AVIATION 2016

13–17 JUNE 2016

WASHINGTON, D.C.

CONCEPTS TO REALITY: DRIVING THE NEXT CENTURY OF FLIGHT INNOVATION

FINAL PROGRAM

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AVIATION 2016

Welcome

Welcome to Washington, DC, and AIAA AVIATION 2016! This year's theme is "Concepts to Reality: Driving the Next Century of Flight Innovation," and we believe you will find our program full of opportunities to consider how today's ideas become tomorrow's realities, and how those realities transform our community and our world.

Michael Delaney will get our plenary program started with a keynote address reflecting on the history of flight and how that storied past will inform our future. Michael Lombardi will treat attendees to a visually rich presentation on the distinguished 100-year history of The Boeing Company. Congressman Steve Knight (R-CA), a member of the House Committee on Science, Space, and Technology, will announce the introduction of his "Aeronautics Innovation Act," while Michimasa Fujino will tell us about the HondaJet and how it reflects the intersection of innovation and inspiration. Richard Clarke will talk to us about the cybersecurity threats posed to the connected commercial aviation environment, and John Langford will help us see a future dominated by UAS and how the arrival of those systems is changing our world. Wrapping things up, Charlie Bolden will discuss NASA's journey to transform aeronautics and aviation.

Taking the plenary sessions one step further, our dynamic Forum 360 program will tackle some of the most pressing issues our community faces. With the number of people flying each year increasing, airport and airline management must consider issues that cause disruptions and how the industry can minimizing their effect on the air transport network. We will examine how aerospace education programs are preparing the future workforce and what might be done to enhance aerospace programs so that our workforce is the best prepared in the world to tackle tomorrow's challenges. Commercial airplane companies from around the world will discuss what it takes to develop a new aircraft design in today's global landscape. NASA will take us through their aeronautics programs, giving us a good look at how they are tackling the hard challenges posed by the need for safe and environmentally responsible air systems. There will be an in-depth look at the future of military aviation as well, considering how that enterprise will evolve. We will grapple with cybersecurity through interactive exercises designed to pose real-time problems and solutions to common vulnerabilities encountered in the aviation enterprise. The future of regulations will be on the table as we examine which regulations help our community innovate and evolve, and which hamper us and how we can change them. We will also examine the future of flight testing and consider the legacy of the X-15 and Space Shuttle on hypersonic flight. In short, we have a lot to talk about.

With over 1,300 presentations scheduled, our technical program is second to none. You will not find the quality, depth, and breadth of this week's presentations at any other gathering, and we thank the Technical Program Committee for developing this outstanding program.

AIAA AVIATION 2016 will excite, motivate, and solidify our community's efforts to constantly dream of the future of aviation and then make that future a reality. We thank you for choosing to be here this week and we are confident you will be pleased with your choice.

AIAA AVIATION 2016 is proud to feature the following conferences:

32nd AIAA Aerodynamic Measurement Technology and Ground Testing Conference

34th AIAA Applied Aerodynamics Conference

AIAA Atmospheric Flight Mechanics Conference

8th AIAA Atmospheric and Space Environments Conference

16th AIAA Aviation Technology, Integration, and Operations Conference

AIAA Flight Testing Conference

8th AIAA Flow Control Conference

46th AIAA Fluid Dynamics Conference

AIAA Modeling and Simulation Technologies Conference

17th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference

47th AIAA Plasmadynamics and Lasers Conference

46th AIAA Thermophysics Conference

DEMAND for UNMANNED: Catalyst for the Machine Intelligence Revolution

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Karen Marais, Purdue University

Scot Campbell, MIT Lincoln Laboratory

Vincent Schultz, NASA Langley Research Center

Virginia Stouffer, LMI

Andrew Gibson, Empirical Systems Aerospace, Inc.

Isaac Choutapalli, The University of Texas - Pan American

Applied Aerodynamics
Kursat Kara, Khalifa University

John Farnsworth, University of Colorado Boulder

Jeremy Pinier, NASA Langley Research Center

Atmospheric and Space Environments
Justin Likar, UTC Aerospace Systems

Nashat Ahmad, NASA Langley Research Center

David Thompson, Mississippi State University

Atmospheric Flight Mechanics
Mark Phillips, NASA Marshall Space Flight Center

Ellen Gillespie, United Space Alliance

Flight Testing
Karl Garman, Federal Aviation Administration

Reagan Woolf, Edwards Air Force Base

Flight Testing/Ground Testing
Starr Ginn, NASA Armstrong Flight Research Center

Calain Schuman, Department of Defense

Ben Mills, Arnold Engineering Development Center/Aerospace Testing Alliance

Flow Control
Kenneth Granlund, Air Force Research Laboratory

Fluid Dynamics
Haoxiang Luo, Vanderbilt University

Ground Testing
Timothy Wadhams, CUBRC

Christine Pastor-Barsi, NASA Glenn Research Center

Modeling and Simulation Technologies
Peter Zaal, San Jose State University

Alaa Elmiligui, NASA Langley Research Center

Multidisciplinary Analysis and Optimization
Vijay Kalivarapu, Iowa State University

Scott Ferguson, North Carolina State University

Plasmadynamics and Lasers
Joseph W. Zimmerman, CU Aerospace, LLC

Thermophysics
Andy Williams, Air Force Research Laboratory

Michael Winter, University of Kentucky

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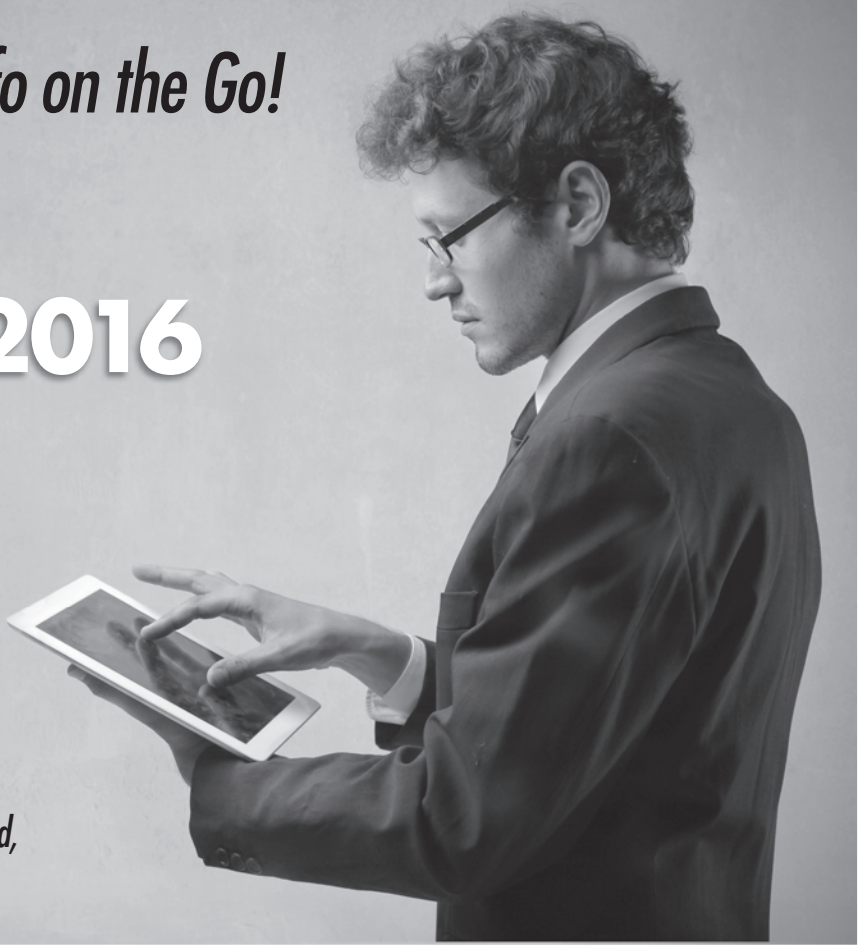

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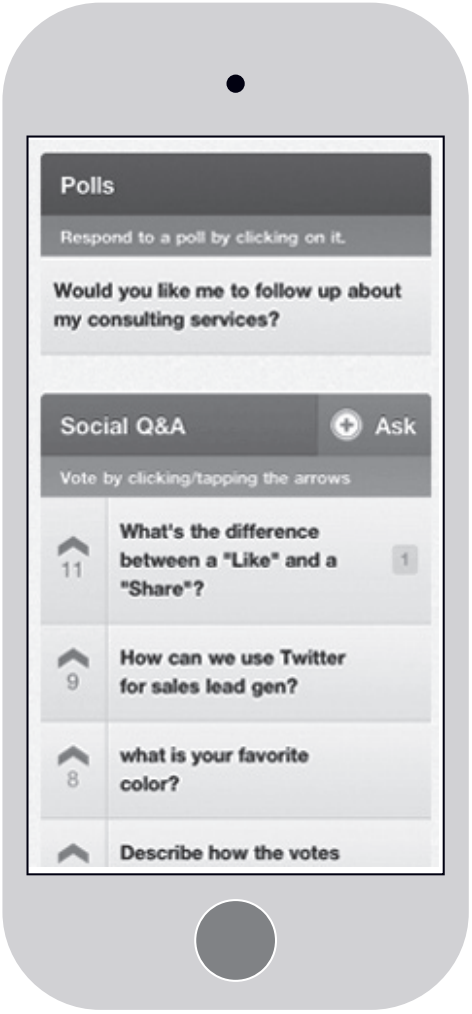

Getting Your Question Answered is as EASY as 1-2-3!

1. Click the "Ask" button to submit a question.
2. Check out the questions that other attendees are asking.
3. If you see a question that you want answered, click on the arrow on the left. The most popular questions automatically rise to the top.

Participate in Session Polls

1. If Polls are available they will appear at the top of the page. Simply click/tap on a Poll to respond.
2. Choose your response(s) and hit "submit".
3. After responding you will be able to see the results on your own device!*

** Some Poll results may be hidden*

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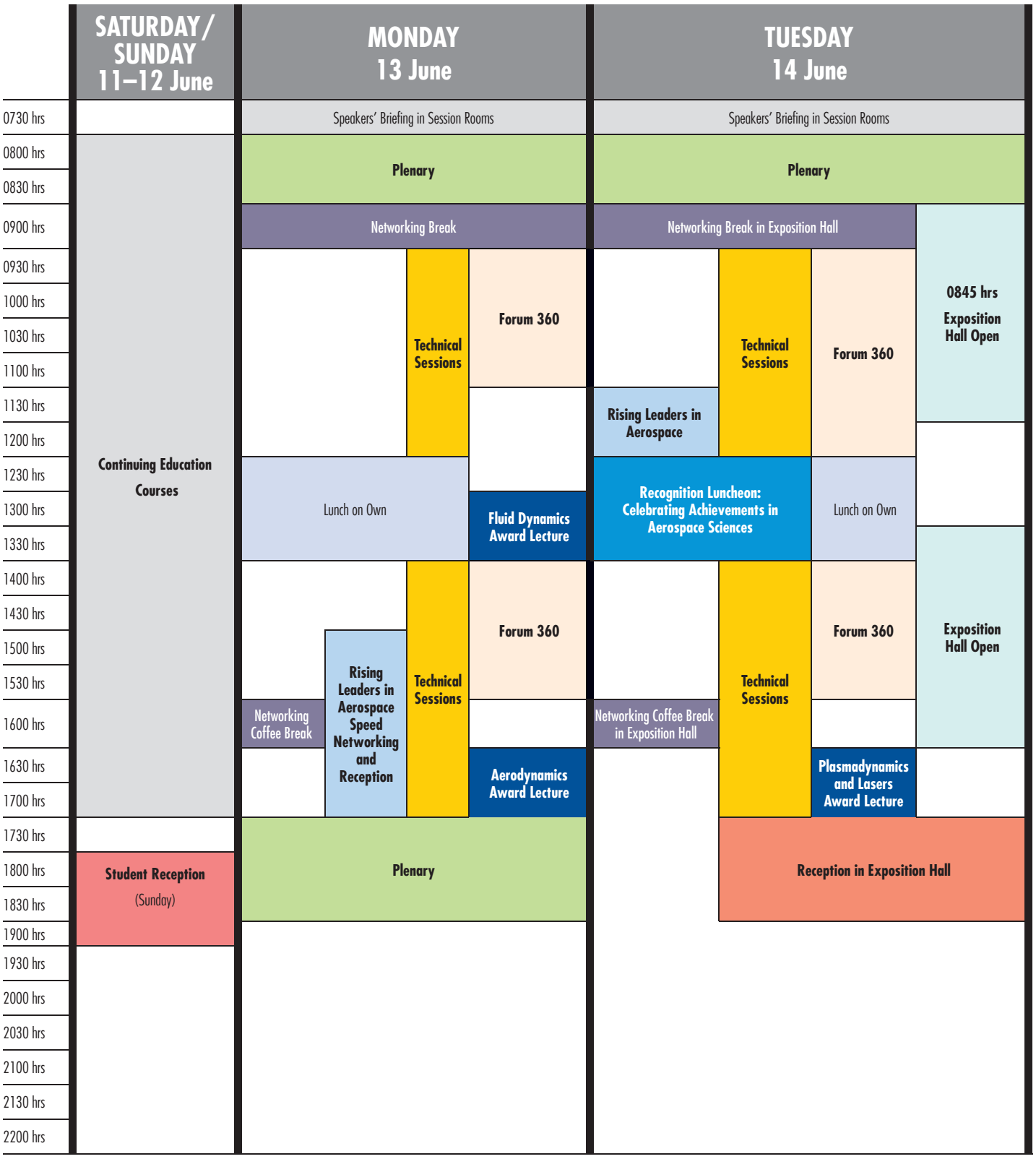
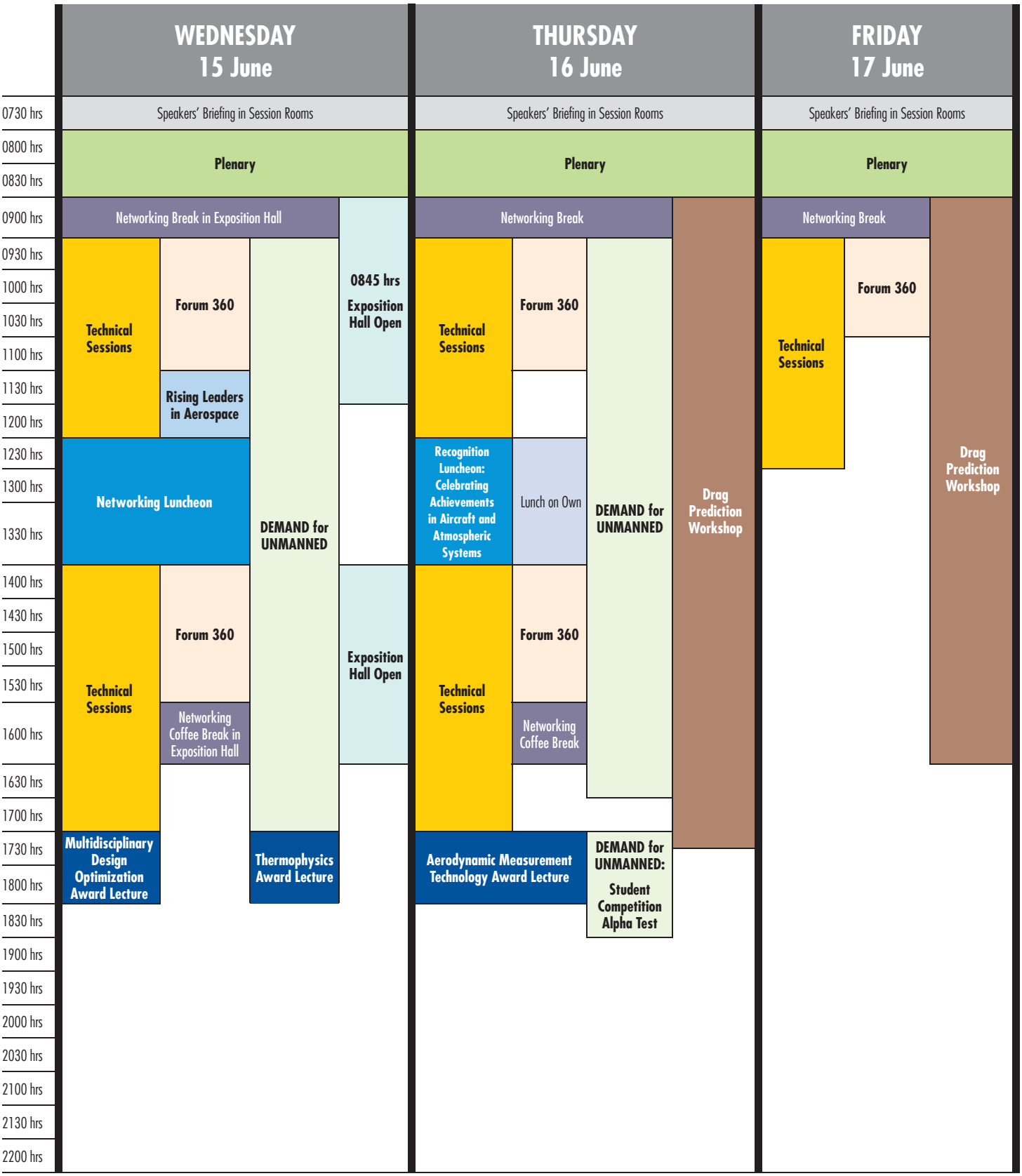
Forum Overview



Forum Overview



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AVIATION WEEK NETWORK

Keynote Speakers and Plenary Sessions

Get the big picture on aviation from the thought leaders in the field during these high-level discussions and presentations.

Monday, 13 June

0800–0900 hrs **International Ballroom (Center)**

The Second Century of Flight — Looking Back to Look Forward

Michael Delaney, Vice President and General Manager, Airplane Development, Boeing Commercial Airplanes

1730–1830 hrs **International Ballroom (Center)**

Making Dreams into Reality — The Epochal Stories That Define The Boeing Company

Michael Lombardi, Director of Boeing Archives, The Boeing Company

Tuesday, 14 June

0745 hrs **International Ballroom (Center)**

Renewing Innovation in U.S. Aeronautics

Congressman Steve Knight (R-CA), House Committee on Science, Space, and Technology

0810–0900 hrs

Balancing Innovation and Inspiration — The HondaJet

Michimasa Fujino, President & CEO, Honda Aircraft Company

Wednesday, 15 June

0800–0900 hrs **International Ballroom (Center)**

Cybersecurity

Richard A. Clarke, Chairman & CEO, Good Harbor Security Risk Management, LLC

Thursday, 16 June

0800–0900 hrs **International Ballroom (Center)**

The Ascent of (Un)manned

John S. Langford, Chairman and Chief Executive Officer, Aurora Flight Sciences Corporation

Friday, 17 June

0800–0900 hrs **International Ballroom (Center)**

Concept to Reality — Our Journey to Transforming Aviation

Charles F. Bolden Jr., Administrator, NASA

Forum 360

FORUM 360°

These conversations will cover a spectrum of timely topics including programs, systems, policy, operations, applications, platforms and more!

Monday, 13 June

0930–1130 hrs **International Ballroom (East)**

Commercial Aviation — Solving the Disruption Challenge

Moderator: **Ben Iannotta,** Editor-in-Chief, Aerospace America

Panelists:

Jim Eck, Assistant Administrator for NextGen, FAA

Robert Pearce, Deputy Associate Administrator for Strategy, Office of the Associate Administrator for Aeronautics, NASA

Bryan Quigley, Managing Director, United Airlines Flight Operations

Lance Sherry, Director, Center for Air Transportation Systems Research and Associate Professor, Systems Engineering and Operations Research Department, George Mason University

1400–1600 hrs **International Ballroom (East)**

The Future of Education

Moderator: **Todd W. Zarfos,** Vice President, Engineering Functions, Boeing Commercial Airplanes

Panelists:

Tara Chklovski, Founder and CEO, Iridescent

Norman L. Fortenberry, Executive Director, American Society for Engineering Education

Alton D. Romig Jr., Executive Officer, National Academy of Engineering

Melissa Musgrave, Head of Employment, Airbus and Airbus Group North America

Darryll J. Pines, Nariman Farvardin Professor of Aerospace Engineering and Dean, A. James Clark School of Engineering, University of Maryland

1400–1600 hrs **Cabinet**

Concepts to Reality — Airplane Development in a Global Environment

Moderator: **Ken Sanger,** Vice President / General Manager, 787 Airplane Development, The Boeing Company

Panelists:

Luis Carlos Affonso, Chief Operating Officer, Commercial Aviation, Embraer S.A.

Simon Carlisle, Director, Strategy, Civil Aerospace, Rolls-Royce

Tom Pelland, President, Engine & Environmental Control Systems, UTC Aerospace Systems

Tuesday, 14 June

0930–1230 hrs **International Ballroom (East)**

NASA Roadmaps — Guiding Direction for Aeronautics Research Investments

Moderator: **Richard A. Wahls,** Strategic Technical Advisor – Advanced Air Vehicles Program, NASA Aeronautics Research Mission Directorate, NASA Langley Research Center

Panelists:

Mark Ballin, Technical Integration Manager, Airspace Operations and Safety Program, NASA Langley Research Center

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

Fayette Collier, Manager, Environmentally Responsible Aviation Project, NASA Langley Research Center

Peter Coen, Manager, Commercial Supersonic Technology Project, NASA Langley Research Center

Jay Dryer, Director, Advanced Air Vehicles Program, NASA Aeronautics Research Mission Directorate, NASA

Barbara Esker, Deputy Director, Advanced Air Vehicles Program, NASA Glenn Research Center

Susan Gorton, Manager, Revolutionary Vertical Lift Technology Project, NASA Langley Research Center

Jessica Nowinski, Detailee, Airspace Operations and Safety Program, NASA

Jaiwon Shin, Associate Administrator, NASA Aeronautics Research Mission Directorate, NASA

Barry Sullivan, Technical Integration Manager for LaRC Airspace Operations and Safety Program, NASA Ames Research Center

Tom Davis, Technology Advisor, Airspace Systems Technology Program, Aviation Systems Division, NASA Ames Research Center

1400–1600 hrs **International Ballroom (East)**

The Future of Military Aviation

Moderator: **Tom Bell,** Vice President, Global Sales & Marketing, Boeing Defense, Space & Security

Panelists:

Shawn Brimley, Executive Vice President and Director of Studies, Center for New American Security

Rear Admiral Donald Gaddis, U.S. Navy (Ret.)

Michael O'Hanlon, Senior Fellow, Foreign Policy, Brookings Institution

Wednesday, 15 June

0930–1130 hrs **International Ballroom (East)**

Cybersecurity Table Top War Gaming Exercise

Take part in a Table Top Exercise (TTX) focusing on the risks and complexities cyber events/cyber incidents can have on supply chain and supply chain management within the aviation domain. Participants will experience a facilitated Brown Paper War Game that will allow them to participate as responders (Blue Team) or threat actors (Red Team) in order to better understand the TTX process and provide them with the ability to discuss aviation-centric approaches to cybersecurity and risk management. During play, participants will be divided into sub teams representative of key functions within the supply chain domain and can expect to discuss topics such as threat actors, threat surfaces, and other cybersecurity issues.

Participants are encouraged to return at 1400 hrs for an extended Hot Wash forum session with industry thought leaders in cybersecurity and the aviation domain.

Those interested in becoming an active participant are expected to be present for the full two-hour morning session and will need to preregister. Those who wish to observe will also need to pre-register. Preregister no later than 1600 hrs on Tuesday, 14 June, at **www.surveymonkey.com/r/G22M7FF**.

1400–1600 hrs **International Ballroom (East)**

TTX Hot Wash and Cybersecurity Interactive Training Session

Following the TTX, teams will participate in a "hot wash" session that will review the TTX's learning objectives and results. Participants will gain further instruction and insights when a panel of thought leaders in cybersecurity, risk management, threat assessment, and role-based training for cyber awareness engage in discussion and answer questions. The day promises to be both instructive and entertaining.

Moderator: **David Shaw,** Founder & CEO, Global Business Analysis

Panelists:

Briguette Carstensen, Vice President & Director of Research, Global Business Analysis

Barbara Endicott-Popovsky, PhD, Professor, University of Washington Institute of Technology & Executive Director, Center for Information Assurance and Cybersecurity

Faye Francy, Executive Director, The Aviation ISAC

Ilanko Subramaniam, GBA CISO, President, Global Business Analysis

Russ Syphert, Senior Threat Analyst, Global Business Analysis

(continued)

Forum 360

Thursday, 16 June

0930–1130 hrs **International Ballroom (East)**

Restoring the Foundation of Aviation

Moderator: **Gregory J. Bowles,** Director, European Regulatory Affairs & Engineering, General Aviation Manufacturers Association

Panelists:

Nicholas K. Borer, Principal Investigator, Aeronautics Systems Analysis Branch, NASA Langley Research Center

Lowell Foster, Flight Test Engineer, FAA Small Airplane Certification

Rick Peri, Vice President, Government and Industry Affairs, Aircraft Electronics Association

Andy Supinie, Director, Aerosciences, Textron Aviation

1400–1600 hrs **International Ballroom (East)**

Aircraft Design and Testing—Today and Tomorrow

Moderator: **Irene M. Gregory,** Senior Technologist for Advanced Control Theory and Applications, NASA Langley Research Center

Panelists:

Jay Brandon, Senior Research Engineer, Flight Dynamics Branch, NASA Langley Research Center

Clay Harden, Principal Engineer, AAP Flight Sciences Integration, Gulfstream

Alan Lawless, Chief Flight Test Engineer, Honda Aircraft Company

Anthony Washburn, Langley Senior Technologist for Aerosciences, NASA Langley Research Center

Friday, 17 June

0930–1130 hrs **International Ballroom (East)**

Hypersonic and Re-Entry Flight Testing — X-15 to Space Shuttle and Beyond

Moderator: **Sandra H. Magnus,** Executive Director, AIAA

Panelists:

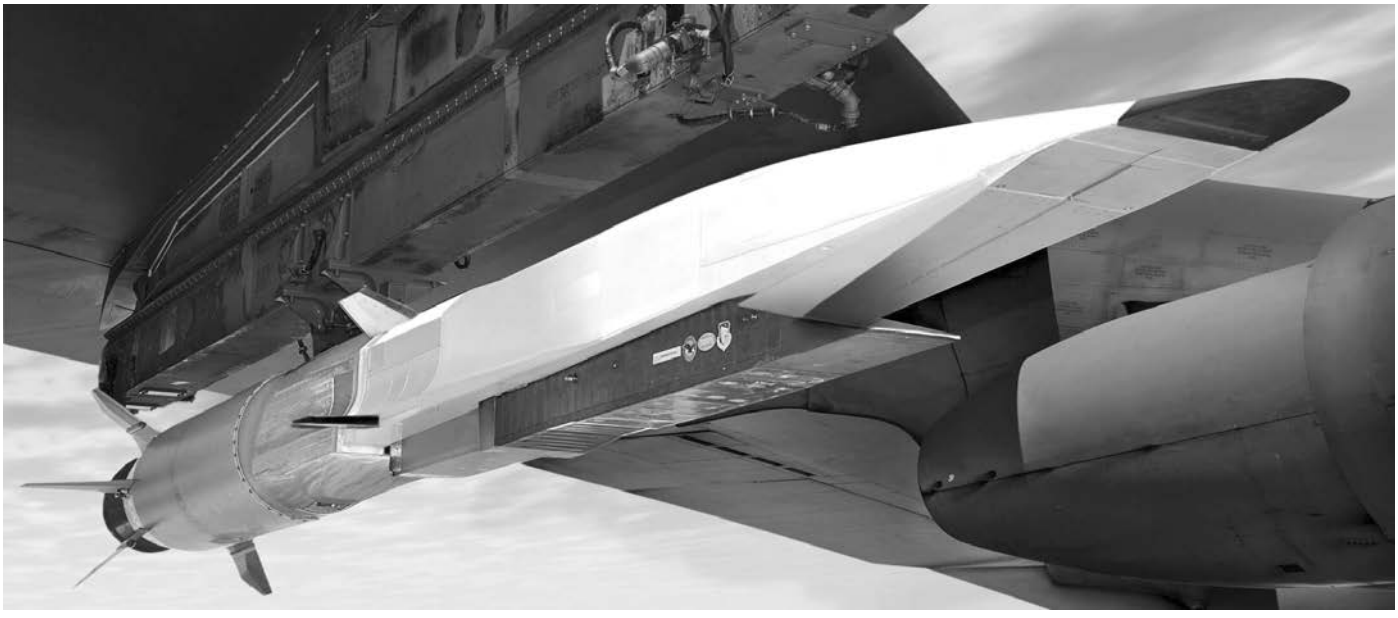
Doug Cooke, Aerospace Consultant, Cooke Concepts and Solutions

Colonel Lee Archambault, Chief Systems Engineer and Test Pilot, Sierra Nevada Corporation; United States Air Force (Ret.); and NASA Astronaut (Ret.)

Major General Joe H. Engle, United States Air Force, Air National Guard (Ret.) and NASA Astronaut (Ret.)

John Olson, Vice President, Space Exploration Systems, Sierra Nevada Corporation

The session is being held in support of the AIAA Foundation. Participants are asked to consider a donation to the AIAA Foundation for their educational programs that foster innovation in science, technology, engineering, and mathematics.



DEMAND FOR UNMANNED

This symposium brings together stakeholders from academia, government, and industry to identify research challenges that will lead to operational opportunities for the Unmanned Aerial Systems (UAS) community. You will discover how UAS are catalysts for autonomy, robotics, and machine intelligence, and how they have the potential to change the nature of civil and military aviation.

Visionaries see a future where UAS are used for myriad purposes—ranging from enhancing public safety and welfare, to expanding business opportunities that are limited only by our imaginations, to widened use in entertainment, sports, leisure, and recreation.

If an era of unheralded UAS utilization is to happen, significant advances in vehicle autonomy, autonomy of operations, and the requisite machine intelligence need to occur. The R&D community from traditional aerospace and from other industry sectors such as information technologies, communication technology, robotics, and energy will need to step up to this challenge. Similarly, both the regulatory and nonregulatory parts of the government have a significant role to play. Furthermore, society must accept both the technologies and the legal and regulatory considerations and concerns. If and when these technical, legal, and societal changes occur, then the near ubiquitous presence of Unmanned Systems with all that they can offer will be realized.

Just as UAS are catalysts for advances in autonomy, machine intelligence, and robotic solutions in aerospace, so too can AIAA be a catalyst for bringing together the R&D community for purposes of networking, vetting of ideas, and presenting research plans and results to peers.

DEMAND for UNMANNED Host:
Jay Gundlach, Founder and President, Flighthouse Engineering LLC

Announcing A New Competition!

The AIAA Unmanned Systems Program Committee is pleased to be collaborating with Drone World Expo on a new competition. The competition will help inform the end - user community about emerging technologies or concepts related to autonomous aerial systems that are most likely to have an effect on their future businesses or operations. Winners will have the opportunity to present their ideas to the end-user community during Drone World Expo, 15–16 November, San Jose, CA.

More information about this competition will be available soon at www.aiaa-aviation.org/DEMANDforUNMANNED/.

Steering Committee
Richard Wlezien, Iowa State University
Paramal H. Kopardekar, NASA Ames Research Center
John S. Langford, Aurora Flight Sciences Corporation
Michael S. Francis, United Technologies Research Center

Wednesday, 15 June

0930–1030 hrs **International Ballroom (West)**

The Changing Face of Aerospace: The Impact of UAS on Aviation

Applications for autonomous systems are untold as technology continues to improve. What advancements need to occur in order for unmanned systems and technologies to transform flight and air transportation? Radio-controlled aircraft have not received the same level of attention or caused anxiety like UAS. What's different about UAS? How much of the public reaction is due to media hype? What steps need to be taken to change public perception?

Moderator: **I. J. Hudson,** Former Technology Reporter, NBC4 Washington (WRC-TV)

Panelists

Michael S. Francis, Chief, Advanced Programs & Senior Fellow, United Technologies Research Center

Parimal H. Kopardekar, Manager, Safe Autonomous System Operations Project, and Principal Investigator, Unmanned Aerial Systems Traffic Management, NASA Ames Research Center

John S. Langford, Chairman and Chief Executive Officer, Aurora Flight Sciences Corporation

Richard Wlezien, Professor and Vance and Arlene Coffman Endowed Department Chair in Aerospace Engineering and Director, Iowa Space Grant Consortium, Iowa State University

1030–1130 hrs **International Ballroom (West)**

Invention, Entrepreneurship, and Unmanned Systems

How were, and are, early-stage technologies and systems developed and what lessons can be adopted to move from remotely piloted vehicles to fully autonomous systems operations?

Moderator: **John Langford,** Chairman and Chief Executive Officer, Aurora Flight Sciences Corporation

Break for Lunch

1130–1400 hrs

1400–1500 hrs **International Ballroom (West)**

Perspectives on the Future of Autonomous Systems and Technology

How is society impacted by autonomous systems? Robots and autonomous systems are being increasingly integrated into modern society, on the battlefield, the road, and factory floor… in business, education, and health. Do they help or hinder? Who is responsible when something goes wrong?

Mary Louise "Missy" Cummings, Associate Professor, Department of Mechanical Engineering and Materials Science, and Director, Humans and Autonomy Laboratory, Duke University

1500–1530 hrs **International Ballroom (West)**

The Autonomy "Dream"

As is pointed out in National Research Council's "Autonomy Research for Civil Aviation: Toward a New Era of Flight," civil aviation is on the brink of potentially revolutionary improvements in aviation capabilities and operations. Hurdles and substantial barriers do exist and need to be overcome if the autonomy revolution is to occur in aeronautics and in aviation. One area that is of particular interest to this symposium and that requires substantial autonomous capabilities is UAS integration into the Next Generation National Airspace System.

John-Paul Clarke, Professor, Daniel Guggenheim School of Aerospace Engineering, and Director, Air Transportation Laboratory, Georgia Institute of Technology

1530–1600 hrs **International Ballroom (West)**

DEMAND for UNMANNED Networking Coffee Break

1600–1730 hrs **International Ballroom (West)**

Technology Roadmaps for Intelligent Autonomous Systems

Autonomy roadmaps for future technologies and operations will be presented and discussed. Research trends in futuristic robotic systems will be similarly be presented and discussed. A roundtable discussion will ensue which ties these roadmaps and research trends back to recommendations made in the NRC Autonomy Study report.

Moderator: **Jay Gundlach,** Founder and President, Flighthouse Engineering LLC, and author of several books on UAS

Presenters

Mark G. Ballin, Technology Integration Manager, NASA Airspace Operations and Safety Program

Sebastian Scherer, Systems Scientist, The Robotics Institute, Carnegie Mellon University

Roundtable Panelists

Jay Gundlach, Founder and President, Flighthouse Engineering LLC

Mark G. Ballin, Technology Integration Manager, NASA Airspace Operations and Safety Program

John-Paul Clarke, Professor, Daniel Guggenheim School of Aerospace Engineering, and Director, Air Transportation Laboratory, Georgia Institute of Technology

Sebastian Scherer, Systems Scientist, The Robotics Institute, Carnegie Mellon University

Thursday, 16 June 2016

0800–0900 hrs **International Ballroom (Center)**

UAS Developments

John S. Langford, Chairman and Chief Executive Officer, Aurora Flight Sciences Corporation

0900–0930 hrs **Meeting Room Foyers**

AVIATION Forum Networking Coffee Break

Thursday, 16 June

1730–1900 hrs **International Ballroom (Center)**

DEMAND for UNMANNED Student Competition Alpha Test

Teams from the University of Michigan, University of Maryland, and McKinley Technology High School in Washington, D.C., will use a UAV quadrotor to participate in a two-part competition that includes autonomy and manual flight skills.

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(continued)

Thursday, 16 June 2016

0930–1045 hrs **International Ballroom (West)**

Transformation in the National Airspace System

The National Airspace System (NAS) stands on the verge of transformation. The convergence of robotics, intelligent machines, autonomy, hybrid-electric propulsion methods, advanced aeronautic design, and work-anywhere, be-anywhere culture is driving our society into a new era. This panel will discuss the transformations being driven by UAS, and potential outcomes from the convergence of these driving technologies, issues and events in our increasingly connected society.

Moderator: **Dallas Brooks,** Director, Raspet Flight Research Laboratory, Mississippi State University and Co-Chair, FAA/DoD/NASA/DHS Unmanned Aircraft System (UAS) Science and Research Panel

Panelists

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

Pete Dumont, Executive Director, ATCA

Jonathan Evans, CEO, Skyward

Steven Pennington, Executive Director, DoD Policy Board on Federal Aviation

Michael Singer, CEO, DroneView Technologies

1100–1215 hrs **International Ballroom (West)**

ASSURE: FAA Center of Excellence for UAS Research

Panelists from the Alliance for System Safety of UAS through Research Excellence (ASSURE), the FAA's Center for Excellence for UAS Research, will provide their perspectives about the technologies and operation procedures required to make UAS operations safe in the NAS and the NextGen.

Moderator: **Sabrina Saunders-Hodge,** NextGen R&D Integration Division Manager, Federal Aviation Administration

Panelists

David Arterburn, Director, Rotorcraft Systems Engineering and Simulation Center, The University of Alabama in Huntsville

Mark Anthony Askelson, Associate Professor, University of North Dakota

Dallas Brooks, Director, Raspet Flight Research & Associate Director for Research, ASSURE FAA UAS Center of Excellence (COE)

Major General James Poss (ret.), Executive Director, Alliance for System Safety of UAS through Research Excellence (ASSURE)

Richard Stansbury, Associate Professor, Embry-Riddle Aeronautical University

1230–1400 hrs

Break for Lunch

1400–1545 hrs **International Ballroom (West)**

UAS Traffic Management System

NASA, working closely with the FAA, is using collaborative innovation to develop a UAS Traffic Management concept to safely enable UAS operations in low-altitude airspace. Bringing together interested parties from industry, government agencies and academia to discuss UAS challenges is an important step to accelerating the integration of UAS into the national airspace. End users will engage with the research, development, and test community to discuss the challenges and needs of small UAS users and missions in this session.

