

Aerospace Systems and Technology Conference

Technical Session Schedule

As of 08/29/2018 07:44 pm

Monday, November 5

Power Systems - Commercial Power Systems

Session Code: ASTC302

Room Private Room 32

Session Time: 1:30 p.m.

This session shall include papers related to commercial aircraft and unmanned vehicles electrical power generation, power management/power distribution, control & protection corona and arc fault detection, power conversion/conditioning, energy storage – batteries/ultracapacitors, and other related issues. New commercial aircraft are considering the use of variable frequency power and the power requirements are going to be much more for a More Electric Airplane.

Organizers - Jon Fifield, Astronics - Luminescent Systems Inc.; Travis E. Michalak, US Air Force Research Laboratory; Mario R. Rinaldi, UTC Aerospace; Christopher Severns, Boeing Co; Sean Field, Naval Air Systems Command; Michael Melnyk, US Department Of The Navy; Doug Harmon, NAVAIR

Preliminary Information

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Time	Paper No.	Title
1:30 p.m.	2018-01-1938 ORAL ONLY	Electrical Energy Storage Technologies for Hybrid Electric Aircraft Iain Robert George Fleming; Patrick Norman, University of Strathclyde; Graeme Burt, University of Stellenbosch; Catherine E. Jones, University of Strathclyde
2:00 p.m.	2018-01-1934	Arc Fault Detection Methods in DC MEA Distribution Systems Jeffy Thomas, Rory Telford, Puran Rakhra, Patrick Norman, Graeme Burt, University of Strathclyde
3:00 p.m.	2018-01-1935	Towards Two and Three-Channel Electrical Architecture Design for More-Electric Engines Qiyang Zhang, Michal Szykiel, Patrick Norman, Graeme Burt, University of Strathclyde
3:30 p.m.	2018-01-1937	Modulation Index Limit Based Control Strategy for the More Electric Aircraft Generator System Seang Shen Yeoh, Mohamed Rashed, Serhiy Bozhko, University of Nottingham
4:00 p.m.	2018-01-1936	Dynamic Stability Analysis of High-Speed Traction Drive CVT for Aircraft Power Generation Kippei Matsuda, Kawasaki Heavy Industries, Ltd.

Tuesday, November 6

(Part 1 of 3) Electric Aircraft

Session Code: ASTC2100

Room Commonwealth Suite

Session Time: 2:30 p.m.

The next generation of aircraft will be Electric Aircraft and in various configurations that were considered improbable, if not impossible. The new aircraft will result in higher performance, added capability, and in a more reliable platform for both personal and public transportation. The demonstrations by NASA and various traditional manufacturers, and new companies, are being used to define the next generation of airplanes. The next generation of more integrated systems, such as integrated propulsion, power, and control, is well underway and yielding positive results.

Organizers - Ravi Rajamani, drR2 Consulting; Pascal Thalín, Unemployed; Patrick Norman, Univ of Strathclyde; Mike Mekhiche, Rolls-Royce Corporation

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Time	Paper No.	Title
2:30 p.m.	ORAL ONLY	SAE Hybrid Propulsion Committee Overview David Alexander, SAE International
3:00 p.m.	ORAL ONLY	Airbus Vision for Hybrid Propulsion Richard Ambroise, Airbus

Tuesday, November 6

Avionics Systems - Aircraft Information and Communication Networks

Session Code: ASTC402

Room Connaught Suite B

Session Time: 1:30 p.m.

The aim of this session is to present the latest developments in aircraft networks and provide information on network standards, physical layers, avionics applications and the role of network infrastructure in system design

Organizers - Serge A. Bruillot, Dassault Aviation; Mark Lawrence Darnell, GE Aviation; Marc Gatti, Thales Avionics; Ralf God, Hamburg University of Technology; Mirko Jakovljevic, TTTech. Computertechnik AG

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Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	Ethernet Networks for Advanced Integrated Systems Mirko Jakovljevic, TTTech. Computertechnik AG
2:00 p.m.	ORAL ONLY	20 Years of TTP Databus: History and Applications Mirko Jakovljevic, TTTech. Computertechnik AG

Tuesday, November 6

Avionics Systems - Artificial Intelligence

Session Code: ASTC414

Room Connaught Suite B

Session Time: 3:00 p.m.

Everyone know and use Artificial Intelligence every days, using Google, Amazon, iPhone with SIRI, etc. but if this use is a common practice in the consumer domain, it is not the case for the domains where safety is Key.

What we propose to address in this section is the use of AI within the domains where safety is key and to analyze how we can use this technology and to do what : helping driver or pilot, in what circumstances and how to validate and qualify it facing certification authorities.

Organizers - Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics

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Time	Paper No.	Title
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3:00 p.m.	ORAL ONLY	AI in the Cockpit.... Again, Really ? Sylvain Hourlier, Thales Avionics
3:30 p.m.	ORAL ONLY	Development Assurance of Machine Learning Systems Joshua Gould Fadaie; David A. Redman, Aerospace Vehicle Systems Institute; Marc Gatti, Thales Avionics; Matthew Carrico, Rockwell Collins; John Strasburger, Federal Aviation Administration; George Romanski, FAA
4:00 p.m.	2018-01-1952 ORAL ONLY	Automotive ADAS HW/SW Platforms and Their Applicability in Aerospace Applications Jacques Gatard, TTTech. Computertechnik AG

Tuesday, November 6

Power Systems - Aircraft Power Management & Distribution

Session Code: ASTC300

Room Private Room 32

Session Time: 2:30 p.m.

This session shall include papers related to military manned aircraft and air vehicle electrical power management and distribution (relays, circuit breakers, SSPCs), control & protection, arc fault protection, power conversion (AC/DC, DC/DC/ AC/AC) and power conditioning. AC (fixed & variable frequency) and DC (28 VDC and 270 VDC) systems are planned for discussion.

