic embedded networks, and discuss approaches and mechanism for defining deterministic Ethernet traffic with desired temporal performance, in closed and open systems.

We will relate the discussion on deterministic Ethernet system integration to system architecture and certifiable embedded platform design for avionics (IMA, distributed IMA), vetronics (ADAS, integrated vehicle architectures) and unmanned systems. Different models of computation and communication such as L-TTA, TTA, GALS and relaxed TTA together with a required technology baseline will be introduced, and their impact on system performance and capabilities of integrated modular architectures and IMA will be assessed.

Finally we will discuss network design methodology and different methods for the traffic analysis and verification in deterministic Ethernet networks.

ML3: Digital Avionics

Maarten Uijt de Haag, Ohio 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, 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, LRDC Systems LLC

This tutorial is an updated version of Cary Spitzer's long-running course of the same name. Architectures from various civil and military aircraft are examined with comparisons of hardware and avionics functions of each discussed in detail. The tutorial presents key architecture and design challenges for legacy as well as new aircraft. These architectures have been carefully chosen to cover the following:

- Broad spectrum of aircraft types
- Federated and integrated designs
- Line Replaceable Unit (LRU) vis-à-vis modular packaging
- Impact of the Modular Open Systems Approach (MOSA) on architecture
- Range of non-essential to flight critical applications.

Tutorial Descriptions

Monday, September 14th

Session 4 – Design Assurance

MM4: Software Design Assurance: Moving from DO-178B to DO-178C

Uma Ferrell, Ferrell and Associates Consulting

DO-178B/ED-12B served as the basic tool for accomplishing software design assurance for the civil aerospace industry for over twenty years. With a newly updated core, its successor, DO-178C/ED-12C, should continue to be THE standard for airborne software design assurance for many years to come. Many companies may have a need to upgrade and update software that has been approved for DO-178B/ED-12B to be compliant to DO-178C/ED-12C. This tutorial is intended to serve as an introduction to DO-178C/ED-12C and to familiarize the student with differences between DO-178B/ED12-B and DO-178C/ED-12C, and ways in which DO-178B/ED-12B compliant software can be upgraded to be compliant with DO-178C/ED-12C per FAA guidance. Starting with the broader regulatory context (e.g., FARs, CS', ACs, AMJ, etc.), this course is intended to give participants an 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. This tutorial is intended to provide a detailed overview of DO-178 (both B and C), what it is, and what it is not, how to apply it, and pitfalls to avoid in its application. The tutorial will conclude with a summary of relevant Federal Aviation Administration (FAA) and European Aviation Safety Agency (EASA) guidance associated with the application of software design assurance and current research activities on related topics. Even if you have some familiarity with DO-178B, this session will help reinforce and deepen your understanding and provide a useful transition to DO-178C..

ML4: DO-178C –Tool Qualification and the Technical Supplements

Tom and Uma Ferrell, Ferrell and Associates Consulting

The release of DO-178C/ED-12C was accompanied by the creation and publication of four additional software design assurance guidelines. The first of these, DO-330, provides a comprehensive standalone treatment of tool qualification with special consideration given to the roles and responsibilities of both tool developers and tool users. DO-330 has been written for use with DO-178C/ED-12C, as well as with DO-254, DO-200A and ARP-4754A. The next three documents serve as technology-specific supplements to DO-178C/ED-12C. DO-331 addresses objectives, activities, and data unique to model-based development and verification. DO-332 and DO-333 provides similar treatments for object-oriented technology and formal methods respectively. This tutorial will provide the student with a comprehensive introduction into all four of these documents. Use of these guidelines in the context of a typical avionics development will be discussed, as will approaches for applying multiple supplements or supplements only to selected areas of the development. Emphasis will be placed on how to integrate the various technical supplement areas into project planning, the development process, and the impacts to the four integral processes of verification, configuration management, quality assurance, and certification liaison. Students are encouraged (but not required) to combine this tutorial with the newly updated DO-178C/ED-12C for a comprehensive introduction to the new software design assurance..

MA4: DO-254 – Complex Electronic Hardware – Lessons from the Trenches

Tom Ferrell, Ferrell & Associates Consulting

RTCA DO-254/ED-80 (Design Assurance Guidance for Airborne Electronic Hardware) was released in April 2000 and has steadily gained ground, now being applied throughout the civilian and military avionics industries. This tutorial, updated with the latest guidance from both the FAA and EASA on DO-254/ED-80's application will provide a comprehensive introduction to DO-254/ED-80. Topics covered will include the simple vs. complex dilemma, scope of application (device vs. higher levels of integration), granularity and format of hardware requirements, dealing with Commercial Off-the-Shelf components, as well as Commercial Intellectual Property (COTS IP), and finding the right balance between different types of verification (simulation, in-circuit directed testing, and the emerging area of constrained random testing). This tutorial will cover both the FAA and EASA guidance related to the application of DO-254 including the challenging and expansive requirements for the use of COTS. Finally, by the time this tutorial is given it is likely that an effort will be underway to update DO-254. A discussion of where this effort appears headed will conclude this tutorial. Even if you have some familiarity with DO-254, this session will help reinforce and deepen your understanding of its content and intent.

34th DASC

Special Tutorial Presentation

Open to all DASC attendees at no cost

Monday 10:00 a.m.
Czech Technical Institute

Room: CVUT FEL (KN) Zengerova Lecture Hall (K1,KN:E-107)
Address: Karlovo náměstí 13 (Charles Square 13), Praha 2, FEL, building E, room 107

How to Write a Paper for IEEE Journals and Navigate the Review Process

George E. Ponchak
NASA Glenn Research Center

The careers of many people depends on their success in writing and getting their papers published. More important, the scientific process requires that scientific findings be published so that other researchers may build on your ideas or refute your findings. If authors are not able to publish their papers then their careers are hurt and scientific progress slows and stops. Therefore, it is critical that researchers and engineers understand the process of writing and getting their papers published in reputable and cited journals and scientific conferences. However, often, authors' papers are rejected because they did not understand what reviewers, Associate Editors, and Editors are looking for in a paper, even if the technical results are good.

This presentation will cover the steps that an author should take to increase the acceptance rate of their papers in journals and conference. It will cover the reasons most papers are rejected and how an author should organize their paper to avoid those reasons. Lastly, it will present what steps you should take if your paper is rejected to get it published in the same journal or in a different journal.

About the Instructor:
George E. Ponchak received the B. E. E. degree from Cleveland State University, Cleveland, OH, the M.S.E.E. degree from Case Western Reserve University, Cleveland, OH in, and the Ph.D. in electrical engineering from the University of Michigan, Ann Arbor, MI.

He joined the staff of the Communications, Instrumentation, and Controls Division at NASA Glenn Research Center, Cleveland, OH in 1983 where he is now a senior research engineer. In 1997-1998 and in 2000-2001, he was a visiting professor at Case Western Reserve University in Cleveland, OH. He has authored and co-authored 200 papers in refereed journals and symposia proceedings.