Session Chair: **Parimal H. Kopardekar,** Manager, Safe Autonomous System Operations Project, and Principal Investigator, Unmanned Aerial Systems Traffic Management, NASA Ames Research Center

Moderator: **Gretchen West,** Senior Advisor of Innovation and Technology, Hogan Lovells and Advisory Board Member, DroneWorld Expo

Panelists

Gregory Agvent, Senior Director, News Operations, CNN

Sean Cassidy, Director, Strategic Partnerships, Amazon Prime Air

R. John Hansman, T. Wilson Professor of Aeronautics & Astronautics and Director of the International Center for Air Transportation, MIT

Jesse Kallman, Director of Business Development & Regulatory Affairs, Airware

Craig Marcinkowski, Director, Strategy and Business Development, Gryphon Sensors

Ashok N. Srivastava, Chief Data Scientist, Verizon

Peng Wei, Assistant Professor, Aerospace Engineering, Iowa State University

UAS Traffic Management System session is presented by DRONE WORLD EXPO

1545–1600 hrs **International Ballroom (West)**

DEMAND for UNMANNED Networking Coffee Break

1600–1700 hrs **International Ballroom (West)**

Visions of the Future

Speakers will address their visions for Cognitive Assistance in Government and Public Sector Applications, Collaborative Operations in Denied Environments, and Human Factors/Human-Machine Interfaces as they pertain to UAS missions, UAS design, and the NextGen air traffic management systems.

Chuck Howell, Chief Engineer, Portfolio Programs and Integration, MITRE

Jean-Charles Ledé, Program Manager, Tactical Technology Office, Defense Advanced Research Projects Agency (DARPA)

Dale Richards, Senior Research Fellow in Human Factors, Coventry University

Special Sessions and Events

The multidimensional program features a leadership exchange/speed mentoring, panel session, Q&A with top industry leaders, and multiple opportunities for networking. These exciting and energetic activities will provide access to top aerospace leaders and their perspectives with subject matter relevant to your career.

Program Agenda

Monday 13 June

1500–1715 hrs **International Ballroom (West)**

Speed Networking and Reception

Senior members of corporations and AIAA will be taking time to meet with the Rising Leaders participants and share their experiences. This event is a great way to get insight from top-level officials and make some great new contacts. And, maybe, they will end up being a mentor for more than just the 15 minutes at this event. Don't miss a terrific opportunity.

Immediately following the roundtable interchange with senior members of the industry there will be a follow-on reception. This will allow for conversations to continue, or if a conversation was cut short, an opportunity to have a follow-up discussion. It will also allow for a casual opportunity to meet the other young professionals who are attending the conference. Having just participated in the speed networking, you'll definitely have at least one thing in common.

Don't miss a terrific opportunity.

Senior Mentors

Mark Ballin, NASA Langley Research Center
Brad Belcher, Rolls-Royce
John Cavolowsky, NASA
Peter Coen, NASA Langley Research Center
Fayette Collier, NASA
Peggy Cornell, NASA Glenn Research Center
Michael Corcoran, The Boeing Company
Barbara Esker, NASA
Matthew Hutchison, Aurora Flight Sciences
Sally Johnson, Adaptive Aerospace group, Inc.
Dean Jorgensen, Space Electronics
Art Mallett, Dunmore Corporation
Jayant Ramakrishnan, Bastion Technologies
David Riley, Boeing Engineering Operations and Technology
Lisa Teague, Rolls-Royce
Gregor Veble Mikic, Joby Aviation
Richard Wahls, NASA Langley Research Center

Speed Networking Sponsor: BOEING

Tuesday, 14 June

1130–1230 hrs **Georgetown East**

Why Work in Aerospace Instead of Silicon Valley

Silicon Valley has been considered a leader in high tech industries, innovation, and startups since the early 1900s. Many young, eager, and ambitious persons have gone to Silicon Valley to be a "force" in their preferred field. But is Silicon Valley the be all and end all of high tech innovation? Does the traditional aerospace industry have anything to offer?

Come listen to what these panelists have to say. While Silicon Valley will always be a force in high tech innovation, learn what some are doing in partnership or in parallel. Learn how traditional aerospace is also making great advances in cutting-edge research.

Moderator: **Craig McGrath,** Product Development, Boeing Commercial Airplanes

Panelist:

Tony Springer, Director, Integration and Management Office, NASA

Wednesday, 15 June

1130–1230 hrs **Columbia 9**

Innovations, Technology, and Skills for the Next 100 Years in Aerospace

Greg Hyslop, Senior Vice President, Engineering, Test & Technology, The Boeing Company

Special Sessions and Events

Thursday and Friday, 16–17 June

Thursday, 0930–1715 hrs **Lincoln West**
Friday, 0930–1630 hrs

6th AIAA CFD Drag Prediction Workshop

Sponsored by the Applied Aerodynamics Technical Committee

The focus of this workshop will be the NASA Common Research Model (CRM) with wind-tunnel measured wing twist; both wing-body and wing-body-pylon-nacelle configurations will be considered. CFD predictions of absolute and incremental force and moment values will be examined and compared. The workshop will include grid convergence and code verification studies. Additionally, an angle-of-attack sweep with static aero-elastic deformations will be considered. Grids will be made available for all required cases.

Optionally, participants are invited to perform solution-adaptation calculations and/or a coupled aero-structural simulation of the CRM wing-body configuration. A finite element model will be made available to participants to calculate twist/deflection due to aerodynamic load.

The objectives of this workshop will be to:

- To assess the state-of-the-art computational methods as practical aerodynamic tools for aircraft force and moment prediction of industry relevant geometries.
- To provide an impartial forum for evaluating the effectiveness of existing computer codes and modeling techniques using Navier-Stokes solvers.
- To identify areas needing additional research and development.

You must be registered for AIAA AVIATION 2016 to participate in the 6th AIAA CFD Drag Prediction Workshop. There is no additional workshop registration fee.

Reception: Thursday, 1745–2000 hrs **International Terrace**
Conference: Friday, 0700–1630 hrs **International Ballroom (West)**

Regional Leadership Conference

The 2016 Regional Leadership Conference (RLC) is a great opportunity to introduce new section officers and deputy directors to the Institute's resources and programs. In addition, meet fellow officers from many different sections within AIAA and learn about the types of activities they hold. AIAA Regions and Sections vary in size from a few dozen to many hundreds of people. You may hear about activities that you want to try in your section, or you may be able to provide assistance to a section that is having difficulty in a particular area. You will also learn how your officer role fits into the overall AIAA hierarchy. Many of the presentations are made by members of the AIAA Board and the conference is presided over by the Vice President, Member Services.

The conference kicks off with an evening reception where attendees can mingle and discuss activities with other officers and AIAA Board members. So if you are a new AIAA officer or a veteran who would like to get a refresher, meet new people, or see what the latest innovations at AIAA are, plan to attend the Regional Leadership Conference.

Networking Events

Understanding the importance of networking with colleagues new and old, a series of activities have been planned that will help you connect with current colleagues and new acquaintances.

Student Welcome Reception

Sunday, 12 June **International Ballroom (West)**
1800–1930 hrs

Mingle with your peers and hear from AIAA Executive Director Sandy Magnus. This reception provides you with the opportunity to meet your fellow students and learn more about the opportunities available to you as an AIAA student member.

Sponsored by Aurora Flight Sciences

Networking Coffee Breaks

Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum. Networking coffee breaks will be held at the following locations and times:

Monday, 13 June	**0900–0930 hrs and 1600–1630 hrs; Meeting Room Foyers**
Tuesday, 14 June	**0845–0930 hrs and 1600–1630 hrs; Exposition Hall**
	Afternoon Coffee Break Sponsor: BASTION TECHNOLOGIES
Wednesday, 15 June	**0845–0930 hrs and 1600–1630 hrs; Exposition Hall**
Thursday, 16 June	**0900–0930 hrs and 1600–1630 hrs; Meeting Room Foyers**
Friday, 17 June	**0900–0930 hrs; Meeting Room Foyers**

Welcome Reception

Tuesday, 14 June **Exposition Hall, Columbia**
1730–1900 hrs

Take this opportunity to engage new contacts and refresh old ones. A ticket for the reception is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site.

Networking Luncheon

Wednesday, 15 June **International Ballroom (Center)**
1230–1400 hrs

A ticket for the luncheon is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site.

Recognition Events

AIAA celebrates our industry's discoveries and achievements from the small but brilliantly simple innovations that affect everyday life to the major discoveries and missions that fuel our collective human drive to explore and accomplish amazing things.

Monday, 13 June

1300–1400 hrs **Cabinet**

Fluid Dynamics Award Lecture

The Hydrodynamic Theory of Premixed Flames: Laminar to Turbulent Propagation

Moshe Matalon, Caterpillar Distinguished Professor, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign

1630–1730 hrs **Cabinet**

Aerodynamics Award Lecture

Some Applications of Computational Fluid Dynamics to Entry and Landing of the Mars Science Laboratory

Pieter Buning, Aerospace Technologist, NASA Langley Research Center

Tuesday, 14 June

1230–1400 hrs **International Ballroom (Center)**

Recognition Luncheon: Celebrating Achievements in Aerospace Sciences

A ticket for the luncheon is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site.

The following awards will be presented:

Aerodynamics Award

Pieter Buning
Aerospace Technologist
NASA Langley Research Center
"In recognition of exceptional leadership, innovation and expertise in the field of overset grid CFD methods and applications that are used internationally for widespread advancements in the aerodynamic design and development of air and space vehicles."

Aerodynamic Measurement Technology Award

Alan C. Eckbreth
Management/Engineering Consultant
"For seminal contributions to the emerging field of laser diagnostics for combustion, especially for his work in coherent anti-Stokes Raman scattering (CARS) spectroscopy."

Fluid Dynamics Award

Moshe Matalon
Caterpillar Distinguished Professor
Department of Mechanical Science and Engineering
University of Illinois at Urbana-Champaign
"For contributions to the development of combustion theory, for revolutionizing understanding of chemically reacting flows, and for work on the hydrodynamic theory of premixed flames."

Ground Testing Award

Zonglin Jiang
Professor, Institute of Mechanics
Chinese Academy of Sciences
"For skillful leadership in conceiving, developing and successfully commissioning the world's largest shock tunnel capable of true hypersonic flight simulation."

Losey Atmospheric Sciences Award

William L. Smith
Professor Emeritus, Department of Atmospheric and Oceanic Sciences, University of Wisconsin-Madison
Distinguished Professor, Department of Atmospheric and Planetary Sciences, Hampton University
"For visionary and pioneering ultraspectral resolution sounding techniques used for current and future polar satellite advanced infrared sounding systems for improved weather forecasting."

Plasmadynamics and Lasers Award

Eric J. Jumper
Roth-Gibson Professor of Aerospace and Mechanical Engineering
University of Notre Dame
"For major contributions in the fields of aero-optics, chemical lasers, and laser-supported detonation, and for the mentoring of young engineers and scientists."

Thermophysics Award

George Cunnington
CEO
Cunnington and Associates
"For lifelong contributions to the development of thermal protection systems, multilayer cryogenic insulation systems, and radiative heat transfer analysis techniques."

Certificates of Merit:

Aerodynamic Measurement Technology Best Paper

AIAA Paper 2016-0791, "Time-Resolved PIV in a Shock Tube," Justin Wagner, Steven Beresh, Edward Demauro, Katya Casper, Daniel Guildenbecher, Brian Pruett, and Paul Farias, Sandia National Laboratories.

(continued)

Recognition Events

Tuesday, 14 June (continued)

Applied Aerodynamics Best Paper

AIAA Paper 2015-2718, "Origins and Further Development of the Jameson-Schmidt-Turkel Scheme," Antony Jameson, Stanford University.

David Weaver Best Student Paper

AIAA Paper 2016-0509, "Heat Transport in Aqueous Suspensions of Alumina Nanoparticles," Murali Gopal Muraleedharan, Dilip Srinivas Sundaram, and Vigor Yang, Georgia Institute of Technology.

Fluid Dynamics Best Paper

AIAA Paper 2016-1062, "An Overview of Combined Uncertainty and A-Posteriori Error Bound Estimates for CFD Calculations," Timothy Barth, NASA Ames Research Center.

Ground Testing Best Paper

AIAA Paper 2015-2861, "Unsteady Low-Speed Wind Tunnel Design," David Greenblatt, Technion—Israel Institute of Technology.

Modeling and Simulation Best Paper

AIAA Paper 2015-2653, "A Bifurcation Study of a Dynamic Model of a Nose Landing Gear Mechanism Subjected to External Disturbances," James Knowles, Loughborough University.

Plasmadynamics and Lasers Best Student Paper

AIAA Paper 2016-1698, "Development of a Cavity Enhanced Thomson and Raman Scattering Diagnostic," Adam Friss, Christopher Limbach, and Azer P. Yalin, Colorado State University.

Thermophysics Best Paper

AIAA Paper 2016-1981, "Spectral, Directional Emittance at Elevated Temperatures for Various Materials," Michael Winter, Robert Bickel, Dusan Sekulic, Helmut Koch, Bradley Butler, and Hai Fu, University of Kentucky.

1630–1730 hrs **International Ballroom (East)**

Plasmadynamics and Lasers Award Lecture

Aero-Optics: A Photon Odyssey

Eric J. Jumper, Roth-Gibson Professor of Aerospace and Mechanical Engineering, University of Notre Dame

Wednesday, 15 June

1730–1830 hrs **International Ballroom (East)**

Mutidisciplinary Design Optimization Award Lecture

A 30-Year Retrospective of Structural and Multidisciplinary Optimization

Robert (Bob) A. Canfield, Professor & Assistant Department Head for Academic Affairs, Virginia Polytechnic Institute and State University

1730–1830 hrs **Lincoln West**

Thermophysics Award Lecture

Measurement of Thermophysical Properties from 4 to 4,000K

George Cunnington, CEO, Cunnington and Associates

(continued)

Recognition Events

Thursday, 16 June

1230–1400 hrs **International Ballroom (Center)**

Recognition Luncheon: Celebrating Achievements in Aircraft and Atmospheric Systems

A ticket for the luncheon is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site.

The following awards will be presented:

Aircraft Design Award

Navy X-47B Unmanned Combat Air System Carrier Demonstration Program (UCAS-D) Team

Department of the Navy
Award accepted by RADM Mathias Winter, Program Executive Officer for Unmanned Aviation and Strike Weapons

"In recognition and sincere appreciation of the significant advances to the state of the art in autonomous aircraft operations on a carrier and in the aerial refueling environment that have been demonstrated by the Navy X-47B UCAS-D and enabled by this very successful aircraft design."

Gardner-Lasser Aerospace History Literature Award

Monique Laney

Assistant Professor of History
Auburn University

German Rocketeers in the Heart of Dixie: Making Sense of the Nazi Past During the Civil Rights Era

Hap Arnold Award For Excellence in Aeronautical Program Management

Paul R. Adams
President (Ret.)
Pratt & Whitney, United Technologies Corporation

"For exceptional program management and leadership in the engineering, development, and production of game-changing technological products, including Pratt & Whitney's PurePower Geared Turbofan™ engine."

Multidisciplinary Design Optimization Award

Rakesh K. Kapania
Mitchell Professor of Aerospace Engineering, Department of Aerospace and Ocean Engineering
Virginia Polytechnic Institute and State University

"For significant contributions in the MDO of truss-braced aircraft, efficient supersonic air vehicles, and pioneering the MDO of wings with curvilinear Spars and Ribs."

Piper General Aviation Award

Gregor Veble Mikic
Chief Aerodynamicist
Joby Aviation

Tine Tomazic
Director of R&D
Pipistrel

"For leadership in the research, design and development, and testing of practical marketable electric general aviation aircraft concepts."

1730–1830 hrs **International Ballroom (East)**

Aerodynamic Measurement Technology Award Lecture

CARS – The First Twenty Years

Alan C. Eckbreth, Management/Engineering Consultant

ITAR Information

A limited number of papers will be presented in "U.S. Only" technical sessions during the conference. In addition to your forum registration, a separate registration process is required to attend these restricted sessions. All individuals must bring the required documentation with them to the ITAR registration desk, most importantly is proof of U.S. Citizenship or Resident Alien Status. **(Please note that a CAC card IS NOT official proof of U.S. Citizenship.)** Please see the detailed information on the ITAR Registration Grid below to determine your individual requirements.

Access to ITAR Sessions: Presenting a Paper, Chairing a Session, or Attending an ITAR-Restricted Presentation

Admittance to the restricted technical program is controlled by the U.S. International Traffic in Arms Regulations (ITAR). All attendees, presenters, and session chairs will need to register for the conference, and then visit the ITAR registration desk to complete the additional processes. Anyone wishing to enter the restricted session room MUST abide by the procedures and submission of verified documents mandated by the DoD. No Exceptions! ITAR Badges must be worn during the sessions. Security will be checking photo IDs upon entrance to the ITAR session rooms.

Availability of Manuscripts from ITAR-Restricted Sessions

For those who are registered to attend the ITAR sessions, a DVD containing the papers from the ITAR sessions will be available for purchase on site at the forum for $25. Those purchasing the DVD must be available to pick it up on Friday, 17 June 2016, between 0900-1230 hrs at the ITAR Registration Desk. All DVDs must be picked up in person. There will be no sale or distribution of these papers after the event.

ITAR Electronics Policy

No phones, computers (other than the presenter), iPads, cameras, Fitbits, or other electronic devices with cameras, recording or two-way transmission capabilities will be permitted into the ITAR session room. There will be a check-in desk in front of the room where you can check these devices. Large briefcases and bags will also need to be checked at the desk.

Important session information for all attendees wishing to present or attend ITAR papers

AIAA Shaping the Future of Aerospace

AIAA Restricted Papers – ITAR Regulations Session Admittance Policy
(Revised 10/19/2012)

Several papers scheduled to be presented at this conference will be restricted papers governed by ITAR (U.S. International Traffic in Arms Regulations). If you plan to attend any presentations restricted by ITAR, you must bring proof of citizenship PLUS the other verification documents as shown below. Please note that only U.S. Citizens and U.S. Resident Aliens can be considered for attendance at these restricted presentations. Admittance to restricted sessions and access to restricted technical papers is implemented and controlled by ITAR .
All restricted session attendees (including speakers and session chairs for these sessions) MUST abide by the procedures and submittal of verification documents as noted below **– NO EXCEPTIONS**:

ATTENDEE CLASSIFICATION	IDENTIFICATION & PROOF OF EMPLOYMENT REQUIREMENTS
U.S. Government Employees	1. Proof of U.S. Citizenship (for example, passport, birth certificate, voters registration card, naturalization papers), **AND** 2. Personal photographic identification: U.S. Government/Military Photo ID badge, such as CAC card
U.S. Citizens	1. Proof of U.S. Citizenship (for example, passport, birth certificate, voters registration card, naturalization papers), **AND** 2. Personal photographic identification (passport, driver's license, etc.), **AND** 3. Certification credentials based on DD Form 2345 (see below for details)
Resident Aliens (U.S.)	1. Resident Alien Card, **AND** 2. Personal photographic identification (passport, driver's license, etc.), **AND** 3. Certification credentials based on DD Form 2345 (see below for details)

DD Form 2345 individual certification credentials (required for U.S. & Resident Aliens) MUST be from one of the following:

1. Copy of an approved and active DD2345 for the individual, **OR**
2. Copy of an approved and active DD2345 for the individual's employer PLUS evidence of current employment status with that employer (corporate ID, business card, etc.), **OR**
3. A listing of the individual's employer in the most recent DoD quarterly Qualified U.S. Contractor Access List PLUS evidence of current employment status with that employer (corporate ID, business card, etc.).

DD Form 2345 may be downloaded and completed online in order to apply for approval to be listed on the Qualified U.S. Contractor List, www.dlis.dla.mil/jcp. Allow at least 4-6 week (or longer) prior to the AIAA technical conference dates for you to receive the approval and be listed on the Qualified U.S. Contractor List.

How to get your ITAR Clearance:
Bring all of the above listed identification, proof of employment and certification credentials to the AIAA ITAR Registration Desk in the AIAA Registration area. Your documents will be verified and you will be provided with a stamp indicating your ITAR clearance. Photo ID will be checked against your ITAR badge before admittance is granted to any ITAR presentation.

Please be advised that all policies and procedures MUST be followed or admittance to restricted sessions will not be permitted.


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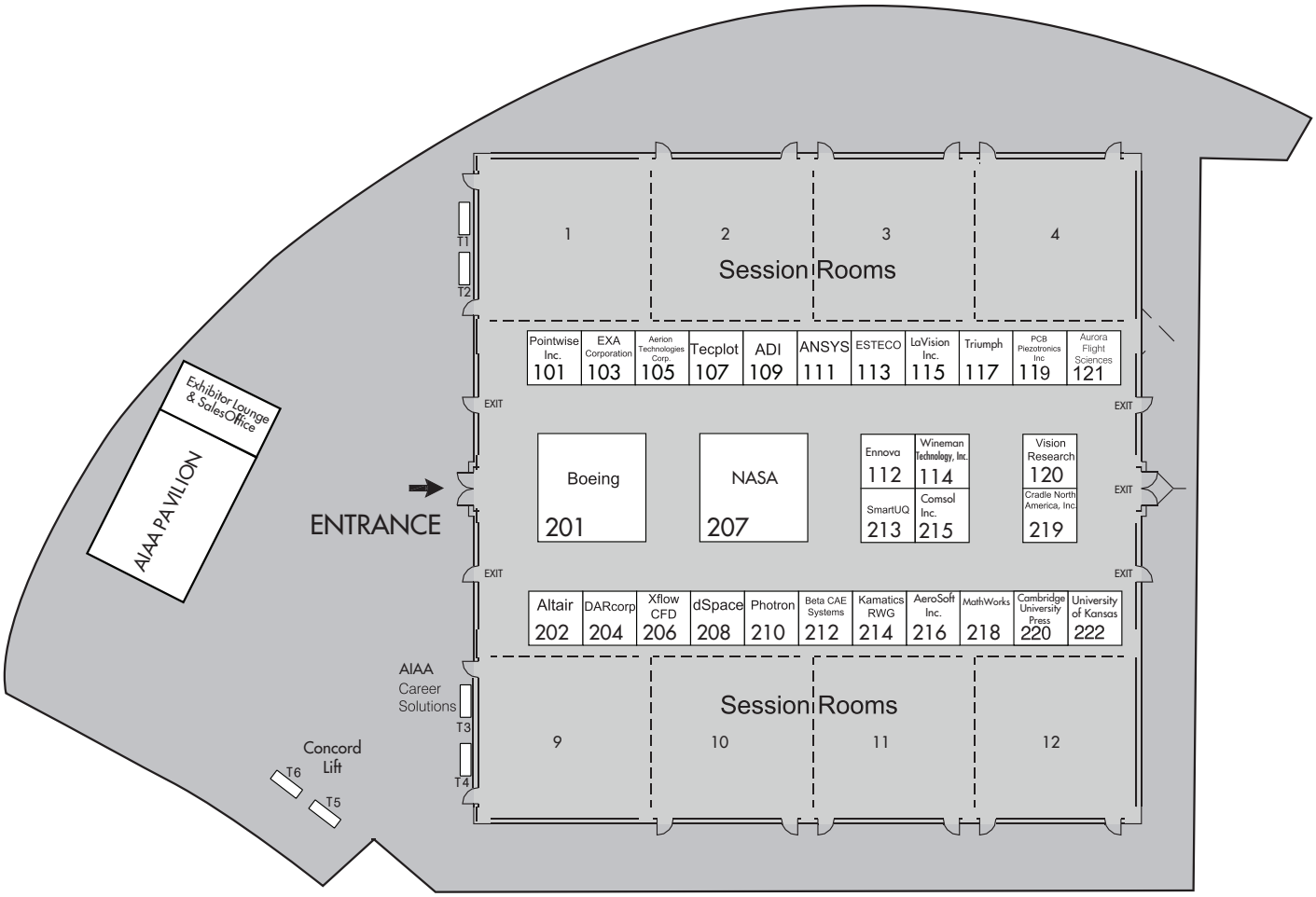
Exposition Hall



Exhibitors by Booth Number (★indicates AIAA Corporate Members)

105	Aerion Technologies★
216	AeroSoft
T-3	AIAA Career Solutions
202	Altair ★
111	ANSYS, Inc.
109	Applied Dynamics, International (ADI)
121	Aurora Flight Sciences ★
212	BETA CAE Systems USA, Inc.
201	The Boeing Company ★
220	Cambridge Universtiy Press
215	Comsol, Inc.
T-6	Concord Lift
219	Cradle North America, Inc.
204	DARcorporation ★
208	dSPACE ★
112	Ennova Technologies
113	ESTECO
103	Exa Corporation
214	Kamatics RWG
115	LaVision, Inc.
218	MathWorks
207	NASA Aeronautics
119	PCB Piezotronics
210	Photron
101	Pointwise, Inc. ★
213	SmartUQ
107	Tecplot, Inc. ★
117	Triumph Aerospace Systems
222	University of Kansas Short Course Program
120	Vision Research
114	Wineman Technology, Inc.
206	XFlow CFD

Exposition Hall

The Exposition Hall is the hub of activity during this event—from seeing exhibitor displays to enjoying networking breaks and other functions. All the major networking events are held in the Exposition Hall to give attendees and exhibitors an opportunity to connect with partners, industry thought leaders, and collaborators who can help move your business forward. The Exposition Hall is located in the Columbia room.

Exposition Hall Hours

Tuesday, 14 June	**0845–1200 hrs; 1330–1630 hrs; Reception*, 1730–1900 hrs**
Wednesday, 15 June	**0845–1200 hrs; 1400–1630 hrs**

**A ticket is required and included in the registration fee where indicated*

Charging Stations

Recharge your mobile device while networking with exhibitors.

Quadcopter Raffle

Enter to win one of two quadcopters! Complete the raffle ticket (behind your registration badge) and drop it in the boxes in the Exposition Hall, or drop in a business card. Winner will be notified by email and does not need to be present to win.

AIAA Pavilion

Stop by the AIAA Pavilion, located in the Exposition Hall, to browse publications and merchandise, learn about your membership benefits, and meet AIAA staff.

30% Off All Books at AIAA AVIATION 2016

AIAA Publications is offering a special show discount on all titles featured at AIAA AVIATION 2016. Attendees can take advantage of a 30% discount off the list price of all books for sale at the AIAA Bookstore located in the AIAA Pavilion. This show special will only be available during the forum! Take advantage of these super savings and visit the AIAA Bookstore.

Meet the Author Sessions

Jay Gundlach
Civil And Commercial Unmanned Aircraft Systems
Tuesday, 14 June
AIAA Exposition Hall Pavilion
Welcome Reception; 1730–1900 hrs

Leland Nicolai
Lessons Learned: A Guide to Improved Aircraft Design
AIAA Exposition Hall Pavilion
Tuesday, 14 June Networking Coffee Breaks
0845–0930 hrs and 1600–1630 hrs
Wednesday, 15 June Networking Coffee Break
0845–0930 hrs

AIAA Foundation

Come visit us in the AIAA Pavilion. Did you know that the AIAA Foundation is celebrating its 20th anniversary? As we celebrate this milestone anniversary, we are asking all our members to join with us as we set out to accomplish an amazing feat: to inspire all members to donate at least $20 each, with a goal of raising $200,000. In addition, we are hosting a Silent Auction with some cool aerospace items for bid. Come to the AIAA Pavilion and check it out! And to show support for the AIAA Foundation, the Institute will match donations, up to $1 million in unrestricted funds…doubling the impact of every donation. With your help and donation, we can reach our goal and continue to inspire and support the next generation of aerospace professionals.

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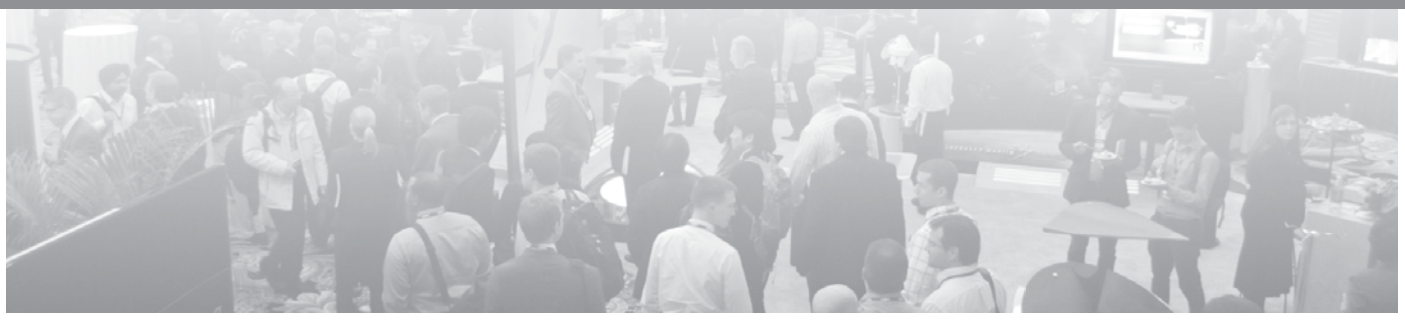

Exhibitors

Aerion Technologies (formerly Desktop Aeronautics) 105

1900 Embarcadero Road
Suite 101
Palo Alto, CA 94303
www.aerion-tech.com
sales@desktopaero.com

Aerion Technologies (formerly Desktop Aeronautics) creates tools for aerodynamic design and analysis of aerospace vehicles. Our flagship product, GoCart, is an intuitive aerial vehicle design tool built around NASA's renowned Cartesian Euler CFD solver, Cart3D. Our customer list includes the major players from the aerospace and defense industry.

AeroSoft Inc. 216

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Aurora Flight Sciences 121

9950 Wakeman Drive
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Exhibitors

Boeing 201

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Comsol Inc. 215

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Cradle North America, Inc. 219

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DARcorporation (Design, Analysis and Research Corporation) is an aeronautical engineering firm, located in Lawrence, Kansas, that has been offering aeronautical engineering consulting services, software and books since 1991.

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Exhibitors

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Exhibitors

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General Information

AIAA Registration and Information Center Hours

The AIAA Registration and Information Center will be located on the Ballroom Level at the Washington Hilton. Hours are as follows:

Sunday, 12 June	**1500–1900 hrs**
Monday, 13 June – Thursday, 16 June	**0700–1730 hrs**
Friday, 17 June	**0700–1230 hrs**

Wi-Fi Internet Access On Site

AIAA is providing limited Wi-Fi service for attendees to use while on site. To keep this service available and optimized for all attendees, please do not download files larger than 2MB, create multiple sessions across multiple devices, or download multiple files in one session. If you receive an error message that an AIAA server is blocking your current IP address, please inform the AIAA registration desk.

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AIAA Livestream Channel

Visit livestream.com/aiaavideo/ to view selected keynotes, plenaries, and Forum 360 sessions. Share the link with colleagues who couldn't attend the forum, so they can watch live or view later.

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Social Media Kiosks

Throughout the forum, social media kiosks will display content shared by forum attendees! Look for your tweets or Instagram photos to be displayed on the screens if you've used our hashtag #aiaaAviation. Follow @AIAA on Twitter for updates about the #aiaaAviation Social Media contest and Tweet Up.

Conference Proceedings

Proceedings for the forum will be available online. The cost is included in the registration fee where indicated. Online proceedings will be available on 13 June 2016. Attendees who register in advance for the online proceedings will be provided with instructions on how to access them. Those registering on site will be provided with instructions at that time.

Proceedings:

1. To view proceedings visit **www.aiaa.org** >ARC>Meeting Papers.
   a. Log in with the link at the top right of the page.
   b. Select the appropriate conference from the list.
   c. **Search for individual papers** with the **Quick Search toolbar** in the upper-right corner of the page:
      i. By paper number: Click the "Paper Number" link, select the conference year, and enter the paper number.
      ii. Use the Search textbox to find papers by author, title, or keyword. The Advanced Search link provides additional search information and options.
2. All manuscript files submitted at least four days prior to the conference are currently in the proceedings. Files submitted after that date, both original and revised manuscripts, will not be available until the final proceedings update, which may take up to 15 business days after the last day of the conference.
3. Direct any questions concerning access to proceedings and/or ARC to **arcsupport@aiaa.org.**

Manuscript Revisions:

1. Manuscript revision is open for all presenting authors from 0900 hrs Eastern Time, Monday, 13 June, through 2000 hrs Eastern Time, Wednesday, 28 June.
2. Revisions submitted for manuscripts already online **will not refresh until after the proceedings have been updated**, which may take up to 15 business days after the last day of the conference.

General Information

Certificate of Attendance

Certificates of Attendance are available for attendees who request documentation at the forum itself. The Certificates of Attendance will be available for attendees to print at a self-service station at the registration desk starting Wednesday, 15 June. AIAA offers this service to better serve the needs of the professional community. Claims of hours or applicability toward professional education requirements are the responsibility of the participant.

Employment Opportunities

AIAA members can post and browse resumes, browse job listings, and access other online employment resources by visiting the AIAA Career Center at **http://careercenter.aiaa.org.** Additionally, a message board will be available for postings in the Exposition Hall.

Membership

AIAA is your vital lifelong link to the collective creativity and brainpower of the aerospace profession and a champion for its achievements – and nonmembers who pay the full conference registration fee will receive their first year's AIAA membership at no additional cost! Students who are not yet members may apply their registration fee toward their first year's student member dues. (Free membership is not included in discounted group-rate registration.)

AIAA Foundation

In celebration of the AIAA Foundation's 20th anniversary, we have challenged AIAA members to donate at least $20 to the foundation. To date, we have raised more than $85,000 on our way to the goal of $200,000! With your gift, we can continue to enhance and create K–12 STEM programs, including classroom grants and hands-on activities, university design competitions, student conferences and recognition awards. To show support of our programming and goal, the Institute will match individual and corporate donations up to one million dollars of unrestricted funds. Your gift will be matched, doubling the impact of your donation, so please consider donating today. For more information and to make a tax-deductible donation, please visit www.aiaafoundation.org.

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Young Professional Guide for Gaining Management Support

Young professionals have the unique opportunity to meet and learn from some of the most important people in the business by attending conferences and participating in AIAA activities. A detailed online guide, published by the AIAA Young Professional Committee, is available to help you gain support and financial backing from your company. The guide explains the benefits of participation, offers recommendations, and provides an example letter for seeking management support and funding, and shows you how to get the most out of your participation. The online guide can be found on the AIAA website at **www.aiaa.org/YPGuide.**

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Restrictions

Photos, video, or audio recording of sessions or exhibits, as well as the unauthorized sale of AIAA-copyrighted material, is prohibited.

International Traffic in Arms Regulations (ITAR)

AIAA speakers and attendees are reminded that some topics discussed in the conference could be controlled by the International Traffic in Arms Regulations (ITAR). U.S. nationals (U.S. citizens and permanent residents) are responsible for ensuring that technical data they present in open sessions to non-U.S. nationals in attendance or in conference proceedings are not export restricted by the ITAR. U.S. nationals are likewise responsible for ensuring that they do not discuss ITAR export-restricted information with non-U.S. nationals in attendance.

General Information

Author and Session Chair Information

Speakers' Briefings in Session Rooms

Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 30-minute briefing on the day of their sessions to exchange bios and review final details prior to the session. Please attend on the day of your session(s). Laptops preloaded with the Speaker Briefing preparation slides will be provided in each session room. Speaker's Briefing schedule is as follows:

Monday, 13 June – Friday, 17 June: 0730 hrs

Speakers' Practice Room

Speakers who wish to practice their presentations may do so in the Convention Office #4 room located on the Terrace Level of the Washington Hilton. A sign-up sheet will be posted on the door. In consideration of others, please limit practice time to 30-minute increments.

Session Chair Reports

All session chairs are asked to complete a session chair report to evaluate their session for future planning. AIAA has partnered with Canvas Solutions to provide an electronic Session Chair Report form. You can download the FREE mobile app in your App Store, AppWorld, or Marketplace by searching for "Canvas Solutions, Inc." The mobile app is free, so please be sure to download it. Detailed instructions will be provided in the session rooms. If you do not have a tablet or a smartphone, simply use the report form as a guide and enter your session chair report information at the session chair reporting computer station located on site near the AIAA registration area. Report data will be collected and used for future planning purposes, including session topics and room allocations. Please submit your session chair report electronically by Friday, 17 June 2016.

Audiovisual

Each session room will be preset with the following: one LCD projector, one screen, one microphone and sound system (if necessitated by room size), and one laser pointer. Laptop computers will also be provided. You may also use your own computer. Any additional audiovisual equipment requested onsite will be at cost to the presenter. Please note that AIAA does not provide security in the session rooms and recommends that items of value not be left unattended.

"No Paper, No Podium" and "No Podium, No Paper" Policy

If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the forum. Also, if the paper is not presented at the forum, it will be withdrawn from the proceedings. It is the responsibility of those authors whose papers or presentations are accepted to ensure that a representative attends the conference to present the paper. These policies are intended to improve the quality of the program for attendees.