Organizers - Jon Fifield, Astronics - Luminescent Systems Inc.; Travis E. Michalak, US Air Force Research Laboratory; Patrick Norman, Univ. of Strathclyde; Mario R. Rinaldi, UTC Aerospace; Sean Field, Naval Air Systems Command

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Time	Paper No.	Title
2:30 p.m.	2018-01-1930	Power Dissipation Optimization for Solid State Power Control Modules in Aircraft Secondary Power Distribution System Neno Novakovic, Milorad Manojlovic, UTC Aerospace Systems
3:00 p.m.	2018-01-1932	Power Quality Test Data Analysis for Aircraft Sub-System Shobha Ramanjani, UTC Aerospace Systems
3:30 p.m.	2018-01-1931	Definition of Test Conditions for High Voltage Aerospace Systems Using the IAGOS Atmospheric Dataset Hasti Haghighi, Ian Cotton, Richard Gardner, University of Manchester; Bastien Sauvage, Université de Toulouse
4:00 p.m.	2018-01-1927	Transient Stability Analysis of DC Solid State Power Controller (SSPC) for More Electric Aircraft Jeevan Adhikari, University of Nottingham

Tuesday, November 6

Littlewood Lecture

Session Code: ASTC1900

Room TBD

Session Time:

Organizers - Robert L. Ireland, Airlines for America; Pascal Joly, Airbus

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<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	2018-01-1925	Highly Efficient Civil Aviation, Now via Operations: AAR & Challenges
	ORAL ONLY	<i>R K Nangia</i>

Tuesday, November 6

Avionics Systems - Aircraft Displays, Instruments and Instrumentation

Session Code: **ASTC400**

Room TBD

Session Time:

This session focuses on all aspects of display technology and visualization in real-time avionics applications and flight simulation. This includes advanced screen technologies, ruggedization methods, embedded display graphics software, tools for visualization and modeling, and open display architectures.

Organizers - *Brecht Baert, Esterline; Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics*

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<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
	ORAL ONLY	Towards a Universal Large Interactive display
		<i>Thierry Ferreira, Thales Aerospace; Philippe Coni, Thales Avionics; Florent Mennechet, THALES AVS</i>
	ORAL ONLY	Avionic Video Systems: From Situation Awareness to Flight Guidance.
		<i>Gwenael Raguenes, Frederic Faubladiet, Airbus Helicopters</i>

Tuesday, November 6

Avionics Systems - Cyber-Security

Session Code: **ASTC405**

Room TBD

Session Time:

Cyber security means to mitigate and manage risk induced by the digitization of aviation. During implementation and operations, cyber security is relevant to all digitally interacting elements. Key topics to address are information security, system security, security engineering, resilience, cyber physical systems, networks, risk analysis methods and management, digitally supported production, supply chain topics, digital operations, regulations and rule-making, methods and tools.

Organizers - *Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics; Ralf God, Hamburg University of Technology; Krishna Sampigethaya, United Technologies Research Center; Hartmut Hintze, Airbus Operations GmbH; Alex Wilson, Wind River*

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<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
3:00 p.m.	ORAL ONLY	One Standard to Secure Them All?
		<i>Michel Messerschmidt, Airbus</i>

3:30 p.m.	ORAL ONLY	How to Protect USB Ports from "USB Kill"™ Threats Genaro Maldonado, Bourns Inc.
4:00 p.m.	2018-01-1940 ORAL ONLY	Cyber Security Enhancements for a Safety-Critical Avionics Platform Arlen Baker, Paul Parkinson, Wind River Systems
4:30 p.m.	2018-01-1941	Anomaly Based Intrusion Detection for an Avionic Embedded System Alienor DAMIEN, Thales AVS & LAAS-CNRS, Toulouse, FRANCE; Marc Fumey, Thales AVS, Toulouse, FRANCE; Eric Alata, Vincent Nicomette, LAAS-CNRS, Univ. de Toulouse, CNRS, INSA; Mohamed KaÅ¸niche, LAAS-CNRS, Univ. de Toulouse, CNRS

Tuesday, November 6

Avionics Systems - System Testing and Simulation

Session Code: ASTC412

Room TBD

Session Time:

This session focuses on advanced methods and tools used for complex systems V&V including certification aspects. Focus should be geared to a (multi-) system integration approach and applications.

Organizers - Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics; Andreas Himmler, dSPACE GmbH; Yves Marcet, Airbus

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Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	Cyclic Simulation Data Exchange in Hybrid Test Systems Lars Stockmann, Sven Laux, Andreas Himmler, dSPACE GmbH
1:30 p.m.	2018-01-1947	A Novel Framework Approach for Model Based Process Integration from Requirements to Verification Demonstrated on a Complex, Cyber-Physical Aircraft System Marcel Gottschall, Bastian Binder, ESI ITI GmbH; Soeren Reglitz, dSPACE GmbH; Gilberto Burgio, Fabio Cremona, Hajer Saada, Luis Diogo Couto, United Technologies Research Center
3:00 p.m.	2018-01-1948	A Methodology for Formal Requirements Validation and Automatic Test Generation and Application to Aerospace Systems Orlando Ferrante, United Technologies Research Center; Eelco Scholte, UTC Aerospace Systems; Simone Rollini, United Technologies Research Center; Rob North, UTC Aerospace Systems; Luca Manica, Valerio Senni, United Technologies Research Center
3:30 p.m.	2018-01-1949	ED-247 (VISTAS) Gateway for Hybrid Test Systems Yannick HILDENBRAND, dSPACE France SARL

Tuesday, November 6

Avionics Systems - Sensor Integration/Interfaces

Session Code: ASTC413

Room TBD

Session Time:

As sensor systems proliferate across multiple platforms, particularly with the explosion of Unmanned Intelligence Systems, the desire for interoperability and interchangeability of the sensor systems across multiple platforms and multiple services has grown. This session will address SAE activities in development of standards to support interoperable/interchangeable sensors, the challenges in developing and using the standards and opportunities for future sensor interface definitions.

Organizers - Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics

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Wednesday, November 7

(Part 2 of 3) Electric Aircraft

Session Code: ASTC2100

Room Commonwealth Suite

Session Time: ALL DAY

The next generation of aircraft will be Electric Aircraft and in various configurations that were considered improbable, if not impossible. The new aircraft will result in higher performance, added capability, and in a more reliable platform for both personal and public transportation. The demonstrations by NASA and various traditional manufacturers, and new companies, are being used to define the next generation of airplanes. The next generation of more integrated systems, such as integrated propulsion, power, and control, is well underway and yielding positive results.