Dr. Ponchak is a Fellow of the IEEE and an Associate Member of the European Microwave Association. Dr. Ponchak was the Editor-in-Chief of the *IEEE Transactions Microwave Theory and Techniques* from 2010-2013, the Editor-in-Chief of the *IEEE Microwave and Wireless Components Letters* from 2006-2009, and the Editor of a special issue of I*EEE Trans. on Microwave Theory and Techniques* on Si MMICs. He has served on the Editorial Board of the *International Journal of RF and Microwave Computer Aided Engineering* since 2005. He received the 2014 N. Walter Cox Award that recognizes an IEEE MTT-S member who has given exemplary service to the Society and the Best Paper of the ISHM'97 30th International Symposium on Microelectronics Award.

Janet L. Kavandi
Astronaut and Deputy Director at the National Aeronautics and Space Administration's Glenn Research Center

Dr. Kavandi was selected as an astronaut in December 1994. During her time in the Astronaut Office, she supported payload integration for the International Space Station, Capsule Communications, Robotics, and served as Deputy Chief of the Astronaut Office. She is a veteran of three space flights, serving as a mission specialist on STS-91 in 1998, STS-99 in 2000, and STS-104 in 2001. Dr. Kavandi has logged more than 33 days in space, traveling more than 13.1 million miles in 535 Earth orbits. Dr. Kavandi will discuss her experience as an astronaut.

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Netherlands Defence Academy

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University of San Diego

Greetings: The 34th meeting of the DASC continues its history as the industry-leading avionics conference distinctive for its dual focus on both avionics and air traffic management. This year's conference theme focuses on the "Impact of Global Mandates on Avionics Research and Development." Our technical sessions address how to meet these mandates for safe and efficient air operations amid new requirements for authentication and encryption as new vehicles and technologies impact the global airspace.

Technical Sessions: The technical sessions that include more than 225 technical presentations scheduled Tuesday, September 15th through Thursday, September 17th. The sessions are organized into an increased 9 tracks, including ones dedicated to Air Traffic Management (ATM), Communication, Navigation, and Surveillance (CNS) Systems, Cyber Security, Human Factors, Integrated Modular Avionics (IMA), Software Engineering, Space Systems and Other Special Topics, Systems Engineering, and Unmanned Air Systems. In addition, a poster track is provided to allow one-on-one interaction with authors on special topics.

Conference Proceedings CD-ROM: The 34th DASC will produce post-conference proceedings that include technical papers, presentations, and plenary speaker contributions, including the executive plenary panel. We expect to mail the proceedings to registered attendees by 19 October 2015.

We appreciate your participation in the 34th meeting of DASC. We are proud to welcome you to Prague, the "City of a Hundred Spires," and are confident that this year, as we enjoy DASC in the heart of Europe, brings the highest mark yet for a truly global conference. We encourage you to learn from and engage in discussions with aerospace industry, government, and academic researchers and practitioners forging the future of aviation. Thank you for your interest and involvement in the future of avionics and air traffic management.

Erik Blasch, Erik Theunissen, Aloke Roy, and Kathleen Kramer

Technical Program Schedule

The technical program for the 34th DASC will present over 200 papers in 9 parallel tracks. This year's theme is "Impact of Global Mandates on Avionics Research and Development." Any questions about the technical program should be directed to the Technical Program Chairs, Erik Blasch (technical.chair@dasconline.org), or Erik Theunissen (technical.intl.chair@dasconline.org). The following schedule, dates, and times are subject to change.

Tracks	Tuesday, September 15	Wednesday, September 16		Thursday, September 17	
	Technical Session A **1:30 pm - 5:00 pm**	Technical Session B 9:00 am - 12:30 am	Technical Session C 1:30 pm - 5:00 pm	Technical Session D 9:00 am - 12:30 am	Technical Session E 1:30 pm - 5:00 pm
Track 1 **Air Traffic Management (ATM)** Room: Tiber Ben Levy, MCR, LLC, Bernd Korn, German Aerospace Center (DLR)	Session A Performance-Based Operations, Ralf H. Mayer, MITRE/CAASD	Session B Capacity, Efficiency, and Environmental Impact, Jason Glaneuski, U.S. Department of Transportation	Session C Improving Planning Quality, Miquel Thierry, Ecole Nationale de l'Aviation Civile (ENAC)	Session D Novel Approaches to Management of Airspace Complexity, Alexander Kuenz, DLR/ Braunschweig	Session E TMA and Surface Operation Interactions, Xavier Prats, Universitat Politecnica de Catalunya
	Session F Room: Rhine Modelling, Simulation and Testing, Husni Idris, Engility Corporation				
Track 2 **Communication, Navigation, and Surveillance (CNS) Systems** Room: Seine Vit Stencel, Honeywell	Session A Navigation, Rafael Apaza, NASA Glenn Research Center	Session B Applications, Phil Paulsen, NASA Glenn Research Center	Session C Physical Layer, Michael Schnell, German Aerospace Center (DLR)	Session D Communications, Tom McParland, BCI	Session E Surveillance, Will Ivancic, NASA Glenn Research Center
				Session F Room: Rhine Interferences & Communication, Dave Matolak, University of South Carolina	**Session G** Room: Rhine Trajectory Management, Vit Stencel, Honeywell
Track 3 **Human Factors** Room: Rhone Tim Waldron, Wingtrack Consulting	Session A Enhanced and Synthetic Vision, Tim Waldron, Wingtrack Consulting	Session B Interaction Methods and Devices, Pavel Paces, Czech Technical University in Prague	Session C Interface Evaluation , Emmanuel Letsu-Dake, Honeywell Advanced Technology	Session D Automation, Rachel Haga, Georgia Tech	Session E Tools, Tim Waldron, Wingtrack Consulting
Track 4 **Cyber** Room: Thames Krishna Sampigethaya, Embry-Riddle Aeronautical University at Prescott	Session A CNS/ATM Cyber Security, Erik Theunissen, The Dutch Defence Academy (NLDA)	Session B Avionics Cyber Security, Steve VanderLeest, DornerWorks and Calvin College	Session C Aviation Information System Cyber Security, Nicolas Larrieu, Ecole Nationale de l'Aviation Civile (ENAC)		
Track 5 **Unmanned Air Systems (UAS)** Room: Severn Chris Wargo, Mosaic ATM	Session A Self Separation / Detect and Avoid, Maria Consiglio, NASA Langley Research Center	Session B Airspace Integration: The ATM Perspective, Richard Jehlen, LS Technologies, LLC.	Session C Communications, Richard Jehlen, LS Technologies, LLC.	Session D Control, Chris Wargo, Mosaic ATM	Session E Innovative Approaches, Brando Suarez, General Atomics Aeronautical Systems, Inc.
Track 6 **Integrated Modular Avionics (IMA)** Room: Clyde Erik Blasch, PhD, MBA	Session A Control/Modal Analysis, Mary Ellen Miller, Mosaic ATM	Session B Software Design/Computing, Kathleen Kramer, University of San Diego	Session C Avoidance/Safety, Phil Paulsen, NASA Glenn Research Center	Session D Communications/Data Management, Will Ivancic, NASA Glenn Research Center	Session E Standards, Aloke Roy, Honeywell International
Track 7 **Systems Engineering** Room: Thames Mary Ellen Miller, Mosaic ATM				Session A Critical Systems Thinking, Brandan VanAcker, U.S. Department of Transportation	Session B Aircraft, Tim Etherington, Rockwell Collins
Track 8 **Software Engineering** Room: Shannon Luc Marcil, CAE	Session A Open Architectures, Niklas Peinecke, German Aerospace Center (DLR)	Session B Software for Avionics, Lars Ebrecht, German Aerospace Center (DLR)	Session C Applications, Uma Ferrell, Ferrell & Associates Consulting	Session D Development, Tom Ferrell, Ferrell & Associates Consulting	
Track 9 **Special Topics and Space Systems** Room: Rhine George Andrew, GNA Aerospace Consulting Group		Session A Special Topics, Maarten Uijt de Haag, Ohio University	Session B Space Systems, George Andrew, GNA Aerospace Consulting Group		
Track 10 **Poster Papers** Rooms: Vltava/Vistula Dave Matolak, University of South Carolina	Session A Poster Papers, Dave Matolak, University of South Carolina				