Journal Publication

Authors of appropriate papers are encouraged to submit them for possible publication in one of the Institute's archival journals: *AIAA Journal; Journal of Aerospace Information Systems; Journal of Air Transportation; Journal of Aircraft; Journal of Guidance, Control, and Dynamics; Journal of Propulsion and Power; Journal of Spacecraft and Rockets;* or *Journal of Thermophysics and Heat Transfer.* You may now submit your paper online at **http://mc.manuscriptcentral.com/aiaa.**

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Committee Meetings

Start Time	End Time	Title	Location
Sunday, 12 June 2016			
0800 hrs	1700 hrs	**Optimal Design in Multidisciplinary Systems**	Embassy
0800 hrs	1700 hrs	**Concepts in the Modern Design of Experiments**	Fairchild East
0800 hrs	1700 hrs	**Aircraft and Rotorcraft System Identification: Engineering Methods and Hands-On Training Using CIFER**	Gunston West
1400 hrs	1500 hrs	**GTTC Steering Subcommittee**	Jefferson
1400 hrs	1500 hrs	**APATC New Member Orientation**	Albright
1430 hrs	1500 hrs	**APATC Liaisons Subcommittee**	Boundary
1500 hrs	1600 hrs	**GTTC New Member and Mentors Meeting**	Jefferson
1500 hrs	1600 hrs	**APATC Education Subcommittee**	Albright
1500 hrs	1600 hrs	**APATC Honors and Awards Subcommittee**	Cardozo
1500 hrs	1600 hrs	**APATC Membership and Nominations Subcommittee**	Boundary
1500 hrs	1600 hrs	**APATC Planning Subcommittee**	Fairchild West
1500 hrs	1600 hrs	**APATC Publicity and Publications Subcommittee**	Gunston East
1500 hrs	1700 hrs	**Information Systems Strategy Meeting - By Invite Only**	DuPont
1600 hrs	1630 hrs	**GTTC Introduction/Overview**	Jefferson
1600 hrs	1700 hrs	**APATC Technical Activities Meeting**	Cardozo
1630 hrs	1700 hrs	**GTTC Program Subcommittee**	Jefferson
1700 hrs	1800 hrs	**GTTC Conferences Subcommittee**	Jefferson
1700 hrs	1800 hrs	**APATC Steering Committee**	Boundary
1800 hrs	1900 hrs	**GTTC Awards Subcommittee**	Jefferson
1800 hrs	2100 hrs	**Applied Aerodynamics TC**	Lincoln
1900 hrs	2100 hrs	**TAC Aircraft and Atmospheric Systems Group**	Georgetown West
1900 hrs	2000 hrs	**GTTC Publications Subcommittee**	Jefferson
1900 hrs	2200 hrs	**FDTC Transition DG**	Cardozo
2000 hrs	2200 hrs	**AMTTC Conferences Subcommittee**	Boundary
2000 hrs	2100 hrs	**GTTC Education and Student Activities Subcommittee**	Jefferson
Monday, 13 June 2016			
0800 hrs	1600 hrs	**GTTC Internal Balance WG**	DuPont Parlor 1101
0930 hrs	1700 hrs	**Corporate Member Committee**	Kalorama Room (Churchill Hotel)
0930 hrs	1230 hrs	**Governance Retreat Part I - By Invite Only**	Kalorama
1200 hrs	1400 hrs	**Aviation MDO SPC**	DuPont Parlor 2101
1200 hrs	1500 hrs	**General Aviation TC**	Boundary
1400 hrs	1600 hrs	**GTTC Future of Ground Testing WG**	Lincoln West
1430 hrs	1830 hrs	**Governance Retreat Part II - By Invite Only**	Kalorama
1700 hrs	1900 hrs	**Computational Fluid Dynamics (CFD) CoS**	DuPont Parlor 1101
1730 hrs	1900 hrs	**AMTTC Awards Subcommittee**	Boundary
1730 hrs	1900 hrs	**APATC Flow Control Applications & Impacts DG**	Holmead East
1730 hrs	1830 hrs	**APATC Missile & Projectile Aeroprediction DG**	Piscataway
1845 hrs	1945 hrs	**GTTC Standards Subcommittee**	Columbia 12
1830 hrs	1930 hrs	**FDTC New Member Orientation**	Holmead West
1830 hrs	2000 hrs	**APATC Aeropropulsive Interactions DG**	DuPont
1900 hrs	2000 hrs	**APATC Collaborative Experiments & Computations DG**	Columbia 9
1900 hrs	2000 hrs	**FDTC Flow Control on Unmanned Aircraft**	Fairchild West
1900 hrs	2100 hrs	**Aircraft Design TC**	Jefferson West
1900 hrs	2100 hrs	**TAC Aerospace Sciences Group**	Lincoln West
1900 hrs	2200 hrs	**Product Support TC**	Piscataway

Committee Meetings

Start Time	End Time	Title	Location
Monday, 13 June 2016 (continued)			
1915 hrs	2115 hrs	**MVCETC Meshing Subcommittee**	Holmead East
1900 hrs	2200 hrs	**Air Transportation Systems TC**	Cardozo
2000 hrs	2100 hrs	**FDTC Modal Decomposition Methods for Aerodynamic Flows DG**	Columbia 12
2000 hrs	2100 hrs	**FDTC High Speed Flow Control**	Fairchild West
2030 hrs	2200 hrs	**Flight Testing TC**	Boundary
2030 hrs	2200 hrs	**Flight Testing TC**	Boundary
Tuesday, 14 June 2016			
0730 hrs	0930 hrs	**International Activities Committee**	International Ballroom West
0800 hrs	1200 hrs	**GTTC Wind Tunnel Flow Quality WG**	DuPont Parlor 1101
0900 hrs	1700 hrs	**GTTC Dual Flow Reference Nozzle WG**	DuPont Parlor 3101
930 hrs	1100 hrs	**Finance Committee**	International Ballroom West
0930 hrs	1200 hrs	**TAC New Initiatives Subcommittee**	Piscataway
1000 hrs	1200 hrs	**AIAA Standards Executive Council (SEC) Meeting**	Boundary
1000 hrs	1400 hrs	**Public Policy Committee Meeting**	DuPont Parlor 4101
1030 hrs	1200 hrs	**RAC I**	DuPont Parlor 2101
1100 hrs	1200 hrs	**Compensation Committee**	International Ballroom West
1300 hrs	1700 hrs	**DETC Subcommittee**	Boundary
1300 hrs	1700 hrs	**GTTC Uncertainty Analysis WG**	DuPont Parlor 1101
1330 hrs	1630 hrs	**TAC Executive Board**	DuPont Parlor 2101
1400 hrs	2200 hrs	**Region & Section Activities Committee**	DuPont Parlor 6101
1430 hrs	1800 hrs	**Guggenheim Board of Award - By Invite Only**	DuPont Parlor 7101
1500 hrs	1600 hrs	**TPTC Best Paper Subcommittee**	DuPont Parlor 4101
1600 hrs	1700 hrs	**TPTC Awards Subcommittee**	DuPont Parlor 4101
1600 hrs	1700 hrs	**TPTC Education Subcommittee**	DuPont Parlor 5101
1700 hrs	1800 hrs	**TPTC Publicity Subcommittee**	DuPont Parlor 3101
1700 hrs	1800 hrs	**TPTC Conference Subcommittee**	DuPont Parlor 1101
1730 hrs	1830 hrs	**FDTC LES DG**	DuPont Parlor 4101
1730 hrs	1900 hrs	**FDTC Fundamentals Subcommittee**	DuPont Parlor 5101
1800 hrs	1900 hrs	**TPTC Nominations Subcommittee**	DuPont Parlor 1101
1800 hrs	1900 hrs	**TPTC Publications Subcommittee**	DuPont Parlor 3101
1800 hrs	2100 hrs	**Design Engineering TC**	Boundary
1800 hrs	2100 hrs	**Atmospheric and Space Environments TC**	DuPont Parlor 2101
1830 hrs	2000 hrs	**Aurora Recuitment Fair**	Columbia 2
1830 hrs	2130 hrs	**Atmospheric Flight Mechanics TC**	Lincoln West
1900 hrs	2200 hrs	**Plasmadynamics and Lasers TC**	Jefferson East
1900 hrs	2200 hrs	**V/STOL Aircraft Systems TC**	Lincoln East
1900 hrs	2200 hrs	**Aircraft Operations TC**	DuPont Parlor 4101
1915 hrs	2215 hrs	**Unmanned Systems PC**	DuPont Parlor 5101
1900 hrs	2200 hrs	**Thermophysics TC**	Monroe
1900 hrs	2000 hrs	**FDTC Fluid-Structure Interaction DG**	Fairchild West
1900 hrs	2100 hrs	**FDTC Free Shear and Mixing Layer Control DG**	Georgetown West
1900 hrs	2000 hrs	**FDTC Low Re DG**	Gunston East
1930 hrs	2200 hrs	**Aerodynamic Measurement Technology TC**	Georgetown East

Committee Meetings

Start Time	End Time	Title	Location
Wednesday, 15 June 2016			
0800 hrs	1200 hrs	**GTTC Dual Flow Reference Nozzle WG**	DuPont
0800 hrs	1200 hrs	**GTTC Future of Ground Testing WG**	Columbia 2
1000 hrs	1600 hrs	**Technical Activities Committee**	Kalorama Room (Churchill Hotel)
1030 hrs	1330 hrs	**2017 Fellows Committee Meeting - By Invite Only**	DuPont Parlor 2101
1230 hrs	1400 hrs	**FDTC Steering Committee**	Boundary
1300 hrs	1530 hrs	**Foundation Board of Trustees (BOT)**	Dupont Parlor 1101
1400 hrs	1700 hrs	**Emerging Technologies Committee**	DuPont Parlor 2101
1500 hrs	1630 hrs	**AVIATION 2017 Technical Program Committee**	Kalorama
1600 hrs	1730 hrs	**BOD Freshman Orientation**	Dupont Parlor 1101
1630 hrs	1730 hrs	**FDTC Turbulence Model Benchmarking DG**	Jay
1730 hrs	1900 hrs	**AMTTC Nominations Subcommittee**	Boundary
1730 hrs	1830 hrs	**FDTC Solver Technology for Turbulent Flows DG**	Embassy
1800 hrs	2000 hrs	**APATC Rotorcraft Simulations & Performance Predictions DG**	Monroe
1830 hrs	2130 hrs	**Multidisciplinary Design Optimization TC**	Lincoln East
1830 hrs	1930 hrs	**FDTC Non-Equilibrium DG**	Jefferson West
1900 hrs	2100 hrs	**FDTC CFD Subcommittee**	Embassy
1900 hrs	2100 hrs	**FDTC Flow Control and Applications Subcommittee**	Kalorama
1900 hrs	2100 hrs	**NASA Aviation Autonomy Roadmap: Community Forum**	Georgetown East/West
1900 hrs	2200 hrs	**Aerospace Traffic Management PC**	DuPont Parlor 2101
Thursday, 16 June 2016			
0800 hrs	1600 hrs	**GTTC WT Model Attitude and Deformation Measurement WG**	DuPont Parlor 1101
1000 hrs	1200 hrs	**GTTC Statistically Defensible Test Methods Focus Group**	Columbia 9
1020 hrs	1035 hrs	**Annual Business Meeting**	Monroe
1500 hrs	1600 hrs	**RAC II Meeting**	Boundary
1730 hrs	1900 hrs	**APATC Low Boom DG**	Fairchild West
1730 hrs	2030 hrs	**Ground Testing TC**	Monroe
1745 hrs	1845 hrs	**FDTC Future of Fluids Subcommittee**	Boundary
1830 hrs	2130 hrs	**Transformational Flight PC**	Jefferson West
1830 hrs	2130 hrs	**Modeling and Simulation TC**	Cardozo
1915hrs	2215 hrs	**Lighter-than-Air Systems TC**	Fairchild West
1900 hrs	2200 hrs	**Fluid Dynamics TC**	Jefferson East
Friday, 17 June 2016			
0700 hrs	1630 hrs	**Regional Leadership Conference**	International Ballroom West
0800 hrs	1200 hrs	**National Partnership for Aeronautical Testing, NPAT**	Oak Lawn
0800 hrs	1600 hrs	**GTTC Industry WG**	Boundary

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Atmospheric Flight Mechanics			
4-AFM-1	**Aeroservoelastic (ASE) Methods**	13-Jun	0930 hrs	Holmead East
5-AFM-2	**Aircraft Flight Dynamics I**	13-Jun	0930 hrs	Holmead West
34-AFM-3	**Launch Vehicle, Missile, and Projectile Flight Dynamics**	13-Jun	1400 hrs	Holmead East
35-AFM-4	**Planetary Entry**	13-Jun	1400 hrs	Georgetown East
72-AFM-5	**Aircraft Flight Dynamics II**	14-Jun	0930 hrs	Holmead West
73-AFM-6	**Unmanned Aerial Systems I**	14-Jun	0930 hrs	Holmead East
105-AFM-7	**Aircraft Flight Dynamics III**	14-Jun	1400 hrs	Holmead West
106-AFM-8	**Unmanned Aerial Systems II**	14-Jun	1400 hrs	Holmead East
143-AFM-9	**Flight Test, System Identification and Parameter Estimation I**	15-Jun	0930 hrs	Holmead West
144-AFM-10	**Unmanned Aerial Systems III**	15-Jun	0930 hrs	Holmead East
175-AFM-11	**Aerodynamic Prediction Methods**	15-Jun	1400 hrs	Holmead East
176-AFM-12	**Flight Test, System Identification and Parameter Estimation II**	15-Jun	1400 hrs	Holmead West
	Aerodynamic Measurement Technology			
6-AMT-1	**Gas Scalar Measurements**	13-Jun	0930 hrs	Columbia 2
36-AMT-2	**Velocimetry I**	13-Jun	1400 hrs	Columbia 2
74-AMT-3	**Velocimetry II**	14-Jun	0930 hrs	Columbia 2
75-AMT-4	**Global Surface Measurements**	14-Jun	0930 hrs	Oak Lawn
107-AMT-5	**Gas Thermometry**	14-Jun	1400 hrs	Columbia 2
145-AMT-6	**Highlighting the Contributions of Prof. Ron Hanson to Aerodynamic Measurement Technology (Invited)**	15-Jun	0930 hrs	Georgetown East
177-AMT-7	**Recent Advancements in Gas Temperature Measurements in Gas Turbines (Invited)**	15-Jun	1400 hrs	Columbia 2
215-AMT-8	**Volumetric Measurement Techniques**	16-Jun	0930 hrs	Columbia 2
216-AMT-9	**MEMS and Novel Surface Sensors**	16-Jun	0930 hrs	Oak Lawn
245-AMT-10/GT-8	**Ground Test Applications of Aerodynamic Measurement Technology**	16-Jun	1400 hrs	Columbia 2
276-LEC-6	**Aerodynamic Measurement Technology Award Lecture**	16-Jun	1730 hrs	International Ballroom (East)
280-AMT-11	**Flow Visualization and Data Acquisition Methods**	17-Jun	0930 hrs	Columbia 2
	Applied Aerodynamics			
7-APA-1	**Flow Control Applications and Demonstrations I**	13-Jun	0930 hrs	Columbia 9
8-APA-2	**Results from the 2nd AIAA Aeroelastic Prediction Workshop I**	13-Jun	0930 hrs	Jefferson West
9-APA-3	**Propeller/Rotorcraft/Wind Turbine Aerodynamics I**	13-Jun	0930 hrs	Northwest
10-APA-4	**Applied CFD & Numerical Correlations with Experimental Data I**	13-Jun	0930 hrs	Columbia 4
21-FC-2/FD-1/APA-5	**Cavity Flows I**	13-Jun	0930 hrs	Columbia 10
37-APA-6/FD-8	**Bio-Inspired Flows**	13-Jun	1400 hrs	Northwest
39-APA-7	**Flow Control Applications and Demonstrations II**	13-Jun	1400 hrs	Columbia 9
40-APA-8	**Results from the 2nd AIAA Aeroelastic Prediction Workshop II**	13-Jun	1400 hrs	Jefferson West
41-APA-9	**Applied CFD & Numerical Correlations with Experimental Data II**	13-Jun	1400 hrs	Columbia 4
67-LEC-2	**Aerodynamics Award Lecture**	13-Jun	1630 hrs	Cabinet
76-APA-10	**VSTOL/STOL Applications**	14-Jun	0930 hrs	Columbia 9
77-APA-11	**Aerodynamic - Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology I**	14-Jun	0930 hrs	Albright
78-APA-12	**Propeller/Rotorcraft/Wind Turbine Aerodynamics II**	14-Jun	0930 hrs	Northwest
79-APA-13	**Hypersonic Aerodynamics**	14-Jun	0930 hrs	Jefferson West
80-APA-14	**Transonic & Supersonic Aerodynamics**	14-Jun	0930 hrs	Columbia 4

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Applied Aerodynamics (continued)			
82-ASE-6/APA-15	**Surface Coatings, Ice Protection and Shedding**	14-Jun	0930 hrs	Georgetown West
108-APA-16/FD-21	**Flapping Flight Aerodynamics**	14-Jun	1400 hrs	Oak Lawn
109-APA-17	**Inlet/Intake Aerodynamics**	14-Jun	1400 hrs	Columbia 9
110-APA-18	**Historically Significant/Influential Papers in Applied Aerodynamics**	14-Jun	1400 hrs	Jefferson West
111-APA-19	**Aerodynamic - Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology II**	14-Jun	1400 hrs	Albright
112-APA-20	**Applied CFD & Numerical Correlations with Experimental Data III**	14-Jun	1400 hrs	Columbia 4
146-APA-21	**High Angle of Attack and High Lift Aerodynamics**	15-Jun	0930 hrs	Columbia 9
147-APA-22	**Ground Vehicle Aerodynamics**	15-Jun	0930 hrs	Albright
148-APA-23/FD-28	**Propeller/Rotorcraft/Wind Turbine Aerodynamics III**	15-Jun	0930 hrs	Northwest
161-FD-30/APA-24	**Modal Decomposition Methods and Analyses**	15-Jun	0930 hrs	Columbia 4
178-APA-25/FD-38	**Aerodynamic Design Methodologies I**	15-Jun	1400 hrs	Albright
179-APA-26	**Aerodynamic - Structural Dynamics Interactions I**	15-Jun	1400 hrs	Northwest
180-APA-27	**Innovative Aerodynamic Concepts & Designs**	15-Jun	1400 hrs	Columbia 9
181-APA-28	**Aerodynamic Testing: Flight, Wind-Tunnel and Flight Testing**	15-Jun	1400 hrs	Columbia 4
217-APA-29	**Aerodynamic Design Methodologies II**	16-Jun	0930 hrs	Albright
218-APA-30	**Aerodynamic - Structural Dynamics Interactions II**	16-Jun	0930 hrs	Northwest
219-APA-32	**Low Boom Activities I**	16-Jun	0930 hrs	Jefferson West
246-APA-33/FD-54	**Unsteady Wing Aerodynamics**	16-Jun	1400 hrs	Kalorama
247-APA-34/FD-55	**Vortex/Vortical Flows I**	16-Jun	1400 hrs	Northwest
248-APA-35	**Airfoil/Wing/Configuration Aerodynamics**	16-Jun	1400 hrs	Columbia 9
249-APA-36	**Aerodynamic Design Methodologies III**	16-Jun	1400 hrs	Albright
250-APA-37	**Low Boom Activities II (Invited)**	16-Jun	1400 hrs	Jefferson West
263-FD-59/FC-19/APA-38	**Gust Response**	16-Jun	1400 hrs	Columbia 10
281-APA-39	**Aerodynamic Design Methodologies IV**	17-Jun	0930 hrs	Albright
282-APA-40	**Weapons Aerodynamics: Missile/Projectile/Guided-Munitions, Carriage and Store Separation**	17-Jun	0930 hrs	Columbia 9
283-APA-41/FD-63	**Low Speed, Low Reynolds Number Aerodynamics**	17-Jun	0930 hrs	Jefferson East
284-APA-42/FD-64	**Vortex/Vortical Flows II**	17-Jun	0930 hrs	Northwest
	Atmospheric and Space Environments			
11-ASE-1	**Aircraft Wake Turbulence I (Invited)**	13-Jun	0930 hrs	Columbia 12
12-ASE-2	**Runback Water Film Dynamics**	13-Jun	0930 hrs	Georgetown West
42-ASE-3	**Aircraft Wake Turbulence II (Invited)**	13-Jun	1400 hrs	Columbia 12
43-ASE-4	**Supercooled-Large Droplet (SLD) Icing**	13-Jun	1400 hrs	Georgetown West
81-ASE-5	**Aircraft Wake Turbulence III (Invited)**	14-Jun	0930 hrs	Columbia 12
82-ASE-6/APA-15	**Surface Coatings, Ice Protection and Shedding**	14-Jun	0930 hrs	Georgetown West
113-ASE-7/ATIO. ATM-9	**Characterization of the Atmospheric Environment using UAS (Invited)**	14-Jun	1400 hrs	Georgetown East
114-ASE-8	**Ice Roughness Characterization and Heat Transfer**	14-Jun	1400 hrs	Georgetown West
149-ASE-9	**NASA/FAA/ONERA Swept Wing Icing Research--SUNSET2**	15-Jun	0930 hrs	Columbia 12
150-ASE-10	**Ice-Crystal (Engine) Icing Physics**	15-Jun	0930 hrs	Georgetown West
182-ASE-11	**Numerical Weather Prediction (Invited)**	15-Jun	1400 hrs	Columbia 12
183-ASE-12	**NASA PSL LF11 Engine Icing Test Campaign**	15-Jun	1400 hrs	Georgetown West
220-ASE-13	**Icing Instrumentation and Test Facilities**	16-Jun	0930 hrs	Columbia 12
221-ASE-14	**HAIC/HIWC 2014 Darwin and 2015 Cayenne Flight Campaigns Update I**	16-Jun	0930 hrs	Georgetown West
251-ASE-15	**Atmospheric Environments**	16-Jun	1400 hrs	Columbia 12
252-ASE-16	**HAIC/HIWC 2014 Darwin and 2015 Cayenne Flight Campaigns Update II and AIRA Forum**	16-Jun	1400 hrs	Georgetown West
285-ASE-17	**Icing CFD**	17-Jun	0930 hrs	Georgetown West

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Aviation Technology, Integration, and Operations			
13-ATIO.ACD-1	**Aircraft Design Methods and Tools I: Systems Architecting and Integration**	13-Jun	0930 hrs	Gunston East
14-ATIO.ATM-1	**UAS Operations I**	13-Jun	0930 hrs	Embassy
15-ATIO.ATM-2	**Air Transportation Systems Modeling I**	13-Jun	0930 hrs	Fairchild West
16-ATIO.ATM-3	**Terminal ATM**	13-Jun	0930 hrs	Fairchild East
17-ATIO.TFPC-1	**Transformational Flight - Automation, Airspace and Flight Path Management of ODM Operations: Panel Discussion**	13-Jun	0930 hrs	Columbia 1
18-ATIO.TFPC-2	**Transformational Flight - Automation Coupling to Advanced Control**	13-Jun	0930 hrs	Gunston West
44-ATIO.ACD-2	**Aircraft Design Methods and Tools II: Geometry, Aerodynamic, and Structural Design**	13-Jun	1400 hrs	Gunston East
45-ATIO.ATM-4	**UAS in the NAS**	13-Jun	1400 hrs	Embassy
46-ATIO.ATM-5	**Human Factors in ATM**	13-Jun	1400 hrs	Fairchild East
47-ATIO.TFPC-3	**Transformational Flight - On-Demand Mobility (ODM) Barriers & Opportunities**	13-Jun	1400 hrs	Columbia 1
83-ATIO.ACD-3	**Unmanned Aircraft**	14-Jun	0930 hrs	Gunston East
84-ATIO.ATM-7	**UAS Operations II**	14-Jun	0930 hrs	Embassy
85-ATIO.ATM-8	**Delay Management**	14-Jun	0930 hrs	Fairchild East
86-ATIO.DE-1	**Design Engineering**	14-Jun	0930 hrs	Gunston West
87-ATIO.TFPC-4/ ATIO.GA-1	**Transformational Flight - On Demand Mobility Markets/Missions**	14-Jun	0930 hrs	Columbia 1
113-ASE-7/ATIO. ATM-9	**Characterization of the Atmospheric Environment using UAS (Invited)**	14-Jun	1400 hrs	Georgetown East
115-ATIO.ACD-4	**Conceptual Aircraft Design Working Group**	14-Jun	1400 hrs	Gunston East
116-ATIO.ATM-10	**UAS Risk and Perception**	14-Jun	1400 hrs	Embassy
117-ATIO.ATM-11	**Weather Impacts**	14-Jun	1400 hrs	Fairchild East
118-ATIO.TFPC-5	**Transformational Flight - On-Demand Mobility (ODM) Enabling Technologies Session**	14-Jun	1400 hrs	Columbia 1
119-ATIO.TFPC-6/ ATIO.VSTOL-1	**Transformational Flight - Unconventional V/STOL Concepts**	14-Jun	1400 hrs	Columbia 12
151-ATIO.ACD-5	**Aircraft Technologies and Concepts - Performance Studies and Design Methods**	15-Jun	0930 hrs	Gunston East
152-ATIO.ATM-12	**Surface Operations Modeling and Analysis I**	15-Jun	0930 hrs	Embassy
153-ATIO.ATM-13	**Environmental Impact Mitigation I**	15-Jun	0930 hrs	Fairchild East
154-ATIO.ATM-14	**Data Mining in ATS I**	15-Jun	0930 hrs	Fairchild West
155-ATIO.TFPC-7/ ATIO.ACD-6/GEPC-1	**Transformational Flight - Electric Thin-Haul/Commuters**	15-Jun	0930 hrs	Columbia 1
184-ATIO.ATM-15	**Surface Operations Modeling and Analysis II**	15-Jun	1400 hrs	Embassy
185-ATIO.ATM-16	**Environmental Impact Mitigation II**	15-Jun	1400 hrs	Fairchild East
186-ATIO.ATM-17	**Data Mining in ATS II**	15-Jun	1400 hrs	Fairchild West
187-ATIO.GA-2	**General Aviation Safety**	15-Jun	1400 hrs	Gunston East
188-ATIO.TFPC-8/ ATIO.FT-1/GEPC-2	**Transformational Flight - SCEPTOR Distributed Electric Propulsion X-Plane**	15-Jun	1400 hrs	Columbia 1
222-ATIO.ACD-7/ ATIO.TFPC-9	**Unconventional, Innovative, and Transformative Concepts**	16-Jun	0930 hrs	Gunston East
223-ATIO.ATM-18	**En-Route ATM I**	16-Jun	0930 hrs	Fairchild East
224-ATIO.ATM-19	**Runway Management**	16-Jun	0930 hrs	Embassy
225-ATIO.ATM-20	**Data Mining in ATS III**	16-Jun	0930 hrs	Fairchild West
226-ATIO.TFPC-10/ ATIO.VSTOL-2	**Transformational Flight - DARPA VTOL X-Plane Concepts**	16-Jun	0930 hrs	Columbia 1
253-ATIO.ATM-21	**En-Route ATM II**	16-Jun	1400 hrs	Fairchild East
254-ATIO.ATM-22	**Reliability and Safety**	16-Jun	1400 hrs	Embassy
255-ATIO.ATM-23	**Arrival Management**	16-Jun	1400 hrs	Fairchild West

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
Aviation Technology, Integration, and Operations (continued)				
256-ATIO.LTA-1	**Lighter-than-Air Systems**	16-Jun	1400 hrs	Gunston East
257-ATIO.TFPC-11/ ATIO.IS-1	**Transformational Flight - NASA Langley Autonomy Incubator**	16-Jun	1400 hrs	Columbia 1
286-ATIO.ATM-24	**NextGen and Future Concepts**	17-Jun	0930 hrs	Embassy
287-ATIO.ATM-25	**Optimal Flight Routes**	17-Jun	0930 hrs	Fairchild West
288-ATIO.ATM-26	**Safe Landings**	17-Jun	0930 hrs	Fairchild East
289-ATIO.GA-3	**Environmentally-Conscious Concepts and Technologies for General Aviation**	17-Jun	0930 hrs	Gunston East
290-ATIO.TFPC-12	**Transformational Flight - UAS Emerging Markets and Technologies**	17-Jun	0930 hrs	Columbia 1
291-ATIO.TFPC-13/ ATIO.ATM-27	**Transformational Flight - Clean Slate Design for Autonomy in Vehicles and Airspace**	17-Jun	0930 hrs	Gunston West
DEMAND for UNMANNED				
156-D4U-1	**DEMAND for UNMANNED: Catalyst for the Machine Intelligence Revolution**	15-Jun	0930 hrs	International Ballroom (West)
227-D4U-2	**DEMAND for UNMANNED: Catalyst for the Machine Intelligence Revolution**	16-Jun	0930 hrs	International Ballroom (West)
275-D4U-3	**DEMAND for UNMANNED Student Competition Alpha Test**	16-Jun	1730 hrs	International Ballroom (West)
Drag Prediction Workshop				
214-WKSP-1	**Drag Prediction Workshop**	16-Jun	0930 hrs	Lincoln West
304-WKSP-2	**Drag Prediction Workshop**	17-Jun	0930 hrs	Lincoln West
Flight Testing				
58-FT-1	**Flight Testing of Manned Aircraft**	13-Jun	1400 hrs	Gunston West
127-FT-2	**Flight Testing of Unmanned Aerial Systems**	14-Jun	1400 hrs	Gunston West
198-FT-3/GT-5	**Correlation of Ground and Flight Test Data**	15-Jun	1400 hrs	DuPont
Flow Control				
20-FC-1	**Flow Control Integration for Flight Control**	13-Jun	0930 hrs	Columbia 11
21-FC-2/FD-1/APA-5	**Cavity Flows I**	13-Jun	0930 hrs	Columbia 10
38-FC-20	**Feedback Flow Control**	13-Jun	1400 hrs	Northwest
50-FC-3	**Flow Control for High-Lift Airfoils**	13-Jun	1400 hrs	Columbia 11
89-FC-4	**Drag Reduction**	14-Jun	0930 hrs	Columbia 11
121-FC-5	**Modal Decomposition Methods for Aerodynamic Flows (Invited)**	14-Jun	1400 hrs	Jefferson East
122-FC-6/FD-22	**Separation Detection and Control**	14-Jun	1400 hrs	Columbia 11
158-FC-7	**Internal Flow Control**	15-Jun	0930 hrs	Columbia 11
159-FC-8	**Circulation Control**	15-Jun	0930 hrs	Columbia 11
160-FC-9/PDL-4/FD-29	**Physics of Plasma Actuators**	15-Jun	0930 hrs	Gunston West
162-FD-32/FC-10	**In Honor of John Lumley's Lasting Legacy to Fluid Dynamics (Invited)**	15-Jun	0930 hrs	Holmead West
190-FC-11	**Crossflow Transition and Separation**	15-Jun	1400 hrs	Columbia 11
193-FD-41/FC-12	**Wing Aerodynamics: Separation and Control**	15-Jun	1400 hrs	Morgan
205-PDL-5/FC-13	**DBD Actuators**	15-Jun	1400 hrs	Gunston West
229-FC-14	**Bluff Body Flow Control**	16-Jun	0930 hrs	Morgan
230-FC-15	**Vortex Generators**	16-Jun	0930 hrs	Columbia 11
259-FC-16	**Physics of Sweeping and Synthetic Jet Actuators**	16-Jun	1400 hrs	Morgan
260-FC-17/FD-56	**Dynamic Stall with Flow Control**	16-Jun	1400 hrs	Columbia 11
261-FC-18/FD-57	**Hypersonic Boundary Layer and Control**	16-Jun	1400 hrs	Lincoln East
263-FD-59/FC-19/APA-38	**Gust Response**	16-Jun	1400 hrs	Columbia 10

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Fluid Dynamics			
21-FC-2/FD-1/APA-5	**Cavity Flows I**	13-Jun	0930 hrs	Columbia 10
22-FD-2	**Geometry and Meshing**	13-Jun	0930 hrs	Georgetown East
23-FD-3	**Turbulence Modeling I: LES, DNS, Hybrid LES/RANS**	13-Jun	0930 hrs	Jay
24-FD-4	**Boundary-Layer Transition: Noise and Receptivity**	13-Jun	0930 hrs	Lincoln East
25-FD-7	**Novel CFD Applications**	13-Jun	0930 hrs	Jefferson East
33-LEC-1	**Fluid Dynamics Award Lecture**	13-Jun	1300 hrs	Cabinet
37-APA-6/FD-8	**Bio-Inspired Flows**	13-Jun	1400 hrs	Northwest
51-FD-9	**Cavity Flows II**	13-Jun	1400 hrs	Albright
52-FD-10	**Trends in Simulation Based Engineering (Invited)**	13-Jun	1400 hrs	Jefferson East
53-FD-11	**Solver Techniques I**	13-Jun	1400 hrs	Holmead West
54-FD-12	**Discontinuous Galerkin Methods - Applications**	13-Jun	1400 hrs	Jay
55-FD-13	**Shock-Boundary Layer Interaction I**	13-Jun	1400 hrs	Oak Lawn
56-FD-14	**High-Speed Boundary-Layer Transition I**	13-Jun	1400 hrs	Lincoln East
57-FD-15	**High-Order Methods I**	13-Jun	1400 hrs	Columbia 10
90-FD-16	**Turbulence Modeling II: RANS, Hybrid RANS/LES**	14-Jun	0930 hrs	Jay
91-FD-17	**Combustion Simulation I**	14-Jun	0930 hrs	Monroe
92-FD-18	**Open Issues in Meshing 2030 (Special Issue)**	14-Jun	0930 hrs	Jefferson East
93-FD-19	**CFD Transition Models**	14-Jun	0930 hrs	Lincoln East
94-FD-20	**High-Order Methods II**	14-Jun	0930 hrs	Columbia 10
108-APA-16/FD-21	**Flapping Flight Aerodynamics**	14-Jun	1400 hrs	Oak Lawn
122-FC-6/FD-22	**Separation Detection and Control**	14-Jun	1400 hrs	Columbia 11
123-FD-23	**Aeroacoustics and Noise**	14-Jun	1400 hrs	Lincoln East
124-FD-24	**Fluid-Structure Interaction**	14-Jun	1400 hrs	Monroe
125-FD-25	**Turbulence Modeling III: LES, DNS, Hybrid LES/RANS**	14-Jun	1400 hrs	Jay
126-FD-26	**Shock-Boundary Layer Interaction II**	14-Jun	1400 hrs	Columbia 10
129-ITAR-2	**High-Speed Flows**	14-Jun	1400 hrs	Cabinet
148-APA-23/FD-28	**Propeller/Rotorcraft/Wind Turbine Aerodynamics III**	15-Jun	0930 hrs	Northwest
160-FC-9/PDL-4/ FD-29	**Physics of Plasma Actuators**	15-Jun	0930 hrs	Gunston West
161-FD-30/APA-24	**Modal Decomposition Methods and Analyses**	15-Jun	0930 hrs	Columbia 4
162-FD-32/FC-10	**In Honor of John Lumley's Lasting Legacy to Fluid Dynamics (Invited)**	15-Jun	0930 hrs	Jefferson East
163-FD-33	**Boundary-Layer Transition: Crossflow**	15-Jun	0930 hrs	Lincoln East
164-FD-34	**RANS and LES Methods**	15-Jun	0930 hrs	Columbia 10
165-FD-35	**Facilities and Measurement Techniques**	15-Jun	0930 hrs	Monroe
166-FD-36	**Adjoints and Error Estimation**	15-Jun	0930 hrs	Oak Lawn
167-FD-37	**CFD for Engineering Applications**	15-Jun	0930 hrs	Morgan
178-APA-25/FD-38	**Aerodynamic Design Methodologies I**	15-Jun	1400 hrs	Albright
191-FD-39	**Shock-Dominated Flows I**	15-Jun	1400 hrs	Oak Lawn
192-FD-40	**Turbulence Modeling - Validation and Applications**	15-Jun	1400 hrs	Jay
193-FD-41/FC-12	**Wing Aerodynamics: Separation and Control**	15-Jun	1400 hrs	Morgan
194-FD-42	**High-Speed Boundary-Layer Transition II**	15-Jun	1400 hrs	Lincoln East
195-FD-43	**Combustion Simulation II**	15-Jun	1400 hrs	Monroe
196-FD-44	**Solver Techniques II**	15-Jun	1400 hrs	Columbia 10
197-FD-45	**Novel CFD Algorithms**	15-Jun	1400 hrs	Jefferson East
210-FD-46	**Transition Open Forum**	15-Jun	1830 hrs	Cardozo

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Fluid Dynamics (continued)			
231-FD-48	**Jet Flows I**	16-Jun	0930 hrs	Holmead West
232-FD-49	**Opportunities in Future Fluid Dynamics Research (Invited)**	16-Jun	0930 hrs	Jefferson East
233-FD-50	**High-Speed Facilities and Test Methods**	16-Jun	0930 hrs	Lincoln East
234-FD-53	**Multiphase Flows I**	16-Jun	0930 hrs	Columbia 10
246-APA-33/FD-54	**Unsteady Wing Aerodynamics**	16-Jun	1400 hrs	Holmead West
247-APA-34/FD-55	**Vortex/Vortical Flows I**	16-Jun	1400 hrs	Northwest
260-FC-17/FD-56	**Dynamic Stall with Flow Control**	16-Jun	1400 hrs	Columbia 11
261-FC-18/FD-57	**Hypersonic Boundary Layer and Control**	16-Jun	1400 hrs	Lincoln East
262-FD-58	**Jet Flows II**	16-Jun	1400 hrs	Holmead West
263-FD-59/FC-19/ APA-38	**Gust Response**	16-Jun	1400 hrs	Columbia 10
264-FD-60	**Identifying the Impact of Non-Equilibrium Mechanisms on Engineering Flows (Invited)**	16-Jun	1400 hrs	Jefferson East
265-FD-61	**Multiphase Flows II**	16-Jun	1400 hrs	Holmead East
266-FD-62	**Shock-Dominated Flows II**	16-Jun	1400 hrs	Oak Lawn
283-APA-41/FD-63	**Low Speed, Low Reynolds Number Aerodynamics**	17-Jun	0930 hrs	Jefferson East
284-APA-42/FD-64	**Vortex/Vortical Flows II**	17-Jun	0930 hrs	Northwest
293-FD-65	**Roughness-Induced Transition**	17-Jun	0930 hrs	Lincoln East
294-FD-66	**Flow Stability**	17-Jun	0930 hrs	Kalorama
295-FD-67	**Computational Modeling for Propulsion Applications**	17-Jun	0930 hrs	Columbia 10
296-FD-68	**Theoretical/Fundamental Fluid Dynamics**	17-Jun	0930 hrs	Columbia 12
297-FD-69	**Uncertainty Quantification and Sensitivity Analysis**	17-Jun	0930 hrs	Morgan
	Ground Testing			
26-GT-1	**High Enthalpy Ground Test Facilities**	13-Jun	0930 hrs	Lincoln West
95-GT-2	**Assessment and Analysis of Ground Test Facilities**	14-Jun	0930 hrs	Lincoln West
128-GT-3	**Development and Performance of Ground Test Facilities**	14-Jun	1400 hrs	Lincoln West
168-GT-4	**Ground Testing for High Speed Flight and Reentry**	15-Jun	0930 hrs	Lincoln West
198-FT-3/GT-5	**Correlation of Ground and Flight Test Data**	15-Jun	1400 hrs	DuPont
199-GT-6	**Employing CFD in Parallel with Ground Testing**	15-Jun	1400 hrs	Lincoln West
235-GT-7	**Experimental Investigations of High Speed Air Breathing Propulsion**	16-Jun	0930 hrs	Cardozo
245-AMT-10/GT-8	**Ground Test Applications of Aerodynamic Measurement Technology**	16-Jun	1400 hrs	Columbia 2
	ITAR Sessions			
96-ITAR-1	**Advancements in Oscillating Heat Pipes**	14-Jun	0930 hrs	Cabinet
129-ITAR-2	**High-Speed Flows**	14-Jun	1400 hrs	Cabinet
169-ITAR-3	**CITMAV**	15-Jun	0930 hrs	Cabinet
200-ITAR-4	**NASA Orion EFT-1 Aeroscience Results - Aerothermal I**	15-Jun	1400 hrs	Cabinet
236-ITAR-5	**NASA Orion EFT-1 Aeroscience Results - Aerothermal II**	16-Jun	0930 hrs	Cabinet
267-ITAR-6	**NASA Orion EFT-1 Aeroscience Results - Aerodynamics**	16-Jun	1400 hrs	Cabinet
298-ITAR-7	**NASA Orion EFT-1 Thermal Protection System**	17-Jun	0930 hrs	Cabinet