Organizers - Ravi Rajamani, drR2 Consulting; Pascal Thalim, Unemployed; Patrick Norman, Univ of Strathclyde; Mike Mekhiche, Rolls-Royce Corporation

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Time	Paper No.	Title
9:00 a.m.	ORAL ONLY	Welcome & Introductions
9:10 a.m.	ORAL ONLY	Electrical Propulsion – “ Onwards and Upwards <i>Around 100 electrically propelled aircraft programmes are now in development. In this presentation Robert Thomson will survey the landscape of the different development programmes, outline the progress made against the barriers to electrical propulsion, and describe the environmental pressures that may accelerate adoption of electrical propulsion. He will also assess the implications for existing and new suppliers to the aerospace industry, including the forthcoming jostle for supremacy between aircraft OEMs, engine companies, and electrical systems suppliers.</i> <i>Robert W. Thomson, Roland Berger Strategy Consultants</i>
9:50 a.m.	ORAL ONLY	Technology Status and Path Forward for Electrified Aircraft <i>There is growing interest in development of electrified aircraft for commercial aviation. The initial introduction of commercial electrified aircraft is expected to be for urban air mobility with three to four passenger and thin haul sector with up to ten passengers. With time the application space for electrified aircraft will be expanded to commuter and regional aircraft. The ultimate goal is to have electric propulsion for 737 class aircraft. Commercial introduction of various aircraft will be a strong function of availability of technology. This presentation will review the current status of various technologies related to the electrified aircraft. Various electrified aircraft configurations that are possible with today’s state of technology will be highlighted. Path forward for development of technologies related to future generation of electrified aircraft will be discussed. The presentation will identify key technical barriers for the expansion of electrified aircraft concept to multiple aviation sectors.</i> <i>Ajay Misra, NASA John Glenn Research Center</i>

- 11:00 a.m. ORAL ONLY Towards Larger Electric Aircraft**
The presentation will discuss the pathways towards larger electric aircraft, with hybrid-electric modular propulsion as an enabling technology. State-of-the art of project MAHEPA will be presented with and real-life experience from certification of electric aircraft compared with the envisioned global regulatory roadmap.

- 11:30 a.m. ORAL ONLY Transformative Vertical Flight WG-4 Public Services**
Tine Tomašič, Pipistrel
 <p>Over the past few years a community of aerospace professionals that includes technical, regulatory, and business elements have been exploring the potential for new forms of air transportation systems. Their focus has been on systems that embody combinations of on-demand, distributed electric propulsion, and vertiport capabilities. This community has been pursuing their interest through a series of Transformative Vertical Flight (TVF) workshops and working groups coordinated by NASA.</p>
 <p>The "Public Services Working Group" is responsible for defining activities in appropriate timeframes that would lead to the creation of a national capability for TVF enabled search and rescue, law enforcement, medical transport, emergency/humanitarian response, and military operations. </p>
 <p>The TVF enabled public services capabilities present excellent opportunities to significantly transform and enhance our ability to help people and save lives. The working group has identified many viable applications as well as the vehicle and system capabilities needed for these short range vertical lift missions. Public services sector could lead the early deployment of TVF vehicles and systems, not only to apply the unique capabilities for public good but also be able to generate good will and positively influence public acceptance of Transformative Vertical Flight system.</p>
- 12:00 p.m. 2018-01-1926 Fully Electric Regional Airliner Feasibility and Design Study**
Johnny T. Doo, International Vehicle Research
 <p>The paper presents a design study for a fully electric regional airliner with a high wing, envisaged to enter service in 2035. The work reported includes the conceptual, preliminary and some detailed design of a 70 passenger twin propeller-driven vehicle, with a 46 passenger short take-off and landing capability also investigated. The design mission is to carry 70 passengers 300 nm with a take-off mass of 27 tonnes and at a cruise Mach number of 0.65.</p>
 <p>The power and propulsion system is reported in some detail. A step change in today's battery technology is envisioned to be required to make such a pure-electric regional airliner feasible. Lithium-Air is a candidate cell chemistry and system sizing aspires to achieve a 900 Wh / kg battery energy density. Operational aspects have been studied and reported. Thermal management design is progressed, in particular considering the electrical power systems requirements and the two 4 MW motors driving the two propellers. Flight path performance is studied in detail and reference made to ACARE Flight Path 2050 targets, including for noise.</p>
 <p>In terms of aircraft structures, particular attention is paid to the wing design, considering the wing no longer needs to serve as a kerosene storage vessel. Structural design and systems integration is investigated, including using a detailed CAD model implemented in CATIA software.</p>
 <p>Certification in the context of Part 25 is given full consideration, with modifications and means of compliance to enable a pure-electric airliner proposed. This is approached by considering in some respects the battery and electrical power distribution system to be equivalent to the kerosene aircraft's fuel system, while for the electric motor, the engine regulations are used in part as being analogous. Lessons learned and key challenges ahead to enable a fully electric airliner are reported. </p>
- Craig Peter Lawson, Howard Smith PhD, Cranfield University*

2:00 p.m.	ORAL ONLY	Title TBD, Pascal Thalin Pascal Thalin
4:00 p.m.	2018-01-1933	Energetic, Environmental and Range Estimation of Hybrid and All-Electric Transformation of an Existing Light Utility Commuter Aircraft Michele Trancossi, Sheffield Hallam University; Jose Pascoa, Universidade Da Beira Interior
5:00 p.m.	ORAL ONLY	Title TBD, Naoki Seki Naoki Seki, IHI Corporation

Wednesday, November 7

Avionics SW/HW Certification: DO-178 and DO-254

Session Code: ASTC403

Room Connaught Suite A

Session Time: 8:30 a.m.

The avionics industry has been working to the DO-254 & DO-178 standard for FPGAs, ASICs, PLDs and Hardware designs for systems, avionics LRUs and IMA hardware applications. There are many areas of this standard which are in flux due to the complexities of the technology as well as the changes in the certification policies in commercial and military programs. This session will discuss several areas of current dialog and concern within the certification community as it relates to this standard.

Organizers - Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics; Tammy M. Reeve, Patmos Engineering Services Inc.