Technical Session A

Tuesday, September 15

A	**Tiber** Track 1 Air Traffic Management	**Seine** Track 2 CNS Systems	**Rhine** Track 1F Air Traffic Management	**Rhone** Track 3 Human Factors
	Performance-Based Operations	Navigation	Modelling, Simulation, and Testing	Enhanced and Synthetic Vision
1:30	1A1 Estimated Time of Arrival (ETA) Performance System Comparative Evaluation Michael Cramer ***The MITRE Corporation***	2A1 Statistical Characterization of Beidou and GPS SIS Errors in the Asian Region Artie Dins ***Honeywell***	1F1 Typical Additional Spacing-Buffer to Apply at 4DME for Delivering Distance Separation Minima Floris Herrema ***EUROCONTROL & TU Delft***	3A1 Traffic Visualization in Helmet-Mounted Displays in Synchronization with Navigation Displays Ferdinand Eisenkeil ***University of Konstanz***
2:00	1A2 flexiGuide - Flexible ATM in the E-TMA to Reduce Environmental Impact Philipp Benjamin Sinapius ***German Aerospace Center (DLR)***	2A2 Assessment of Current DME Performance and the Potential to Support a Future A-PNT Solution Valeriu Vitan ***EUROCONTROL***	1F2 Dynamic Airpace Configurations Generated by Evolutionary Algorithms Marina Sergeeva ***ENAC***	3A2 SmartView Lower Minimums: A Synthetic Vision Guidance System Thea Feyereisen ***Czech Technical University in Prague***
2:30	1A3 Suboptimal Longitudal Reference Trajectory Computation for Time Based Continuous Descent Operations Thierry Miquel ***Ecole Nationale de l'Aviation Civile***	2A3 Use of High Altitude Platform Systems to Augment Ground Based APNT Systems Omar Garcia Crespillo ***German Aerospace Center (DLR)***	1F3 Evaluation of in-Flight Trajectory Optimisation with Time Constraints in a Moving Base Flight Simulator Xavier Prats ***Technical University of Catalonia***	3A3 High-Fidelity Terrain Landscape EFIS Visualization in Comparative Navigation to Solve Disorientation Pavel Paces ***Czech Technical University in Prague***
3:00	**Break sponsored by Honeywell Aerospace**			
3:30	1A4 Wind Networking Applied to Aircraft Trajectory Prediction Karim Legrand ***Ecole Nationale de l'Aviation Civile***	2A4 Navigation Systems with 3D Maps for Mobile Tablets Tatsuo Minohara ***Chiba University of Commerce***	1F4 Waypoint Optimization for Accurate Pseudo-RTA in Descent Trajectory Noboru Takeichi ***Tokyo Metropolitan University***	
4:00	1A5 The 5th Dimension in Conflict Management - XYZT+Capability Alexander Kuenz ***DLR German Aerospace Center***	2A5 Simulations Investigating Combined Effect of Lateral and Vertical Navigation Errors on PBN to XIs Transition David De Smedt ***EUROCONTROL***	1F5 Stand-Loop Simulation of Air Traffic Control Systems Ramis Gabeydulin ***Russian State Research Institute of Aviation Systems (GosNIIAS)***	
4:30	1A6 En-Route Automation Modernization (ERAM) Trajectory Model Evolution to Support Trajectory-Based Operations (TBO) Sergio Torres ***Lockheed Martin IS&GS-Civil***			

A	**Thames** Track 4 Cyber	**Severn** Track 5 Unmanned Air Systems	**Clyde** Track 6 Integrated Modular Avionics	**Shannon** Track 8 Software Engineering
	CNS/ATM Cyber Security	Self Separation/Detect and Avoid	Control/Model Analysis	Open Architectures
1:30	4A1 OpenSky: A Swiss Army Knife for Air Traffic Security Research Martin Strohmeier ***University of Oxford***	5A1 DAIDALUS: Detect and Avoid Alerting Logic for Unmanned Systems Cesar Munoz ***NASA***	6A1 WEMSgen: A Real-Time Weather Modeling Library for On-Board Trajectory Optimisation and Planning Xavier Prats ***Technical University of Catalonia***	8A1 Applying SpaceVPX Modular Open Systems Interconnect Concepts Harry Goedeke ***Northrop Grumman***
2:00	4A2 Verifying ADS-B Navigation Information Through Doppler Shift Measurements Nirnimesh Ghose ***University of Arizona***	5A2 Systematic Specification of Conflict Geometries for Comparison and Evaluation of Human-in-the-Loop Traffic Avoidance Functions Brandon Suarez ***General Atomics Aeronautical Systems***	6A2 New IMA Architecture Approach Based on IMA Resources Beatrice Kornek-Percin ***Diehl Aerospace GmbH***	8A2 A Real-Time Orbit Satellites Uncertainty Propagation and Visualization System Using Graphics Computing Unit and Multi-Threading Processing Kui Liu ***Intelligent Fusion Technology***
2:30	4A3 Detecting Malicious ADS-B Broadcasts Using Wide Area Multilateration Marcio Monteiro ***Instituto de Controle do Espaco Aereo***	5A3 Human-in-the-Loop Experimental Research for Detect and Avoid Maria Consiglio ***NASA Langley Research Center***	6A3 Towards Flight Stability Verification Using Statistical Techniques Rajeev Narayanan ***State University of New York***	8A3 Analysis and Architecture Design of Time-Triggered Avionics WDM Network Ying Xiong ***Beihang University***
3:00	**Break sponsored by Honeywell Aerospace**			
3:30	4A4 Altering UAV Flight Path by Threatening Collision Pietro Pierpaoli ***University of Miami***	5A4 Short-Term Conflict Resolution for Unmanned Aircraft Traffic Management Hao Yi Ong ***Stanford University***	6A4 A Multiple Hypothesis Predictive Alerting (MHPA) Method for Improved Aircraft State Awareness Pengfei Duan ***Ohio University***	8A4 Avionics Software Portability Enabled by Application of the Future Airborne Capability Environment (FACE) Technical Standard Scott Wigginton ***U.S. Army Aviation Applied Technology Directorate***
4:00	4A5 Secure Routing Protocol Design For UAV Ad Hoc Networks Jean Aime Maxa ***University of Toulouse***	5A5 Multi-Intruder Aircraft, Multi-Sensor Tracking System Vibhor Bageshwar ***Honeywell Internationa***		8A5 High Performance, Fault-Tolerant Interconnect Architectures for Future Space Applications Charles Collier ***AFRL Space Vehicles***
4:30	4A6 Cyber Security and Advanced Civilian Air Traffic Management Concepts Brian Smith ***NASA Ames Research Center***			8A6 A Software Implementation of ARINC 661 Graphics Output Jiyoung Yoon ***Kyungpook National University***