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Multidisciplinary Analysis and Optimization			
27-MAO-1	**Design Optimization of Aircrafts and Other Complex Systems I**	13-Jun	0930 hrs	Cardozo
28-MAO-2	**Shape and Topology Optimization I**	13-Jun	0930 hrs	Columbia 3
59-MAO-3	**Design Optimization of Aircrafts and Other Complex Systems II**	13-Jun	1400 hrs	Cardozo
60-MAO-4	**Shape and Topology Optimization II**	13-Jun	1400 hrs	Columbia 3
97-MAO-5	**Design Optimization of Aircrafts and Other Complex Systems III**	14-Jun	0930 hrs	Cardozo
98-MAO-6	**Shape and Topology Optimization III**	14-Jun	0930 hrs	Columbia 3
130-MAO-7	**Design Optimization of Aircrafts and Other Complex Systems IV**	14-Jun	1400 hrs	Cardozo
131-MAO-8	**Shape and Topology Optimization IV**	14-Jun	1400 hrs	Columbia 3
170-MAO-10	**Shape and Topology Optimization V**	15-Jun	0930 hrs	Columbia 3
201-MAO-11	**Structural Optimization I**	15-Jun	1400 hrs	Columbia 3
202-MAO-12	**Surrogate Modeling and Non-Deterministic Design - Methods and Applications I**	15-Jun	1400 hrs	Cardozo
209-LEC-5	**Multidisciplinary Analysis and Optimization Award Lecture**	15-Jun	1730 hrs	International Ballroom (East)
237-MAO-13	**Structural Optimization II**	16-Jun	0930 hrs	Columbia 3
238-MAO-14	**Emerging Methods, Algorithms, and Dynamic Data Driven Systems**	16-Jun	0930 hrs	Columbia 4
268-MAO-16	**Surrogate Modeling and Non-Deterministic Design - Methods and Applications II**	16-Jun	1400 hrs	Cardozo
269-MAO-17	**Emerging Methods, Algorithms, and Large Scale Applications in MAO I**	16-Jun	1400 hrs	Columbia 4
299-MAO-18	**Surrogate Modeling and Non-Deterministic Design - Methods and Applications III**	17-Jun	0930 hrs	Cardozo
	Modeling and Simulation Technologies			
29-MST-1	**Modeling and Simulation of Uninhabited Aerial Vehicles I**	13-Jun	0930 hrs	Monroe
30-MST-2	**Computational Methods for Fluid Dynamics**	13-Jun	0930 hrs	Morgan
61-MST-3	**Human Factors, Perception, and Cueing**	13-Jun	1400 hrs	Morgan
62-MST-4	**Modeling and Simulation of Uninhabited Aerial Vehicles II**	13-Jun	1400 hrs	Monroe
99-MST-5	**Modeling and Simulation of Air Traffic Management I**	14-Jun	0930 hrs	Fairchild West
100-MST-6	**Modeling and Simulation of Vehicle Dynamics, Systems, and Environments**	14-Jun	0930 hrs	Morgan
132-MST-7	**UAV Path Planning and Collision Avoidance**	14-Jun	1400 hrs	Morgan
133-MST-8	**Modeling and Simulation of Air Traffic Management II**	14-Jun	1400 hrs	Fairchild West
171-MST-9	**Modeling and Simulation of Aeroelasticity I**	15-Jun	0930 hrs	Piscataway
203-MST-10	**Model and Simulation Integration**	15-Jun	1400 hrs	Georgetown East
204-MST-11	**Modeling and Simulation of Aeroelasticity II**	15-Jun	1400 hrs	Piscataway
239-MST-12	**Model and Simulation Design, Development, Testing, and Validation**	16-Jun	0930 hrs	Piscataway
240-MST-13	**Fault Detection and Health Monitoring**	16-Jun	0930 hrs	Georgetown East
270-MST-15	**Special Modeling and Simulation Topics**	16-Jun	1400 hrs	Georgetown East
300-MST-16	**Modeling and Simulation of Propulsion Systems**	17-Jun	0930 hrs	Georgetown East
301-MST-17	**Modeling and Simulation of Structures and Structural Dynamics**	17-Jun	0930 hrs	Piscataway
	National Institute of Aerospace			
134-NIA-1	**National Institute of Aerospace Graduate Student Researchers**	14-Jun	1400 hrs	Piscataway

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Plasmadynamics and Lasers			
31-PDL-1	**Computational Methods**	13-Jun	0930 hrs	Piscataway
63-PDL-2	**Plasma and Laser Diagnostics**	13-Jun	1400 hrs	Piscataway
101-PDL-3	**Aero-Optics**	14-Jun	0930 hrs	Georgetown East
138-LEC-3	**Plasmadynamics and Lasers Award Lecture**	14-Jun	1630 hrs	International Ballroom (East)
160-FC-9/PDL-4/FD-29	**Physics of Plasma Actuators**	15-Jun	0930 hrs	Gunston West
205-PDL-5/FC-13	**DBD Actuators**	15-Jun	1400 hrs	Gunston West
241-PDL-6	**Plasma and Laser Technologies**	16-Jun	0930 hrs	Gunston West
271-PDL-7	**Plasma Aerodynamics**	16-Jun	1400 hrs	Gunston West
	Rising Leaders in Aerospace			
250-LTA-1	**Lighter-than-Air Systems & Technologies I**	25-Jun	0900 hrs	Steuben
65-RLA-1	**Rising Leaders in Aerospace: Speed Networking and Reception**	13-Jun	1500 hrs	International Ballroom (West)
103-RLA-2	**Rising Leaders in Aerospace Panel Discussion: Why Work in Aerospace Instead of Silicon Valley?**	14-Jun	1130 hrs	Georgetown East
173-RLA-3	**Rising Leaders in Aerospace Keynote**	15-Jun	1130 hrs	Columbia 9
	Thermophysics			
32-TP-1	**Ablation I**	13-Jun	0930 hrs	DuPont
64-TP-2	**Ablation II - Modeling**	13-Jun	1400 hrs	DuPont
96-ITAR-1	**Advancements in Oscillating Heat Pipes**	14-Jun	0930 hrs	Cabinet
102-TP-3	**Reentry Systems and Instrumentation**	14-Jun	0930 hrs	Kalorama
135-TP-5	**Radiation**	14-Jun	1400 hrs	Kalorama
136-TP-6	**Special Session: Spacecraft Thermal Management**	14-Jun	1400 hrs	DuPont
169-ITAR-3	**CITMAV**	15-Jun	0930 hrs	Cabinet
172-TP-7	**Advanced Modeling I - DSMC**	15-Jun	0930 hrs	Jefferson West
200-ITAR-4	**NASA Orion EFT-1 Aeroscience Results - Aerothermal I**	15-Jun	1400 hrs	Cabinet
206-TP-8	**Advanced Modeling II - Hypersonic Flows**	15-Jun	1400 hrs	Jefferson West
208-LEC-4	**Thermophysics Award Lecture**	15-Jun	1730 hrs	Lincoln West
236-ITAR-5	**NASA Orion EFT-1 Aeroscience Results - Aerothermal II**	16-Jun	0930 hrs	Cabinet
242-TP-9	**Special Session: Thermal Management Systems**	16-Jun	0930 hrs	DuPont
243-TP-10	**High Enthalpy Ground Testing**	16-Jun	0930 hrs	Jay
267-ITAR-6	**NASA Orion EFT-1 Aeroscience Results - Aerodynamics**	16-Jun	1400 hrs	Cabinet
272-TP-11	**Thermophysics**	16-Jun	1400 hrs	DuPont
273-TP-12	**Advanced Modeling III - DNS and State to State**	16-Jun	1400 hrs	Jay
298-ITAR-7	**NASA Orion EFT-1 Thermal Protection System**	17-Jun	0930 hrs	Cabinet
302-TP-13	**Heat Transfer in Aerospace Applications**	17-Jun	0930 hrs	DuPont
303-TP-14	**Advanced Modeling IV**	17-Jun	0930 hrs	Jay

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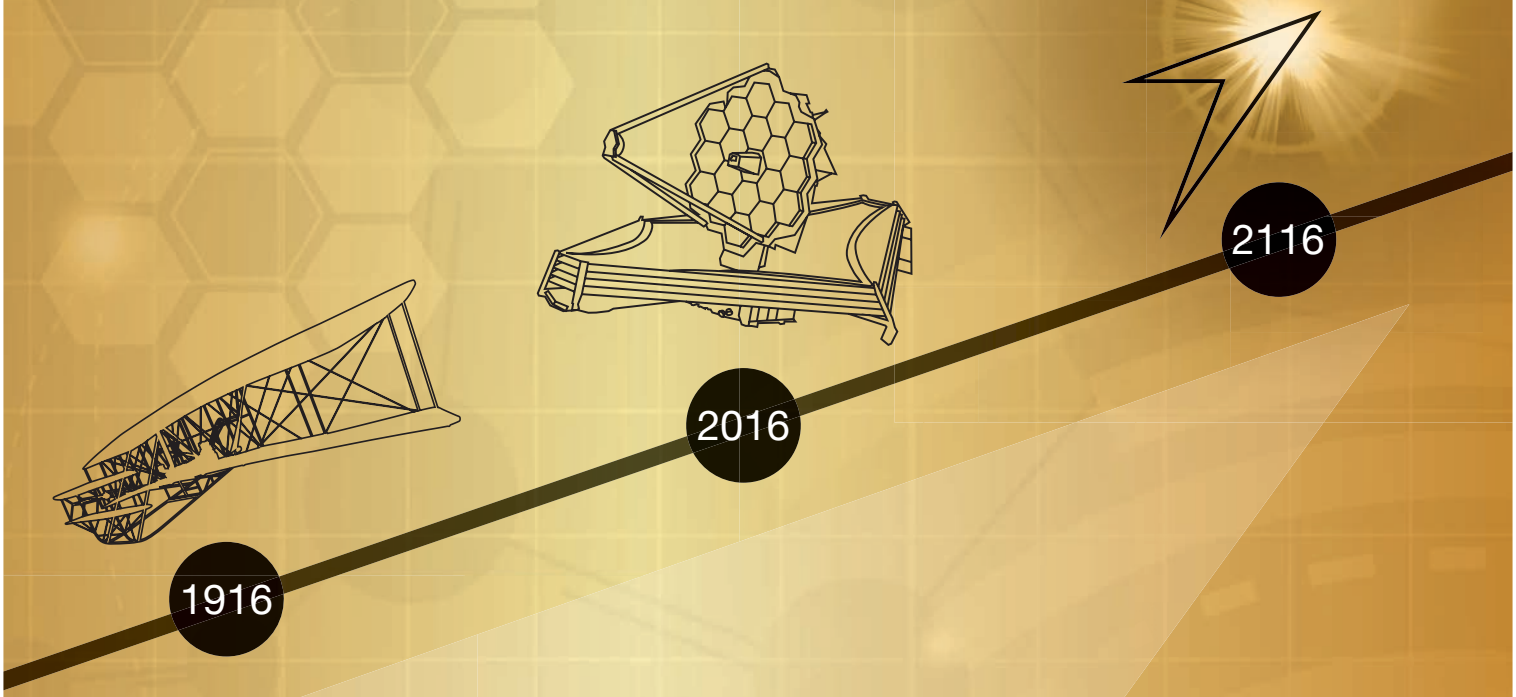

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Monday, 13 June 2016

1-SB-1 0730 - 0800 hrs	Speakers' Briefing	Session Rooms

Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 30-minute briefing on the day of their session to exchange bios and review final details prior to the session. Please attend on the day of your session.

Monday, 13 June 2016

2-PLNRY-1 0800 - 0900 hrs	Plenary	International Ballroom (Center)

The Second Century of Flight—Looking Back to Look Forward
Michael Delaney
Vice President and General Manager, Airplane Development
The Boeing Company

Monday, 13 June 2016

3-NW-1 0900 - 0930 hrs	Networking Coffee Break	Meeting Room Foyers

Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.

Monday, 13 June 2016

4-AFM-1 — Aeroservoelastic (ASE) Methods — Holmead East

Chaired by: A. DA RONCH, University of Southampton and B. LEONHARDT, Northrop Grumman Corporation

0930 hrs AIAA-2016-2700 **Flight Testing an Adaptive Feedforward Controller for Gust Loads Alleviation on a Flexible Aircraft** F. Li, Y. Wang, China Academy of Aerospace Aerodynamics, Beijing, China; A. Da Ronch, University of Southampton, Southampton, United Kingdom	1000 hrs AIAA-2016-2701 **A Load-Based Feedback Approach for Distributed Aeroservoelastic Control** V. Suryakumar, Texas A&M University, College Station, TX; A. Mangalam, Tao of Systems Integration, Inc., Hampton, VA; Y. Babbar, T. Strganac, Texas A&M University, College Station, TX	1030 hrs AIAA-2016-2702 **Studies on Unsteady Aerodynamic Modeling and Flight Simulation at High Angles of Attack** L. Shen, D. Huang, G. Wu, Nanjing University of Aeronautics and Astronautics, Nanjing, China					

Monday, 13 June 2016

5-AFM-2 — Aircraft Flight Dynamics I — Holmead West

Chaired by: D. MURRI, NASA Engineering and Safety Center and N. HALL

0930 hrs AIAA-2016-2703 **Airborne Landing Distance: A Neural Network Approach** B. Carvalho, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1000 hrs AIAA-2016-2704 **Dynamic Ground Effect on the Aerodynamic Coefficients of a Wing using a Panel Method** P. Boschetti, G. Quijada, E. Cárdenas, Simón Bolívar University, Naiguata, Venezuela	1030 hrs AIAA-2016-2705 **Rotary Balance Wind Tunnel Testing for the FASER Flight Research Aircraft** C. Denham, Virginia Polytechnic Institute and State University, Blacksburg, VA; D. Owens, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-2706 **Wind Tunnel Tests for Validation of Control Algorithms at High Angles of Attack Using Autonomous Aircraft Model Mounted in 3DOF Gimbals** D. Ignatyev, K. Zaripov, M. Sidoryuk, K. Kolinko, A. Khrabrov, TsAGI, Zhukovsky, Russia	1130 hrs AIAA-2016-2707 **Model Based Online Monitoring of Uncertain Plants Subject to Stochastic Disturbances** D. Löbl, N. Mumm, F. Holzapfel, Technical University of Munich, Garching, Germany	1200 hrs AIAA-2016-2708 **Investigation and Flight Dynamic Analysis of General Aviation Safety** E. Harrison, H. Jimenez, D. Mavris, Georgia Institute of Technology, Atlanta, GA		

Monday, 13 June 2016							
6-AMT-1	**Gas Scalar Measurements**						**Columbia 2**
Chaired by: C. COMBS, The University of Tennessee Space Institute and B. BATHEL, NASA Langley Research Center							
0930 hrs AIAA-2016-2709 **Two-Point Dynamic Rayleigh Scattering Measurements in a Free Jet** A. Fagan, K. Zaman, NASA Glenn Research Center, Cleveland, OH; K. Elam, Jacobs, Cleveland, OH	1000 hrs AIAA-2016-2710 **Simultaneous Multi-Property Laser Diagnostics using Filtered Rayleigh Scattering** J. George, T. Jenkins, MetroLaser, Inc., Laguna Hills, CA; J. Sutton, Ohio State University, Columbus, OH	1030 hrs AIAA-2016-2711 **WIDECARS Measurements of a Turbulent, Premixed, Ethylene-Air Flame Flame in a Dual-Mode Scramjet** A. Cutler, E. Gallo, L. Cantu, George Washington University, Washington, D.C.; R. Rockwell, C. Goyne, University of Virginia, Charlottesville, Charlottesville, VA	1100 hrs AIAA-2016-2712 **Disturbance and Phase Speed Measurements for Shock Tubes and Hypersonic Boundary-Layer Instability** J. Jewell, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Parziale, Stevens Institute of Technology, Hoboken, NJ; K. Lam, B. Hagen, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH	1130 hrs AIAA-2016-2713 **An Optical Ray Tracing Method for Analyzing Beam-Steering Effects During Laser Diagnostics in Turbulent Media** W. Kulatilaka, Y. Wang, Texas A&M University, College Station, TX	1200 hrs AIAA-2016-2714 **Measurement of Dissociation Fraction and Temperature using Laser Rayleigh Scattering Methods** J. George, MetroLaser, Inc., Laguna Hills, CA; C. Limbach, Colorado State University, Fort Collins, CO; T. Jenkins, MetroLaser, Inc., Laguna Hills, CA; R. Miles, Princeton University, Princeton, NJ		

Monday, 13 June 2016							
7-APA-1	**Flow Control Applications and Demonstrations I**						**Columbia 9**
Chaired by: J. MURRAY, Sandia National Laboratories and J. FARNSWORTH, University of Colorado Boulder							
0930 hrs AIAA-2016-2715 **A Method of Reducing the Drag of Transport Wings** J. Alderman, S. Rolston, Airbus, Bristol, United Kingdom; M. Gaster, C. Atkin, City University London, London, United Kingdom	1000 hrs AIAA-2016-2716 **CROR-Powerplant pylon wake mitigation for noise reduction through innovative blowing/ suction-based active flow control system** Y. Bury, University of Toulouse, Toulouse, France; A. Bordron, Aéroconseil, Blagnac, France; H. Belloc, University of Toulouse, Toulouse, France; D. Prat, Airbus, Toulouse, France	1030 hrs AIAA-2016-2717 **Investigation of the Discrete Effects of Suction in Large Scale Arrays for Laminar Flow Control** B. Crowley, C. Atkin, City University London, London, United Kingdom	1100 hrs AIAA-2016-2718 **Wingtip Vortex Modifications Using Alternating Jets** R. Kranepuhl, University of the German Federal Armed Forces, Neubiberg, Germany; S. Shkarayev, P. Planchenault, University of Arizona, Tucson, Tucson, AZ	1130 hrs AIAA-2016-2719 **Aerodynamics of Wing with Oscillating Wingtip Flapper** S. Shkarayev, University of Arizona, Tucson, Tucson, AZ; E. Su, Northwestern Polytechnical University, Xi'an, China; L. Zhao, Beihang University, Beijing, China	1200 hrs AIAA-2016-2720 **The Role of Spanwise Flow for Swept Wing Separation Control with Varied Spanwise Jet Spacing** M. Walker, K. Hipp, J. Bons, Ohio State University, Columbus, OH		

Monday, 13 June 2016							
8-APA-2	**Results from the 2nd AIAA Aeroelastic Prediction Workshop I**						**Jefferson West**
Chaired by: J. HEEG, NASA-Langley Research Center and D. SCHUSTER, NASA-Langley Research Center							
0930 hrs AIAA-2016-2721 **Overview and Data Comparisons from the 2nd Aeroelastic Prediction Workshop** J. Heeg, P. Chwalowski, NASA Langley Research Center, Hampton, VA; D. Raveh, Technion-Israel Institute of Technology, Haifa, Israel; A. Jirasek, M. Dalenbring, Swedish Defense Research Agency (FOI), Stockholm, Sweden	1000 hrs AIAA-2016-2722 **FUN3D Analyses in Support of the Second Aeroelastic Prediction Workshop** P. Chwalowski, J. Heeg, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-2723 **A Comparison of CFD and AIC-Based Methods for Unsteady Aerodynamics and Flutter Computations of the AEPW-2 Wing Model** G. Begnini, C. Spode, A. Pantaleao, B. Guaraldo, G. Marcório, M. Pedras, Embraer, São José dos Campos, Brazil; et al.	1100 hrs AIAA-2016-2724 **Flow Simulations for the Second Aeroelastic Prediction Workshop Using the EZNSS Code** D. Raveh, Technion-Israel Institute of Technology, Haifa, Israel				

Monday, 13 June 2016							
9-APA-3	**Propeller/Rotorcraft/Wind Turbine Aerodynamics I**						**Northwest**
Chaired by: J. RAULEDER, Technical University of Munich and M. CALVERT, U.S. Army AMRDEC							
0930 hrs AIAA-2016-2725 **Design of advanced airfoil for stall-regulated wind turbines** F. Grasso, Aerodynamix, Naples, Italy; D. Coiro, N. Bizzarrini, G. Calise, University of Naples "Federico II", Naples, Italy	1000 hrs AIAA-2016-2726 **Transient CFD analysis of three dimensional dynamic stall on 5 MW NREL wind turbine baseline rotor** N. Fatima, D. Gopal, Indian Institute of Technology Madras, Chennai, India	1030 hrs AIAA-2016-2727 **DDES and URANS comparison of the NREL phase-VI wind turbine at deep stall** H. Rahimi, B. Dose, I. Herraez, J. Peinke, University of Oldenburg, Oldenburg, Germany; B. Stoevesandt, Fraunhofer, Oldenburg, Germany	1100 hrs AIAA-2016-2728 **An Experimental Study on the Wake Characteristics of Dual-Rotor Wind Turbines by Using a Stereoscopic PIV Technique** H. Hu, T. Wei, Z. Wang, Iowa State University, Ames, IA	1130 hrs AIAA-2016-2729 **A Comparative Assessment of Correlation-based Transition Models for Wind Power Applications** D. Corson, Altair Engineering, Inc., Malta, NY; A. Zamora, Siemens, Boulder, CO; S. Medida, Altair Engineering, Inc., Sunnyvale, CA			

Monday, 13 June 2016							
10-APA-4	**Applied CFD & Numerical Correlations with Experimental Data I**						**Columbia 4**
Chaired by: K. KONTIS, University of Glasgow and K. MASSEY, DARPA/TTO							
0930 hrs AIAA-2016-2730 **Application of Multi-Strand Solver to Complex Rotorcraft Simulations** V. Lakshminarayan, Science and Technology Corporation, Moffett Field, CA; J. Sitaraman, Parallel Geometric Algorithms, LLC, Sunnyvale, CA; A. Wissink, Army Aviation and Missile Research Development and Engineering Center, Moffett Field, CA	1000 hrs AIAA-2016-2731 **Assessment of CREATE-AV(TM) Helios Near-Body Solvers for the Wake Prediction of HART-II Rotor** B. Jayaraman, Science and Technology Corporation, Moffett Field, CA; J. Lim, R. Jain, Army Aviation and Missile Research Development and Engineering Center, Moffett Field, CA	1030 hrs AIAA-2016-2732 **Computational Study of a Lifting Surface in Propeller Slipstreams** S. Chadha, B. Pomeroy, M. Selig, University of Illinois, Urbana-Champaign, Urbana, IL					

Monday, 13 June 2016							
11-ASE-1	**Aircraft Wake Turbulence I (Invited)**						**Columbia 12**
Chaired by: J. CROUCH, Boeing Commercial Airplanes and D. SCHAUERHAMER, Jacobs Technology							
0930 hrs AIAA-2016-2733 **Assessing Wake-Turbulence Characteristics for Commercial Aircraft (Invited)** J. Crouch, M. Czech, The Boeing Company, Seattle, WA	1000 hrs AIAA-2016-2734 **Effect of Ground Obstacle of Different Aspect Ratio on Wake Vortex Dissipation (Invited)** C. Wang, D. Zhao, Nanyang Technological University, Singapore, Singapore; J. Schluter, Deakin University, Melbourne, Australia; F. Holzäpfel, A. Stephan, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	1030 hrs AIAA-2016-2735 **Numerical Optimization of Plate Lines Design for Enhanced Wake Vortex Decay (Invited)** A. Stephan, F. Holzäpfel, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	1100 hrs AIAA-2016-2736 **Reduced Order Modeling of Contrails: Jet Induction and Vortex Phases** A. Inamdar, S. Lele, M. Jacobson, Stanford University, Stanford, CA	1130 hrs AIAA-2016-2737 **Sensitivity Study of Aircraft Wake Vortices Using OVERFLOW (Invited)** D. Schauerhamer, S. Robinson, University of California, Davis, Davis, CA			

Monday, 13 June 2016							
12-ASE-2	**Runback Water Film Dynamics**						**Georgetown West**
Chaired by: W. WRIGHT, ASRC Aerospace Corporation and A. WORK							
0930 hrs AIAA-2016-2738 **An Experimental Invesitgation on the Dynamic Water Runback Process Over an Airfoil Surface Pertinent to Aircraft Icing Phenomena** K. Zhang, A. Rothmayer, H. Hu, Iowa State University, Ames, IA	1000 hrs AIAA-2016-2739 **An Experimental Investigation on the Effects of Surface Wettability on Water Runback and Ice Accretion over an Airfoil Surface** R. Waldman, H. Li, H. Hu, Iowa State University, Ames, IA	1030 hrs AIAA-2016-2740 **An Experimental Investigation on the Water Runback Process over an Airfoil Surface with Realistic Ice Roughness** Y. Liu, K. Zhang, H. Hu, Iowa State University, Ames, IA	1100 hrs AIAA-2016-2741 **Gravitational Effects in Low-Speed Air-Driven Films** A. Rothmayer, K. Zhang, H. Hu, Iowa State University, Ames, IA	1130 hrs AIAA-2016-2742 **Droplet reemission from rotating surfaces: experimental study on disks and a scale model fan, and model derivation.** B. Déjean, E. Radenac, P. Berthoumieu, ONERA, Toulouse, France			

Monday, 13 June 2016							
13-ATIO.ACD-1	**Aircraft Design Methods and Tools I: Systems Architecting and Integration**						**Gunston East**
Chaired by: M. DRAKE, Boeing Commercial Airplanes and S. KOMADINA, Northrop Grumman Aerospace Systems							
0930 hrs AIAA-2016-2743 **Aircraft Systems Architecting – a Functional-Logical Domain Perspective** M. Guenov, A. Molina-Cristobal, V. Voloshin, A. Riaz, A. van Heerden, Cranfield University, Cranfield, United Kingdom; S. Sharma, Airbus, Bristol, United Kingdom; et al.	1000 hrs AIAA-2016-2744 **Heuristic Definition, Evaluation, and Impact Decomposition of Aircraft Subsystem Architectures** I. Chakraborty, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1030 hrs AIAA-2016-2745 **Assessing Impact of Epistemic and Technological Uncertainty on Aircraft Subsystem Architectures** I. Chakraborty, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1100 hrs AIAA-2016-2746 **Impact of Subsystem Secondary Power Requirements on Gas Turbine Sizing and Performance** M. Ozcan, I. Chakraborty, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1130 hrs AIAA-2016-2747 **Extraction of Conceptual Design Information Concerning Aircraft Systems by Genetic Programming** T. Maedomari, K. Rinoie, University of Tokyo, Tokyo, Japan			

Monday, 13 June 2016							
14-ATIO.ATM-1	**UAS Operations I**						**Embassy**
Chaired by: K. MARAIS, Purdue University							
0930 hrs AIAA-2016-2748 **Towards Autonomous Aviation Operations: What can we learn from other areas of automation?** B. Sridhar, P. Kopardekar, NASA Ames Research Center, Moffett Field, CA	1000 hrs AIAA-2016-2749 **Rapid Trajectory Feasibility Verification for UAS Traffic Management** A. Ishihara, J. Jung, J. Rios, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2016-2750 **Multi-Mode Guidance for an Independent Multicopter Geofencing System** M. Stevens, E. Atkins, University of Michigan, Ann Arbor, Ann Arbor, MI					

Monday, 13 June 2016							
15-ATIO.ATM-2	**Air Transportation Systems Modeling I**						**Fairchild West**
Chaired by: K. SHETH, NASA Ames Research Center and J. KOELLING, NASA-Langley Research Center							
0930 hrs AIAA-2016-2751 **Analysis of Prediction Uncertainty in Interval Management** S. Torres, G. Nagle, Lockheed Martin Corporation, Rockville, MD	1000 hrs AIAA-2016-2752 **The U.S. National Airspace System: a Model for Verification and Validation of Complex, Distributed Systems-of-systems** W. Felder, Stevens Institute of Technology, Hoboken, NJ	1030 hrs AIAA-2016-2753 **Initial Feasibility Test of Exploring the Air Traffic management Design Tradespace through Surrogate Modeling** K. Schwartz, H. Pfaender, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA; V. Stouffer, V. Kumar, LMI, Tysons, VA; et al.	1100 hrs AIAA-2016-2754 **Hierarchical Decision-Modeling Framework for Air Transportation System** K. Moolchandani, Z. Sha, A. Maheshwari, J. Thekinen, N. Davendralingam, J. Panchal, Purdue University, West Lafayette, IN; et al.	1130 hrs AIAA-2016-2755 **Initial Results from the Metrosim Project** F. Wieland, A. Tyagi, R. Sharma, M. Santos, Intelligent Automation, Inc., Rockville, MD	1200 hrs AIAA-2016-2756 **Coordination Logic for Repulsive Resolution Maneuvers** A. Narkawicz, C. Munoz, A. Dutle, NASA Langley Research Center, Hampton, VA		

Monday, 13 June 2016							
16-ATIO.ATM-3	**Terminal ATM**						**Fairchild East**
Chaired by: B. BAXLEY, NASA Langley Research Center							
0930 hrs AIAA-2016-2757 **Study on Continuous Descent Operation for Efficient Air Transport System** A. Errico, V. Di Vito, L. Federico, Italian Aerospace Research Center (CIRA), Capua, Italy	1000 hrs AIAA-2016-2758 **Impact of Runway Closures on Arrival Flows at a Major Metropolitan Airport** J. DeArmon, J. Conroy, T. Masek, MITRE Corporation, McLean, VA	1030 hrs AIAA-2016-2759 **Performance of an Automated System for Control of Traffic in Terminal Airspace** A. Nikoleris, H. Erzberger, R. Paielli, NASA Ames Research Center, Moffett Field, CA; Y. Chu, University of California, Santa Cruz, Santa Cruz, CA	1100 hrs AIAA-2016-2760 **Miles-in-Trail Requirements Relaxation: A Key Benefit Mechanism of Integrated Arrival Departure Surface Traffic Management** A. Saraf, J. Bertino, N. Luch, ATAC Corporation, Santa Clara, CA; H. Idris, N. Shen, Engility Corporation, Billerica, MA	1130 hrs AIAA-2016-2761 **Operational Characteristics Identification and Simulation Model Verification for Incheon International Airport** Y. Eun, D. Jeon, Korea Aerospace Research Institute, Daejeon, South Korea; H. Lee, University of California, Santa Cruz, Moffett Field, CA; Z. Zhu, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA; M. Jeong, Korea Aerospace Research Institute, Daejeon, South Korea; et al.	1200 hrs AIAA-2016-2762 **Identifying significant traffic flow patterns in Multi-Airport Systems Terminal Manoeuvring Areas under uncertainty.** S. Sidiropoulos, A. Majumdar, K. Han, W. Ochieng, Imperial College London, London, United Kingdom		

Monday, 13 June 2016		
17-ATIO.TFPC-1 **0930 - 1230 hrs**	**Transformational Flight - Automation, Airspace and Flight Path Management of ODM Operations: Panel Discussion**	**Columbia 1**

Moderator: Bruce J. Holmes, CEO, AirMarkets Corporation

Panelists:

Natalia Alexandrov	**Joe Burns**	**Parimal Kopardekar**	**John Langford**	**Neil Planzer**	**Brien Seeley**	**Ryan Stone**
Senior Research Scientist NASA Langley Research Center	CEO Sensurion Corporation	UTM Project Director NASA Ames Research Center	Chairman and CEO Aurora Flight Sciences	Vice President, Air Traffic Management Boeing Commercial Airplanes	Founder Sustainable Aviation Foundation - CAFÉ Foundation	President SmartSky Networks

Monday, 13 June 2016							
18-ATIO.TFPC-2	**Transformational Flight - Automation Coupling to Advanced Control**						**Gunston West**
Chaired by: A. GIBSON, Empirical Systems Aerospace and K. GOODRICH, NASA Langley Research Center							
0930 hrs Oral Presentation **Automation and Pilot Aids to Improve Single-Pilot Safety and Performance in Part 135 Operations** K. Goodrich, M. Moore, NASA Langley Research Center, Hampton, VA	1000 hrs Oral Presentation **Remote Rescue Mission Autonomy: Robust Outer Loop Control Needs** B. Allen, P. Rothhaar, J. Neilan, L. Tran, A. Trujillo, K. Goodrich, NASA Langley Research Center, Hampton, VA; et al.	1030 hrs AIAA-2016-2763 **Self-Aware Vehicles: Mission and Performance Adaptation to System Health Degradation** I. Gregory, NASA Langley Research Center, Hampton, VA	1100 hrs Oral Presentation **Control Systems for Distributed Aerial Robotics** P. Rothhaar, J. Cooper, J. Neilan, L. Tran, A. Trujillo, A. Hagiopol, NASA Langley Research Center, Hampton, VA; et al.				