Preliminary Information

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Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	<p>Avionics Equipment Product Policy: Challenges and Complexities in the Current Certification Process</p> <p>Since years Airbus helicopters is engaged in design process based on definition and integration of a company product policy. Product shall be understood as an equipment, Application SW, Concept HMI,.. Main reason is to simplify and shorten the path of aircraft development, de-scope product development to Aircraft development, keep a harmonized family concept on all fleet.
</p></p> <p>On the other hand, certification process based on Top down approach starting from Aircraft function down to Hardware item or SW item are not really adapted in this industrial methodology. To fix the issue, Airbus helicopters is proposing an alternative methods fitting with industrial constraint and certification requirements defined in CS 27/29 1309.
</p></p> <p>The presentation will be composed of 3 parts
Concept of product policy within AH
Difficulties to integrate a product policy in a certification process
How to stream line product policy integration in a certification process
Frederic Faubladiere, Louis Fabre, Airbus Helicopters</p>

9:00 a.m.	ORAL ONLY	<p>Feedback of a Use Case on a Real Time On-board Many Core Implementation</p> <p><i>This presentation is depicting the activities conducted by engineers and PhD Student, of the Software expertise team of the embedded computer department of Airbus Helicopters design Office, as part of the different research projects* and the perspectives of manycore computers for the development of light avionic computers. This presentation will first report on experiments made to port existing software into on-board real-time computations, using a manycore processor.</i></p> <p><i>There are two main problems to be addressed:</i></p> <ol style="list-style-type: none"> <i>1. The management of the flow of inputs from sensors;</i> <i>2. The projection of existing system/software architecture on to the processors of on cluster.</i> <p><i>The presentation will conclude on the foreseen perspectives of using manycore processors to develop a light avionic computer identifying:</i></p> <ol style="list-style-type: none"> <i>1. The driving factors of the choice</i> <i>2. The key aspects to be studied</i> <p><i>*Part of this work was supported by the CAPACITES research project, supported by the French authorities through the "Investissements d'avenir" program.</i></p> <p><i>Louis Fabre, Frederic Faubladiere, Airbus Helicopters</i></p>
9:30 a.m.	ORAL ONLY	<p>Satisfying the timing requirements of CAST-32A using COTS OS and Tools</p> <p><i>Olivier Charrier, Wind River; Guillem Bernat, Rapita Systems Ltd.</i></p>
10:00 a.m.	ORAL ONLY	<p>Safety Critical COTS Hardware, Fact or Fiction?</p> <p><i>This presentation will discuss the changes in the COTS industry to support systems with DO-254/ED-80 and DO-178C/ED-12C requirements including a revolutionary change from providing hardware to providing complete COTS designs as Intellectual Property (IP) solutions. The presentation will also touch on some of the concerns with certifying with COTS Circuit Board Assemblies.</i></p> <p><i>Commercial-Off-The Shelf (COTS) hardware modules have become a staple of modern embedded systems saving integrators time and money over traditional custom-built systems. This is serving the mil/aero industry well since the change from mil-spec started 20 years ago. Now mil/aero requirements are evolving to include DO-254/ED-80 safety requirements for hardware and the COTS industry is in lock-step providing safety certifiable hardware solutions continuing to enable system integrators to provide cost effective solutions. This is leading to COTS designs that could provide advantages to system integrators supplying commercial, civil or military safety critical avionics platforms.</i></p> <p><i>Gregory Sikkens, Core Avionics and Industrial Inc.</i></p>
11:00 a.m.	ORAL ONLY	<p>DO-254 and DO-178 Transition Criteria: What is it and Why it is Important?</p> <p><i>Tammy M. Reeve, Patmos Engineering Services Inc.</i></p>
11:30 a.m.	2018-01-1939	<p>A Structured Assurance Case for Commercial Off-The-Shelf (COTS) Airborne Electronic Hardware (AEH)</p> <p><i>Guy-Andre Berthon, Thales Avionics</i></p>

Wednesday, November 7

Avionics Systems - Integrated Architectures and IMA

Session Code: ASTC408

Room Connaught Suite B**Session Time: 8:30 a.m.**

The aim of this session is to present the latest development in aircraft avionics advanced system architectures and Integrated Modular Avionics, and provide information about Avionics Platforms including associated standards and surrounding development environments, looking at corresponding trends and challenges.

Organizers - Serge A. Bruillot, Dassault Aviation; Marc Gatti, Thales Avionics; Mirko Jakovljevic, TTTech. Computertechnik AG; Alex Wilson, Wind River

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Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	Multicore Processors: How to Implement Multi-DAL Level Application with Security Stakes Marc Gatti, Thales AVS France
9:00 a.m.	2018-01-1943	Model-Based System Engineering Methodology for Implementing Networked Aircraft Control System on Integrated Modular Avionics - Environmental Control System Case Study Susan Liscouet-Hanke, Prince George Mathew, Concordia University Montreal; Yann Le Masson, Bombardier Aerospace
9:30 a.m.	ORAL ONLY	Update on Using Multicore Processors for Safety Critical Avionics Alex Wilson, Wind River
10:00 a.m.	2018-01-1946 ORAL ONLY	Modular SWaP-Optimized On-Board Computer For Radiation-Tolerant Applications Mirko Jakovljevic, TTTech. Computertechnik AG; Jacques Gatard
11:00 a.m.	2018-01-1945 ORAL ONLY	Advanced System Architectures with Modular On-Board Computer Mirko Jakovljevic, TTTech. Computertechnik AG
11:30 a.m.	2018-01-1944	Multi-Organization Model Integration with AADL Tyler Smith, Rand Whillock, Robert Edman, Bruce Lewis, Steve Vestal, Adventium Labs
12:00 p.m.	2018-01-1942	An Integrated Approach to Model Based Engineering with SysML, AADL and FACE Wang Zhe, ISAE, ANSYS, AVIC Digital; Jerome Hugues, Jean-Charles Chaudemar PhD, ISAE; Thierry LeSergent, ANSYS

Wednesday, November 7**(Part 1 of 3) Aerospace Systems and Operations - Aerospace Systems Modeling and Simulation****Session Code: ASTC100****Room Private Room 32****Session Time: 9:00 a.m.**

The future of the Aerospace Operations requires the development of new technologies and concepts, and the capability to integrate complex systems to satisfy the needs of future aerospace operations. Presentations are solicited in Aerospace Modeling and Simulation. These sessions will provide a forum for international discussion and information on leading-edge research and developments associated with new insights of future concept elements and new technologies in aerospace operations.