Technical Session B

Wednesday, September 16

B	**Tiber** Track 1 Air Traffic Management	**Seine** Track 2 CNS Systems	**Rhine** Track 9A Special Topics	**Rhone** Track 3 Human Factors
	Capacity, Efficiency, and Environmental Impact	Applications	Special Topics	Interaction Methods and Devices
9:00	1B1 Capacity Analysis of Offshore Helicopter Traffic in Southeast Brazil Italo Romani de Oliveira ***General Electric Global Research***	2B1 Safety Services Using the Internet Protocol Suite: Benefits, Progress, and Challenges Gregory Saccone ***Boeing Research & Technology***	9A1 Immunity Testing in an Airborne Radio-Communication System Jan Leuchter ***University of Defence***	3B1 Multimodal Navigation Display Martin Dostál ***Honeywell International***
9:30	1B2 Analysis of Congestion Pricing Model to Handle "Day of Operations" Airport Capacity Reduction Abdul Qadar Kara ***King Fahd University of Petroleum and Minerals***	2B2 Implementation of Automatic Dependent Surveillance (ADS-B) in Colombia Leonardo Gomez ***TESDA Research Group, Colombian Air Force***	9A2 Aviation Simulation Training in the Czech Air Force Jan Boril ***University of Defence***	3B2 Speech Inputs to Safety Logic Systems Hunter Kopald ***The MITRE Corporation***
10:00	1B3 A Reanalysis of Aviation Effects from Volcano Eruption of Eyjafjallajökull in 2010 Angela R. Schmitt ***German Aerospace Center (DLR)***	2B3 Evaluation of CPDLC and Voice Communication during Approach Phase Henrich Glaser-Opitz ***Technical University of Kosice, Faculty of Aeronautics***	9A3 Aviation Mandates in an Automated Fossil-Free Century Hugh Blair-Smith ***Down to the Metal***	3B3 Mobile Device Integration in the Cockpit: Benefits, Challenges, and Recommendations Matthew Carrico ***Rockwell Collins***
10:30	**Break sponsored by Honeywell Aerospace**			
11:00	1B4 Flight Planning in the Future Collaborative Environment Stephane Mondoloni ***The MITRE Corporation***	2B4 The Usability of ADS-C EPP Data for Air Traffic Control Applications Eliana Haugg ***DFS Deutsche Flugsicherung***	9A4 Control of the Satellites by Using Control Moment Gyros in Pyramidal Configuration Mihai Lungu ***University of Craiova , Faculty of Electrical Engineering***	3B4 LED Light Sources in the Approach Slope Indicators and Their Visibility in Inhomogeneous Atmosphere Radim Bloudicek ***University of Defence***
11:30	1B5 Increasing Capacity or Productivity with Controller Assistance Tools in High Complexity Airspace Katharina Reinhardt ***DFS Deutsche Flugsicherung GmbH***	2B5 Validation of a New Satellite Communications Protocol for Long-Term ATM Needs Lorena Albiol ***Indra Sistemas***	9A5 Flight Guidance along Air Streams Felix Mora-Camino ***ENAC***	3B5 Ontologies for the NextGen System Erik Blasch ***U.S .Air Force Research Laboratory***
12:00	1B6 Benefits and Challenges of a Civil Air to Air Refuelling Network Analysed in a Traffic Simulation Fabian Morscheck ***DLR***			3B6 Assistant Based Speech Recognition — Another Pair of Eyes for the Arrival Manager Hejar Guerluek ***German Aerospace Center (DLR)***

B	**Thames** Track 4 Cyber	**Severn** Track 5 Unmanned Air Systems	**Clyde** Track 6 Integrated Modular Avionics	**Shannon** Track 8 Software Engineering
	Avionics Cyber Security	Airspace Integration/The ATM Perspective	Software Design/Computing	Software for Avionics
9:00	4B1 Challenges of Security and Trust in Avionics Wireless Networks Raja Naeem Akram ***Royal Holloway, University of London***	5B1 A Methodology for Measuring the Impact of Flight Inefficiency of Future RPAS Operations Marc Pérez-Batlle ***Technical University of Catalonia (UPC)***	6B1 The Concept and Architecture of Mission System for Next Generation Aircraft Guoqing Wang ***China National Aeronautical Radio Electronics Research Institute***	8B1 Automatically Cross-Checked Design for Multidisciplinary Development of Avionics Carlos C. Insaurralde ***Teesside University***
9:30	4B2 On Effectiveness of Game Theoretic Modeling and Analysis against Cyber Threats for Avionic Systems Sixiao Wei ***Intelligent Fusion Technology, Inc.***	5B2 New Entrants (RPA/Space Vehicles) Operational Impacts Upon NAS ATM and ATC Chris Wargo ***Mosaic ATM***	6B2 Next Generation IMA Configuration Engineering - from Architecture to Application Martin Halle ***Hamburg University of Technology, Institute of Aircraft Systems Engineering***	8B2 Risk-Based Alternatives to the DO-178C Software Design Assurance Processes Edward Lester ***The MITRE Corporation***
10:00	4B3 Securing The Global Airspace System Via Identity-Based Security William Ivancic ***NASA Glenn Research Center***	5B3 Modeling Emergent Risks in Complex Airspace: UAS Operations in a Metroplex Environment Vitaly Guzhva ***MCR Federal, LLC***	6B3 Structured and Symmetric IMA Architecture Optimization: Use Case Ariane Launcher Bjoern Annighoefer ***Hamburg University of Technology / SYSTAR Innovation***	8B3 Partitioning Strategy of Flight Software for the IMA System Yongjin Seo ***Chungnam National University***
10:30	**Break sponsored by Honeywell Aerospace**			
11:00		5B4 Options for Insertion of RPAS into The Air Traffic System Eric Thomas ***Rockwell Collins France***	6B4 Investigation into a Layered Approach to Architecting Security-Informed Safety Cases Kateryna Netkachova ***City University London and Adelard LLP***	8B4 Applying Use Case Driven UML-Based Comet Method for Autonomous Flight Management on IMA Platform Francesca Maria Pisano ***C.I.R.A – Italian Aerospace Research Centre***
11:30			6B5 MPSoC Hypervisor: The Safe & Secure Future of Avionics Operations Steven VanderLeest ***DornerWorks and Calvin College***	