Monday, 13 June 2016		
19-F360-1 **0930 - 1130 hrs**	**Commercial Aviation—Solving the Disruption Challenge**	**International Ballroom (East)**

Moderator: Ben Iannotta, Editor-in-Chief, Aerospace America

Panelists:

Jim Eck	**Robert Pearce**	**Bryan Quigley**	**Lance Sherry**
Assistant Administrator for NextGen FAA	Deputy Associate Administrator for Strategy Office of the Associate Administrator for Aeronautics NASA	Managing Director United Airlines Flight Operations	Director, Center for Air Transportation Systems Research and Associate Professor, System Engineering and Operations Research Department George Mason University

Monday, 13 June 2016							
20-FC-1	**Flow Control Integration for Flight Control**						**Columbia 11**
Chaired by: K. HUBER, and G. DALE, Air Force Research Laboratory							
0930 hrs AIAA-2016-2764 **Crossed-Actuation AFC for Lateral-Directional Control of an ICE-101/Saccon UCAV** D. Williams, Illinois Institute of Technology, Chicago, IL; J. Seidel, U.S. Air Force Academy, Colorado Springs, CO	1000 hrs AIAA-2016-2765 **Active Flow Control on the Stability and Control Configuration (SACCON)** M. Jentzsch, L. Taubert, I. Wygnanski, University of Arizona, Tucson, Tucson, AZ	1030 hrs AIAA-2016-2766 **Application of Active Flow Control to a Generic Low Aspect-Ratio Trapezoidal Wing for High Lift Generation** B. Röntsch, L. Taubert, P. Tewes, J. Little, I. Wygnanski, University of Arizona, Tucson, Tucson, AZ	1100 hrs AIAA-2016-2767 **Discrete vortices on delta wings with unsteady leading-edge blowing** J. Bartasevicius, University of Glasgow, Glasgow, United Kingdom; A. Buzica, C. Breitsamter, Technical University of Munich, Munich, Germany	1130 hrs AIAA-2016-2768 **Actuations of Synthetic Jets on a UCAV Planform at High Angles of Attack** J. Lee, S. Lee, C. Kim, Seoul National University, Seoul, South Korea			

Monday, 13 June 2016							
21-FC-2/FD-1/APA-5	**Cavity Flows I**						**Columbia 10**
Chaired by: K. CASPER, Sandia National Laboratories and L. UKEILEY, University of Florida							
0930 hrs AIAA-2016-2769 **Control of Low-Speed Cavity Flow Using Steady Jets** N. Al Haddabi, K. Kontis, H. Zare-Behtash, University of Glasgow, Glasgow, United Kingdom	1000 hrs AIAA-2016-2770 **Supersonic Cavity Flow Control for Scramjet Applications** N. Webb, M. Samimy, Ohio State University, Columbus, OH	1030 hrs AIAA-2016-2771 **Computational Analysis of Partially-Covered Cavity With and Without Side Walls** S. Premachandran, Z. Hu, X. Zhang, University of Southampton, Southampton, United Kingdom	1100 hrs AIAA-2016-2772 **Effect of Rear Face Geometry on the Open Cavity Oscillatory Flow at M=0.9** S. Das, Birla Institute of Technology, Ranchi, India; J. Cohen, Technion-Israel Institute of Technology, Haifa, Israel	1130 hrs AIAA-2016-2773 **Generic Cavity Test within the NRC 1.5 m Trisonic Wind Tunnel** M. MacMaster, National Research Council Canada, Ottawa, Canada	1200 hrs AIAA-2016-2774 **Wavelet Analysis of Complex Geometry Transonic Cavity Flows** D. Bacci, A. Saddington, D. Bray, Cranfield University, Shrivenham, United Kingdom		

Monday, 13 June 2016							
22-FD-2	**Geometry and Meshing**						**Georgetown East**
Chaired by: N. CHRISOCHOIDES, Old Dominion University and H. LUO, North Carolina State University							
0930 hrs AIAA-2016-2775 **High-Order Mesh Curving Using WCN Mesh Optimization** S. Karman, Pointwise, Inc., Fort Worth, TX; J. Erwin, R. Glasby, D. Stefanski, University of Tennessee, Knoxville, TN	1000 hrs AIAA-2016-2776 **Curved mesh generation using radial basis functions** A. Kashi, H. Luo, North Carolina State University, Raleigh, NC	1030 hrs AIAA-2016-2777 **An adaptive remeshing strategy for unsteady aerodynamics applications** A. Limare, University of Technology, Troyes, France; P. Brenner, Airbus, Les Mureaux, France; H. Borouchaki, University of Technology, Troyes, France	1100 hrs AIAA-2016-2778 **Telescopic Approach for Extreme-Scale Parallel Mesh Generation for CFD Applications** N. Chrisochoides, Old Dominion University, Norfolk, VA	1130 hrs AIAA-2016-2779 **Singular mesh generation from multiple overset meshes: a tool for industrial applications** G. Abbruzzese, M. Cordero Gracia, M. Gómez López, Technical University of Madrid, Madrid, Spain	1200 hrs AIAA-2016-2780 **Comparison of linear and non-linear elasticity large displacement mesh deformation in Computational Fluid Dynamics** B. Shamsaei, J. Newman, University of Tennessee, Chattanooga, Chattanooga, TN		

Monday, 13 June 2016							
23-FD-3	**Turbulence Modeling I: LES, DNS, Hybrid LES/RANS**						**Jay**
Chaired by: G. CANDLER, University of Minnesota							
0930 hrs AIAA-2016-2781 **Filtered velocity based LES of mixing in high speed recirculating shear flow** S. Gs, A. Kartha, G. Candler, University of Minnesota, Minneapolis, Minneapolis, MN	1000 hrs AIAA-2016-2782 **Simulation of Airfoil Stall Flows Using IDDES with High Order Schemes** Y. Yang, G. Zha, University of Miami, Coral Gables, FL	1030 hrs AIAA-2016-2783 **Wall--modeled Large Eddy Simulation of Flow Over a Wall--mounted Hump** P. Iyer, National Institute of Aerospace, Hampton, VA; M. Malik, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-2784 **Budget of Turbulent Kinetic Energy in a Shock Wave/ Boundary-layer Interaction** M. Vyas, NASA Glenn Research Center, Cleveland, OH; M. Waindim, D. Gaitonde, Ohio State University, Columbus, OH	1130 hrs AIAA-2016-2785 **Shedding Light into the Quasi-Laminarization Process** G. Araya, University of Puerto Rico, Mayaguez, Mayaguez,	1200 hrs AIAA-2016-2786 **Wall-Modeled Large Eddy Simulation of Laminar Separation Bubble Flows** F. Cadieux, J. Sadique, X. Yang, C. Meneveau, R. Mittal, Johns Hopkins University, Baltimore, MD		

Monday, 13 June 2016							
24-FD-4	Boundary-Layer Transition: Noise and Receptivity						Lincoln East
Chaired by: A. CHOU, NASA Langley Research Center and J. SMITH, Sandia National Laboratories							
0930 hrs AIAA-2016-2787 **Multivariate Statistics Analysis of the Pressure Field Induced by High-Speed Turbulent Boundary Layers** C. Zhang, L. Duan, Missouri University of Science and Technology, Rolla, MO	1000 hrs AIAA-2016-2788 **Receptivity of High-Speed Boundary Layers to Kinetic Fluctuations** A. Fedorov, Moscow Institute of Physics and Technology, Zhukovsky, Russia; A. Tumin, University of Arizona, Tucson, Tucson, AZ	1030 hrs AIAA-2016-2789 **High Frequency Free-Stream Disturbance Measurements in Hypersonic Wind Tunnels by Means of a Slender Wedge Probe** A. Wagner, E. Schuelein, K. Hannemann, German Aerospace Center (DLR), Göttingen, Germany	1100 hrs AIAA-2016-2790 **Receptivity and Forced Response to Acoustic Disturbances in High-Speed Boundary Layers** P. Balakumar, R. King, A. Chou, L. Owens, M. Kegerise, NASA Langley Research Center, Hampton, VA	1130 hrs AIAA-2016-2791 **Local scattering theory and the role of an abrupt change on boundary-layer instability and acoustic radiation** M. Dong, Tianjin University, Tianjin, China; X. Wu, Imperial College London, London, United Kingdom	1200 hrs AIAA-2016-2792 **Direct numerical simulation of a wavepacket in a boundary layer at Mach 0.9** A. Martinez, M. Medeiros, University of São Paulo, São Carlos, Brazil		

Monday, 13 June 2016							
25-FD-7	Novel CFD Applications						Jefferson East
Chaired by: J. SEIDEL, USAF Academy and C. SCHROCK, Air Force Research Laboratory							
0930 hrs AIAA-2016-2793 **Neutralization of Airborne Contaminants** J. Boris, G. Patnaik, Naval Research Laboratory, Washington, D.C.	1000 hrs AIAA-2016-2794 **Evaporative Cooling of Idealized Torso Geometries Including Protective Armor** D. Mott, A. Kercher, A. Corrigan, Naval Research Laboratory, Washington, D.C.	1030 hrs AIAA-2016-2795 **CFD Investigation of Supersonic Bleed with Discretely Modeled Holes in Cambridge Wind Tunnel at Various Conditions** S. Duncan, P. Orkwis, M. Ugolotti, University of Cincinnati, Cincinnati, OH	1100 hrs AIAA-2016-2796 **Indicial Methods For the Numerical Calculation of Dynamic Derivatives of a Finned Projectile** M. Ghoreyshi, P. French, U.S. Air Force Academy, Colorado Springs, CO; D. Findlay, J. Lee, Naval Air Warfare Center, Patuxent River, MD; A. Jirasek, A. Lofthouse, U.S. Air Force Academy, Colorado Springs, CO	1130 hrs AIAA-2016-2797 **Dynamic Stability Analysis of the Orion Crew Module through Computational Fluid Dynamics** A. Potturi, O. Peroomian, Metacomp Technologies, Agoura Hills, CA			

Monday, 13 June 2016							
26-GT-1	High Enthalpy Ground Test Facilities						Lincoln West
Chaired by: M. RHODE, NASA Langley Research Center and B. MILLS, AEDC/ ATA							
0930 hrs AIAA-2016-2798 **The Plasma Wind Tunnels at the Institute of Space Systems: Current Status and Challenges** S. Loehle, S. Fasoulas, G. Herdrich, T. Hermann, B. Massuti-Ballester, A. Meindl, University of Stuttgart, Stuttgart, Germany; et al.	1000 hrs AIAA-2016-2799 **Plasma Wind Tunnel Flow Analysis with High Speed Imaging** F. Zander, T. Hermann, S. Loehle, University of Stuttgart, Stuttgart, Germany	1030 hrs AIAA-2016-2800 **Tomographic Optical Emission Spectroscopy for Plasma Wind Tunnel Testing** T. Hermann, S. Loehle, University of Stuttgart, Stuttgart, Germany	1100 hrs AIAA-2016-2801 **Analysis of Air Plasma Flows in Magnetoplasmadynamic Arcjet Testing** F. Zander, S. Loehle, University of Stuttgart, Stuttgart, Germany	1130 hrs AIAA-2016-2802 **Review of Heat Flux Measurements for High Enthalpy Flows** S. Loehle, University of Stuttgart, Stuttgart, Germany	1200 hrs AIAA-2016-2803 **Characterizing FLEET for Aerodynamic Measurements in Various Gas Mixtures and non-Air Environments** N. Calvert, Y. Zhang, R. Miles, Princeton University, Princeton, NJ		

Monday, 13 June 2016							
27-MAO-1	Design Optimization of Aircrafts and Other Complex Systems I						Cardozo
Chaired by: R. KOLONAY, Air Force Research Laboratory/RQVC/WPAFB and C. HEATH, NASA Glenn Research Center							
0930 hrs AIAA-2016-2804 **Parallel Aircraft Trajectory Optimization with Analytic Derivatives** R. Falck, J. Gray, NASA Glenn Research Center, Cleveland, OH; B. Naylor, DB Consulting, Inc., Cleveland, OH	1000 hrs AIAA-2016-2805 **Multi-Disciplinary, Multi-Fidelity Discrete Data Transfer Using Degenerate Geometry Forms** E. Olson, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-2806 **Aerostructural design optimization of a continuous morphing trailing edge aircraft for improved mission performance** D. Burdette, G. Kenway, J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI	1100 hrs AIAA-2016-2807 **A Methodology for Probabilistic Analysis of Distributed Multidisciplinary Architecture (PADMA)** S. Ghosh, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1130 hrs AIAA-2016-2808 **Evaluation of the impacts of the Objective Function definition in Aircraft Conceptual Design** D. Bianchi, T. Orra, Embraer, São José dos Campos, Brazil; F. Silvestre, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil			

Monday, 13 June 2016							
28-MAO-2	**Shape and Topology Optimization I**						**Columbia 3**
Chaired by: S. FERGUSON, North Carolina State University and G. KENWAY, Univeristy of Michigan Department of Aerospace Engineering							
0930 hrs AIAA-2016-2809 **Topology Optimization of Nonlinear Cellular Materials** J. Carstensen, J. Guest, Johns Hopkins University, Baltimore, MD	1000 hrs AIAA-2016-2810 **Topology Optimization for Additive Manufacturing: New Projection-based Design Algorithms** M. Osanov, J. Carstensen, E. Tromme, J. Guest, Johns Hopkins University, Baltimore, MD; C. Williams, Virginia Polytechnic Institute and State University, Blacksburg, VA	1030 hrs AIAA-2016-2811 **Topology Optimization of 3D Woven Micro-lattices using a Projection-based Ground Structure Approach** S. Ha, Korea Maritime and Ocean University, Busan, South Korea; J. Guest, Johns Hopkins University, Baltimore, MD	1100 hrs AIAA-2016-2812 **Efficient Modal Design Variables Applied to Aerodynamic Optimization of a Modern Transport Wing** C. Allen, D. Poole, T. Rendall, University of Bristol, Bristol, United Kingdom	1130 hrs AIAA-2016-2813 **Broadband Shape and Topology Optimization of Acoustic Metamaterials and Phononic Crystals** W. Lin, J. Newman, W. Anderson, University of Tennessee, Chattanooga, Chattanooga, TN			

Monday, 13 June 2016							
29-MST-1	**Modeling and Simulation of Uninhabited Aerial Vehicles I**						**Monroe**
Chaired by: N. MACCHIARELLA, Embry-Riddle Aeronautical University and S. BEARD, NASA-Ames Research Center							
0930 hrs AIAA-2016-2814 **Analysis of the quality control of UAVs for the case of the analytical redundancy of measurements** D. Nowak, A. Tomczyk, G. Kopecki, Rzeszow University of Technology, Rzeszow, Poland	1000 hrs AIAA-2016-2815 **Design, Development, and Testing of a UAV Hardware-in-the-Loop testbed for Aviation and Airspace Prognostics Research** C. Teubert, G. Gorospe, C. Kulkarni, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; C. Quach, NASA Langley Research Center, Hampton, VA; E. Hogge, Northrop Grumman Corporation, Hampton, VA; D. Burgett, Christopher Newport University, Newport News, VA	1030 hrs AIAA-2016-2816 **Development of a Microgravity Generating UAV Using COTS Autopilots** J. Hathaway, J. Jacob, Oklahoma State University, Stillwater, OK	1100 hrs AIAA-2016-2817 **A family of universal miniature autopilots – design solutions, characteristics, hardware/ software-in-the-loop simulations** G. Kopecki, P. Rzucidlo, P. Grzybowski, D. Kordos, Rzeszow University of Technology, Rzeszow, Poland	1130 hrs AIAA-2016-2818 **Developing Automated Contingency Procedures for the ATOL System of a Fixed-Wing UAV through Online FDD** M. Kügler, F. Holzapfel, Technical University of Munich, Munich, Germany	1200 hrs AIAA-2016-2819 **First-Principles Modeling of A Miniature Tilt-Rotor Convertiplane in Low-Speed Operation** G. Cai, A. Saeed, A. Younes, T. Taha, J. Dias, L. Seneviratne, Khalifa University, Abu Dhabi, United Arab Emirates		

Monday, 13 June 2016							
30-MST-2	**Computational Methods for Fluid Dynamics**						**Morgan**
Chaired by: A. ELMILIGUI, NASA Langley Research Center and D. KEATING							
0930 hrs AIAA-2016-2820 **Non-Intrusive Uncertainty Quantification of CFD Based on Adaptive Stochastic Kriging** B. Wang, Y. Zhang, J. Gong, W. Zhang, K. Zhang, China Academy of Aerospace Aerodynamics, Beijing, China	1000 hrs AIAA-2016-2821 **Improved Kriging Model for MDOE wind tunnel tests** H. Ma, J. Zhang, Y. Qin, China Academy of Aerospace Aerodynamics, Beijing, China	1030 hrs AIAA-2016-2822 **A High-Order Overset Method on Moving and Deforming Grids** J. Crabill, A. Jameson, Stanford University, Stanford, CA					

Monday, 13 June 2016							
31-PDL-1	**Computational Methods**						**Piscataway**
Chaired by: T. MOELLER, University of Tennessee Space Institute and J. POGGIE, Purdue University- Sch of Aero and Astro							
0930 hrs AIAA-2016-2823 **Finite Volume Method for Divergence-free Solutions to Maxwell's Equations** R. Thompson, The Boeing Company, Huntsville, AL; T. Moeller, University of Tennessee, Tullahoma, Tullahoma, TN	1000 hrs AIAA-2016-2824 **Numerical Simulation of Mars Entry Flight using Magnetohydrodynamic Parachute Effect** T. Fujino, T. Takahashi, University of Tsukuba, Tsukuba, Japan	1030 hrs AIAA-2016-2825 **Computational Multi-Fluid Model for Partially Ionized and Magnetized Plasma** A. Alvarez Laguna, A. Lani, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; Y. Maneva, Catholic University of Leuven, Leuven, Belgium; H. Deconinck, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; S. Poedts, Catholic University of Leuven, Leuven, Belgium	1100 hrs AIAA-2016-2826 **Numerical Simulation and Analysis of Hypersonic Vehicle Plasma Sheath** T. Deyang, Q. Kun, Zhejiang University, Hangzhou, China				

Monday, 13 June 2016							
32-TP-1	**Ablation I**						**DuPont**
Chaired by: A. MARTIN, University of Kentucky and E. STERN, NASA Ames Research Center							
0930 hrs AIAA-2016-2827 **Gas-surface interactions of high-temperature materials under high-enthlapy flows using plasma wind tunnels** B. Massuti-Ballester, G. Herdrich, University of Stuttgart, Stuttgart, Germany	1000 hrs AIAA-2016-2828 **Expansion Tunnel Ablation Testing in Venus Entry Conditions** N. Banerji, P. Leyland, Swiss Federal Institute of Technology, Lausanne, Switzerland; R. Morgan, University of Queensland, Brisbane, Australia	1030 hrs AIAA-2016-2829 **Electromagnetic Wave Transmission through Lightweight Carbon Phenolic Ablator: Microwave to Infrared Frequencies** M. Eberhart, S. Loehle, F. Zander, University of Stuttgart, Stuttgart, Germany; H. Merbold, ABB Group, Zurich, Switzerland; A. Murk, University of Bern, Bern, Switzerland; S. Merli, University of Stuttgart, Stuttgart, Germany	1100 hrs AIAA-2016-2830 **Characterization of Ablation Product Radiation Signatures of PICA and FiberForm** M. Winter, B. Butler, University of Kentucky, Lexington, Lexington, KY; P. Danehy, S. Splinter, NASA Langley Research Center, Hampton, VA; Z. Diao, F. Pnaerai, University of Kentucky, Lexington, Lexington, KY; et al.	1130 hrs AIAA-2016-2831 **The ESA ARC Project: Ablation Radiation Coupling for hypervelocity re-entry with low density type ablators** P. Leyland, U. Sheikh, B. Duval, Swiss Federal Institute of Technology, Lausanne, Switzerland; T. Hermann, S. Loehle, University of Stuttgart, Stuttgart, Germany; T. McIntyre, University of Queensland, Brisbane, Australia; et al.	1200 hrs AIAA-2016-2832 **Investigation of Pyrolysis Gas Chemistry in an Inductively Coupled Plasma Facility** C. Tillson, J. Uhl, J. Meyers, D. Fletcher, University of Vermont, Burlington, Burlington, VT		

Monday, 13 June 2016		
33-LEC-1 **1300 - 1400 hrs**	**Fluid Dynamics Award Lecture**	**Cabinet**
The Hydrodynamic theory of Premixed Flames: Laminar to Turbulent Propagation **Moshe Matalon** Caterpillar Distinguished Professor, Mechanical Science and Engineering University of Illinois at Urbana-Champaign		

Monday, 13 June 2016							
34-AFM-3	**Launch Vehicle, Missile, and Projectile Flight Dynamics**						**Holmead East**
Chaired by: F. FRESCONI, US Army Research Lab and T. LAVIN, Sandia National Laboratories							
1400 hrs AIAA-2016-2833 **Optimal Gliding Guidance for Long Range Hypersonic vehicles with Impact angle Constraints using Pseudospectral Method** K. Kalirajan, A. Joshi, Indian Institute of Technology Bombay, Mumbai, India	1430 hrs AIAA-2016-2834 **SHEFEX II - An Aerodynamic and Structural Post-Flight Analysis** M. Franze, German Aerospace Center (DLR), Brunswick, Germany	1500 hrs AIAA-2016-2835 **Epsilon-Trig Regularization Method for Bang-Bang Optimal Control Problems** K. Mall, M. Grant, Purdue University, West Lafayette, IN	1530 hrs AIAA-2016-2836 **Airship Control using Expert Demonstrations** O. Daskiran, A. Dogan, University of Texas, Arlington, Arlington, TX	1600 hrs AIAA-2016-2837 **Distributed Cooperative Guidance Law for Multiple Flight Vehicles of Saturation Attack** Z. Enjiao, T. Chao, S. Wang, M. Yang, Harbin Institute of Technology, Harbin, China			

Monday, 13 June 2016							
35-AFM-4	**Planetary Entry**						**Georgetown East**
Chaired by: M. GRANT, Purdue University and C. KARLGAARD, Analytical Mechanics Associates Inc							
1400 hrs AIAA-2016-2838 **Constrained Trajectory Optimization for Planetary Entry via Sequential Convex Programming** Z. Wang, M. Grant, Purdue University, West Lafayette, IN	1430 hrs AIAA-2016-2839 **Reconstructed Parachute System Performance During the Second LDSD Supersonic Flight Dynamics Test** C. O'Farrell, E. Brandeau, C. Tanner, J. Gallon, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; S. Muppidi, ERC, Inc., Moffett Field, CA; I. Clark, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1500 hrs AIAA-2016-2840 **Dynamic CFD Simulations of the MEADS II Ballistic Range Test Model** E. Stern, NASA Ames Research Center, Moffett Field, CA; A. Schwing, NASA Johnson Space Center, Houston, TX; J. Brock, Analytical Mechanics Associates, Inc., Moffett Field, CA; M. Schoenenberger, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2016-2841 **Trigonomerization of Optimal Control Problems with Bounded Controls** K. Mall, M. Grant, Purdue University, West Lafayette, IN	1600 hrs AIAA-2016-2842 **Incorporation of Effects of Control Surfaces into Hypersonic Trajectory Optimization Framework** H. Saranathan, M. Grant, Purdue University, West Lafayette, IN			

Monday, 13 June 2016							
36-AMT-2	**Velocimetry I**						**Columbia 2**
Chaired by: L. MA, Virginia Tech and A. FAGAN, NASA Glenn Research Center							
1400 hrs AIAA-2016-2843 **Femtosecond-Laser-Based Measurements of Velocity and Density in the NASA Langley 0.3-m Transonic Cryogenic Tunnel** R. Burns, C. Peters, P. Danehy, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2016-2844 **Development of Hydroxyl Tagging Velocimetry for Low Velocity Flows** M. Andre, P. Bardet, George Washington University, Washington, D.C.; R. Burns, P. Danehy, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2016-2845 **Femtosecond Laser Tagging Characterization of a Sweeping Jet Actuator Operating in the Compressible Regime** C. Peters, R. Miles, Princeton University, Princeton, NJ; R. Burns, P. Danehy, B. Bathel, G. Jones, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2016-2846 **Enhancement of FLEET in Argon Gas Mixtures** Y. Zhang, N. Calvert, M. Shneider, R. Miles, Princeton University, Princeton, NJ	1600 hrs AIAA-2016-2847 **Selective Two-Photon Absorptive Resonance Femtosecond-Laser Electronic-Excitation Tagging (STARFLEET) Velocimetry in Flow and Combustion Diagnostics** N. Jiang, Spectral Energies, LLC, Dayton, OH; B. Halls, Air Force Research Laboratory, Wright-Patterson AFB, OH; H. Stauffer, Spectral Energies, LLC, Dayton, OH; P. Danehy, NASA Langley Research Center, Hampton, VA; J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH; S. Roy, Spectral Energies, LLC, Dayton, OH	1630 hrs AIAA-2016-2848 **An Experimental Investigation with Molecular Tagging Technique on the Spray Flow Ejected from an Air-Blast Nozzle** F. Chen, H. Liu, Shanghai Jiao Tong University, Shanghai, China; H. Li, H. Hu, Iowa State University, Ames, IA		

Monday, 13 June 2016							
37-APA-6/FD-8	**Bio-Inspired Flows**						**Northwest**
Chaired by: R. RAMAMURTI and J. MURRAY, Sandia National Laboratories							
1400 hrs AIAA-2016-2849 **Instantaneous Lift and Motion Characteristics of Butterflies in Free Flight** M. Sridhar, C. Kang, D. Landrum, University of Alabama, Huntsville, Huntsville, AL	1430 hrs AIAA-2016-2850 **Three-Dimensional Numerical Simulation of Hummingbird Forward Flight** J. Song, H. Luo, Vanderbilt University, Nashville, TN; B. Tobalske, University of Montana, Missoula, Missoula, MT; T. Hedrick, University of North Carolina, Chapel Hill, Chapel Hill, NC	1500 hrs AIAA-2016-2851 **Influence of Vortical Interactions on Thunniform Fish Motions** K. Srivastava, K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI	1530 hrs AIAA-2016-2852 **Bio-Inspired Sinusoidal Leading-Edged Wings** M. Post, A. Sapell, J. Hart, U.S. Air Force Academy, Colorado Springs, CO				

Monday, 13 June 2016							
38-FC-20	**Feedback Flow Control**						**Northwest**
Chaired by: D. WILLIAMS, Illinois Institute of Technology and U. KAUL, NASA ARC							
1400 hrs **No Presentations**				1600 hrs AIAA-2016-2853 **Discrete Time Open-Loop and Closed-Loop Flow Control Based on Van der Pol Modeling** V. Motta, P. Mouyon, C. Döll, ONERA, Toulouse, France	1630 hrs AIAA-2016-2854 **Analysis of the filtering effect of the stochastic estimation and accuracy improvement by sensor location optimization** A. Arnault, J. Dandois, J. Monnier, J. Delva, ONERA, Meudon, France; J. Foucaut, Lille University of Science and Technology, Villeneuve d'Ascq, France	1700 hrs AIAA-2016-2855 **Global Mode Based Control of Supersonic Jet Noise** M. Natarajan, J. Freund, D. Bodony, University of Illinois, Urbana-Champaign, Urbana, IL	

Monday, 13 June 2016							
39-APA-7	**Flow Control Applications and Demonstrations II**						**Columbia 9**
Chaired by: B. CYBYK, The Johns Hopkins University Applied Physics Laboratory and K. KARA, Khalifa University of Science, Technology & Research							
1400 hrs AIAA-2016-2856 **Numerical Study of a Double Stream Jet: ZDES Simulation, Stability Analysis and Noise Reduction** F. Sartor, F. Gand, M. Huet, S. Beneddine, D. Sipp, ONERA, Meudon, France	1430 hrs AIAA-2016-2857 **Reynolds Number Effect of Leading Edge Tubercles on Airfoil Aerodynamics** L. Peristy, R. Perez, A. Asghar, W. Allan, Royal Military College of Canada, Kingston, Canada	1500 hrs AIAA-2016-2858 **Numerical Simulation of a Sweeping Jet Actuator** K. Kara, Khalifa University, Abu Dhabi, United Arab Emirates	1530 hrs AIAA-2016-2859 **Flow Control and Analysis on Simplified Ship Helideck** Q. Gallas, M. Lamoureux, J. Monnier, A. Gilliot, C. Verbeke, J. Delva, ONERA, Lille, France	1600 hrs AIAA-2016-2860 **Effects of Geometric Parameters on Performance of Sweeping Jet Actuator** B. Slupski, K. Kara, Khalifa University, Abu Dhabi, United Arab Emirates			

Monday, 13 June 2016							
40-APA-8	**Results from the 2nd AIAA Aeroelastic Prediction Workshop II**						**Jefferson West**
Chaired by: J. HEEG, NASA-Langley Research Center and D. RAVEH							
1400 hrs AIAA-2016-2861 **RANS-LES Hybrid Turbulence Modelling for Aeroelastic Problems: Test Case 3 in the Second AIAA Aeroelastic Prediction Workshop** M. Righi, Zurich University of Applied Sciences, Zurich, Switzerland	1430 hrs AIAA-2016-2862 **An Immersed Boundary Method for Solving the Compressible Navier-Stokes Equations with Fluid-Structure Interaction** C. Brehm, University of Arizona, Tucson, Tucson, AZ; M. Barad, C. Kiris, NASA Ames Research Center, Moffett Field, CA						

Monday, 13 June 2016							
41-APA-9	**Applied CFD & Numerical Correlations with Experimental Data II**						**Columbia 4**
Chaired by: K. VANDEN, USAF and L. UKEILEY, University of Florida							
1400 hrs AIAA-2016-2863 **Assessment of an Inviscid Euler-Adjoint Solver for Prediction of Aerodynamic Characteristics of the NASA HL-20 Lifting Body** D. Almosnino, Self, Redmond, WA	1430 hrs AIAA-2016-2864 **A Low Subsonic Study of the NASA N2A Hybrid Wing-Body Using an Inviscid Euler-Adjoint Solver** D. Almosnino, Self, Redmond, WA	1500 hrs AIAA-2016-2865 **Aerodynamic Interactions between Landing-Gear Components** S. Spagnolo, X. Zhang, Z. Hu, D. Angland, University of Southampton, Southampton, United Kingdom	1530 hrs AIAA-2016-2866 **DDES Simulation of a Complex Main Landing Gear with Six-Wheel Bogie** U. Oza, Z. Hu, X. Zhang, University of Southampton, Southampton, United Kingdom	1600 hrs AIAA-2016-2867 **Numerical Assessment for PIV Measurement in Airplane Wakes** K. Matsushima, Toyama University, Toyama, Japan; H. Kato, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan			

Monday, 13 June 2016								
42-ASE-3	Aircraft Wake Turbulence II (Invited)							Columbia 12
Chaired by: M. PRUIS, Northwest Research Associates Inc and S. KOERNER, DLR								
1400 hrs AIAA-2016-2868 **Uncertainly Quantification of Lidar-Derived Wake Vortex Parameters with/without Data Assimilation (Invited)** T. Misaka, S. Obayashi, Tohoku University, Sendai, Japan; S. Jeong, KyungHee University, Seoul, South Korea	1430 hrs AIAA-2016-2869 **Development and assessment of a Wake Vortex characterization algorithm based on a hybrid LIDAR signal processing** A. Hallermeyer, A. Dolfi-Bouteyre, M. Valla, ONERA, Palaiseau, France; L. Le Brusquet, G. Fleury, Laboratory of Signals and Systems (L2S), Gif-sur-Yvette, France; L. Thobois, LEOSPHERE, Orsay, France; et al.	1500 hrs AIAA-2016-2870 **Deployment of a next generation and operational LIDAR solution for monitoring wake vortices for supporting new wake turbulence regulations (Invited)** L. Thobois, R. Krishnamurthy, J. Cariou, J. Nicolaon, LEOSPHERE, Orsay, France	1530 hrs AIAA-2016-2871 **Summary of NASA Wake and Weather Data Collection at Memphis International Airport: 2013-2015 (Invited)** M. Pruis, D. Delisi, NorthWest Research Associates, Redmond, WA; D. Jacob, Coherent Research Group, LLC, Key West, FL; D. Lai, NorthWest Research Associates, Redmond, WA	1600 hrs AIAA-2016-3715 **Weather Aware Route Planning (WARP)** J. Eanes, W. Monach, Daniel H. Wagner Associates, Inc., Hampton, VA			

Monday, 13 June 2016								
43-ASE-4	Supercooled-Large Droplet (SLD) Icing							Georgetown West
Chaired by: M. POTAPCZUK, NASA Glenn Research Center and P. VILLEDIEU								
1400 hrs AIAA-2016-2872 **Numerical Investigation of High-Speed Droplet Impact on Solid and Wet Surfaces** Y. Guo, Y. Lian, University of Louisville, Louisville, KY	1430 hrs AIAA-2016-2873 **A revisited model for SLD impact onto a solid surface.** P. Trontin, P. Villedieu, ONERA, Toulouse, France	1500 hrs AIAA-2016-2874 **Additional Results of Glaze Icing Scaling in SLD Conditions** J. Tsao, Ohio Aerospace Institute, Cleveland, OH	1530 hrs AIAA-2016-2875 **Super-cooled Large Droplet Ice Accretion Reproduction and Scaling Law Validation** E. Rocco, Y. Han, J. Palacios, Pennsylvania State University, University Park, PA; R. Kreeger, NASA Glenn Research Center, Cleveland, OH	1600 hrs AIAA-2016-2876 **Numerical Modeling of First and Second Order SLD Effects on 3D Geometries** D. Bilodeau, W. Habashi, McGill University, Montréal, Canada; G. Baruzzi, ANSYS, Inc., Montréal, Canada; M. Fossati, McGill University, Montréal, Canada	1630 hrs AIAA-2016-2877 **A combined post-processing method for SLD modeling** J. Cliquet, Airbus, Toulouse, France		

Monday, 13 June 2016								
44-ATIO.ACD-2	Aircraft Design Methods and Tools II: Geometry, Aerodynamic, and Structural Design							Gunston East
Chaired by: W. ANEMAAT, DARcorporation and R. VOS								
1400 hrs AIAA-2016-2878 **Advanced Modeling in OpenVSP** R. McDonald, California Polytechnic State University, San Luis Obispo, CA	1430 hrs AIAA-2016-2879 **Framework for Assessing Impact of Active Flow Control Technologies for Commercial Aircraft** B. Hiller, Y. Cai, E. Karagoz, Georgia Institute of Technology, Atlanta, GA; C. Wilhelms, RWTH Aachen University, Aachen, Germany; I. Chakraborty, S. Briceno, Georgia Institute of Technology, Atlanta, GA; et al.	1500 hrs AIAA-2016-2880 **Robust Optimization of Transonic Airfoil for Generic Fighter Aircraft using Global Variable Fidelity Modeling** M. Tyan, N. Nguyen, J. Lee, Konkuk University, Seoul, South Korea	1530 hrs AIAA-2016-2881 **Conceptual Design of Swept-Wing Root Airfoils** M. Sol, R. Vos, Delft University of Technology, Delft, The Netherlands	1600 hrs AIAA-2016-2882 **A Ground Structure Approach for the Evolutionary Optimization of Aircraft Wing Structures** T. Ikonen, A. Sobester, University of Southampton, Southampton, United Kingdom	1630 hrs AIAA-2016-2883 **Automated Generation of Finite-Element Meshes for Aircraft Conceptual Design** W. Li, J. Robinson, NASA Langley Research Center, Hampton, VA	1700 hrs AIAA-2016-2884 **Rapid Design and Optimization of Waverider from 3D Flow** C. Liu, B. Peng, B. Chen, C. Ji, China Academy of Aerospace Aerodynamics, Beijing, China	

Monday, 13 June 2016							
45-ATIO.ATM-4	**UAS in the NAS**						**Embassy**
Chaired by: L. REDDY, Purdue University							
1400 hrs AIAA-2016-2885 **Investigating Traffic Avoidance Maneuver Preferences of Unmanned Aircraft Operators_20151027** M. Kuffner, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; R. Guendel, Odyssey Systems Consulting Group, Wakefield, MA; S. Darrah, Booz Allen Hamilton, Dayton, OH	1430 hrs AIAA-2016-2886 **Emergent Detect and Avoid in the Absence of Intent Information of Intruder Aircraft** V. Kuo, Human Solutions, Inc., Washington, D.C.	1500 hrs AIAA-2016-2887 **From Rural to Urban Environments: Human/ Systems Simulation Research for Low Altitude UAS Traffic Management (UTM)** T. Prevot, J. Homola, J. Mercer, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2016-2888 **UAS Traffic Management (UTM) Concept of Operations to Safely Enable Low Altitude Flight Operations** T. Prevot, J. Rios, P. Kopardekar, J. Robinson III, M. Johnson, J. Jung, NASA Ames Research Center, Moffett Field, CA	1600 hrs AIAA-2016-2889 **Demonstration of an Adaptable NextGen Interface for the UAS Ground Control Station** J. Murphy, N. Otto, S. Jovic, NASA Ames Research Center, Moffett Field, CA; T. Carniol, RGI Commercial Solutions, Fairfax, VA	1630 hrs AIAA-2016-2890 **A Hierarchical Hybrid State System Based Controller Design Approach for an Autonomous UAS Mission** M. Hejase, Ohio State University, Columbus, OH; A. Oguz, Turkish Air Force Academy, Istanbul, Turkey; A. Kurt, Center for Automotive Research, Columbus, OH; U. Ozguner, K. Redmill, Ohio State University, Columbus, OH		

Monday, 13 June 2016							
46-ATIO.ATM-5	**Human Factors in ATM**						**Fairchild East**
Chaired by: N. SMITH, NASA-Ames							
1400 hrs AIAA-2016-2891 **Pilot Evaluation of a Decision Support Tool for Weather and Terrain Avoidance during Departure** J. Gauci, K. Theuma, D. Zammit Mangion, University of Malta, Msida, Malta	1430 hrs AIAA-2016-2892 **Insights in Mining the NTSB Accident and Incident Database** J. Cistone, Sullivan Aviation Services, LLC, Hanover, PA	1500 hrs AIAA-2016-2893 **Impacts of Guidance function on Air Traffic Controller situation awareness** M. Ellejmi, S. Dubuisson, M. Bonnier, R. Lane, EUROCONTROL, Bretigny, France	1530 hrs AIAA-2016-2894 **The Effect of Cockpit-Based Convective Weather Notifications on Pilot Decision Making** S. Campbell, A. Alexander, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA	1600 hrs AIAA-2016-2895 **Flight Crew Responses from the Interval Management Alternative Clearances (IMAC) Human-In-The-Loop Experiment** B. Baxley, S. Wilson, R. Roper, K. Swieringa, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2016-2896 **Human-in-the-Loop Investigation of Interoperability Between Terminal Sequencing and Spacing, Automated Terminal Proximity Alert, and Wake-Separation Recategorization** T. Callantine, San Jose State University, Moffett Field, CA; T. Prevot, NASA Ames Research Center, Moffett Field, CA; N. Bienert, A. Borade, C. Gabriel, V. Gujral, San Jose State University, Moffett Field, CA; et al.		

Monday, 13 June 2016							
47-ATIO.TFPC-3	**Transformational Flight - On-Demand Mobility (ODM) Barriers & Opportunities**						**Columbia 1**
Chaired by: V. STOUFFER, LMI and V. KUMAR, Intelligent Automation Inc.							
1400 hrs AIAA-2016-2897 **On-Demand Aviation Regulatory Obstacles and Resulting Research Roadmaps** R. Hemm, D. Duncan, V. Stouffer, LMI, Tysons, VA	1430 hrs AIAA-2016-2898 **Net Present Value, Trade-space, and Feasibility of On-Demand Aircraft** M. Narkus-Kramer, LMI, Tysons, VA; J. Tejeda, Booz Allen Hamilton, Washington, D.C.; V. Stouffer, R. Hemm, S. Trajkov, LMI, Tysons, VA; J. Creedon, Old Dominion University, Norfolk, VA; et al.	1500 hrs AIAA-2016-2899 **Impact of Reduced Crew Operations on Airlines - Operational Challenges and Cost Benefits** A. Malik, V. Gollnick, Institute of Air Transportation Systems, Hamburg, Germany	1530 hrs AIAA-2016-2900 **Economical assessment of air mobility on demand concepts with focus on Germany** M. Kreimeier, E. Stumpf, D. Gottschalk, RWTH Aachen University, Aachen, Germany				

Monday, 13 June 2016		
48-F360-2 1400 - 1600 hrs	The Future of Education	International Ballroom (East)

Moderator: Todd W. Zarfos, Vice President, Engineering Functions, Boeing Commercial Airplanes

Panelists:

Tara Chklovski
Founder, CEO
Iridescent

Norman L. Fortenberry
Executive Director
American Society for Engineering Education

Alton D. Romig, Jr.
Executive Officer
National Academy of Engineering

Melissa Musgrave
Head of Employment
Airbus and Airbus Group North America

Darryll J. Pines
Nariman Farvardin Professor of Aerospace Engineering
Dean, A. James Clark School of Engineering
University of Maryland

Monday, 13 June 2016		
49-F360-3 1400 - 1600 hrs	Concepts to Reality—Airplane Development In A Global Environment	Cabinet

Moderator: Ken Sanger, Vice President / General Manager 787 Airplane Development, The Boeing Company

Panelists:

Luis Carlos Affonso
Chief Operating Officer, Commercial Aviation
Embraer S.A.