Organizers - Jorge Bardina, NASA Ames Research Center; Ebad Jahangir, United Technologies Research Center; Travis E. Michalak, US Air Force Research Laboratory; Luis Rabelo, Univ. of Central Florida; Jonathan Liscouet, Bombardier

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<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
9:00 a.m.	2018-01-1915	The Distributed Simulation of Intelligent Terrain Exploration <i>David Anekstein; Jacob Cornett; Marc Guerrero; Cory Williamson</i>
9:30 a.m.	2018-01-1914	Medical Data System High Level View for Deep Space Gateway <i>Jorge Bardina, NASA Ames Research Center</i>
10:00 a.m.	2018-01-1963	Simulation Optimization of the NASA Mars Fuel In Situ Resource Utilization and its Infrastructure

Ashley Vezina, University of Central Florida; Lindsey Coutts, David Burns, Emily Cohen, University of Central Florida

Wednesday, November 7

(Part 2 of 3) Aerospace Systems and Operations - Aerospace Systems Modeling and Simulation

Session Code: ASTC100

Room Private Room 32

Session Time: 11:00 a.m.

The future of the Aerospace Operations requires the development of new technologies and concepts, and the capability to integrate complex systems to satisfy the needs of future aerospace operations. Presentations are solicited in Aerospace Modeling and Simulation. These sessions will provide a forum for international discussion and information on leading-edge research and developments associated with new insights of future concept elements and new technologies in aerospace operations.

Organizers - *Jorge Bardina, NASA Ames Research Center; Ebad Jahangir, United Technologies Research Center; Travis E. Michalak, US Air Force Research Laboratory; Luis Rabelo, Univ. of Central Florida; Jonathan Liscouet, Bombardier*

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<i>Time</i>	<i>Paper No.</i>	<i>Title</i>
11:30 a.m.	2018-01-1913	Regeneration Mode , Dissipation Mode, and Power Harvesting Both Electromagnetic and Magneto-Rheological Shock Absorbers <i>Ahmed Shehata, Helwan University</i>
12:00 p.m.	2018-01-1918	Analysis of the Effects of Modeling Depth and Parameter Uncertainties on the System Behavior of a Multifunctional High Lift Actuation System <i>Andreas SchÄrfer, Michael Schmid, German Aerospace Center (DLR)</i>

Wednesday, November 7

(Part 3 of 3) Aerospace Systems and Operations - Aerospace Systems Modeling and Simulation

Session Code: ASTC100

Room Private Room 32

Session Time: 3:00 p.m.

The future of the Aerospace Operations requires the development of new technologies and concepts, and the capability to integrate complex systems to satisfy the needs of future aerospace operations. Presentations are solicited in Aerospace Modeling and Simulation. These sessions will provide a forum for international discussion and information on leading-edge research and developments associated with new insights of future concept elements and new technologies in aerospace operations.

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Florida; Jonathan Liscouet, Bombardier

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Time	Paper No.	Title
3:00 p.m.	ORAL ONLY	Thermal Modelling of Future Engine and Airframe Integrated Thermal Concepts David Judt, Craig Lawson, Cranfield University
3:30 p.m.	2018-01-1910	Multi-level Modeling Methodology for Aircraft Thermal Architecture Design Florian Sanchez, Susan Liscouet-Hanke, Concordia University Montreal; Yanik Boutin, Stéphanie Beaulac, Stéphane Dufresne, Bombardier Aerospace
4:00 p.m.	2018-01-1916	Reliability Case Analysis of an Autonomous Air Cooling System (AACS) for Aerospace Applications Chung man Fong, Patrick Norman, University of Strathclyde
4:30 p.m.	2018-01-1917	The Fault-Augmented Approach for the Systematic Simulation of Fault Behaviour in Multi-Domain Systems in Aerospace Artem Kolesnikov, Maxim Andreev, Andreas Abel, ESI ITI GmbH

Wednesday, November 7

(Part 1 of 2) Cyber-Physical Security

Session Code: ASTC2400

Room Private Room 33

Session Time: 9:00 a.m.

Organizers - Alex Wilson, Wind River; Hartmut Hintze, Airbus Operations GmbH; Ralf God, Hamburg University of Technology

Chairpersons - Krishna Sampigethaya, Embry-Riddle Aeronautical University Inc

Preliminary Information

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Time	Paper No.	Title
9:00 a.m.	ORAL ONLY	Welcome & Introductions Krishna Sampigethaya, United Technologies Research Center
9:15 a.m.	ORAL ONLY	Industrial Security in Light of Digital Transformation Kevin Jones, Airbus
9:45 a.m.	ORAL ONLY	Aviation in the World of Cyber Threats Sean Sullivan, Boeing

10:45 a.m.	ORAL ONLY	<p>Panel Session #1: Aircraft Cyber Security</p> <p><i>This session brings together experts from government, industry, and academia to discuss new cyber security concerns and developments related to commercial aircraft. Topics include emerging regulations, technology, and gaps.</i></p> <p>Moderators - Judith Ritchie, SAE International</p> <p>Panelists - Jonathan Butts, Qed Secure Solutions; Davide Martini, Easa Europa; Sean Sullivan, Boeing;</p> <p><i>Meet the Participants ; ; ;</i></p>
1:30 p.m.	ORAL ONLY	<p>Assessing Today's Vulnerabilities in Preparation of Future Technologies</p> <p><i>Brendan Hill, BSI Group</i></p>
2:00 p.m.	ORAL ONLY	<p>Title TBD, Judith Richie</p> <p><i>Judith Ritchie, SAE International</i></p>

Wednesday, November 7

(Part 1 of 2) Digital Design and Manufacturing

Session Code: ASTC2300

Room Private Room 38

Session Time: ALL DAY

Industry 4.0 and the many components of this initiative, such as IIoT, Digital Thread/Twin, Additive Manufacturing and AR/VR, will be discussed in detail to provide greater understanding of the technologies and their uses. Government, industry, and academia need to collaborate to assure that these technologies achieve their fullest potential for all stakeholders. This session will provide the participants an understanding of the current and future state of this technology as it is related to aerospace and defense.