Technical Session C

Wednesday, September 16

C	**Tiber** Track 1 Air Traffic Management	**Seine** Track 2 CNS Systems	**Rhine** Track 9B Space Systems	**Rhone** Track 3 Human Factors
	Improving Planning Quality	Physical Layer	Space Systems	Interface Evaluation
1:30	1C1 Collaborative Trajectory Option Program Demonstration Mary Ellen Miller ***Mosaic ATM***	2C1 On the Practicability of Airborne MIMO Communication Dominik Rieth ***Airbus Group Innovations***	9B1 Optimal Aircraft Rerouting during Commercial Space Launches Rachael Tompa ***Stanford University***	3C1 Enhanced Flight Vision Systems Operational Feasibility Study Using Radar and Infrared Sensors Timothy Etherington ***Rockwell Collins***
2:00	1C2 Parallel Complexity Computation Based on Dynamical Systems Tambet Treimuth ***French Civil Aviation University (ENAC)***	2C2 Improving Coding Scheme of LDACS in the Reverse Link Mohamad Mostafa ***German Aerospace Center (DLR), Institute of Communications and Navigation***	9B2 Assessing Impact of Space Operations using Historical Traffic Patterns Amal Srivastava ***The MITRE Corporation***	3C2 Design and Evaluation of a Touch Screen Concept for Pilot Interaction with Avionic Systems Jason Gauci ***Institute of Aerospace Technologies, University of Malta***
2:30	1C3 Characterizing and Classifying Historical Days Based on Weather and Air Traffic Kenneth Kuhn ***RAND Corporation***	2C3 Time-Domain Channel Estimation for Aeronautical OFDM System with Impulsive Interference Jianing Yang ***Beihang University***	9B3 Getting to "Yes": Managing ATM Planning through an Open Collaboration App Catherine Bolczak ***The MITRE Corporation***	3C3 Development of an Operator Interface to Improve Landing Accuracy of Semi-Autonomous Parafoils Chris Reinert ***Purdue University***
3:00	**Break**			
3:30	1C4 Operationally Significant Weather: Convective Forecasts Prompting Reroute Operations Ngaire Underhill ***MIT Lincoln Laboratory***	2C4 Model Based Design of an Avionics Power Line Communications Physical Layer Juergen Wassner ***Lucerne University of Applied Sciences & Art***	9B4 SESAR SatCom System Identification and Verification Strategy Stefano La Barbera ***Thales Alenia Space S.p.A.***	3C4 Target Size Guidelines for Interactive Displays on the Flight Deck Huseyin Avsar ***The University of Nottingham***
4:00	1C5 Observed Impact of Traffic and Weather on Continuous and Continuous Climb Operations Lakshmi Vempati ***Federal Aviation Administration***	2C5 Implementation of Adaptive Modulation for A/G Communication System Using ZeptoSDR Zakaria El Alaoui Ismaili ***École de Technologie Supérieure (ETS)***	9B5 Antares VTB Integration and Verification Results Automatic Taxiing Stefano La Barbera ***Thales Alenia Space S.p.A.***	3C5 Can Spatial Audio Support Pilots? 3D-Audio for Future Pilot-Assistance Systems Christian A. Niermann ***German Aerospace Center (DLR)***
4:30		2C6 Evaluation of DME Squitter Coherency Pavel Dycka ***University of Defence***	9B6 Correlator Based Group Delay Measurement for Delta-Dor Signals Chethan Ramesh ***R V College of Engineering***	

C	**Thames** Track 4 Cyber	**Severn** Track 5 Unmanned Air Systems	**Clyde** Track 6 Integrated Modular Avionics	**Shannon** Track 8 Software Engineering
	Aviation Information Systems Cyber Security	Communication	Avoidance/Safety	Applications
1:30	4C1 Towards a More Secure ATC Voice Communications System Tim H. Stelkens-Kobsch ***German Aerospace Center (DLR)***	5C1 Optimal Lost-Link Policies for Unmanned Aircraft Youngjun Kim ***Stanford University***	6C1 Onboard Radar Display for VFR Collision Avoidance Niklas Peinecke ***German Aerospace Center (DLR)***	8C1 Benefits of Security-Informed Safety-Oriented Process Line Engineering Barbara Gallina ***Mälardalen University***
2:00	4C2 "Security Situation Management - Developing a Concept of Operations and Threat Prediction Capability" Denis Kolev ***Rinicom***	5C2 Air-Ground Channel Characterization for Unmanned Aircraft Systems: the Mountainous Environment Ruoyu Sun ***University of South Carolina***	6C2 Adaptive Stress Testing of Airborne Collision Avoidance Systems Ritchie Lee ***Carnegie Mellon University Silicon Valley***	8C2 A CNL to Requirements as the Basis to Automate Tasks of Critical System Development Marcelo Castro ***Instituto Tecnológico de Aeronáutica (ITA)***
2:30	4C3 Towards Developing Metrics for Operational Resilience Performance of European Airports Rainer Koelle ***EUROCONTROL***	5C3 Architectural Design for Intelligent Autonomy in Unmanned Aircraft Carlos C. Insaurralde ***Teesside University***	6C3 Current Techniques, Trends, and New Horizons in Avionics Networks Configuration Wilfried Steiner ***TTTech Computertechnik AG***	8C3 An Interdisciplinary Academic Project for Spatial Critical Embedded System Agile Development Gildarcio Sousa Goncalves ***Instituto Tecnologico de Aeronautica - ITA***
3:00	**Break**			
3:30		5C4 Scalable Network Architecture for UAS Control and Non-Payload Communications (CNPC) Radio Links Joseph Ishac ***NASA Glenn Research Center***	6C4 AutoTaxi System Design for Aircraft Juraj Kardoš ***Brno University of Technology***	8C4 A Credible Autocoding Application within a Rocket and Its Payload Raphael Cohen ***Georgia Institute of Technology***
4:00			6C5 Model Checking of Safety Property in Integrated Complex System: A Case Study in IMA Domain Fuchun Ren ***School of Reliability and Systems Engineering, Beihang University***	8C5 Using Template Matching for Object Recognition in Infrared Video Sequences Pham Ich Quy ***University of Defence***
4:30				8C6 Single Event Effects Test Facility at Oak Ridge National Laboratory Bernard Riemer ***Oak Ridge National Laboratory***