Tom Pelland
President, Engine & Environmental Control Systems
UTC Aerospace Systems

Simon Carlisle
Director, Strategy, Civil Aerospace
Rolls Royce

Monday, 13 June 2016							
50-FC-3	Flow Control for High-Lift Airfoils						Columbia 11
Chaired by: R. KUMAR, Florida State University and J. LIN, NASA-Langley Research Center							
1400 hrs AIAA-2016-2901 **Performance Enhancement of an Airfoil Model with a Control Surface using Synthetic Jets** M. Monastero, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	1430 hrs AIAA-2016-2902 **High-Lift Performance Enhancement of a Simple Flap using Aerodynamic Flow Control** M. DeSalvo, Georgia Institute of Technology, Atlanta, GA; A. Gissen, E. Whalen, The Boeing Company, St. Louis, MO; A. Glezer, Georgia Institute of Technology, Atlanta, GA	1500 hrs AIAA-2016-2903 **Unsteady Active Flow Control on the Morphed Leading Edge of a High-lift Configuration Laminar Airfoil** A. Jairam, L. Clemons, R. Wlezien, Iowa State University, Ames, IA	1530 hrs AIAA-2016-2904 **Implementation and Testing of a Modular Rapid Prototyped Laminar Airfoil with Steady Blown Active Flow Control Slots** L. Clemons, P. Clayton, A. Jairam, R. Wlezien, Iowa State University, Ames, IA	1600 hrs AIAA-2016-2905 **Traverse Actuation Method** A. Shmilovich, Y. Yadlin, The Boeing Company, Huntington Beach, CA	1630 hrs AIAA-2016-2906 **Unsteady Active Flow Control on the Leading Edge of a High-lift Configuration Laminar Airfoil** L. Clemons, R. Wlezien, Iowa State University, Ames, IA	1700 hrs AIAA-2016-2907 **Using Computational Fluid Dynamics and Experiments to Design Sweeping Jets for High Reynolds Number Cruise Configurations** G. Jones, W. Milholen, J. Fell, S. Webb, C. Cagle, NASA Langley Research Center, Hampton, VA	

Monday, 13 June 2016							
51-FD-9	Cavity Flows II						Albright
Chaired by: R. SCHMIT, USAF AFRL and S. DAS, Birla Institute of Technology, Mesra, Ranchi							
1400 hrs AIAA-2016-2908 **Time-dependent airloads on a cylinder in a supersonic cavity** D. Chin, K. Granlund, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2016-2909 **Compressibility Effects in the Shear Layer over a Rectangular Cavity** S. Beresh, J. Wagner, K. Casper, Sandia National Laboratories, Albuquerque, NM	1500 hrs AIAA-2016-2910 **Three-Dimensional Measurement of Edge Effects in Open Cavities of Finite-Span** E. Demauro, S. Beresh, J. Wagner, J. Henfling, R. Spillers, Sandia National Laboratories, Albuquerque, NM	1530 hrs AIAA-2016-2911 **Unsteady Pressure Sensitive Paint Measurements of Resonance Properties in Complex Cavities** K. Casper, J. Wagner, S. Beresh, R. Spillers, J. Henfling, Sandia National Laboratories, Albuquerque, NM	1600 hrs AIAA-2016-2912 **A numerical study of the saturation process in an open cavity flow** N. Vinha, F. Meseguer-Garrido, J. de Vicente, E. Valero, Technical University of Madrid, Madrid, Spain	1630 hrs AIAA-2016-2913 **Control of flow instabilities in an open aircraft bay model cavity** Q. Liu, Technical University of Madrid, Madrid, Spain; F. Gómez, Monash University, Melbourne, Australia; V. Theofilis, Technical University of Madrid, Madrid, Spain		

Monday, 13 June 2016								
52-FD-10	Trends in Simulation Based Engineering (Invited)							Jefferson East
Chaired by: M. MALIK, NASA-Langley Research Center and M. ROGERS, NASA-Ames Research Center								
1400 hrs AIAA-2016-2914 **The Need for Advanced Simulations for Advanced Air Vehicle Concepts** J. Dryer, NASA Headquarters, Washington, D.C.; M. Rogers, NASA Ames Research Center, MOFFETT FIELD, CA	1430 hrs Oral Presentation **Requirements for Certification by Analysis and Implications for CFD** R. Gregg-III, The Boeing Company, Seattle, WA; J. Alonso, Stanford University, Stanford, CA	1500 hrs Oral Presentation **DLR's efforts for Digital Flight: A Virtual Aircraft Technology Integration Platform** C. Rossow, N. Kroll, S. Goertz, German Aerospace Center (DLR), Braunschweig, Germany	1530 hrs AIAA-2016-2916 **Outcomes from the DOE Workshop on Turbulent Flow Simulation at the Exascale** M. Sprague, National Renewable Energy Laboratory, Golden, CO; S. Boldyrev, University of Wisconsin, Madison, Madison, WI; C. Chang, Princeton University, Princeton, NJ; P. Fischer, University of Illinois, Urbana-Champaign, Urbana, IL; R. Grout, National Renewable Energy Laboratory, Golden, CO; W. Gustafson, Pacific Northwest National Laboratory, Richland, WA; et al.	1600 hrs AIAA-2016-2917 **Future Directions of High Fidelity CFD for Aerothermal Turbomachinery Analysis and Design** G. Laskowski, J. Kopriva, V. Michelassi, S. Shankaran, GE Aviation, Lynn, MA; U. Paliath, R. Bhaskaran, GE Global Research, Niskayuna, NY; et al.	1630 hrs AIAA-2016-2918 **Unstructured Grid Adaptation: Status, Potential Impacts, and Recommended Investments Towards CFD 2030** M. Park, NASA Langley Research Center, Hampton, VA; A. Loseille, French National Institute for Research in Computer Science and Control (INRIA), Le Chesnay, France; J. Krakos, T. Michal, The Boeing Company, St. Louis, MO; J. Alonso, Stanford University, Stanford, CA		

Monday, 13 June 2016								
53-FD-11	Solver Techniques I							Holmead West
Chaired by: P. BUNING, NASA-Langley Research Center and D. FRENCH, University of Cincinnati								
1400 hrs AIAA-2016-2919 **Comparative Analysis of the Arbitrary Mesh Interface(AMI) and Overset Methods for Dynamic Body Motions in OpenFOAM** D. Chandar, H. Gopalan, Institute of High Performance Computing, Singapore, Singapore	1430 hrs AIAA-2016-2920 **Cartesian Grid Method for Complex Compressible Flows and Its Applications** N. Zhao, Z. Shen, Nanjing University of Aeronautics and Astronautics, Nanjing, China; O. Hu, Aviation Industry Corporation of China (AVIC), Jingdezhen, China	1500 hrs AIAA-2016-2921 **Near-Body Grid Adaption for Overset Grids** P. Buning, NASA Langley Research Center, Hampton, VA; T. Pulliam, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2016-2922 **Theoretical Error Analysis of Direct Overset Finite Element Methods** D. French, University of Cincinnati, Cincinnati, OH; J. Benek, C. Schrock, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2016-2923 **Hybrid Parallel CPU-GPU Incompressible Flow Solver with Ghost-cell Immersed Boundary Method and Adaptive Mesh Refinement** A. Jost, J. Zhang, Florida Institute of Technology, Melbourne, FL	1630 hrs AIAA-2016-2924 **Multilevel Parallelism for CFD Codes on Heterogeneous Platforms** B. Baghapour, A. McCall, C. Roy, Virginia Polytechnic Institute and State University, Blacksburg, VA		

Monday, 13 June 2016								
54-FD-12	Discontinuous Galerkin Methods - Applications							Jay
Chaired by: K. SHAHBAZI, South Dakota School of Mines and Technology and D. KESSLER, Naval Research Laboratory								
1400 hrs AIAA-2016-2925 **Simulations of Compressible Taylor-Green Flow by a Discontinuous Galerkin Method** H. Atkins, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2016-2926 **Progress Towards the Application of the Recovery-Based Disontinuous Galerkin Method to Practical Flow Physics Problems** P. Johnson, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI	1500 hrs AIAA-2016-2927 **A Reconstructed Direct Discontinuous Galerkin Method for Compressible Turbulent Flows on Hybrid Grids** X. Yang, Commercial Aircraft Corporation of China, Ltd. (COMAC), Shanghai, China; J. Cheng, Beihang University, Beijing, China; X. Liu, C. Wang, North Carolina State University, Raleigh, NC; J. Si, Commercial Aircraft Corporation of China, Ltd. (COMAC), Shanghai, China; H. Luo, North Carolina State University, Raleigh, NC	1530 hrs AIAA-2016-2928 **A Direct Discontinuous Galerkin Method for Computation of Turbulent Flows on Hybrid Grids** J. Cheng, Beihang University, Beijing, China; X. Liu, North Carolina State University, Raleigh, NC; X. Yang, Commercial Aircraft Corporation of China, Ltd. (COMAC), Shanghai, China; T. Liu, Beihang University, Beijing, China; H. Luo, North Carolina State University, Raleigh, NC	1600 hrs AIAA-2016-2929 **Validation of Overset Discontinuous Galerkin and Hybrid RANS/LES Method for Jet Noise Prediction** R. Harris, R. Arslanbekov, CFD Research Corporation, Huntsville, AL; A. Sescu, E. Collins, E. Luke, Mississippi State University, Mississippi State, AL	1630 hrs AIAA-2016-2930 **A fully-implicit, Giles-type nonreflecting boundary condition in a DG-Chimera turbomachinery solver** N. Wukie, P. Orkwis, M. Turner, University of Cincinnati, Cincinnati, OH	1700 hrs AIAA-2016-2931 **Supersonic Film Cooling Simulation with a DG Method** X. Shi, N. Hu, G. Zhang, C. Yue, X. Yuan, China Academy of Aerospace Aerodynamics, Beijing, China; C. Shu, Brown University, Providence, RI	

Monday, 13 June 2016							
55-FD-13	**Shock-Boundary Layer Interaction I**						**Oak Lawn**
Chaired by: J. BENEK, Air Force Research Lab AFRL/RQ and P. MORGAN, Ohio Aerospace Institute							
1400 hrs AIAA-2016-2932 **Reynolds-Averaged Navier-Stokes Simulations of Swept Shock Wave Boundary Layer Interactions at Mach 2 and 5** K. Holst, J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN	1430 hrs AIAA-2016-2933 **Investigation of Unsteadiness in a Mach 2 Swept-Ramp Shock/Boundary-Layer Interaction Using 50 kHz PIV** L. Vanstone, N. Clemens, M. Saleem, S. Seckin, University of Texas, Austin, Austin, TX	1500 hrs AIAA-2016-2934 **Effect of Reynolds Number on 3-D Shock Wave Boundary Layer Interactions** A. Baldwin, N. Arora, R. Kumar, F. Alvi, Florida State University, Tallahassee, FL	1530 hrs AIAA-2016-2935 **Sharp-Fin Induced Shock Wave/Turbulent Boundary Layer Interactions in an Axisymmetric Configuration** J. Pickles, P. Subbareddy, V. Narayanaswamy, North Carolina State University, Raleigh, NC	1600 hrs AIAA-2016-2936 **Low-frequency unsteadiness in a wide-span hypersonic shock/turbulent boundary layer interaction** C. Helm, M. Martin, University of Maryland, College Park, College Park, MD	1630 hrs AIAA-2016-2937 **Pulse Energy Effect on Shock Wave Boundary Layer Interaction Control using Repetitive Energy Depositions** A. Iwakawa, T. Tamba, S. Pham, T. Shoda, A. Sasoh, Nagoya University, Nagoya, Japan		

Monday, 13 June 2016							
56-FD-14	**High-Speed Boundary-Layer Transition I**						**Lincoln East**
Chaired by: R. KIMMEL, USAF AFRL/RQHF and B. WHEATON, JHU Applied Physics Laboratory							
1400 hrs AIAA-2016-2938 **Instability Measurements in the Boeing/AFOSR Mach-6 Quiet Tunnel** J. Edelman, B. Chynoweth, G. McKiernan, C. Sweeney, S. Schneider, Purdue University, West Lafayette, IN	1430 hrs AIAA-2016-2939 **Laminar-Turbulent Transition on a Flared Cone at Mach 6** C. Hader, H. Fasel, University of Arizona, Tucson, Tucson, AZ	1500 hrs AIAA-2016-2940 **Modal Analysis of Receptivity Mechanisms for a Freestream Hot-Spot Perturbation on a Blunt Compression-Cone Boundary Layer** M. Miselis, Y. Huang, X. Zhong, University of California, Los Angeles, Los Angeles, CA	1530 hrs AIAA-2016-2941 **PSE and Spatial Biglobal Instability Analysis of HIFiRE-5 Geometry** T. Kocian, A. Moyes, C. Mullen, H. Reed, Texas A&M University, College Station, TX	1600 hrs AIAA-2016-2942 **DNS and PSE study on the stabilization effect of hypersonic boundary layer waves using 2-D surface roughness** K. Fong, X. Zhong, University of California, Los Angeles, Los Angeles, CA	1630 hrs AIAA-2016-2943 **Optical Measurements of Transitional Events in a Mach-6 Laminar Boundary Layer** S. Gordeyev, T. Juliano, University of Notre Dame, Notre Dame, IN		

Monday, 13 June 2016							
57-FD-15	**High-Order Methods I**						**Columbia 10**
Chaired by: D. WILLIS, University of Massachusetts Lowell and C. LIANG, George Washington University							
1400 hrs AIAA-2016-2944 **A High-Order Conservative Eulerian Simulation Method for Vortex Dominated Flows** J. Bevan, D. Willis, University of Massachusetts, Lowell, Lowell, MA	1430 hrs AIAA-2016-2945 **High-Order Eulerian Methods for Elastic-Plastic Flow in Solids and Coupling with Fluid Flows** N. Ghaisas, A. Subramaniam, S. Lele, Stanford University, Stanford, CA	1500 hrs AIAA-2016-2946 **High-Order Strand Grid Methods for Multi-species Reacting Flow** C. Blakely, A. Katz, O. Tong, Utah State University, Logan, UT	1530 hrs AIAA-2016-2947 **Implicit Spectral Difference Method Solutions of Compressible Flows Considering High-Order Meshes** F. Moreira, E. Jourdan, C. Breviglieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; A. Aguiar, Federal University of ABC, Santo André, Brazil; J. Azevedo, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil	1600 hrs AIAA-2016-2948 **High-Order Hybrid Fourier Continuation-WENO Scheme for 3D Compressible Navier-Stokes Equations** K. Shahbazi, South Dakota School of Mines and Technology, Rapid City, SD	1630 hrs AIAA-2016-2949 **A high order spectral difference method for fluid-structure interaction using an implicit-explicit RK coupling scheme** X. Zhang, C. Liang, L. Li, Z. Zhang, J. Lee, George Washington University, Washington, D.C.		

Monday, 13 June 2016							
58-FT-1	**Flight Testing of Manned Aircraft**						**Gunston West**
Chaired by: S. GINN, NASA AFRC and R. ROEDTS, Columbia Helicopters, Inc							
1400 hrs AIAA-2016-2950 **Wing Deformation Measurement As Bases for In-flight Aerodynamics** R. Tagai, K. Nakakita, M. Kurita, T. Nakajima, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1430 hrs AIAA-2016-2951 **Background Oriented Schlieren (BOS) of a Supersonic Aircraft in Flight** J. Heineck, NASA Ames Research Center, Moffett Field, CA; D. Banks, NASA Armstrong Flight Research Center, Edwards, CA; E. Schairer, NASA Ames Research Center, Moffett Field, CA; E. Haering, P. Bean, NASA Armstrong Flight Research Center, Edwards, CA	1500 hrs AIAA-2016-2952 **Entry Flight Testing the Space Shuttle, 1977 to 1984** D. Cooke, Cooke Concepts and Solutions, Gettysburg, PA; J. Engle, Engle Technologies, Houston, TX	1530 hrs AIAA-2016-2953 **Flight Test Experiments on Cavity Flow in a SUU-41 Pod** Z. Probst, M. Reeder, Air Force Institute of Technology, Wright-Patterson AFB, OH; R. Johnson, J. Grove, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2016-2954 **Variable Stability Learjets – First Flights of an Old Airplane with a New VSS** Z. McCarley, J. Lindak, Calspan Corporation, Niagara Falls, NY	1630 hrs Oral Presentation **Instrumentation and Baseline Characterization of a Tecnam P2006T for the SCEPTOR Distributed Electric Propulsion test vehicle.** T. Foster, D. Howe, P. Osterkamp, Empirical Systems Aerospace, Inc., Pismo Beach, CA		

Monday, 13 June 2016							
59-MAO-3	**Design Optimization of Aircrafts and Other Complex Systems II**						**Cardozo**
Chaired by: A. NAJAFI, ANSYS, Inc. and S. CHOI, Virginia Polytechnic Institute and State University							
1400 hrs AIAA-2016-2955 **Control Power Optimization Using Artificial Intelligence For Forward Swept Wing And Hybrid Wing Body Aircraft** M. Adegbindin, N. Love, R. Kapania, J. Schetz, Virginia Polytechnic Institute and State University, Blacksburg, VA	1430 hrs AIAA-2016-2956 **Comparing Different Off-the-Shelf Optimizers' Performance in Conceptual Aircraft Design** A. Wendorff, E. Botero, J. Alonso, Stanford University, Stanford, CA	1500 hrs AIAA-2016-2957 **Development of a Multidisciplinary Design Analysis and Optimization Toolset for Integrated Spacecraft Subsystem Models** T. Winter, M4 Engineering, Inc., Long Beach, CA; B. Coleman, H. Pernicka, Missouri University of Science and Technology, Rolla, MO	1530 hrs AIAA-2016-2958 **Topology Optimization of a Blended-Wing-Body Aircraft Structure** G. Singh, V. Toropov, Queen Mary University of London, London, United Kingdom; J. Eves, Altair Engineering, Inc., Bristol, United Kingdom	1600 hrs AIAA-2016-2959 **Efficient Framework for Missile Design and 6DoF Simulation using Multi-fidelity Analysis and Data Fusion** N. Nguyen, M. Tyan, J. Lee, Konkuk University, Seoul, South Korea	1630 hrs AIAA-2016-2960 **Multidisciplinary Design Optimization Research of overall Aero-engine based on Flow Path** X. Shen, W. Hu, Beihang University, Beijing, China		

Monday, 13 June 2016							
60-MAO-4	**Shape and Topology Optimization II**						**Columbia 3**
Chaired by: S. CHOWDHURY, University at Buffalo and T. HEARN, NASA Glenn Research Center							
1400 hrs AIAA-2016-2961 **A Multifidelity Multiobjective Optimization Framework for High-Lift Airfoils** J. Demange, A. Savill, T. Kipouros, Cranfield University, Cranfield, United Kingdom	1430 hrs AIAA-2016-2962 **Comparison and combination of experience-based parameterization with vertex morphing in aerodynamic shape optimization of a forward-swept wing aircraft** D. Baumgärtner, Technical University of Munich, Munich, Germany; A. Viti, A. Dumont, G. Carrier, ONERA, Meudon, France; K. Bletzinger, Technical University of Munich, Munich, Germany	1500 hrs AIAA-2016-2963 **An Efficient Unsteady Aerodynamic and Aeroacoustic Design Framework Using Discrete Adjoint** B. Zhou, T. Albring, N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany; T. Economon, J. Alonso, Stanford University, Stanford, CA					

Monday, 13 June 2016							
61-MST-3	**Human Factors, Perception, and Cueing**						**Morgan**
Chaired by: D. CARTMELL, Boeing Engineering Operations & Technology and C. TAYLOR, The MITRE Corporation							
1400 hrs AIAA-2016-2964 **Interactions of Outside Visual Cues and Motion Cueing Settings in Yaw Tracking** H. Peterse, D. Pool, M. van Paassen, M. Mulder, Delft University of Technology, Delft, The Netherlands	1430 hrs AIAA-2016-2965 **Effects of Different Heave Motion Components on Pilot Pitch Control Behavior** P. Zaal, San Jose State University, Moffett Field, CA	1500 hrs AIAA-2016-2966 **Measurement of Perceived Motion In a Fixed Base Simulator** S. Chivukula, F. Cardullo, K. Zaychik, A. Momani, State University of New York, Binghamton, NY	1530 hrs AIAA-2016-2967 **Flight Crew Response to Unexpected Events: A Simulator Experiment** J. Field, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands; L. Fucke, B. Correia Grácio, The Boeing Company, Madrid, Spain; F. Mohrmann, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands	1600 hrs AIAA-2016-2968 **Functional Symbology – Evaluation of task-specific Head-Up Display information for use on a commercial flight deck** D. Richards, Coventry University, Coventry, United Kingdom; P. Lamb, BAE Systems, Rochester, United Kingdom			

Monday, 13 June 2016							
62-MST-4	**Modeling and Simulation of Uninhabited Aerial Vehicles II**						**Monroe**
Chaired by: S. BEARD, NASA-Ames Research Center and T. BURRESS, Lockheed Martin							
1400 hrs AIAA-2016-2969 **Modeling SJA-based UAV Flight Control in Extraterrestrial Conditions** P. Pagadala, M. Reed, E. Besson, V. Golubev, N. Uddanti, Embry-Riddle Aeronautical University, Daytona Beach, FL	1430 hrs AIAA-2016-2970 **Analysis of Onboard Takeoff and Landing Characteristics for Unmanned Aerial Vehicles** D. Liu, G. Liu, G. Hong, Beihang University, Beijing, China	1500 hrs AIAA-2016-2971 **Small-scale coaxial armed unmanned helicopter flight dynamics investigation** M. Wu, M. Chen, F. Wang, Q. Wang, Beihang University, Beijing, China	1530 hrs AIAA-2016-2972 **Attitude and Altitude Stabilization of Fixed Wing VTOL Unmanned Air Vehicle** A. Guclu, ROKETSAN Missile Industries, Inc., Ankara, Turkey; D. Kurtulus, Middle East Technical University, Ankara, Turkey; K. Arikan, Atilim University, Ankara, Turkey				

Monday, 13 June 2016							
63-PDL-2	**Plasma and Laser Diagnostics**						**Piscataway**
Chaired by: J. DRAKES, Aerojet Rocketdyne and C. SUCHOMEL, USAF							
1400 hrs AIAA-2016-2973 **Assessment of Coherent Laser Diagnostic Techniques for Probing Atomic Oxygen in High-Enthalpy Flows** A. Meindl, T. Hermann, S. Loehle, S. Fasoulas, University of Stuttgart, Stuttgart, Germany	1430 hrs AIAA-2016-2974 **Characterization of NO Production Over Metallic Surfaces in Air Plasmas Using Laser Induced Fluorescence** L. Allen, J. Meyers, D. Fletcher, University of Vermont, Burlington, Burlington, VT	1500 hrs AIAA-2016-2975 **Laser Light Scattering from Equilibrium, High Temperature Gases: Limitations on Rayleigh Scattering Thermometry** C. Limbach, C. Dumitrache, A. Yalin, Colorado State University, Fort Collins, CO	1530 hrs AIAA-2016-2976 **A Microscopic Study of Laser Interactions with Single Levitated Liquid Droplets in an Electrodynamic Balance** C. Limbach, R. Robinson, D. Adams, M. Wilbanks, A. Yalin, Colorado State University, Fort Collins, CO				

Monday, 13 June 2016							
64-TP-2	**Ablation II - Modeling**						**DuPont**
Chaired by: B. HOLLIS, NASA-Langley Research Center and T. GOKCEN, Analytical Mechanics Associates, Inc.							
1400 hrs AIAA-2016-2977 **Two-Dimensional Modeling of Ablation and Pyrolysis with Application to Rocket Nozzles** P. Cross, Naval Air Warfare Center, China Lake, CA; I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1430 hrs AIAA-2016-2978 **Inverse Heat Conduction Methods in the CHAR Code for Aerothermal Flight Data Reconstruction** B. Oliver, A. Amar, NASA Johnson Space Center, Houston, TX	1500 hrs AIAA-2016-2979 **Overview of the CHarring Ablator Response (CHAR) Code** A. Amar, B. Oliver, B. Kirk, G. Salazar, NASA Johnson Space Center, Houston, TX; J. Droba, HX5, Houston, TX	1530 hrs AIAA-2016-2980 **Tangle-free Finite Element Mesh Motion for Ablation Problems** J. Droba, NASA Johnson Space Center, Houston, TX	1600 hrs AIAA-2016-2981 **Advanced Parallelization Strategies for Modelling Flow Through Ablative Thermal Protection Systems** R. Jambunathan, D. Levin, University of Illinois, Urbana-Champaign, Urbana, IL	1630 hrs AIAA-2016-2982 **Development and Verification of Enclosure Radiation Capabilities in the CHarring Ablator Response (CHAR) code.** G. Salazar, J. Droba, B. Oliver, A. Amar, NASA Johnson Space Center, Houston, TX		

Monday, 13 June 2016		
65-RLA-1 1500 - 1715 hrs	**Rising Leaders in Aerospace: Speed Networking and Reception**	International Ballroom (West)

Get your questions answered! Senior Mentors will include:

Mark Ballin NASA Langley Research Center	**Brad Belcher** Rolls Royce	**John Cavolowsky** NASA	**Peter Coen** NASA Langley Research Center	**Fayette Collier** NASA	**Michael Corcoran** The Boeing Company
Peggy Cornelle NASA Glenn Research Center	**Barbara Esker** NASA	**Matthew Hutchison** Aurora Flight Sciences	**Sally Johnson** Adaptive Aerospace group, Inc.	**Dean Jorgensen** Space Electronics	**Art Mallett** Dunmore Corporation
Jayant Ramakrishnan Bastion Technologies	**David Riley** Boeing Engineering Operations and Technology	**Lisa Teague** Rolls Royce	**Richard Wahls** NASA Langley Research Center	**Matthew Hutchison** Aurora Flight Sciences	**Gregor Verble Mikic** Joby Aviation

Monday, 13 June 2016		
66-NW-2 1600 - 1630 hrs	**Networking Coffee Break**	Meeting Room Foyers

Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.

Monday, 13 June 2016		
67-LEC-2 1630 - 1730 hrs	**Aerodynamics Award Lecture**	Cabinet

Some Applications of Computational Fluid Dynamics to Entry and Landing of the Mars Science Laboratory
Pieter Buning
Aerospace Technologist
NASA Langley Research Center

Monday, 13 June 2016		
68-PLNRY-2 1730 - 1830 hrs	**Plenary**	International Ballroom (Center)

Making Dreams into Reality — The Epochal Stories That Define the Boeing Company
Michael Lombardi
Director of Boeing Archives
The Boeing Company

Tuesday

Tuesday, 14 June 2016		
69-SB-2 0730 - 0800 hrs	**Speakers' Briefing**	Session Rooms

Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 30-minute briefing on the day of their session to exchange bios and review final details prior to the session. Please attend on the day of your session.

Tuesday, 14 June 2016		
70-PLNRY-3 0745 - 0900 hrs	**Plenary**	International Ballroom (Center)

0745 hrs

Renewing Innovation in U.S. Aeronautics
Congressman Steve Knight (R-CA)
House Committee on Science, Space, and Technology

0810 hrs

Innovation and Inspiration — The HondaJet
Michimasa Fujino
President & CEO
Honda Aircraft Company

Tuesday, 14 June 2016		
71-NW-3 0845 - 0930 hrs	Networking Coffee Break	Columbia
Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.		

Tuesday, 14 June 2016							
72-AFM-5	Aircraft Flight Dynamics II						Holmead West
Chaired by: F. FRESCONI, US Army Research Lab							
0930 hrs AIAA-2016-2983 **Propeller Torque Effect on Steady-State Turn Trim of Standard and Mass-Actuated Airplane** S. Erturk, A. Dogan, University of Texas, Arlington, Arlington, TX	1000 hrs AIAA-2016-2984 **A wind tunnel tested control system for a morphing wing actuation mechanism** M. Tchatchueng Kammegne, R. Botez, L. Grigorie, University of Québec, Montréal, Canada; M. Mamou, Y. Mebarki, National Research Council Canada, Ottawa, Canada	1030 hrs AIAA-2016-2985 **Aerobatic Maneuvers of a Compound Rotorcraft at High Advance Ratios - Flight Path Generation and Dynamic Simulation** A. Thorsen, J. Horn, Pennsylvania State University, University Park, PA	1100 hrs AIAA-2016-2986 **Development and Evaluation of a Unified Control Architecture for a Compound Rotorcraft in Maneuvering Flight** A. Thorsen, J. Horn, Pennsylvania State University, University Park, PA	1130 hrs AIAA-2016-2987 **Formation Flight for Fuel Saving in Coronet Mission - Part A: Sweet Spot Determination** C. Kniffin, A. Dogan, University of Texas, Arlington, Arlington, TX; W. Blake, Air Force Research Laboratory, Wright-Patterson AFB, OH			

Tuesday, 14 June 2016							
73-AFM-6	Unmanned Aerial Systems I						Holmead East
Chaired by: T. FIELDS, University of Missouri-Kansas City and K. CUNNINGHAM, NASA Langley Research Center							
0930 hrs AIAA-2016-2988 **Development of Robust Flight Control Laws for a Highly Flexible Aircraft in the Frequency Domain** A. Köthe, R. Luckner, Technical University of Berlin, Berlin, Germany; P. González Ramirez, F. Silvestre, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; Z. Pang, C. Cesnik, University of Michigan, Ann Arbor, Ann Arbor, MI	1000 hrs AIAA-2016-2989 **Meta Aircraft Controllability** B. Troub, C. Montalvo, University of South Alabama, Mobile, AL	1030 hrs AIAA-2016-2990 **Overcoming the Challenges of Using Unmanned Aircraft for Bridge Inspections** I. Hernandez, T. Fields, J. Kevern, University of Missouri, Kansas City, Kansas City, MO	1100 hrs AIAA-2016-2991 **An Autonomous, Visually-Guided, Counter-sUAS Aerial Vehicle with Net Countermeasure** T. Horiuchi, M. Paras, T. Cervi, B. Oursler, S. Sanz, J. Gaus, University of Maryland, College Park, College Park, MD; et al.	1130 hrs AIAA-2016-2992 **Linear Control of Highly Flexible Aircraft based on Loop Separation** P. Gonzalez, F. Silvestre, P. Paglione, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; A. Köthe, Technical University of Berlin, Berlin, Germany; Z. Pang, C. Cesnik, University of Michigan, Ann Arbor, Ann Arbor, MI	1200 hrs AIAA-2016-2993 **Assessment of Asymmetric Flight on Solar UAS** E. Belfield, A. Drake, California Polytechnic State University, San Luis Obispo, CA		

Tuesday, 14 June 2016							
74-AMT-3	Velocimetry II						Columbia 2
Chaired by: J. JEWELL, Air Force Research Laboratory and R. BURNS, NASA Langley Research Center							
0930 hrs AIAA-2016-2994 **Applications of Temporal Supersampling in Pulse-Burst PIV** S. Beresh, J. Wagner, E. Demauro, J. Henfling, R. Spillers, P. Farias, Sandia National Laboratories, Albuquerque, NM	1000 hrs AIAA-2016-2995 **PIV Measurements of a plunging Airfoil at High Angles of Attack** M. Zakaria, F. Jafari, M. Hajj, Virginia Polytechnic Institute and State University, Blacksburg, VA	1030 hrs AIAA-2016-2996 **Investigation on the Response Mechanisms of Tracer Particles for PIV measurements in Supersonic Flows** F. Chen, Y. Mi, X. Chen, H. Liu, Shanghai Jiao Tong University, Shanghai, China	1100 hrs AIAA-2016-2997 **Investigation of the influence of subgrid-scale stress on the accuracy of non-intrusive spatial pressure measurement using a DNS channel flow database** X. Liu, S. Siddle-Mitchel, San Diego State University, San Diego, CA; J. Katz, Johns Hopkins University, Baltimore, MD	1130 hrs AIAA-2016-2998 **In-Flight PIV for CROR Flight Test Demonstration** V. Pommier-Budinger, Y. Bury, University of Toulouse, Toulouse, France; G. Michon, Clément Ader Institute, Toulouse, France; G. Napias, University of Toulouse, Toulouse, France			

Tuesday, 14 June 2016							
75-AMT-4	**Global Surface Measurements**						**Oak Lawn**
Chaired by: T. IOPPOLO, Southern Methodist University and B. THUROW, Auburn University							
0930 hrs AIAA-2016-2999 **Development of a Grid PSP/ TSP System for Unsteady Measurements on Rotating Surfaces** D. Peng, L. Jiao, Y. Liu, Shanghai Jiao Tong University, Shanghai, China	1000 hrs AIAA-2016-3000 **Skin Friction Measurements to Evaluate Viscous Drag Reduction Approaches** J. Naughton, E. DeMillard, P. Davidson, University of Wyoming, Laramie, Laramie, WY	1030 hrs AIAA-2016-3001 **An Experimental Study of Barchan-Dune-Shaped Injection Compounds for Improved Film Cooling Effectiveness** W. Zhou, H. Hu, Iowa State University, Ames, IA					

Tuesday, 14 June 2016							
76-APA-10	**VSTOL/STOL Applications**						**Columbia 9**
Chaired by: N. HALL and J. GEORGE, Metrolaser Inc.							
0930 hrs AIAA-2016-3002 **Aerodynamic Analysis for Conceptual Design of a Lift-Fan type Aircraft** H. Lee, R. Prasad, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA	1000 hrs AIAA-2016-3003 **Numerical Investigations of Fan-In-Wing Aerodynamic Performance with Active Flow Control** C. Sheng, Q. Zhao, University of Toledo, Toledo, OH	1030 hrs AIAA-2016-3004 **Experimental Verification of a Semi-Empirical V/STOL Aircraft Performance Analysis Method** M. Bronz, A. Drouin, French Civil Aviation University, Toulouse, France	1100 hrs AIAA-2016-3005 **Unsteady Velocity Measurements of Supersonic Military-Style Exhaust Jets in Practical Configurations** S. Hromisin, Pennsylvania State University, University Park, PA; R. Powers, L. Myers, Naval Air Systems Command, Patuxent River, MD; D. McLaughlin, Pennsylvania State University, University Park, PA	1130 hrs AIAA-2016-3006 **UC2AV:Unmanned Circulation Control Aerial Vehicle for Short Takeoff and Enhanced Payload** K. Kanistras, P. Saka, K. Valavanis, M. Rutherford, University of Denver, Denver, CO		

Tuesday, 14 June 2016							
77-APA-11	**Aerodynamic - Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology I**						**Albright**
Chaired by: N. NGUYEN, NASA-Ames Research Center and A. JONES, University of Maryland							
0930 hrs AIAA-2016-3007 **Wing Shaping Concept for Distributed Propulsion Aircraft to Improve Aerodynamic Efficiency** N. Nguyen, K. Reynolds, NASA Ames Research Center, Moffett Field, CA; E. Ting, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA	1000 hrs AIAA-2016-3008 **A Study on VGTM Actuation System for Multi Axis Morphing Wing of UAV** P. Shanmugam, S. Raja, National Aerospace Laboratories, Bengaluru, India; K. Parammasivam, F. Zohra, Anna University, Chennai, India	1030 hrs AIAA-2016-3009 **Comparison of Curvilinear Stiffeners and Tow Steered Composites for Aeroelastic Tailoring of Transports** B. Stanford, NASA Langley Research Center, Hampton, VA; C. Jutte, Craig Technologies, Inc., Cape Canaveral, FL	1100 hrs AIAA-2016-3010 **Aerodynamic Characteristics and Shape Optimization of a Variable Camber Compliant Wing** Y. Jo, Korea Advanced Institute of Science and Technology, Daejeon, South Korea; S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA; L. Zientarski, J. Joo, Air Force Research Laboratory, Wright-Patterson AFB, OH	1130 hrs AIAA-2016-3011 **A Status Review of the Commercial Supersonic Technology (CST) Aeroservoelasticity (ASE) Project** W. Silva, M. Sanetrik, P. Chwalowski, C. Funk, NASA Langley Research Center, Hampton, VA	1200 hrs AIAA-2016-3012 **Aerodynamic Modeling of Transonic Aircraft Using Vortex Lattice Coupled with Transonic Small Disturbance for Conceptual Design** D. Chaparro, MORI Associates, Inc., Moffett Field, CA; G. Fujiwara, University of Washington, Seattle, Seattle, WA; E. Ting, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA	

Tuesday, 14 June 2016							
78-APA-12	**Propeller/Rotorcraft/Wind Turbine Aerodynamics II**						**Northwest**
Chaired by: J. RAULEDER, Technical University of Munich and J. CODER, Applied Research Laboratory - Penn State							
0930 hrs AIAA-2016-3013 **Aeromechanics Analysis of a Coaxial Rotor System in Hover and High-Advance-Ratio Forward Flight** R. Feil, J. Rauleder, M. Hajek, Technical University of Munich, Munich, Germany	1000 hrs AIAA-2016-3014 **Investigation of Centrifugal Pumping Rotor Blades in Hover Using CFD** S. Platzer, J. Rauleder, M. Hajek, Technical University of Munich, Munich, Germany	1030 hrs AIAA-2016-3015 **Pusher-Propeller Blade Loading With and Without Pylon Trailing-Edge Blowing** T. Sinnige, D. Ragni, G. Eitelberg, L. Veldhuis, Delft University of Technology, Delft, The Netherlands	1100 hrs AIAA-2016-3016 **A More Comprehensive Database for Low Reynolds Number Propeller Performance Validations** A. Ghoddoussi, L. Miller, Wichita State University, Wichita, KS	1130 hrs AIAA-2016-3017 **Effect of Reynolds Numbers of 10,000 to 100,000 on Rotor Blades of Small Unmanned Aerial Vehicles** H. Otsuka, K. Nagatani, Tohoku University, Sendai, Japan	1200 hrs AIAA-2016-3018 **Turbulent Boundary Layer Response to Multiple Step Changes in Surface Roughness** J. George, MetroLaser, Inc., Laguna Hills, CA; G. Byun, R. Simpson, Applied University Research, Inc., Blacksburg, VA		

Tuesday, 14 June 2016							
79-APA-13	**Hypersonic Aerodynamics**						**Jefferson West**
Chaired by: A. VANDERWYST, Leidos and B. OSBORNE, The Boeing Company							
0930 hrs AIAA-2016-3019 **Numerical analysis of a separated flow on a supersonic cone flare model** O. Frayssinet, French Atomic Energy and Alternative Energies Commission, Le Barp, France	1000 hrs AIAA-2016-3021 **Coefficient Revision for Supersonic Turbulent Density Fluctuation Model** H. Pan, P. Su, X. Cheng, H. Ma, China Academy of Aerospace Aerodynamics, Beijing, China	1030 hrs AIAA-2016-3022 **Euler model of mass loss in the process of hypersonic solid particle impact** H. Dai, C. Zhu, H. Zhao, Z. Wang, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1100 hrs AIAA-2016-3023 **Aerodynamic Force Measurements during 100 Milliseconds Test Duration** Y. Wang, Y. Liu, C. Luo, Z. Jiang, Chinese Academy of Sciences, Beijing, China	1130 hrs AIAA-2016-3024 **Numerical Simulation of Time-Varying Plasma Sheath for Reentry Vehicle** C. Shao, T. Deyang, W. Chen, Zhejiang University, Hangzhou, China			

Tuesday, 14 June 2016							
80-APA-14	**Transonic & Supersonic Aerodynamics**						**Columbia 4**
Chaired by: M. POST, USAF Academy and V. BHAGWANDIN, US Army Research Laboratory							
0930 hrs AIAA-2016-3025 **A novel mid-field breakdown of the aerodynamic force in compressible flows** M. Ostieri, R. Tognaccini, B. Mele, University of Naples "Federico II", Naples, Italy	1000 hrs AIAA-2016-3026 **An Investigation of C-130 Aircraft Base Drag Reduction with Aftbody Modifications** H. Telli, Turkish Air Force Academy, Istanbul, Turkey; E. Ayan, Middle East Technical University, Ankara, Turkey; S. Soyer, Istanbul Technical University, Istanbul, Turkey; E. Gülsever, S. Özcan, Turkish Air Force Academy, Istanbul, Turkey	1030 hrs AIAA-2016-3027 **Development of Deformed CAD Geometries of NASA's Common Research Model for the Sixth AIAA CFD Drag Prediction Workshop** S. Keye, German Aerospace Center (DLR), Braunschweig, Germany; M. Gammon, International TechneGroup, Inc. (ITI), Cambridge, United Kingdom	1100 hrs AIAA-2016-3028 **Shape Optimization of Supersonic Bodies to Reduce Sonic Boom Signature** J. Li, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1130 hrs AIAA-2016-3029 **CFD Performance of Turbulence Models for Flow from Supersonic Nozzle Exhausts** H. Lee, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO			

Tuesday, 14 June 2016							
81-ASE-5	**Aircraft Wake Turbulence III (Invited)**						**Columbia 12**
Chaired by: A. BROWN, National Research Council Canada and D. DELISI, Northwest Research Associates Inc							
0930 hrs AIAA-2016-3030 **The Development of Wake Turbulence Re-Categorization in the United States (Invited)** J. Cheng, A. Hoff, Engility Corporation, Washington, D.C.; J. Tittsworth, W. Gallo, Federal Aviation Administration, Washington, D.C.	1000 hrs AIAA-2016-3031 **Flight data of axial flows in wake vortex instability (Invited)** A. Brown, National Research Council Canada, Ottawa, Canada	1030 hrs AIAA-2016-3032 **Wake Vortex Collection and Analysis at the Dubai International Airport (Invited)** M. Fantauzzi, Dubai Air Navigation Services, Dubai, United Arab Emirates; D. Delisi, M. Pruis, D. Lai, NorthWest Research Associates, Redmond, WA; D. Jacob, Coherent Research Group, LLC, Key West, FL	1100 hrs AIAA-2016-3033 **APA3.8 Fast-Time, Numerical Wake Model Description and Validation (Invited)** D. Delisi, NorthWest Research Associates, Redmond, WA; R. Robins, Scientific Computing Associates, Seattle, WA; M. Pruis, NorthWest Research Associates, Redmond, WA	1130 hrs AIAA-2016-3034 **Multi-Model Ensemble Wake Vortex Prediction - Further Development and Probabilistic Assessment (Invited)** S. Koerner, F. Holzäpfel, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	1200 hrs AIAA-2016-3035 **A Study on Wake Turbulence Encounter during UAV Formation Flight Using Coupled Aerodynamics/Flight Dynamics Simulation (Invited)** A. He, Z. Zheng, H. Chao, P. Tian, University of Kansas, Lawrence, Lawrence, KS; Y. Gu, West Virginia University, Morgantown, WV		

Tuesday, 14 June 2016							
82-ASE-6/APA-15	**Surface Coatings, Ice Protection and Shedding**						**Georgetown West**
Chaired by: J. PALACIOS, The Pennsylvania State University							
0930 hrs AIAA-2016-3036 **Multi Time Scale Ice Growth in Films Flowing Over an Anisotropic Solid** A. Rothmayer, Iowa State University, Ames, IA	1000 hrs AIAA-2016-3037 **Studies on Electro Impulse De-Icing of a Leading Edge Structure in an Icing Wind Tunnel** H. Sommerwerk, P. Horst, S. Bansmer, Technical University of Braunschweig, Braunschweig, Germany	1030 hrs AIAA-2016-3038 **Analysis of Piezoelectric Ice Protection Systems Combined with Ice-Phobic Coatings** V. Pommier-Budinger, University of Toulouse, Toulouse, France; M. Budinger, Clément Ader Institute, Toulouse, France; N. Tepylo, X. Huang, Carleton University, Ottawa, Canada	1100 hrs AIAA-2016-3039 **Analysis and Prediction of Ice Shedding for a Full-Scale Heated Tail Rotor** R. Kreeger, NASA Glenn Research Center, Cleveland, OH; R. Douglass, Ohio Northern University, Ada, OH; M. Gazella, Kent State University, Kent, OH; Z. Koster, Virginia Polytechnic Institute and State University, Blacksburg, VA; J. Turk, Cleveland State University, Cleveland, OH; A. Work, Ohio Aerospace Institute, Cleveland, OH	1130 hrs AIAA-2016-3040 **Surface Chemical Functionality Effect Upon Ice Adhesion Shear Strength** J. Smith, C. Wohl, NASA Langley Research Center, Hampton, VA; R. Kreeger, NASA Glenn Research Center, Cleveland, OH; J. Palacios, T. Knuth, Pennsylvania State University, University Park, PA	1200 hrs AIAA-2016-3041 **Characterization of Insect Residue on an Aerodynamic Leading Edge** K. Krishnan, R. Robison, F. Tetteh, E. Loth, University of Virginia, Charlottesville, Charlottesville, VA; T. Farrell, J. Crouch, The Boeing Company, Seattle, WA; et al.		