Organizers - Paul Robert Davies, Boeing Co.; Thomas Krueger, Airbus Operations SAS; Remy MATHIEU-DAUDE, Airbus SAS; Lorrie J. Sivich, Boeing Research & Technology

Preliminary Information

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Time	Paper No.	Title
9:00 a.m.	ORAL ONLY	<p>Welcome and Introductions</p> <p><i>Thomas Krueger, Airbus Operations SAS</i></p>
9:15 a.m.	ORAL ONLY	<p>Keynote Speaker: Maxim Nazukin</p> <p><i>Maxim Nazukin, Roland Berger</i></p>
9:45 a.m.	ORAL ONLY	<p>Keynote Speaker: David Harra</p> <p><i>David Harra, Airbus UK</i></p>
11:15 a.m.	ORAL ONLY	<p>IIoT Session, Peter Maloney</p> <p><i>Peter Maloney, Inaventure</i></p>
11:45 a.m.	ORAL ONLY	<p>IIoT Session, Anes Hodzic</p> <p><i>Anes Hodzic</i></p>
1:30 p.m.	ORAL ONLY	<p>Additive Manufacturing, Detlev Konigorski</p> <p><i>Detlev Konigorski, Airbus</i></p>
3:30 p.m.	ORAL ONLY	<p>Panel #1: Additive Manufacturing</p> <p>Panelists - Detlev Konigorski, Aircraft;</p> <p><i>Meet the Participants</i></p>

Wednesday, November 7

Unmanned Aerial Systems - Aerodynamics

Session Code: ASTC500

Room Private Room 41

Session Time: 11:00 a.m.

Although UAS aerodynamics is similar to that of manned aircraft, some design requirements are unique for micro, small, and high altitude, long-endurance vehicles. This session discusses critical aspects of aerodynamics for fixed and rotary wing UAS along with lighter-than-air unmanned technologies.

Organizers - Patrick H. Browning, West Virginia Univ.; Yin M. Chen, US Army ARDEC; Richard Garcia, Southwest Research Institute; Ebad Jahangir, United Technologies Research Center

Preliminary Information

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Time	Paper No.	Title
11:00 a.m.	2018-01-1954	Safety Analysis of an Airship that Loses Buoyant Gas from the Hull <i>Michele Trancossi, Sheffield Hallam University; Jose Pascoa, Universidade Da Beira Interior; Giuseppe Cannistraro PhD, Universita degli Studi di Messina</i>
11:30 a.m.	2018-01-1955	Numerical and Experimental Analysis and Energy Model of a High Camber Wing <i>Michele Trancossi, Sheffield Hallam University</i>
12:00 p.m.	2018-01-1953	Nearfield Analysis of Low Speed Flow Over a Dielectric Barrier Discharge Device for Enhancement of Small UAV Aerodynamics <i>Patrick H. Browning, West Virginia University</i>

Wednesday, November 7

Unmanned Aerial Systems - Cooperative Systems

Session Code: ASTC501

Room Private Room 41

Session Time: 1:30 p.m.

Some of the real benefits of UAVs can only be realized when they can autonomously work together and with human teammates. Topics in this session include distributed/cooperative control of multiple vehicles operating in dynamic, uncertain, and adversarial environments.

Organizers - Patrick H. Browning, West Virginia Univ.; Yin M. Chen, US Army ARDEC; Richard Garcia, Southwest Research Institute; Ebad Jahangir, United Technologies Research Center

Preliminary Information

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Time	Paper No.	Title
1:30 p.m.	2018-01-1956	A JSON Interface for Simulation-Algorithm Communication for Modelling UAV Swarms as an Alternative to ROSUnitySim <i>Yin M. Chen, US Army ARDEC; Wai Lun Leong, National University of Singapore</i>
2:00 p.m.	ORAL ONLY	Human/Robot Collaboration in Aerial Surveillance Missions <i>Richard C. Millar, The George Washington University; Hafliði Jonsson, Naval Postgraduate School; Thomas Mazzuci, George Washington University; Jim Parker, Vacutherm Inc.</i>

Wednesday, November 7

Unmanned Aerial Systems - Systems Integration

Session Code: ASTC511

Room Private Room 41

Session Time: 3:00 p.m.

This session discusses aspects of UAS system integration, from mission planning to multi-aircraft and payload control, post-mission analysis and dissemination. UAS operators can discuss complete and intuitive aspects of systems operation, versatile payload installation, and control throughout every mission phase, from launch to recovery. Hardware, software, logistics, and design aspects of UAS that might be generalized to be interoperable with other operations are of interest.

Organizers - Patrick H. Browning, West Virginia Univ.; Richard Garcia, Southwest Research Institute; Ebad Jahangir, United Technologies Research Center; Jonathan Liscouet, Bombardier; Susan Liscouet-Hanke, Concordia University Montreal

Preliminary Information

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Time	Paper No.	Title
3:00 p.m.	2018-01-1964	Practical Design Space Exploration for Synthesis of Heterogeneous System-of-Systems Jeffrey R. Peters, Ebad Jahangir, Amit Surana, Zohaib Mian, United Technologies Research Center

Thursday, November 8

(Part 3 of 3) Electric Aircraft

Session Code: ASTC2100

Room Commonwealth Suite

Session Time: ALL DAY

The next generation of aircraft will be Electric Aircraft and in various configurations that were considered improbable, if not impossible. The new aircraft will result in higher performance, added capability, and in a more reliable platform for both personal and public transportation. The demonstrations by NASA and various traditional manufacturers, and new companies, are being used to define the next generation of airplanes. The next generation of more integrated systems, such as integrated propulsion, power, and control, is well underway and yielding positive results.

Organizers - Ravi Rajamani, drR2 Consulting; Pascal Thalin, Unemployed; Patrick Norman, Univ of Strathclyde; Mike Mekhiche, Rolls-Royce Corporation

Preliminary Information

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Time	Paper No.	Title
9:00 a.m.	ORAL ONLY	Welcome & Introductions
9:10 a.m.	ORAL ONLY	Connecting Communities - How Electric Aircraft Will Enable the New Demand-Driven World Roei Ganzarski, MagniX
9:50 a.m.	ORAL ONLY	The Path To High Performance Electric Aircraft Kevin Noertker, Ampaire
1:30 p.m.	ORAL ONLY	Expert Panel Discussion: When Will We See Commercial Electric Aircraft? Moderators - Ravi Rajamani, drR2 Consulting Panelists - Johnny T. Doo, International Vehicle Research; Pascal Thalin; Michael Winter, Pratt & Whitney; <i>Learn More About the Panel</i>

Thursday, November 8

Connected Aircraft

Session Code: ASTC2000

Room Connaught Suite B

Session Time: 9:00 a.m.