Technical Session D

Thursday, September 17

D	**Tiber** Track 1 Air Traffic Management	**Seine** Track 2 CNS Systems	**Rhine** Track 2F CNS Systems	**Rhone** Track 3 Human Factors
	Novel Approaches to Mgt of Airspace Complexity	Communications	Interferences & Communication	Automation
9:00	1D1 Color Schemata for a Sectorless ATM Controller Working Position Bettina Birkmeier ***DLR (German Aerospace Center)***	2D1 Method to Emulate the L-Band Digital Aeronautical Communication System for SESAR Evaluation and Verification Thomas Gräupl ***German Aerospace Center (DLR)***	2F1 Spread Spectrum Design for Aeronautical Communication System with Radio Frequency Interference Gang Wang ***Intelligent Fusion Technology, Inc.***	3D1 Flight Deck Information Automation: A Human-In-The Loop In-Trail Procedure Simulation Study Emmanuel Letsu-Dake ***Emmanuel Letsu-Dake***
9:30	1D2 An Evolutionary Multi-Objective Approach for Network-Wide Conflict-Free Flight Trajectories Planning Kai-quan Cai ***School of Electronic and Information Engineering, Beihang University***	2D2 An Enhanced 1-Hop Clustering Algorithm for Publish/Subscribe Systems in AANETs Mickaël Royer ***ENAC Toulouse, France***	2F2 Resource Allocation in Underlay Cognitive Radio SATCOM System Zhihui Shu ***Intelligent Fusion Technology, Inc.***	3D2 Exploring Human-System Resilience in Air Traffic Management Technologies Sarah Yenson ***MIT Lincoln Laboratory***
10:00	1D3 A Scenario-Based Approach to Robust Estimation of Air Traffic Flow Boundary Zhong-ying Qiu ***School of Electronic and Information Engineering, Beihang University***	2D3 NASA-Hitachi AeroMACS Technology Trials and Minimum Operational Performance System (MOPS) Conformance Testing Rafael Apaza ***NASA Glenn Research Center***	2F3 Evaluation of Testing Aircraft Receiver in the Presence of Interference Martin Zeinert ***University of Defence***	3D3 Detection of Operator Performance Break-down as an Automation Triggering Mechanism Hyo-sang Yoo ***San Jose State University/NASA Ames Research Center***
10:30	**Break**			
11:00		2D4 VDL-2 for the ATN/IPS Thomas McParland ***BCI***	2F4 Air/Ground Data Communication Radios for Future ATM Radek Zaruba ***Honeywell***	3D4 Potential Benefits of Strategic Problem Resolution in Aircraft Automation Timothy Waldron ***WingTrack Consulting***
11:30		2D5 Final Results of Simulations of an Aeronautical Telecommunications Network for Ground to Ground Subnet Applications Oscar Fernando Pico Ortiz ***National University of Colombia***	2F5 TOPMET/TOPLINK: Aviation Efficiency Collaborative Services Daniel Muller ***Thales Air Systems***	3D5 Route Augmentation Enhancing Situational Awareness and Flight Management Lars Ebrecht ***German Aerospace Center (DLR)***
12:00		2D6 Comparison of L-DACS and FBMC Performance in Over-Water Air-Ground Channels Hosseinali Jamal ***University of South Carolina***		

D	**Thames** Track 7A Systems Engineering	**Severn** Track 5 Unmanned Air Systems	**Clyde** Track 6 Integrated Modular Avionics	**Shannon** Track 8 Software Engineering
	Critical Systems Thinking	Control	Communications and Data Management	Development
9:00	7A1 Design Recommendations to Mitigate Memory and Cache Non-Determinisms in Multi-Core IMA Platforms of Airborne Systems Rafael Domingues ***Instituto Tecnológico de Aeronáutica (ITA)***	5D1 Analysis of Safety Implications for SJA-Based Robust UAS Flight Control Technology Vladimir Golubev ***ERAU***	6D1 Synthesized Verification Method for Inter-Partition Communication in IMA System Integration Hongsheng Zhao ***National Key Laboratory of Science and Technology on Avionics Integration***	8D1 Use of the RTCA DO-330 in Aeronautical Databases Johnny Marques ***EMBRAER***
9:30	7A2 A Complete Toolchain for an Interference-Free Deployment of Avionic Applications on Multi-Core Systems Sylvain Girbal ***Thales TRT***	5D2 Sensor Registration Detection for UAV Air Traffic Control Kathleen Kramer ***University of San Diego***	6D2 Communication Integrity For Future Helicopters Flight Control Systems Amira Zammali ***LAAS-CNRS, Université de Toulouse***	8D2 A Set of Metrics to Assess and Monitor Compliance with RTCA DO-178C Sarasuaty Megume Hayashi Yelisetty ***EMBRAER***
10:00	7A3 Reconfigurable Multi-Core Scheduling for Real-Time Functions in Avionic Mission Systems Thomas Hanti ***TH Ingolstadt***	5D3 Zarzirbird Project: Modeling RPAS Dynamics for Load Stability Magali Andreia Rossi ***University of Florence***	6D3 An Optimized Answer Toward a Switchless Avionics Communication Network Patrice Toillon ***THALES Avionics***	8D3 Integrating An Assurance Case Into DO-178B Compliant Software Development John Knight ***Dependable Computing***
10:30	**Break**			
11:00	7A4 Safety Considerations for WCET Evaluation Methods In Avionic Equipment Xavier Jean ***Thales Research and Technology***	5D4 Evaluation of KPIs for RPAS C3 Satellite Data Link: The RAPTOR Tool Roberto Winkler ***Thales Alenia Space Italia***	6D4 A Method of Integrated Modular Avionics System Configuration Data Management Wen Xu ***China National Aeronautical Radio Electronics Research Institute***	8D4 Deterministic Platform Software for Hard Real-Time Systems Using Multi-Core COTS Sylvain Girbal ***Thales Research and Technology***
11:30	7A5 Adaptive Approach to Motion Cueing Algorithm Jan Vlk ***Brno University of Technology***		6D5 Application of Thermo Electric Cooler (TEC) in Avionics for Thermal Management Yan Wen Ng ***Nanyang Technological University***	8D5 Distributed IMA: Use Cases for Embedded Platforms Mirko Jakovljevic ***TTTech Computertechnik AG***
12:00			6D6 Exploring Opportunities of Bi-Directional Connectivity From Mobile Devices To The Flight Deck Stefan Engels ***Jeppesen GmbH***	8D6 A Modeling Method of Multi-Runway Airport Surface Operation System Based on ACTCPN Miao Tang ***Nanjing University of Aeronautics and Astronautics***

Technical Session E

Thursday, September 17

E	**Tiber** Track 1 Air Traffic Management	**Seine** Track 2 CNS Systems	**Rhine** Track 2G CNS Systems	**Rhone** Track 3 Human Factors
	TMA and Surface Operation Interactions	Surveillance	Trajectory Management	Tools
1:30	1E1 Integration of Controller Scheduling Tools with a Runway Management Capability Nikolai Okuniek ***German Aerospace Center (DLR)***	2E1 Enhanced Techniques for Improved ADS-B Messages Reception Milan Sopata ***Honeywell International s.r.o, Brno***	2G1 A Decision Support Tool for Weather and Terrain Avoidance during Departure Nathalie Margaret Cauchi ***Institute of Aerospace Technologies, University of Malta***	3E1 Exploring Management of Arrival Spacing using Route Extensions with Terminal Spacing Tools Bonny Parke ***San Jose State University Research Foundation/ NASA Ames***
2:00	1E2 A Decision Support Method for Flight Cancellations in Adverse Weather: An Airport Perspective Xue Mao ***School of Electronic and Information Engineering, Beihang University***	2E2 Passive Vertical Tracking using DME Multilateration Jorge Ramírez ***Universitat Politecnica de Catalunya***	2G2 Safety Control Structure Analysis of Intersecting Air Routes in CNS/ATM Dongbin Li ***Department of Air Traffic Safety Management, Civil Aviation Management Institute***	3E2 Sensitivity Analysis of Event Sequence Diagrams for Aircraft Accident Scenarios Seungwon Noh ***George Mason University***
2:30	1E3 Information Management - FIXM and Mini Global Keith Garfield ***Embry-Riddle Aeronautical University***	2E3 Validation of Extended Hybrid Surveillance Silvie Luisa Brázdilová ***Honeywell***	2G3 Decentralized Multi-Aircraft Conflict Resolution in the Presence of Uncertainty Lin-quan Fang ***TSchool of Electronic and Information Engineering, Beihang University***	3E3 Pilot Controller Design using the CTU simulator for Shared Situation Awareness Pavel Paces ***Czech Technical University***
3:00	1E4 Analysis of Interaction and Integration between Arrival and Departure Traffic in Airport Metroplex Environments Husni Idris ***Engility Corporation***		2G4 Comparative Study of Metroplex Airspace and Procedures Using Machine Learning to Discover Flight Track Anomalies Bryan Matthews ***Stinger Ghaffarian Technologies Inc.***	3E4 Context Maps: A Systematic Approach to Identifying and Incorporating Contextual Influence in Decision Support Systems Rachel Haqa ***Georgia Institute of Technology***
3:30				3E5 Differing Air Traffic Controller Responses to Similar Trajectory Prediction Errors Joey Mercer ***San Jose State University / NASA Ames Research Center***