Tuesday, 14 June 2016							
83-ATIO.ACD-3	**Unmanned Aircraft**						**Gunston East**
Chaired by: M. LOGAN, NASA Langley Research Center and P. RAJ, Virginia Polytechnic Institute and State University							
0930 hrs AIAA-2016-3042 **Design, Flight Mechanics and Flight Demonstration of a Tiltable Propeller VTOL UAV** Z. Öznalbant, M. Kavsaoğlu, M. Cavcar, Anadolu University, Eskisehir, Turkey	1000 hrs AIAA-2016-3043 **A Framework for Integrated Analysis, Design, and Rapid Prototyping of Small Unmanned Airplanes** D. Locascio, C. Ramee, E. Schaus, K. Cooksey, Georgia Institute of Technology, Atlanta, GA; E. Spero, Army Research Laboratory, Aberdeen Proving Ground, MD; D. Mavris, Georgia Institute of Technology, Atlanta, GA	1030 hrs AIAA-2016-3044 **Unlimited Endurance Low Altitude Wind Powered Unmanned Aerial Vehicle** M. Sadraey, Daniel Webster College, Nashua, NH	1100 hrs AIAA-2016-3045 **Conceptual design study of an Anti-Drone Drone** T. Lefebvre, T. Dubot, ONERA, Toulouse, France	1130 hrs AIAA-2016-3046 **Flight dynamics study of a small tilt rotor UAV with tail propeller** D. Wu, H. Li, Commercial Aircraft Corporation of China, Ltd. (COMAC), Shanghai, China; S. Li, Beihang University, Beijing, China			

Tuesday, 14 June 2016							
84-ATIO.ATM-7	**UAS Operations II**						**Embassy**
Chaired by: M. WILCOXEN							
0930 hrs AIAA-2016-3047 **A Value Driven Design Approach to Municipal Electric Utility Unmanned Aerial Systems Deployment** D. Long, S. Ferguson, North Carolina State University, Raleigh, NC	1000 hrs AIAA-2016-3048 **A Variable-Fidelity Approach to Wake Safety Analysis in the Context of UAS Integration in the NAS** P. Kazarin, V. Golubev, Embry-Riddle Aeronautical University, Daytona Beach, FL; A. Provalov, ISA Software, Bethesda, MD; S. Borener, D. Hufty, Federal Aviation Administration, Washington, D.C.	1030 hrs AIAA-2016-3049 **Low-Altitude UAS Traffic Coordination with Dynamic Geofencing** G. Zhu, P. Wei, Iowa State University, Ames, IA	1100 hrs AIAA-2016-3050 **Artificial Potantial Field Based Autonomus UAV Fligh in Dynamic Environment** A. Oguz, E. Duymaz, Turkish Air Force Academy, Istanbul, Turkey				

Tuesday, 14 June 2016							
85-ATIO.ATM-8	**Delay Management**						**Fairchild East**
Chaired by: N. NEOGI, NASA Langley Research Center							
0930 hrs AIAA-2016-3051 **Estimating Over-Conservatism in Airspace Constraint Management** S. Heitin, J. DeArmon, B. Bateman, J. Conroy, MITRE Corporation, McLean, VA	1000 hrs AIAA-2016-3052 **Analyzing Double Delays at Newark Liberty International Airport** A. Evans, University of California, Santa Cruz, Moffett Field, CA; P. Lee, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2016-3053 **A Human-in-the-loop Evaluation of a Coordinated Arrival/ Departure Scheduling Operations for Managing Departure Delays at LaGuardia Airport** P. Lee, N. Smith, NASA Ames Research Center, Moffett Field, CA; N. Bienert, C. Brasil, N. Buckley, E. Chevalley, San Jose State University, Moffett Field, CA; et al.	1100 hrs AIAA-2016-3054 **Analysis of Additional Delays Experienced by Flights Subject to Ground Holding** K. Bilimoria, NASA Ames Research Center, Moffett Field, CA				

Tuesday, 14 June 2016							
86-ATIO.DE-1	**Design Engineering**						**Gunston West**
Chaired by: S. ROWE, NASA Marshall Space Flight Center and C. DAVIES, Lockheed Martin Aeronautics							
0930 hrs AIAA-2016-3055 **Uncertainty Quantification via Elicitation of Expert Judgements** B. Profir, M. Eres, J. Scanlan, University of Southampton, Southampton, United Kingdom; M. Moss, R. Bates, Rolls-Royce Group plc, Derby, United Kingdom	1000 hrs AIAA-2016-3056 **Optimization of an Advanced Hybrid Wing Body Concept using HCDstruct Version 1.2** J. Quinlan, F. Gern, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3057 **A Lean Product Development (LPD) approach on education and knowledge management in aircraft design** C. Feltrin, A. de Paula, M. de Queiroz Cordova Santos, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1100 hrs AIAA-2016-3058 **Aerospace Partners for the Advancement of Collaborative Engineering, a Review** M. Wald, S. Gorrell, Brigham Young University, Provo, UT; M. Richey, K. Chang, F. Zender, The Boeing Company, Everett, WA	1130 hrs AIAA-2016-3059 **The Effects of Supersonic Inlet Topology on the Installed Performance of Tubofan Engines** R. Palma, T. Takahashi, Arizona State University, Tempe, AZ	1200 hrs AIAA-2016-3060 **Sizing Study for Assessing First-Order Feasibility of the Bell X-1A Supersonic Rocket-Powered Aircraft** S. Hussein, B. Chudoba, University of Texas, Arlington, Arlington, TX		

Tuesday, 14 June 2016							
87-ATIO.TFPC-4/ATIO.GA-1	**Transformational Flight - On Demand Mobility Markets/Missions**						**Columbia 1**
Chaired by: N. BORER, NASA Langley Research Center and M. MOORE, NASA Langley Research Center							
0930 hrs AIAA-2016-3061 **A Vision and Opportunity for Transformation of On-Demand Air Mobility** B. Holmes, Holmes Consulting, LLC, Williamsburg, VA	1000 hrs AIAA-2016-3062 **Silicon Valley as an Early Adopter for On-Demand Civil VTOL Operations** K. Antcliff, M. Moore, K. Goodrich, NASA Langley Research Center, Hampton, VA	1030 hrs Oral Presentation **Impact of Operational Requirements on Intra-Urban VTOL Conceptual Design** W. Fredericks, NASA Langley Research Center, Hampton, VA	1100 hrs Oral Presentation **Inter-Urban Civil VTOL Air-Taxi Feasibility** M. Moore, K. Goodrich, K. Antcliff, W. Fredericks, NASA Langley Research Center, Hampton, VA	1130 hrs AIAA-2016-3063 **Regional Sky Transit II** B. Seeley, Sustainable Aviation Foundation, Inc., Santa Rosa, CA			

Tuesday, 14 June 2016		
88-F360-4 0930 - 1230 hrs	NASA Roadmaps—Guiding Direction for Aeronautics Research Investments	International Ballroom (East)

Moderator: Richard A. Wahls, Strategic Technical Advisor – Advanced Air Vehicles Program, NASA Aeronautics Research Mission Directorate, NASA Langley Research Center

Panelists:

Mark Ballin
Technical Integration Manager for NASA Langley Research Center
Airspace Operations and Safety Program
NASA

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

Fayette Collier
Manager, Environmentally Responsible Aviation Project
NASA Langley Research Center Peter Coen, Manager,
Commercial Supersonic Technology Project
NASA

Jay Dryer
Director, Advanced Air Vehicles Program
NASA Aeronautics Research Mission Directorate
NASA

Barbara Esker
Deputy Manager, Advanced Air Vehicles Program
NASA

Susan Gorton
Manager, Revolutionary Vertical Lift Technology Project
NASA Langley Research Center
NASA

Jessica Nowinski
Research Psychologist, Human Systems Integration Division
NASA

Jaiwon Shin
Associate Administrator
NASA Aeronautics Research Mission Directorate
NASA

Barry Sullivan
Integration Manager, Next Generation Air Transportation System (NextGen),
Airspace Systems Program Office
NASA

Tom Davis
Technology Advisor, Airspace Systems Technology Program, Aviation Systems Division
NASA Ames Research Center
NASA

Tuesday, 14 June 2016							
89-FC-4	Drag Reduction						Columbia 11
Chaired by: R. KIMMEL, USAF AFRL/RQHF							
0930 hrs AIAA-2016-3064 **On the effect of discrete roughness on crossflow instability in very low turbulence environment** M. Placidi, E. van Bokhorst, C. Atkin, City University London, London, United Kingdom	1000 hrs AIAA-2016-3065 **The effect of local steady suction on the stability and transition of boundary layer on a flat plate** Z. Huang, Tianjin University, Tianjin, China; X. Wu, Imperial College London, London, United Kingdom	1030 hrs AIAA-2016-3066 **Transonic Airfoil Performance Enhancement Using Co-Flow Jet Active Flow Control** Z. Liu, G. Zha, University of Miami, Miami, FL	1100 hrs AIAA-2016-3067 **Hairy Chemical Coating for Drag Reduction** M. Hasegawa, H. Sakaue, University of Notre Dame, Notre Dame, IN	1130 hrs AIAA-2016-3068 **Predetermined control of turbulent boundary layer by means of a piezoelectric oscillator** X. Zheng, H. Zhang, Tianjin University, Tianjin, China; S. Yang, Nanyang Technological University, Singapore, Singapore; N. Jiang, Tianjin University, Tianjin, China; Y. Wu, Nanyang Technological University, Singapore, Singapore			

Tuesday, 14 June 2016							
90-FD-16	Turbulence Modeling II: RANS, Hybrid RANS/LES						Jay
Chaired by: L. DUAN, Missouri University of Science and Technology and Y. LV, Stanford University							
0930 hrs AIAA-2016-3069 **Application of a New Simple Rotation and Curvature Correction to the Wray-Agarwal Turbulence Model** X. Zhang, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1000 hrs AIAA-2016-3070 **Application of the Quadratic Constitutive Relation to Various Turbulence Models in OpenFOAM** H. Nagapetyan, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1030 hrs AIAA-2016-3071 **Validation of the Wray-Agarwal Turbulence Model for Shock-Wave Boundary Layer Interaction Flows** F. Acquaye, J. Li, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1100 hrs AIAA-2016-3072 **Implementation and Validation of Correlation-based Transition Models in AcuSolve** S. Medida, D. Corson, M. Barton, Altair Engineering, Inc., Sunnyvale, CA	1130 hrs AIAA-2016-3073 **Simulating Sources of Unsteadiness in a High-Speed Wall-Bounded Jet** K. Low, R. Bush, Pratt & Whitney, East Hartford, CT; J. Winkler, United Technologies Corporation, East Hartford, CT	1200 hrs AIAA-2016-3074 **Verification of RANS and Hybrid RANS-LES Modelling in Computations of a Delta-Wing Flow** S. Peng, Swedish Defense Research Agency (FOI), Stockholm, Sweden		

Tuesday, 14 June 2016							
91-FD-17	**Combustion Simulation I**						**Monroe**
Chaired by: B. MAICKE, Pennsylvania State University and K. DURAISAMY, University of Michigan, Ann Arbor							
0930 hrs AIAA-2016-3075 **Application of the Evolution-Variable Manifold Approach to Cavity-Stabilized Ethylene Combustion** N. Cymbalist, California Institute of Technology, Pasadena, CA; G. Candler, University of Minnesota, Minneapolis, Minneapolis, MN; P. Dimotakis, California Institute of Technology, Pasadena, CA	1000 hrs AIAA-2016-3076 **Simulation of a Lean-Direct Injection Combustor Using a Body-Fitted Voxel Mesh** C. Wey, NASA Glenn Research Center, Cleveland, OH	1030 hrs AIAA-2016-3077 **Numerical Investigations of High Frequency Pulsed Fuel Injection into Supersonic Crossflows** N. Williams, T. Moeller, University of Tennessee, Tullahoma, Tullahoma, TN	1100 hrs AIAA-2016-3078 **Properties of a New Ensemble Kalman Filter Algorithm for Combustion Application** X. Gao, Y. Wang, N. Overton, Colorado State University, Fort Collins, CO; X. Tu, University of Kansas, Lawrence, Lawrence, KS; M. Zupanski, Colorado State University, Fort Collins, CO				

Tuesday, 14 June 2016							
92-FD-18	**Open Issues in Meshing 2030 (Special Issue)**						**Jefferson East**
Chaired by: J. MASTERS, AEDC and H. THORNBURG, DRC PETTT							
0930 hrs AIAA-2016-3079 **Geometry, Mesh Generation, and the CFD 2030 Vision** J. Chawner, Pointwise, Inc., Fort Worth, TX; J. Dannenhoffer, Syracuse University, Syracuse, NY; N. Taylor, MBDA, Filton, United Kingdom	1000 hrs AIAA-2016-3080 **The NASA Common Research Model: A Geometry-Handling Perspective** M. Gammon, International TechneGroup, Inc. (ITI), Cambridge, United Kingdom; N. Taylor, MBDA, Filton, United Kingdom	1030 hrs AIAA-2016-3081 **A Survey of Solver-Related Geometry and Meshing Issues** J. Masters, Arnold Engineering Development Center, Arnold AFB, TN	1100 hrs **Open Discusion**				

Tuesday, 14 June 2016							
93-FD-19	**CFD Transition Models**						**Lincoln East**
Chaired by: H. JOHNSON, University of Minnesota and M. TUFTS, Texas A&M University							
0930 hrs AIAA-2016-3082 **Database Approach for 2D Flow Transition Prediction in a RANS Code** G. Bégou, H. Deniau, O. Vermeersch, G. Casalis, ONERA, Toulouse, France	1000 hrs AIAA-2016-3083 **Understanding Transition with Reynolds Stresses and Rapidly Distorting Shear Flow** J. Moore, Self, Blacksburg, VA	1030 hrs AIAA-2016-3084 **A Linear Stability Theory-Based Transition Model Using Local Variables for RANS Simulations of Transitional Flow** J. Xu, J. Bai, L. Qiao, Y. Zhang, Z. Fu, Northwestern Polytechnical University, Xi'an, China	1100 hrs AIAA-2016-3085 **Implementation of Three Different Transition Methods and Comparative Analysis of the Results Computed by OVERSET Software** H. Li, Y. Ren, H. Tang, Z. Qian, Aviation Industry Corporation of China (AVIC), Shenyang, China	1130 hrs AIAA-2016-3086 **Numerical Aspects of Including Crossflow Effects in the Recently Proposed Transition Models** L. Wang, Z. Liu, S. Fu, Tsinghua University, Beijing, China			

Tuesday, 14 June 2016							
94-FD-20	**High-Order Methods II**						**Columbia 10**
Chaired by: M. PLESNIAK and B. HELENBROOK, Clarkson University							
0930 hrs AIAA-2016-3087 **Adjoint-Consistency of Spacetime Discontinuous Galerkin Discretizations for Incompressible Flows** A. Kercher, A. Corrigan, D. Kessler, R. Johnson, D. Mott, Naval Research Laboratory, Washington, D.C.	1000 hrs AIAA-2016-3088 **Analysis of Implicit Time-Advancing p-Multigrid Schemes for Discontinuous Galerkin Discretizations of the Euler Equations** B. Mascarenhas, Pratt & Whitney, East Hartford, CT; B. Helenbrook, Clarkson University, Potsdam, NY	1030 hrs AIAA-2016-3089 **Accuracy Enhancement of a Riemann-Solver-Free Spacetime Discontinuous Galerkin Method via Constrained Least Square Reconstruction** S. Tu, Jackson State University, Jackson, MS	1100 hrs AIAA-2016-3090 **High-Order Entropy Stable Discontinuous Galerkin Schemes in a Space-Time Computational Framework** M. Zakerzadeh, G. May, RWTH Aachen University, Aachen, Germany				

Tuesday, 14 June 2016							
95-GT-2	**Assessment and Analysis of Ground Test Facilities**						**Lincoln West**
Chaired by: W. HUMPHREYS, NASA Langley Research Center and M. RIVERS, NASA Langley Research Center							
0930 hrs AIAA-2016-3091 **Towards the Use of CFD to Improve and Validate the Wall Correction Methodology at the NRC 1.5 m Trisonic Wind Tunnel** A. Toledano, J. Weiss, F. Morency, University of Québec, Montréal, Canada; C. Broughton, A. Benmeddour, National Research Council Canada, Ottawa, Canada	1000 hrs AIAA-2016-3092 **Uncertainty Analysis of Test Data at the NRC 1.5-Meter Trisonic Wind Tunnel** S. Fakhraei, J. Weiss, University of Québec, Montréal, Canada	1030 hrs AIAA-2016-3093 **The Impact of Truth Surrogate Variance on Quality Assessment/Assurance in Wind Tunnel Testing** R. DeLoach, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-3094 **Uncertainty Propagation via Monte Carlo Simulation in the PWT and VKF Wind Tunnels at AEDC** C. Morris, Aerospace Testing Alliance, Tullahoma, TN; D. Crowley, Arnold Engineering Development Complex, Tullahoma, TN	1130 hrs AIAA-2016-3095 **Analysis and calculation of droplet-air mixed phase flow model in icing wind tunnel** D. Qian, Z. Wang, C. Zhu, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1200 hrs AIAA-2016-3096 **Calculation of Missile Testing Capability with All Up Round Test Equipment** F. Akalin, ROKETSAN Missile Industries, Inc., Ankara, Turkey		

Tuesday, 14 June 2016							
96-ITAR-1	**Advancements in Oscillating Heat Pipes**						**Cabinet**
Chaired by: E. SILK, NASA-Goddard Space Flight Center and D. PYTEL, Lockheed Martin Space Systems							
0930 hrs AIAA-2016-3097 **The Performance Limits of Oscillating Heat Pipes: Theory and Validation** B. Drolen, The Boeing Company, El Segundo, CA; C. Smoot, ThermAvant Technologies, Columbia, MO	1000 hrs AIAA-2016-3098 **The effect of hybrid hydrophobic and hydrophilic surfaces on heat transfer performance of an oscillating heat pipe** F. Zhang, R. Winholtz, H. Ma, University of Missouri, Columbia, Columbia, MO	1030 hrs AIAA-2016-3099 **An Empirical Study of the Two-Phase Thermal Resistance in an Oscillating Heat Pipe Heat Spreader** D. Pounds, J. Boswell, L. Ellebracht, ThermAvant Technologies, Columbia, MO	1100 hrs AIAA-2016-3100 **Experimental Investigation of Flow Induced Vibrations of an Oscillating Heat Pipe** S. Smith, Air Force Research Laboratory, Kirtland AFB, NM; M. Rhodes, Mississippi State University, Mississippi State, MS; E. Ardelean, Acme Solutions, LLC, Albuquerque, NM; B. Taft, Air Force Research Laboratory, Kirtland AFB, NM	1130 hrs AIAA-2016-3101 **Thermal Performance Characterization of Flexible, Multi-material Oscillating Heat Pipes** D. Hengeveld, M. Wilson, LoadPath, Albuquerque, NM; B. Taft, Air Force Research Laboratory, Kirtland AFB, NM			

Tuesday, 14 June 2016							
97-MAO-5	**Design Optimization of Aircrafts and Other Complex Systems III**						**Cardozo**
Chaired by: A. NAJAFI, ANSYS, Inc. and J. MARTINS, University of Michigan							
0930 hrs AIAA-2016-3102 **High fidelity aerodynamic optimization in distributed overall aircraft design** X. Gu, P. Ciampa, B. Nagel, German Aerospace Center (DLR), Hamburg, Germany	1000 hrs AIAA-2016-3103 **Multi-disciplinary Optimization of Stiffened, Fiber-steered Composite Fuselage for Mechanical and Vibro-acoustic Requirements** G. Serhat, I. Basdogan, Koç University, Istanbul, Turkey	1030 hrs AIAA-2016-3104 **Combined Aerostructural Wing and High-Lift System Optimization** K. van den Kieboom, A. Elham, Delft University of Technology, Delft, The Netherlands	1100 hrs AIAA-2016-3105 **Aeroservoelastic Optimisation of an Aerofoil with Active Compliant Flap via Reparametrisation and Variable Selection** J. Broughton-Venner, A. Wynn, R. Palacios, Imperial College London, London, United Kingdom	1130 hrs AIAA-2016-3106 **Aero-structural approach coupled with direct operative cost optimization for new aircraft design in preliminary design** A. Viti, ONERA, Meudon, France; T. Druot, Airbus, Toulouse, France; A. Dumont, G. Carrier, ONERA, Meudon, France	1200 hrs AIAA-2016-3107 **A Probabilistic Parameter Sensitivity Analysis Approach For An Aircraft** S. Selvi, ROKETSAN Missile Industries, Inc., Ankara, Turkey		

Tuesday, 14 June 2016							
98-MAO-6	**Shape and Topology Optimization III**						**Columbia 3**
Chaired by: J. GRAY, NASA Glenn Research Center and G. KENNEDY, Georgia Institute of Technology							
0930 hrs AIAA-2016-3108 **RANS-based Shape Optimization of Dual-Rotor Wind Turbines using Variable-fidelity Models** A. Thelen, L. Leifsson, A. Sharma, Iowa State University, Ames, IA; S. Koziel, Reykjavik University, Reykjavik, Iceland	1000 hrs AIAA-2016-3109 **Efficient Multi-Objective Aerodynamic Optimization by Design Space Dimension Reduction and Co-Kriging** A. Amrit, L. Leifsson, Iowa State University, Ames, IA; S. Koziel, Y. Tesfahunegn, Reykjavik University, Reykjavik, Iceland	1030 hrs AIAA-2016-3110 **Topology Optimization of a Bi-Stable Cardiovascular Stent with Snap-Through Response** K. James, University of Illinois, Urbana-Champaign, Urbana, IL; H. Waisman, Columbia University, New York, NY	1100 hrs AIAA-2016-3111 **A CMA-ES enhanced MOEA/D applied to multiobjective aerodynamic optimization design** X. Zhu, Z. Gao, Northwestern Polytechnical University, Xi'an, China	1130 hrs AIAA-2016-3112 **Efficient Aerodynamic Design using the Discrete Adjoint Method in SU2** T. Albring, M. Sagebaum, N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany			

Tuesday, 14 June 2016							
99-MST-5	**Modeling and Simulation of Air Traffic Management I**						**Fairchild West**
Chaired by: C. TAYLOR, The MITRE Corporation and B. APONSO, NASA-Ames Research Center							
0930 hrs AIAA-2016-3113 **Design and Evaluation of User Interfaces for an Airport Management Simulation** S. Schier, T. Pett, O. Mohr, S. Yeo, German Aerospace Center (DLR), Braunschweig, Germany	1000 hrs AIAA-2016-3114 **Using Visualization to Understand Simulations of ATM scenarios** A. Wallace, E. Mercer, Brigham Young University, Provo, UT; N. Rungta, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2016-3115 **Formal Scenario Definition Language for Aviation: Aircraft Landing Case Study** S. Jafer, B. Chhaya, Embry-Riddle Aeronautical University, Daytona Beach, FL; U. Durak, T. Gerlach, German Aerospace Center (DLR), Braunschweig, Germany	1100 hrs AIAA-2016-3116 **Aircraft Performance for Open Air Traffic Simulations** I. Metz, German Aerospace Center (DLR), Braunschweig, Germany; J. Hoekstra, J. Ellerbroek, Delft University of Technology, Delft, The Netherlands; D. Kügler, German Aerospace Center (DLR), Braunschweig, Germany				

Tuesday, 14 June 2016							
100-MST-6	**Modeling and Simulation of Vehicle Dynamics, Systems, and Environments**						**Morgan**
Chaired by: D. GINGRAS, Bihrle Applied Research Inc. and N. MACCHIARELLA, Embry-Riddle Aeronautical University							
0930 hrs AIAA-2016-3117 **A Model for Real-Time Detection of Aircraft Damage** B. Blair, H. Lee, University of California, Santa Cruz, Santa Cruz, CA; M. Davies, NASA Ames Research Center, Moffett Field, CA	1000 hrs AIAA-2016-3118 **NISAR Spacecraft Environmental Torque Modeling During Operations** F. Rizvi, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1030 hrs AIAA-2016-3119 **Conceptual Flight Dynamic Model for Bombardier Global 5000 Aircraft** M. Moallemi, S. Jafer, M. Towhidnejad, Embry-Riddle Aeronautical University, Daytona Beach, FL	1100 hrs AIAA-2016-3120 **Real-Time Planning in the Net-Centric Warfare Environment Based on the Aircraft Susceptibility** S. Shi, B. Song, Y. Pei, R. Zhang, Northwestern Polytechnical University, Xi'an, China	1130 hrs AIAA-2016-3121 **Design and Simulation of F/A-18A Automatic Carrier Landing Guidance Controller** L. Yue, G. Liu, G. Hong, Beihang University, Beijing, China	1200 hrs AIAA-2016-3122 **Lateral-Directional Simulation of F/A-18 Aircraft Landing on a Carrier in Complex Environment** K. Wang, G. Liu, G. Hong, Beihang University, Beijing, China		

Tuesday, 14 June 2016							
101-PDL-3	**Aero-Optics**						**Georgetown East**
Chaired by: M. RENNIE, University of Notre Dame and C. NOREN, Directed Energy Directorate, Air Force Research Laboratory							
0930 hrs AIAA-2016-3123 **A Robust Modification of a Predictive Adaptive-Optic Control Method for Aero-Optics** W. Burns, E. Jumper, S. Gordeyev, University of Notre Dame, Notre Dame, IN	1000 hrs AIAA-2016-3124 **Multiple Aperture Approach for the Study of Large-Scale Boundary-Layer Structures** M. Kemnetz, W. Burns, S. Gordeyev, University of Notre Dame, Notre Dame, IN	1030 hrs AIAA-2016-3125 **LES/RANS Modeling of Aero-Optical Effects in a Supersonic Cavity Flow** I. Zilberter, J. Edwards, North Carolina State University, Raleigh, NC					

Tuesday, 14 June 2016							
102-TP-3	**Reentry Systems and Instrumentation**						**Kalorama**
Chaired by: D. HASH, NASA - ARC							
0930 hrs AIAA-2016-3126 **Experimental and Computational Fluid Dynamics Studies of Superorbital Earth Re-entry.** E. Fahy, University of Queensland, Brisbane, Australia; D. Buttsworth, University of Southern Queensland, Toowoomba, Australia; R. Gollan, P. Jacobs, R. Morgan, University of Queensland, Brisbane, Australia	1000 hrs AIAA-2016-3127 **Flight Experiment Verification of Shuttle Boundary Layer Transition Prediction Tool** S. Berry, K. Berger, T. Horvath, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3128 **Assessment of Fencing on the Orion Heatshield** A. Alunni, T. Gokcen, Analytical Mechanics Associates, Inc., Moffett Field, CA	1100 hrs AIAA-2016-3129 **Uncertainty Analysis of Thermal Protection System Response of a Hypersonic Inflatable Aerodynamic Decelerator** A. Brune, S. Hosder, Missouri University of Science and Technology, Rolla, MO; K. Edquist, S. Tobin, NASA Langley Research Center, Hampton, VA	1130 hrs AIAA-2016-3130 **Mars 2020 Entry, Descent, and Landing Instrumentation (MEDLI2)** H. Hwang, D. Bose, NASA Ames Research Center, Moffett Field, CA; H. Wright, NASA Langley Research Center, Hampton, VA; T. White, Analytical Mechanics Associates, Inc., Moffett Field, CA; M. Schoenenberger, NASA Langley Research Center, Hampton, VA; J. Santos, Jacobs, Moffett Field, CA; et al.			

Tuesday, 14 June 2016		
103-RLA-2 **1130 - 1230 hrs**	**Rising Leaders in Aerospace Panel Discussion: Why Work in Aerospace Instead of Silicon Valley?**	**Georgetown East**

Come listen to what these panelists have to say. While Silicon Valley will always be a force in high tech innovation, learn what some are doing in partnership or in parallel. Learn how traditional aerospace is also making great advances in cutting edge research.

Moderator: Craig McGrath, Product Development, Boeing Commercial Airplanes

Panelist:

Tony Springer
Director – Integration & Management Office, NASA

Tuesday, 14 June 2016		
104-LNCH-1 **1230 - 1400 hrs**	**Awards Luncheon: Celebrating the Achievements in Aerospace Sciences**	**International Ballroom (Center)**

A ticket for the luncheon is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site, as space is available.