Preliminary Information

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Time	Paper No.	Title
9:00 a.m.	ORAL ONLY	TBD, Sean Sullivan <i>Sean Sullivan, Boeing</i>
9:30 a.m.	ORAL ONLY	Advancements and Lessons Learned with Multi-touch Cockpit Display Systems <i>Daniel Fitzgerald, Rockwell Collins Display Systems</i>
10:00 a.m.	ORAL ONLY	TBD, Grace Jiang <i>Grace Jiang, Aviage Systems</i>
10:30 a.m.	ORAL ONLY	Advancements in Sonic Boom Displays <i>Laura M. Smith-Velazquez, Rockwell Collins</i>
11:30 a.m.	ORAL ONLY	TBD, Panasonic Avionics <i>TBD, Panasonic Avionics</i>

Thursday, November 8

(Part 1 of 2) Aerospace Systems and Operations - Systems Engineering

Session Code: ASTC104

Room Private Room 32

Session Time: 9:00 a.m.

The future of Aerospace Systems and Operations require the efficient development and execution of interdisciplinary processes based on stakeholder's needs throughout the life cycle of the system. System analysis, design and development, implementation and transition with reliability and safety are needed to satisfy the needs of future aerospace operations. These sessions will explore systems engineering in aerospace systems and operations, active and proposed safety initiatives for the aerospace industry and will provide a forum for international discussion and information on leading-edge research and developments associated with best practices, novel approaches for safety, validation and verification, and reliability of system engineering in aerospace systems and operations.

Organizers - *Jorge Bardina, NASA Ames Research Center; Joel Boelke, United Technologies Corp.; Ebad Jahangir, United Technologies Research Center; Susan Liscouet-Hanke, Concordia University Montreal; Luis Rabelo, Univ. of Central Florida; Jonathan Liscouet, Bombardier*

Preliminary Information

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Time	Paper No.	Title
9:30 a.m.	2018-01-1922	Feedback on Application of MBSE Approach to an Avionics Subsystem <i>Jian Tang, Shaofan Zhu, COMAC; Raphael Faudou, Jean-Marie Gauthier, Samares-Engineering</i>
10:00 a.m.	2018-01-1919	Design and Development for Multi-Generational Teams <i>Michael Conroy, Florida Space Institute; Luis Rabelo, University of Central Florida</i>

10:30 a.m. 2018-01-1920 **Quantifying the Impact of Re-Categorization at the San Diego International Airport**
Lauren Brads, Bradley Kriznar, Estefania Reyes, Adan Vela, University of Central Florida

Thursday, November 8

(Part 2 of 2) Aerospace Systems and Operations - Systems Engineering

Session Code: **ASTC104**

Room Private Room 32

Session Time: **11:00 a.m.**

The future of Aerospace Systems and Operations require the efficient development and execution of interdisciplinary processes based on stakeholder's needs throughout the life cycle of the system. System analysis, design and development, implementation and transition with reliability and safety are needed to satisfy the needs of future aerospace operations. These sessions will explore systems engineering in aerospace systems and operations, active and proposed safety initiatives for the aerospace industry and will provide a forum for international discussion and information on leading-edge research and developments associated with best practices, novel approaches for safety, validation and verification, and reliability of system engineering in aerospace systems and operations.

Organizers - *Jorge Bardina, NASA Ames Research Center; Joel Boelke, United Technologies Corp.; Ebad Jahangir, United Technologies Research Center; Susan Liscouet-Hanke, Concordia University Montreal; Luis Rabelo, Univ. of Central Florida; Jonathan Liscouet, Bombardier*

Preliminary Information

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Time	Paper No.	Title
11:00 a.m.	ORAL ONLY	A Model-Based Systems Engineering Approach for the Development of Test Means for Flight Control Systems <i>Susan Liscouet-Hanke, Hasti Jahanara, Concordia University Montreal; Jean-Louis Bauduin, Thales Canada Inc.</i>
11:30 a.m.	2018-01-1923	Development of an MRM Time-Based System for Aircraft Scenario <i>Jaeho KIM, Mario Marin, Kyungeun Lee, Gene Lee, University of Central Florida</i>
12:00 p.m.	2018-01-1921 ORAL ONLY	Practical Application of MBSE in the Development of Future High Integrity Aircraft Electronic Systems <i>Steven David Angus Fletcher, Frazer-Nash Consultancy, Ltd.</i>

Thursday, November 8

(Part 2 of 2) Cyber-Physical Security

Session Code: **ASTC2400**

Room Private Room 33

Session Time: **ALL DAY**

Cyber Physical Systems Security (CPSS) is an emerging and important field for quality, reliability, safety, and security of cyber physical systems (CPS). CPS include Industrial Control Systems (ICS), IoT, Platform Information Technology (PIT) and embedded systems. Government, industry, and academic need collaboration and action to address vulnerabilities unique to microelectronic parts and security of CPS. This session address these issues on aviation and defense.

Organizers - *Alex Wilson, Wind River; Ralf God, Hamburg University of Technology; Hartmut Hintze, Airbus Operations GmbH*