E	**Thames** Track 7B Systems Engineering	**Severn** Track 5 Unmanned Air Systems	**Clyde** Track 6 Integrated Modular Avionics
	Aircraft	Innovative Approaches	Standards
1:30	7B1 Evolution of the Systems Integrator Role and Change Management Process within Highly Integrated Aircraft Systems Christopher Watkins ***Gulfstream Aerospace Corporation***	5E1 Expanding the Operational Range of UAS with an Onboard Supervisory Instance Andreas Frey ***Technische Hochschule Ingolstadt***	6E1 Why We Can't Live Without ARINC 610C Luc Marcil ***CAE***
2:00	7B2 A Rule-Based Approach for Safety Analysis Using STAMP/STPA Danilo Gurgel ***Instituto Tecnológico de Aeronáutica***	5E2 Integrated Simulation-Supported VLOS & B-VLOS RPAS Mission Planning for Forest Fire Disaster Relief Fritz Zobl ***Interfaculty Department of Geoinformatics - Z_GIS, University of Salzburg***	6E2 An Approach for Verification of ARINC 653 Time Partitioning Concept Ugur Usug ***TUBITAK***
2:30	7B3 Eliminating Visibility Problems from Low Visibility Operations Tim Etherington ***Rockwell Collins***	5E3 Comparison of Open-Source CFD Software for Aerodynamic Analysis of Mini-UAV Tomáš Vogeltanz ***Tomas Bata University in Zlín***	6E3 Will Your CAN Architecture Survive the Next 25 Years: Physical Testing of CAN Bus Networks Arne Dr. Brehmer ***Vector Informatik***
3:00	7B4 Refactoring Design Assurance Thomas Ferrell ***FAA Consulting, Inc.***	5E4 Argument-Based Airworthiness Assurance of Small UAS Ganesh Pai ***SGT / NASA Ames Research Center***	
3:30	7B5 Multifunctional Module for Thermocouple Simulation Sang Van Doan ***University of Defence***	5E5 Dependability of Software of Unknown Pedigree: Case Studies on Unmanned Aircraft Systems Stephen Cook ***The MITRE Corporation***	

Poster Papers – Session 10A

Tuesday 1:30 – 5:00
Vltava/ Vistula

Design and Realization of IMA Simulation Platform Based on CPCI Bus Using VxWorks653 RTOS

Gang Xiao
Shanghai Jiao Tong University

Layered-V

Thomas Driessen
University of Augsburg

Network Performance Analysis of Time-Triggered Ethernet Based on Network Calculus for DIMA

Xiaomin Liu
China Academy of Electronics and Information Technology

Partitioning: How Far Do You Need to Go?

Olivier Charrier
Wind River

Dimensioning Buffers for AFDX Networks with Multiple Priorities Virtual Links

Rodrigo Coelho
Technische Universitaet Kaiserslautern

Plenary Session

Wednesday 8:00 – 9:00

Moderator:

Erik Blasch
IEEE Aerospace & Electronic Systems Society

Speakers:

Mr. Michael Ball
Northrop Grumman Corporation
"Challenges and Opportunities in Transition to a Digital Airspace System"

Dr. Stephane Mondoloni
The MITRE Corporation
"International Data Standardization – Fun Puzzles for All"

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September 25-29, 2016

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ABSTRACT DETAILS
Authors are invited to submit abstracts of no more than 750 words before 1 March 2016, 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 paper submission, please include a short biographical sketch of the author(s), mailing address, email, telephone, and fax numbers. Final manuscripts of selected papers are due 8 August 2016.

35th DASC

35th DIGITAL AVIONICS SYSTEMS CONFERENCE

CALL FOR PARTICIPATION
Technical Papers, Tutorials & Exhibits

Enabling Avionics for UAS/UTM (UAS Traffic Management)


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We welcome everyone to join us for the 35th DASC in Sacramento, CA!

CONFERENCE THEME: The conference theme for the 35th DASC is the design of air transportation systems that accommodate aircraft and unmanned aerospace systems (UAS). The presentations, posters, papers, and discussions that will comprise this conference build upon the theme of Air Traffic Management (ATM). Participants will be challenged to show how their work helps to develop, promote, or enable UAS Traffic Management (UTM) including small-UAS in class G airspace. Of particular interest will be perspectives that describe the use of policy, avionics, and optimization for safe and reliable airspace coordination between aircraft and UAS. Talks of interest may focus on methods of ground, air, and space coordination between commercial and recreational UAS for various societal applications. The future of UAS presents a broad range of applications requiring proactive consideration of avioinics design, navigation strategies, and airspace use.

TECHNICAL CHALLENGES REMAIN:
- Decision-support tools to improve system state awareness and predict change
- Avionics designs to 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
- UTM strategies affording the safe introduction of UAS in the NAS
- CNS developments to support more efficient aircraft-ATM coordination
- Air transportation services to under-served markets
- Role for humans and RPVs in an increasingly automated ATC system
- Safety management systems including UTM performance metrics
- Airport operations affordability, reliability, and sustainability
- Environmental impact assessment and management
- Reliable communications, navigation, and surveillance technologies

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 international developments. Attendees can participate in active conversations with colleagues, researchers, and practitioners who are the experts and leaders in the field. We welcome you to join us and participate in the 35th DASC as we engage in the important issues of the aviation electronics (i.e., "avionics") industry!

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

TECHNICAL PROGRAM

35th DASC

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.

UAS/UTM: Issues, challenges, and opportunities infolding from UAS developments. Of interest are designs and methods for testing and analyzing UAS into the airspace.

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 span-ning 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:

Dr. Maarten Uijt de Haag
Ohio University
(740) 593-9562
uijtdeha@ohiou.edu

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 at exhibits.chair@dasconline.org.

Mosaic ATM—Advancing UAS Implementation by Forecasting Global Demand

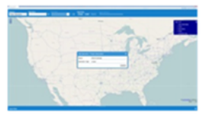
UAS Forecast for Discrete Airspace Density—UAXPAN

Mosaic ATM, Inc. under a NASA SBIR is developing a forecast engine to drive decisions in system design, investment and fiscal planning of UAS implementations. Our crowd-sourced and cloud-based service will provides users access to accurate decision data.

Forecasting Features

- Ease of access using a web based service
- Flexible step-by-step screens walk users through forecast scenario building and reporting
- Forecast Wizards to ease user entry of demand data and forecast creation.
- Private and public data partitioning
- All UAS marketplace players can participate to enhance forecast range and scope
- Inputs from subject matter experts and firms directly involved in the evolution in unmanned systems
- Applications provided to support calculation of communication loading

Scenario Builder



Industry Forecast Builder

Geospatial Reporting

Demand Generations

Mosaic ATM is seeking you as a Beta User for trials to begin in October 2015

Beta users will gain early access to the forecast data as well having the opportunity to shape the system features.