Chairpersons - *Krishna Sampigethaya, Embry-Riddle Aeronautical University Inc*

Preliminary Information

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Time	Paper No.	Title
9:00 a.m.	ORAL ONLY	Welcome & Introductions Ralf God, Hamburg University of Technology
9:05 a.m.	ORAL ONLY	Keynote Speaker: Davide Martini Davide Martini, Easa Europa
9:35 a.m.	ORAL ONLY	Keynote Speaker: Vivien Eberhardt Vivien Eberhardt, Sita
10:05 a.m.	ORAL ONLY	Keynote Speaker: Christopher Johnson Christopher Johnson, Univ. of Glasgow
10:50 a.m.	ORAL ONLY	Panel Session #2 - Airline and Airport IT Security <i>This session brings together experts from government, industry, and academia to discuss new cyber security concerns and developments related to airlines and airports. Topics include recent developments towards preparing crew and infrastructure at airport for IT security requirements.</i> Moderators - Ralf God, Hamburg University of Technology Panelists - Vivien Eberhardt, Sita; Christopher Johnson, Univ. of Glasgow; Sven Taubert, Lufthansa Technik AG; Meet the Participants ; ;
1:30 p.m.	ORAL ONLY	Panel Session #3 - Air Traffic Control System Cyber Security <i>This session brings together experts from government, industry, and academia to discuss new cyber security concerns and developments related to communications, navigation, and surveillance systems of the aircraft as well as air traffic management systems. Topics include research and development as well as standardization activities in ADS-B, GPS, and NextGen and SESAR.</i> Panelists - Tobias Kiesling, Airbus; Matt Shreeve, Helios; Meet The Participants ;
3:00 p.m.	ORAL ONLY	Panel Session #4 - Drones and Their Security <i>This session brings together experts from government, industry, and academia to discuss new cyber security and privacy concerns and developments related to unmanned aircraft and their civilian uses.</i> Panelists - Andy Thurling, NUAIR Alliance; Meet the Participants

Thursday, November 8

(Part 2 of 2) Digital Design and Manufacturing

Session Code: ASTC2300

Room Private Room 38

Session Time: ALL DAY

Industry 4.0 and the many components of this initiative, such as IIoT, Digital Thread/Twin, Additive Manufacturing and AR/VR, will be discussed in detail to provide greater understanding of the technologies and their uses. Government, industry, and academia need to collaborate to assure that these technologies achieve their fullest potential for all stakeholders. This session will provide the participants an understanding of the current and future state of this technology as it is related to aerospace and defense.

Organizers - Paul Robert Davies, Boeing Co.; Thomas Krueger, Airbus Operations SAS; Remy MATHIEU-DAUDE, Airbus SAS; Lorrie J. Sivich, Boeing Research & Technology

Preliminary Information

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Time	Paper No.	Title
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8:45 a.m.	ORAL ONLY	Welcome & Introductions
9:00 a.m.	ORAL ONLY	Keynote Speaker: Dassault Systems .. TBD
9:30 a.m.	ORAL ONLY	Keynote Speaker: Paul Davies, Boeing Paul Robert Davies, Boeing Co.
10:30 a.m.	2018-01-1929	Improving Manufacturing Efficiencies Through Industry 4.0 Technologies in Aerospace Sastry Veluri, Infosys Limited; Dr Ravi Kumar, Ramji vasudevan, Infosys Limited; Dr Ravi Prakash Gorur, Enose Nampuraja, Mahesh Shankaraiah, Simha Tanjore, Dr Shama Rao, Infosys Limited
11:00 a.m.	ORAL ONLY	Digital Thread / Twin, Katerina Schaefer Katharina Schaefer, SAP AG
11:30 a.m.	ORAL ONLY	Aerospace 4.0 – Enabling Supply Chain Adoption of Digital Capabilities Sameer Savani, ADS Group
12:00 p.m.	2018-01-1928	Challenges of Digital Twin in High Value Manufacturing Sumit Singh, Essam Shehab PhD, Cranfield University; Nigel Higgins, Kevin Fowler, Airbus Operations Ltd., UK; Tetsuo Tomiyama PhD, Cranfield University; Chris Fowler PhD, Airbus Operations Ltd., UK
1:30 p.m.	ORAL ONLY	The Role of Augmented Reality with a 4IR Future Chris Freeman, AMRC with Boeing
2:30 p.m.	ORAL ONLY	AR/VR/MR - A4Blue TBD, A4Blue
4:00 p.m.	ORAL ONLY	Panel #4 - AR/VR/MR Chris Freeman, AMRC with Boeing

Thursday, November 8

Unmanned Aerial Systems - UAS Manufacturing

Session Code: ASTC504

Room Private Room 41

Session Time: 11:00 a.m.

This session discusses manufacturing aspects related to unmanned aerial vehicle systems. Full and prototype scales and their testing are considered along with development of the manufacturing tools specific of UAV. Verification of manufacturing methodologies and process capabilities are also addressed. Less expensive and faster manufacturing methods using rapid prototyping technology are of interest.

Organizers - Patrick H. Browning, West Virginia Univ.; Yin M. Chen, US Army ARDEC; Richard Garcia, Southwest Research Institute

Preliminary Information

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Time	Paper No.	Title
11:00 a.m.	2018-01-1958	Design, Manufacturing, Testing, and Analysis of a Highly-Constrained Single-Use UAV Wing Patrick H. Browning, Levi S. Hubbard, Philip Pennock, West Virginia University

11:30 a.m. 2018-01-1960 **Design, Development and Integration of a Wing-Morphing, Bimodal Unmanned Vehicle**
Dian Guo

Thursday, November 8

Unmanned Aerial Systems - Propulsion

Session Code: **ASTC506**

Room Private Room 41

Session Time: **1:30 p.m.**

This session discusses UAV propulsion systems development and performance. All propulsion systems will be considered, from solar to fuel cell, to turbine. Propulsion alternatives for small airborne vehicles will be also discussed. Reliability, performance, and integration of existent UAV propulsions technologies will be addressed. New engine technology, new designs, or even new fundamental research and propulsion concepts are also of interest.

Organizers - *Patrick H. Browning, Patrick H. Browning, West Virginia Univ.; Yin M. Chen, US Army ARDEC*

Preliminary Information

Inclusion of a paper title in this preliminary program does not indicate acceptance of the manuscript. Final technical paper selection expected by September 17, 2018 and the schedule will be finalized by September 30, 2018.

Time	Paper No.	Title
1:30 p.m.	2018-01-1961 ORAL ONLY	Energy Optimization of High-Thickness High-Lift Wing for a Blended Wing Drone With Ducted Fan Propulsion and Boundary Layer Ingestion <i>Michele Trancossi, Sheffield Hallam University; Jose Pascoa, Universidade Da Beira Interior</i>
2:00 p.m.	2018-01-1962	Potential Improvements in Turbofan Idle Steady State and Dynamic Performance <i>Hossein Balaghi, University of Nottingham; Jean-Marc Le-Peuvedic, Dassault Aviation; Mohamed Rashed, Serhiy Bozhko, University of Nottingham</i>