Three representative operational geometries

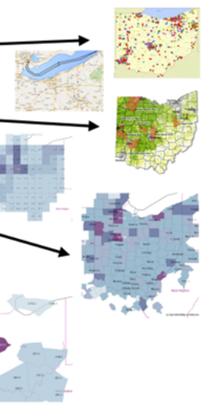
- ◊ Point(s) – for fixed, stationary operations.
- ◊ Line(s) – for flight path and linear operations.
- ◊ Polygon(s) – for area type operations.

Reporting Geographic Structures

- ◊ Square / Hex grid cells.
- ◊ County and other Geo-Political boundaries.
- ◊ Airspace sectors and structures.

Reporting Metrics

- ◊ MAX metric for worst case analysis.
- ◊ DENSITY metric for time based averages.
- ◊ STATISTICAL metric (Monte-Carlo) for more refined statistical analysis.



Email your Request for a System Account to:
uaxpan_accounts@mosaicatm.com

540 Fort Evans Rd., N.E. | Ste. 300 | Leesburg, Virginia 20176 | 800.405.8576 | www.mosaicatm.com

MOSAIC ATM
Innovators for the Next Generation of Aviation

Mosaic ATM Advancing the Goals of NextGen

Who We Are

Mosaic ATM, Inc. is a small business founded in 2004. We are a diverse team of engineers, scientists, and software developers helping to shape the next generation of aviation. We apply the latest digital technology to support human decision-making, streamline complex systems, improve efficiency, and enhance communications for our partners at NASA, the FAA, the DoD, airlines, and others in the aviation, defense, and research communities.

The professionals at Mosaic are actively involved in researching and developing new ways to increase airspace capacity and to improve manned and unmanned aviation. With a wide array of disciplines and a depth of expertise, Mosaic helps our customers to join the next generation of aviation. It is who we are.

Research & Development

Creating capacity and efficiency improvements for current and NextGen operational environments. Expertise airport surface traffic management, weather, traffic flow management, and user operations.

- Operations Research
- Modeling & Simulation
- Prototype Development & Evaluation

Engineering Services

Bridging the gap from concept to value, following strict processes and rigorous testing to ensure outcomes are optimized and return value for investment.

- System Engineering
- Acquisition Support/Investment Analysis
- Concepts & Requirements Validation

Commercial Applications

Innovation made tangible with implementation into commercial operations. Unique, cost-effective, and proven products to meet industry needs in the digital age.

- Situational Awareness
- Collaborative Decision Making
- Data Analysis & Metrics

Air Traffic Control Association (ATCA) Award for Small Business

Cited for…

"…Mosaic's tireless contribution to NextGen issues and your partnership with all major stakeholders to advance key NextGen technologies. Specifically, your engagement in the Ground Delay Program Parameters Selection Model in Operational Evaluation, Precision Departure Release Capability (PDRC) Operational Evaluation, and Collaborative Departure Queue Management reflect your impressive engagement in NextGen modernization. To be the lead on three different major field evaluations puts Mosaic ATM at the forefront of companies contributing to NextGen success – regardless of size, and this award recognizes this impressive achievement."

Bridging the Gap From Concept to Operation

Decision Support Tools

- Surface Viewers
- Weather Decision Support
- Surface & Airspace Operations Simulator (SAOS)
- Prediction of flight events and traffic demand
- Demand/Capacity Modeling
- Collaborative Trajectory Option Program (CTOP)
- Airport Runway Configuration Manager (ARCM)

Service Capabilities

- Metrics, Reporting, Playback and Analysis
- Weather Integration
- DMAN/AMAN
- Service By Mosaic Integration Platform
- CDM and ATFM Consulting
- Space Vehicle Operations
- UAS in the NAS

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ICNS - 2016

Securing an Integrated CNS System to Meet Future Challenges

ICNS
www.i-cns.org

Integrated Communications, Navigation and Surveillance (ICNS) Conference

19-21 April 2016

Westin Washington Dulles Airport, Herndon, Virginia

The ICNS Conference is an International Aviation Conference addressing technology and policy advances in ICNS - new research, development and implementation programs and policies related to ICNS capabilities and applications, including:

- Cyber Security
- Future Communications
- Satellite-based Navigation & APNT
- Surveillance & Situational Awareness
- Safe & Secure Air Transportation Systems
- Airport & Airspace Optimization/Operations
- Performance-based CNS/ATM
- Commercial, Military, and Consumer UAS
- Commercial Space Transportation
- Climate Change and Aviation Weather

Abstract Submission Date: 18 December 2015
Notification of Acceptance: 22 January 2016
Final Paper Submission Date: 19 March 2016

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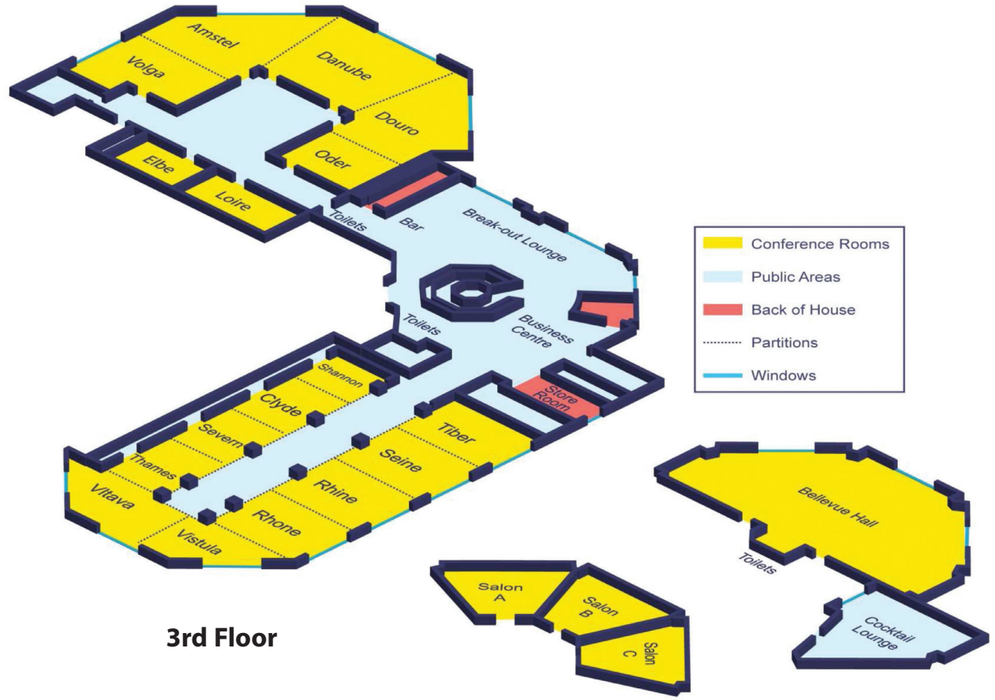
Corinthia Hotel, Prague

September 13-17, 2015



3rd Floor

24th Floor

Notes

34th DASC

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