The following awards will be presented:

Aerodynamics Award
Aerodynamic Measurement Technology Award
Fluid Dynamics Award
Ground Testing Award
Losey Atmospheric Sciences Award
Plasmadynamics and Lasers Award
Thermophysics Award

Tuesday, 14 June 2016							
105-AFM-7	**Aircraft Flight Dynamics III**						**Holmead West**
Chaired by: C. SUCHOMEL, USAF and N. HALL							
1400 hrs AIAA-2016-3131 **Formation Flight for Fuel Saving in Coronet Mission - Part B: Full Mission Analysis** C. Kniffin, A. Dogan, University of Texas, Arlington, Arlington, TX; W. Blake, Air Force Research Laboratory, Wright-Patterson AFB, OH	1430 hrs AIAA-2016-3132 **Influence of Piston Propeller-driven engine Model into the Design of Cruise Autopilot** P. Gonzalez, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; P. Boschetti, Simón Bolívar University, Naiguata, Venezuela; F. Silvestre, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1500 hrs AIAA-2016-3133 **Influence of aircraft flexibility on Frequency Domain Handling Qualities Criteria** D. Drewiacki, F. Silvestre, A. Guimaraes Neto, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1530 hrs AIAA-2016-3134 **Effect of body configuration and deformation on the dynamic stability of flapping flight** S. Zeyghami, A. Bode-Oke, H. Dong, University of Virginia, Charlottesville, Charlottesville, VA	1600 hrs AIAA-2016-3135 **Steady-State Stall/Post-Stall Modeling for a Low-Wing General Aviation Aircraft** G. Ananda , M. Selig, University of Illinois, Urbana-Champaign, Urbana, IL	1630 hrs AIAA-2016-3136 **Flying Qualities Evaluation of an Unmanned Aircraft Using JSBSim** J. Kim, D. Kunz, Air Force Institute of Technology, Wright-Patterson AFB, OH		

Tuesday, 14 June 2016							
106-AFM-8	**Unmanned Aerial Systems II**						**Holmead East**
Chaired by: A. DA RONCH, University of Southampton							
1400 hrs AIAA-2016-3137 **Experimental and Numerical Investigation of Entomopter Flapping Wings Aerodynamic Performance** A. Zyluk, K. Sibilski, Air Force Institute of Technology, Warsaw, Poland; P. Czekalowski, Institute of Aviation, Warsaw, Poland	1430 hrs AIAA-2016-3138 **Longitudinal and Directional Control Modeling for a Small Powered Parafoil Aerial Vehicle** V. Devalla, P. Om, University of Petroleum and Energy Studies, Dehradun, India	1500 hrs AIAA-2016-3139 **Small Unmanned Aerial Vehicle Passive Range Estimation from a Single Microphone** J. King, I. Faruque, University of Maryland, College Park, College Park, MD	1530 hrs AIAA-2016-3140 **Investigation On Dynamic Characteristic Of a Mini Angle Of Attack Sensor For Small UAV** D. Wu, Z. Tan, Y. Zhong, S. Yang, Commercial Aircraft Corporation of China, Ltd. (COMAC), Shanghai, China; L. Song, Beihang University, Beijing, China				

Tuesday, 14 June 2016							
107-AMT-5	**Gas Thermometry**						**Columbia 2**
Chaired by: P. BARDET, George Washington University and A. SYDNEY, Naval Research Laboratory							
1400 hrs AIAA-2016-3141 **Simultaneous Minor-Species Detection and Single-Shot Thermometry via Femtosecond, Fully Resonant, Electronically Enhanced CARS (FREE-CARS)** H. Stauffer, D. Richardson, J. Schmidt, S. Roy, Spectral Energies, LLC, Dayton, OH; P. Wrzesinski, J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH	1430 hrs AIAA-2016-3142 **Tunable diode laser absorption spectroscopy of CO_2 and H_2O at 2.7 μm in a scramjet combustor and in exhaust gases of a hybrid rocket motor** A. Mohamed, J. Messineo, J. Lestrade, S. Defoort, J. Soutade, P. Viguier, ONERA, Palaiseau, France	1500 hrs AIAA-2016-3143 **100-KHz-Rate Gas-Phase Temperature Measurements using Picosecond, Burst-Mode, Laser-Based CARS Spectroscopy** P. Hsu, S. Roy, N. Jiang, M. Splichenko, Spectral Energies, LLC, Dayton, OH; J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2016-3144 **Spontaneous Raman Scattering Temperature Measurements in High-Speed H_2 Jet Flames** H. Reising, T. Haller, N. Clemens, P. Varghese, University of Texas, Austin, Austin, TX	1600 hrs AIAA-2016-3145 **Comparison of Chirped-Probe and Hybrid fs/ps Femtosecond CARS for Gas Phase Thermometry** D. Richardson, H. Stauffer, S. Roy, Spectral Energies, LLC, Dayton, OH; J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH			

Tuesday, 14 June 2016							
108-APA-16/FD-21	**Flapping Flight Aerodynamics**						**Oak Lawn**
Chaired by: K. MOORED, Lehigh University and A. JONES, University of Maryland							
1400 hrs AIAA-2016-3146 **Numerical simulation of a flapping wing MAV based on wing deformation capture analysis** W. Tay, National University of Singapore, Singapore, Singapore; J. de Baar, Australian National University, Canberra, Australia; M. Percin, S. Deng, B. van Oudheusden, Delft University of Technology, Delft, The Netherlands	1430 hrs AIAA-2016-3147 **Computational Study of Three-Dimensional Rigid Flapping Wings with Unequal Pitch/Plunge Frequency** N. Lee, M. Kim, S. Lee, Inha University, Incheon, South Korea; H. Cho, S. Shin, Seoul National University, Seoul, South Korea	1500 hrs AIAA-2016-3148 **Force Measurements of Flapping Membrane Wings with Spanwise Chord Variation Operating at High Angles of Attack** M. Zakaria, D. Allen, C. Woolsey, M. Hajj, Virginia Polytechnic Institute and State University, Blacksburg, VA	1530 hrs AIAA-2016-3149 **Low order modeling of forces and flow features in flapping wings** M. Raiola, P. Moral, S. Discetti, A. Ianiro, Charles III University of Madrid, Leganes, Spain	1600 hrs AIAA-2016-3150 **Thrust generation in heaving and flapping wings in forward flight** G. Arranz, O. Flores, Universidad Carlos III de Madrid, Leganes, Spain	1630 hrs AIAA-2016-3151 **CFD-Coupled Trim Analysis of a Millimeter-Scale Flapping Wing MAV in Steady Turning Flight** C. Badrya, A. Sridharan, J. Baeder, University of Maryland, College Park, College Park, MD	1700 hrs AIAA-2016-3152 **Varying Reynolds Number of Biomimetic Flapping Wing By Changing Air Density and Wing Length** D. Hope, A. Deluca, R. O'Hara, Air Force Institute of Technology, Wright-Patterson AFB, OH	

Tuesday, 14 June 2016							
109-APA-17	**Inlet/Intake Aerodynamics**						**Columbia 9**
Chaired by: N. HARIHARAN, CREATE-AV and D. O'BRIEN, US Army RDECOM							
1400 hrs AIAA-2016-3153 **Influence of near-leading edge curvature on the performance of aero-engine intake lips at high-incidence** A. Coschignano, H. Babinsky, University of Cambridge, Cambridge, United Kingdom	1430 hrs AIAA-2016-3154 **Convoluted Intake Distortion Measurements Using Stereo Particle Image Velocimetry** D. Gil-Prieto, P. Zachos, D. MacManus, G. Tanguy, Cranfield University, Cranfield, United Kingdom	1500 hrs AIAA-2016-3155 **Pressure flow field and inlet flow distortion metrics reconstruction from velocity data** M. Frascella, P. Zachos, D. Gil-Prieto, D. MacManus, Cranfield University, Cranfield, United Kingdom	1530 hrs AIAA-2016-3156 **Dynamic Flow Distortion Investigation in an S-duct using DDES and SPIV data** D. Gil-Prieto, P. Zachos, D. MacManus, G. Tanguy, Cranfield University, Cranfield, United Kingdom	1600 hrs AIAA-2016-3157 **Passive flow control study in a convoluted intake using Stereo Particle Image Velocimetry** G. Tanguy, P. Zachos, D. MacManus, D. Gil-Prieto, Cranfield University, Cranfield, United Kingdom; E. Garnier, ONERA, Meudon, France	1630 hrs AIAA-2016-3158 **Numerical Investigation of Bleed Effects on Supersonic Inlet under Various Bleed and Inlet Conditions** Y. Choe, C. Kim, Seoul National University, Seoul, South Korea		

Tuesday, 14 June 2016							
110-APA-18	**Historically Significant/Influential Papers in Applied Aerodynamics**						**Jefferson West**
Chaired by: J. PINIER, NASA Langley Research Center and B. MCGRATH, JHU/Applied Physics Laboratory and R. WAHLS, NASA Aeronautics Research Mission Directorate							
1400 hrs AIAA-2016-3939 **Selected Scientific and Technical Contributions of Edward C. Polhamus** J. Luckring, NASA Langley Research Center, Hampton, VA	1500 hrs Oral Presentation **On the Design of Subsonic Airfoils for High Lift** R. Liebeck, The Boeing Company, Huntington Beach, CA						

Tuesday, 14 June 2016							
111-APA-19	**Aerodynamic - Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology II**						**Albright**
Chaired by: N. NGUYEN, NASA-Ames Research Center and A. VANDERWYST, Leidos							
1400 hrs AIAA-2016-3159 **Real-Time Adaptive Least-Squares Drag Minimization for Performance Adaptive Aeroelastic Wing** Y. Ferrier, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA; E. Ting, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA	1430 hrs AIAA-2016-3160 **An Integral Boundary Layer Direct Method Applied to 2D Transonic Small-Disturbance Equations** G. Fujiwara, University of Washington, Seattle, Seattle, WA; D. Chaparro, MORI Associates, Inc., Moffett Field, CA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA	1500 hrs AIAA-2016-3161 **Lift Optimization Study of a Multi-Element Three-Segment Variable Camber Airfoil** U. Kaul, N. Nguyen, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2016-3162 **Roll Control Evaluation of the X-56A Flying Wing Aircraft Using Active Camber Control compared to Conventional Ailerons using Vortex Lattice Theory** E. Yerly, A. Deluca, Air Force Institute of Technology, Wright-Patterson AFB, OH; J. Joo, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2016-3163 **Static Aeroelastic Model Assessment in the Transonic Regime** M. Denison, Science and Technology Corporation, Mountain View, CA; E. Ting, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; J. Housman, N. Nguyen, NASA Ames Research Center, Moffett Field, CA			

Tuesday, 14 June 2016							
112-APA-20	**Applied CFD & Numerical Correlations with Experimental Data III**						**Columbia 4**
Chaired by: M. CONWAY, The Aerospace Corporation and K. KONTIS, University of Glasgow							
1400 hrs AIAA-2016-3164 **Transition Transport Modeling for the Prediction of Crossflow Transition** C. Grabe, N. Shengyang, A. Krumbein, German Aerospace Center (DLR), Braunschweig, Germany	1430 hrs AIAA-2016-3165 **Evaluation of Six Turbulence Models for Accurate Numerical Simulation of 2D Slot Nozzle Ejector** I. Witte, Washington University in St. Louis, St. Louis, MO; C. Graham, The Boeing Company, St. Louis, MO; R. Agarwal, T. Wray, Washington University in St. Louis, St. Louis, MO	1500 hrs AIAA-2016-3166 **Comparison of Uncoupled and Coupled CFD-based Simulation Techniques for the Prediction of the Aerodynamic Behavior of a Complex Projectile** S. Silton, J. Sahu, F. Fresconi, Army Research Laboratory, Aberdeen Proving Ground, MD	1530 hrs AIAA-2016-3167 **A numerical Method for Transonic Wind Tunnel Wall Interference Correction in Airfoil Testing** B. Ma, G. Wang, Z. Ye, Northwestern Polytechnical University, Xi'an, China; L. Xu, University of New South Wales, Canberra, Australia	1600 hrs AIAA-2016-3168 **Numerical Simulation of Supersonic Jets in Transonic and Supersonic Crossflows Using *Kestrel*** L. Johnsen, Air Force Institute of Technology, Wright-Patterson AFB, OH; C. Martin, Air Force Research Laboratory, Eglin AFB, FL; M. Reeder, D. Crowe, Air Force Institute of Technology, Wright-Patterson AFB, OH	1630 hrs AIAA-2016-3169 **Hypersonic Experimental Aero-thermal Capability Study through Multilevel Fidelity Computational Fluid Dynamics** D. Sagerman, University of Dayton, Dayton, OH; J. Tancred, Air Force Research Laboratory, Wright-Patterson AFB, OH; M. Rumpfkeil, University of Dayton, Dayton, OH; B. Hellman, Air Force Research Laboratory, Wright-Patterson AFB, OH	1700 hrs AIAA-2016-3170 **Numerical Prediction of Longitudinal Dynamic Stability for a Lifting Body in Transonic Flow** B. Reimann, German Aerospace Center (DLR), Braunschweig, Germany	

Tuesday, 14 June 2016							
113-ASE-7/ATIO.ATM-9	**Characterization of the Atmospheric Environment using UAS (Invited)**						**Georgetown East**
Chaired by: D. THOMPSON, Mississippi State University and V. SCHULTZ, NASA Langley Research Center							
1400 hrs Oral Presentation **CLOUD-MAP: Advancing Meteorology and Atmospheric Physics Through Unmanned Aerial Systems (Invited)** P. Chilson, University of Oklahoma, Norman, Norman, OK; J. Jacob, Oklahoma State University, Stillwater, OK; S. Smith, University of Kentucky, Lexington, Lexington, KY; A. Houston, University of Nebraska, Lincoln, Lincoln, NE	1430 hrs AIAA-2016-3171 **Toward an Autonomous Airborne Scientist for Studying Severe Local Storms (Invited)** E. Frew, B. Argrow, University of Colorado, Boulder, Boulder, CO	1500 hrs AIAA-2016-3172 **Integration of Infrasonic Sensing with UAS (Invited)** B. Elbing, R. Gaeta, Oklahoma State University, Stillwater, OK	1530 hrs Oral Presentation **The Application of Unmanned Aircraft Systems towards Supercell Research and Forecasting (Invited)** A. Houston, University of Nebraska, Lincoln, Lincoln, NE	1600 hrs AIAA-2016-3173 **Boundary Layer Measurements Over Land Use/Cover Discontinuities Using a Small UAS (Invited)** J. Dyer, L. Wasson, R. Moorhead, Mississippi State University, Mississippi State, MS	1630 hrs AIAA-2016-3174 **Fundamental Turbulence Measurement with Unmanned Aerial Vehicles (Invited)** B. Witte, J. Mullen, M. Thamann, S. Bailey, University of Kentucky, Lexington, Lexington, KY	1700 hrs Oral Presentation **NOAA Atmospheric, Marine and Polar Monitoring Using UASs (including Rapid Response)** J. Coffey, Cherokee Nation Technologies, Washington, D.C.; R. Hood, T. Jacobs, G. Wick, National Oceanic and Atmospheric Administration, Silver Spring, MD; R. Moorhead, Mississippi State University, Starkville, MS; J. Walker, Cherokee Nation Technologies, Washington, D.C.	

Tuesday, 14 June 2016							
114-ASE-8	**Ice Roughness Characterization and Heat Transfer**						**Georgetown West**
Chaired by: D. RIGBY, Vantage Partners Limited and S. OTTA, GE Global Research Center							
1400 hrs AIAA-2016-3175 **Convection from Hemispherical and Conical Model Ice Roughness Elements in Stagnation Region Flows** M. Hughes, S. McClain, T. Shannon, Baylor University, Waco, TX; M. Vargas, A. Broeren, NASA Glenn Research Center, Cleveland, OH	1430 hrs AIAA-2016-3176 **Heat Transfer Evaluation on Ice Roughened Cylinders in Transition Regime** Y. Han, J. Palacios, Pennsylvania State University, University Park, PA	1500 hrs AIAA-2016-3177 **Convection from a Simulated NACA 0012 with Icing Roughness of Different Shape and Thermal Conductivity** T. Shannon, S. McClain, Baylor University, Waco, TX	1530 hrs AIAA-2016-3178 **Surface Roughness and Heat Transfer Prediction for Development of an Improved Aircraft Ice Accretion Modeling Tool** Y. Han, J. Palacios, Pennsylvania State University, University Park, PA	1600 hrs AIAA-2016-3179 **Manual Point Cloud Registration for Combined Ice Roughness and Ice Thickness Measurements** S. McClain, Baylor University, Waco, TX	1630 hrs AIAA-2016-3180 **Ice Roughness and its Impact on the Ice Accretion Process** J. Steiner, German Aerospace Center (DLR), Braunschweig, Germany; S. Bansmer, Technical University of Braunschweig, Braunschweig, Germany	1700 hrs AIAA-2016-3181 **Characterization of Ice Roughness Variations in Scaled Glaze Icing Conditions** S. McClain, Baylor University, Waco, TX; M. Vargas, NASA Glenn Research Center, Cleveland, OH; J. Tsao, Ohio Aerospace Institute, Cleveland, OH	

Tuesday, 14 June 2016							
115-ATIO.ACD-4 **1400 - 1700 hrs**	**Conceptual Aircraft Design Working Group**						**Gunston East**
CADWG - The Conceptual Aircraft Design Working Group will host a panel discussion focusing on unmanned aircraft design. Panelists: **Michael Logan**, NASA Langley Research Center; **M. Christopher Cotting**, USAF/TPS; **Darold Cummings**, Consultant; **Clif Davies**, Lockheed Martin Corporation; **Jay Gundlach**, UAV Design Book Author & Entrepreneur; **Robert Love**, General Atomics							

Tuesday, 14 June 2016							
116-ATIO.ATM-10	**UAS Risk and Perception**						**Embassy**
Chaired by: B. SRIDHAR, NASA Ames Research Center							
1400 hrs AIAA-2016-3182 **Identifying and Mitigating Human Factors Errors in Unmanned Aircraft Systems** P. Neff, K. Garman, Federal Aviation Administration, Lakewood, CA	1430 hrs AIAA-2016-3183 **Capturing Safety Requirements to Enable Effective Task Allocation between Humans and Automaton in Increasingly Autonomous Systems** N. Neogi, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2016-3184 **Assessing System Safety for an Urban, Tethered UAS** L. Hale, C. Denham, Virginia Polytechnic Institute and State University, Blacksburg, VA; J. Luxhoj, Rutgers University, Piscataway, NJ; C. Mancini, Northrop Grumman Corporation, Brooklyn, NY; C. Woolsey, R. Mooney, Virginia Polytechnic Institute and State University, Blacksburg, VA	1530 hrs AIAA-2016-3185 **Multivariate Probit Models and Qualitative Analysis of Survey on Public and Stakeholder Perception of Unmanned Aircraft** L. Reddy, D. DeLaurentis, Purdue University, West Lafayette, IN	1600 hrs AIAA-2016-3186 **Strategies to Model System Risk Using UAS Safety Analysis Model (USAM)** A. Tyagi, Y. Zhang, Intelligent Automation, Inc., Rockville, MD; S. Toussaint, Coherent Technical Services, Inc., Lexington Park, MD; J. Luxhoj, LCR, LLC, Somerset, NJ			

Tuesday, 14 June 2016							
117-ATIO.ATM-11	**Weather Impacts**						**Fairchild East**
Chaired by: A. EVANS, University of California Santa Cruz							
1400 hrs AIAA-2016-3187 **Algorithms for Collision Detection Between a Point and a Moving Polygon, with Applications to Aircraft Weather Avoidance** A. Narkawicz, G. Hagen, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2016-3188 **Using Ensemble Weather Forecasts for Predicting Airport Runway Configuration and Capacity** S. Tien, C. Taylor, C. Wanke, MITRE Corporation, McLean, VA	1500 hrs AIAA-2016-3189 **Improving Operational Acceptability of Dynamic Weather Routes Through Analysis of Commonly Use Routings** A. Evans, University of California, Santa Cruz, Moffett Field, CA; B. Sridhar, D. McNally, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2016-3190 **Risk-Hedged Approach for Re-routing Air Traffic Under Weather Uncertainty** A. Sadovsky, K. Bilimoria, NASA Ames Research Center, Moffett Field, CA				

Tuesday, 14 June 2016							
118-ATIO.TFPC-5	**Transformational Flight - On-Demand Mobility (ODM) Enabling Technologies Session**						**Columbia 1**
Chaired by: M. PATTERSON and M. MOORE, NASA Langley Research Center							
1400 hrs Oral Presentation **FAA-NASA On-Demand Mobility and Emerging Aviation Technology Roadmap** K. Goodrich, NASA Langley Research Center, Hampton, VA; W. Ryan, Federal Aviation Administration, Kansas City, MO	1430 hrs Oral Presentation **Electric Propulsion Market Pathway Emergence as a Disruptive Technology** M. Moore, N. Borer, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2016-3191 **Transformational Autonomy and Personal Transportation: Synergies and Differences between Cars and Planes** K. Goodrich, NASA Langley Research Center, Hampton, VA; J. Nickolaou, General Motors, Warren, MI; M. Moore, NASA Langley Research Center, Hampton, VA	1530 hrs Oral Presentation **Robotic Legged Landing Gear for Rotorcraft** M. Ward, M. Costello, Georgia Institute of Technology, Atlanta, GA	1600 hrs AIAA-2016-3192 **Tactile Active Gear (TAG) For V/ESTOL Electrically Powered Aircraft** B. Seeley, Sustainable Aviation Foundation, Inc., Santa Rosa, CA	1630 hrs Oral Presentation **Wind Tunnel Validation of High-Lift Propellers** X. Fei, B. German, Georgia Institute of Technology, Atlanta, GA		

Tuesday, 14 June 2016							
119-ATIO.TFPC-6/ATIO. VSTOL-1	**Transformational Flight - Unconventional V/STOL Concepts**						**Columbia 12**
Chaired by: W. FREDERICKS, NASA-Langley Research Center and G. GATLIN, NASA Langley Research Center							
1400 hrs Oral Presentation **Sikorsky X2 Technology, S-97 RAIDER and Future Applications** M. Alber, Sikorsky Aircraft Corporation, Stratford, CT	1430 hrs Oral Presentation **Joby S4 Electric VTOL Concept** A. Stoll, J. Bevirt, G. Veble Mikic, Joby Aviation, Santa Cruz, CA	1500 hrs AIAA-2016-3193 **Tri-Fan VTOL Conceptual Design** D. Olcott, Answer Engineering, LLP, Parker, CO	1530 hrs Oral Presentation **Hexplane Technology: Three Wing, Six Tilt-Propulsion Units, VTOL Aircraft** R. Oliver, J. Rutherford, Oliver VTOL, Bluffton, SC; W. Anemaat, Design, Analysis and Research Corporation, Lawrence, KS	1600 hrs Oral Presentation **The S2 Million Dollar GoFly Prize** G. Lighter, Go Fly Prize, Greenwich, CT	1630 hrs AIAA-2016-3194 **FlyKart - Mini Personal Air Vehicle** R. Bulaga, Trek Aerospace, Inc., Folsom, CA; J. Portlock, Electro.Aero Pty Ltd, Perth, Australia		

Tuesday, 14 June 2016		
120-F360-5 **1400 - 1600 hrs**	**The Future of Military Aviation**	**International Ballroom (East)**

Moderator: Tom Bell, Vice President, Global Sales & Marketing, Boeing Defense, Space & Security

Panelists:

Shawn Brimley
Executive Vice President and Director of Studies
Center for New American Security

Rear Admiral Donald Gaddis
U.S. Navy (Ret.)

Michael O'Hanlon
Senior Fellow, Foreign Policy
Brookings Institution

Tuesday, 14 June 2016							
121-FC-5	**Modal Decomposition Methods for Aerodynamic Flows (Invited)**						**Jefferson East**
Chaired by: K. TAIRA, Florida State University and D. SMITH, Office of Naval Research							
1400 hrs Oral Presentation **An Overview of Modal Decomposition Methods for Aerodynamic Flows** T. Colonius, California Institute of Technology, Pasadena, CA	1430 hrs Oral Presentation **Applications of the Proper Orthogonal Decomposition** L. Ukeiley, University of Florida, Gainesville, Gainesville, FL	1500 hrs Oral Presentation **Balanced POD and the Eigensystem Realization Algorithm** D. Luchtenburg, Cooper Union, New York, NY; C. Rowley, Princeton University, Princeton, NJ	1530 hrs Oral Presentation **Decomposing Fluid Flows According to their Dynamics: A~Tutorial on Dynamic Mode Decomposition of Fluids Data** M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN; M. Williams, United Technologies Corporation, East Hartford, CT	1600 hrs Oral Presentation **Global linear stability analysis past the solution of multi-dimensional EVP and SVD problems** J. Perez, V. Theofilis, Technical University of Madrid, Madrid, Spain	1630 hrs Oral Presentation **Resolvent Analysis** M. Luhar, University of Southern California, Los Angeles, CA; B. McKeon, California Institute of Technology, Pasadena, CA	1700 hrs Oral Presentation **Compressed sensing and coherent structures in fluids** S. Brunton, University of Washington, Seattle, Seattle, WA	

Tuesday, 14 June 2016								
122-FC-6/FD-22	Separation Detection and Control							Columbia 11
Chaired by: D. GARMANN, Air Force Research Laboratory								
1400 hrs AIAA-2016-3195 **Induced Stall Cells on a NACA0015 Airfoil using Passive and Active Trips** H. Dell'Orso, W. Chan, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	1430 hrs AIAA-2016-3196 **Separation Control Using Plasma Actuator on an Elliptic Airfoil at Low Reynolds Numbers** X. Yan, X. Meng, Northwestern Polytechnical University, Xi'an, China; S. Luo, F. Liu, University of California, Irvine, Irvine, CA	1500 hrs AIAA-2016-3197 **Low-Cost Detection of Boundary Layer Separation with Dynamic Pressure Measurements** L. Edelman, A. Pensado, S. Robinson, C. Van Dam, University of California, Davis, Davis, CA	1530 hrs AIAA-2016-3198 **Control of Airfoil Flow at Cruise Condition by DBD Plasma Actuator - Sophisticated Airfoil vs. Simple Airfoil with Flow Control -** K. Asano, University of Tokyo, Sagamihara, Japan; M. Sato, T. Nonomura, A. Oyama, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; K. Fujii, Tokyo University of Science, Shinjuku, Japan	1600 hrs AIAA-2016-3199 **Separation Control on a NACA 0015 Airfoil with Plasma-Actuator-Generated Disturbance** Z. Lu, C. Wang, L. Wang, M. Alam, Y. Zhou, Harbin Institute of Technology, Shenzhen, China			

Tuesday, 14 June 2016								
123-FD-23	Aeroacoustics and Noise							Lincoln East
Chaired by: R. WLEZIEN, Iowa State University and F. SARTOR, ONERA								
1400 hrs AIAA-2016-3200 **Direct numerical investigation of sound-orifice interaction grazed by a Mach 0.5 turbulent boundary layer** Q. Zhang, D. Bodony, University of Illinois, Urbana-Champaign, Urbana, IL	1430 hrs AIAA-2016-3201 **Modification of Flow Structures Associated with Broadband Trailing Edge Noise** H. Clemons, R. Wlezien, Iowa State University, Ames, IA	1500 hrs AIAA-2016-3202 **The Influence of Velocity Field Estimation on the Prediction of Far-Field Acoustics** A. Nickels, L. Ukeiley, University of Florida, Gainesville, Gainesville, FL; R. Reger, L. Cattafesta, Florida State University, Tallahassee, FL	1530 hrs AIAA-2016-3203 **Experiments on Slat Noise from -6° to 18° Angles of Attack** F. Amaral, M. Medeiros, C. Pagani, University of São Paulo, São Carlos, Brazil	1600 hrs AIAA-2016-3204 **Direct numerical simulations of tonal noise generation for a two dimensional airfoil at low and moderate Reynolds numbers** Y. Zhang, X. Wu, W. Li, Shanghai Jiao Tong University, Shanghai, China	1630 hrs AIAA-2016-3205 **Effect of Geometry Variations on Tandem Airfoil Interaction Noise** C. Zhang, Shanghai Jiao Tong University, Shanghai, China		

Tuesday, 14 June 2016								
124-FD-24	Fluid-Structure Interaction							Monroe
Chaired by: J. JAWORSKI, Lehigh University and X. LIU, San Diego State University								
1400 hrs AIAA-2016-3206 **Flow Field Analysis of Fully Coupled Computations of a Flexible Wing undergoing Stall Flutter** C. Fagley, J. Seidel, T. McLaughlin, U.S. Air Force Academy, Colorado Springs, CO	1430 hrs AIAA-2016-3207 **The Response of a Single Degree-of-Freedom Wing at Low Reynolds Number** F. Manar, M. Cassell, A. Jones, University of Maryland, College Park, College Park, MD	1500 hrs AIAA-2016-3208 **Aeroelastic Response of an Airfoil at Transitional Reynolds Numbers** C. Barnes, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2016-3209 **On the Effective Length of Fluttering Finite-Length Pipes** K. Lupo, J. Sargeant, J. Jaworski, Lehigh University, Bethlehem, PA	1600 hrs AIAA-2016-3210 **Non-linear Fluid-Structure Interaction using a Partitioned Lattice Boltzmann - FEA approach.** G. Trapani, R. Brionnaud, D. Holman, Next Limit Technologies, Madrid, Spain	1630 hrs AIAA-2016-3211 **Modeling Unsteady Lift on a Hydrofoil due to the Ingestion of Turbulence and Hydro-elastic Motion** M. Catlett, J. Anderson, Naval Surface Warfare Center, West Bethesda, MD		

Tuesday, 14 June 2016								
125-FD-25	Turbulence Modeling III: LES, DNS, Hybrid LES/RANS							Jay
Chaired by: J. EDWARDS and M. VYAS, NASA Glenn Research Center								
1400 hrs AIAA-2016-3212 **Development of a new LES/RANS formulation** J. Edwards, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2016-3213 **Turbulent Inflow Generation for Direct Simulations of Hypersonic Turbulent Boundary Layers and their Freestream Acoustic Radiation** J. Huang, L. Duan, Missouri University of Science and Technology, Rolla, MO	1500 hrs AIAA-2016-3214 **Reduced Order Modeling of Turbulent Flows Using Statistical Coarse-graining** E. Parish, K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI	1530 hrs AIAA-2016-3215 **Application of the Wray-Agarwal Model to Compressible Flows** T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1600 hrs AIAA-2016-3216 **Numerical Investigation of Pressure Gradient Effects on Coherent Structures and Turbulence Anisotropy** L. Schiavo, W. Wolf, University of Campinas, Campinas, Brazil; J. Azevedo, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil	1630 hrs AIAA-2016-3217 **Development of a One-Equation Turbulence Model based on Epsilon-Equation** M. Rahman, Aalto University, Helsinki, Finland; R. Agarwal, Washington University in St. Louis, St. Louis, MO; T. Siikonen, Aalto University, Helsinki, Finland	1700 hrs AIAA-2016-3218 **High Temperature Effects on DNS of Shock/Turbulence Interaction** J. Samuel, S. Ghosh, Indian Institute of Technology Madras, Chennai, India	

Tuesday, 14 June 2016							
126-FD-26	**Shock-Boundary Layer Interaction II**						**Columbia 10**
Chaired by: J. SIVASUBRAMANIAN, The University of Arizona and A. GROSS, New Mexico State University							
1400 hrs AIAA-2016-3219 **Experimental Investigation of Corner Shock Boundary Layer Interactions** M. Funderburk, V. Narayanaswamy, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2016-3220 **Numerical Investigation of Oblique-Shock/Boundary-Layer Interactions in Supersonic Flows** J. Sivasubramanian, H. Fasel, University of Arizona, Tucson, Tucson, AZ	1500 hrs AIAA-2016-3221 **Interaction of an oblique shock with a transitional Mach 5.92 boundary layer** P. Shrestha, N. Hildebrand, A. Dwivedi, J. Nichols, M. Jovanovic, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN	1530 hrs AIAA-2016-3222 **Experiments on Unsteadiness Associated with Cylinder-induced Shock-Laminar Boundary Layer Interaction in Hypersonic Flow** H. Itoh, M. Mizoguchi, National Defense Academy, Yokosuka, Japan	1600 hrs AIAA-2016-3223 **Flowfield of a 3-D Swept Shock Boundary Layer Interaction in a Mach 2 Flow** N. Arora, M. Ali, F. Alvi, Florida State University, Tallahassee, FL	1630 hrs AIAA-2016-3224 **Numerical Exploration of Supersonic Flow Over a Wall-Mounted Hemisphere** P. Morgan, Ohio Aerospace Institute, Wright-Patterson AFB, OH; S. Sherer, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH		

Tuesday, 14 June 2016							
127-FT-2	**Flight Testing of Unmanned Aerial Systems**						**Gunston West**
Chaired by: D. OWENS, NASA-Langley Research Center and W. SCHUMAN							
1400 hrs AIAA-2016-3225 **Application of an ADS-B Sense and Avoid Algorithm** R. Arteaga, M. Cavalin, M. Dandachy, NASA Armstrong Flight Research Center, Edwards, CA; R. Kotcher, Carnegie Mellon University, Pittsburgh, PA	1430 hrs AIAA-2016-3226 **Integration and Evaluation of COTS Pressure Sensors for Flush Air Data Sensing on Small-Scale UAVs** A. Alkurdi, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia; R. Bunge, Stanford University, Stanford, CA; E. Alfaris, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia	1500 hrs AIAA-2016-3227 **Aircraft Instrumentation and Computer Vision-Aided Flight Analysis of Local Air Flow** J. Strader, S. Harper, Y. Gu, West Virginia University, Morgantown, WV					

Tuesday, 14 June 2016							
128-GT-3	**Development and Performance of Ground Test Facilities**						**Lincoln West**
Chaired by: J. MICOL, NASA and S. HELLAND, NASA							
1400 hrs AIAA-2016-3228 **Pressure Tap Effects on the Lift Measurement of an Airfoil Section** M. Kuester, A. Borgoltz, W. Devenport, Virginia Polytechnic Institute and State University, Blacksburg, VA	1430 hrs AIAA-2016-3229 **Wind Tunnel Support System Influence on NASA Common Research Model at Low Speed Conditions** A. Waldmann, T. Lutz, E. Kraemer, University of Stuttgart, Stuttgart, Germany	1500 hrs AIAA-2016-3230 **The Overall Scheme Design and Debugging of the Liquid Nitrogen Injection Cooling System in NF-6 Wind Tunnel** C. Gao, T. Zhou, Z. Zhang, Northwestern Polytechnical University, Xi'an, China	1530 hrs AIAA-2016-3231 **Mechanical Simulation and Experiment of Electric Impulse De-icing System** Y. Wang, C. Zhu, Nanjing University of Aeronautics and Astronautics, Nanjing, China; B. Fu, Science and Technology on Space Physics Laboratory, Beijing, China; K. Li, Z. Wang, Nanjing University of Aeronautics and Astronautics, Nanjing, China				

Tuesday, 14 June 2016							
129-ITAR-2	**High-Speed Flows**						**Cabinet**
Chaired by: K. CASPER, Sandia National Laboratories and D. LEWIS, Aerospace Testing Alliance (ATA)							
1400 hrs Oral Presentation **Effect of bluntness and angle of attack on circular cone transition at Mach 10** I. Leyva, Air Force Research Laboratory, Edwards AFB, CA; E. Marineau, C. Moraru, M. Marana, Arnold Engineering Development Complex, Silver Spring, MD; A. Lingfu, University of Maryland, College Park, College Park, MD	1430 hrs Oral Presentation **Amplitude Method for Estimating the Boundary Layer Transition Onset on Inclined Blunt Circular Cones at Mach 10** E. Marineau, Arnold Engineering Development Center, Silver Spring, MD; I. Leyva, Air Force Research Laboratory, Edwards AFB, CA; C. Moraru, M. Marana, Arnold Engineering Development Center, Silver Spring, MD; A. Lingfu, University of Maryland, College Park, College Park, MD	1500 hrs AIAA-2016-3233 **Numerically Assessing Boundary Layer Stabilization due to Axisymmetric Roughness Strips in Hypersonic Flow** B. Grier, Z. Riley, J. McNamara, Ohio State University, Columbus, OH	1530 hrs AIAA-2016-3234 **Optimization of a Mach 6 Quiet Wind Tunnel Nozzle** M. Lakebrink, The Boeing Company, Saint Louis, MO; K. Bowcutt, The Boeing Company, Huntington Beach, CA; T. Winfree, The Boeing Company, Tukwila, WA; T. Juliano, University of Notre Dame, Notre Dame, IN	1600 hrs AIAA-2016-3235 **Investigations of Supersonic Flow over a Hemispherical Turret Using Numerical Simulations** C. Tam, T. Madden, D. Wittich, C. Noren, Air Force Research Laboratory, Kirtland AFB, NM; D. Carnrike, R. Kumar, Florida State University, Tallahassee, FL; et al.	1630 hrs AIAA-2016-3236 **Wind Tunnel Demonstration of a Gust Rejecting Wing Using Distributed Bio-Inspired Pressure Sensing** R. Griffin, M. Lieu, A. Dropkin, Aurora Flight Sciences, Cambridge, MA; M. Sytsma, Air Force Research Laboratory, Eglin AFB, FL		

Tuesday, 14 June 2016							
130-MAO-7	**Design Optimization of Aircrafts and Other Complex Systems IV**						**Cardozo**
Chaired by: S. CHOI, Virginia Polytechnic Institute and State University and P. LYU, COMSOL Inc.							
1400 hrs AIAA-2016-3237 **A Risk-Aversion-Based Project Valuation Method to Determine Optimal Technology Infusion and Architecture in Aircraft Design** F. Burgaud, J. Durand, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1430 hrs AIAA-2016-3238 **A Methodology to Evaluate Tradeoffs between Individual Architecture Development and Numerality to Achieve Group Performance in Robotics Swarms** J. Durand, F. Burgaud, K. Cooksey, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1500 hrs AIAA-2016-3239 **Optimal Spacecraft Hardware Placement to Minimize Required Power Input for Hibernation Survival** R. Pitre, I. Kim, Queen's University, Kingston, Canada	1530 hrs AIAA-2016-3240 **Assessment of airframe-subsystems synergy on overall aircraft performance in a Collaborative Design** P. Prakasha, P. Ciampa, German Aerospace Center (DLR), Hamburg, Germany; L. Boggero, M. Fioriti, Technical University of Turin, Turin, Italy	1600 hrs AIAA-2016-3241 **Adjoint Approach based on Reduced-order Model for Steady PDE Systems** J. Li, K. Qu, J. Cai, C. Cao, Northwestern Polytechnical University, Xi'an, China			

Tuesday, 14 June 2016							
131-MAO-8	**Shape and Topology Optimization IV**						**Columbia 3**
Chaired by: M. STELMACK, Lockheed Martin Aeronautics and B. STANFORD, NASA Langley Research Center							
1400 hrs AIAA-2016-3242 **Topology Optimization Formulations for Circuit Board Heat Spreader Design** D. Lohan, University of Illinois, Urbana-Champaign, Urbana, IL; E. Dede, Toyota Motor Corporation, Ann Arbor, MI; J. Allison, University of Illinois, Urbana-Champaign, Urbana, IL	1430 hrs AIAA-2016-3243 **Wing airfoil geometric parametrization method for efficient aerodynamic design optimization** R. de Souza, A. Cuco, T. Orra, Embraer, São José dos Campos, Brazil	1500 hrs AIAA-2016-3244 **A Hybrid Aerodynamic Optimization Algorithm Based on Differential Evolution and RBF Response Surface** K. Deng, H. Chen, Tsinghua University, Beijing, China	1530 hrs AIAA-2016-3245 **Multilevel Collaborative Aerodynamic Design Optimization Based on Sobol' Global Sensitivity Analysis** C. Wang, Z. Gao, Northwestern Polytechnical University, Xi'an, China				

Tuesday, 14 June 2016							
132-MST-7	**UAV Path Planning and Collision Avoidance**						**Morgan**
Chaired by: P. ZAAL, NASA Ames Research Center and F. CARDULLO, State University of NY							
1400 hrs AIAA-2016-3246 **Multi-Rotor Aircraft Collision Avoidance using Partially Observable Markov Decision Processes** E. Mueller, NASA Ames Research Center, Moffett Field, CA; M. Kochenderfer, Stanford University, Stanford, CA	1430 hrs AIAA-2016-3247 **Simulation Comparison of Collision Avoidance Algorithms for Small Multi-Rotor Aircraft** E. Mueller, NASA Ames Research Center, Moffett Field, CA; M. Kochenderfer, Stanford University, Stanford, CA	1500 hrs AIAA-2016-3248 **UAV Path-Planning using Bezier Curves and a Receding Horizon Approach** B. Ingersoll, J. Ingersoll, P. DeFranco, A. Ning, Brigham Young University, Provo, UT	1530 hrs AIAA-2016-3249 **Bio-Inspired Opportunistic Approaches in Energy-Conserving/Harnessing Flight-Path Modeling for UAS** S. Gudmundsson, V. Golubev, S. Drakunov, C. Reinholtz, Embry-Riddle Aeronautical University, Daytona Beach, FL	1600 hrs AIAA-2016-3250 **Multi-UAVs Target Assignment Using Opposition-based Genetic Algorithm with Multiple Mutation Operators** Y. Wen, L. Liu, Z. Wang, J. Kou, T. Long, Beijing Institute of Technology, Beijing, China	1630 hrs AIAA-2016-3251 **Swarming Coordination of Multiple Unmanned Aerial Vehicles in Three-Dimensional Space** Y. Jia, China Aerospace Science and Industry Corporation (CASIC), Beijing, China		

Tuesday, 14 June 2016							
133-MST-8	**Modeling and Simulation of Air Traffic Management II**						**Fairchild West**
Chaired by: B. APONSO, NASA-Ames Research Center and D. CARTMELL, Boeing Engineering Operations & Technology							
1400 hrs AIAA-2016-3252 **A Method to Extract Aircraft Information from Noisy VFR Flight Track Data** S. Ayyalasomayajula, Y. Zhang, N. Nigam, F. Wieland, Intelligent Automation, Inc., Rockville, MD	1430 hrs AIAA-2016-3253 **Exploring the Air-Ground Workload Tradespace** K. Nelson, H. Lee, University of California, Santa Cruz, Santa Cruz, CA; M. Davies, NASA Ames Research Center, Moffett Field, CA	1500 hrs AIAA-2016-3254 **Modeling Functional Specifications of Ground Systems in the NAS** C. Krantz, Royal Institute of Technology (KTH), Stockholm, Sweden; N. Rungta, NASA Ames Research Center, Moffett Field, CA; E. Mercer, Brigham Young University, Provo, UT	1530 hrs AIAA-2016-3255 **Flight planning in case of volcanic eruption** A. Schmitt, A. Kuenz, German Aerospace Center (DLR), Braunschweig, Germany				

Tuesday, 14 June 2016							
134-NIA-1	**National Institute of Aerospace Graduate Student Researchers**						**Piscataway**
Chaired by: C. BRITCHER, Old Dominon University							
1400 hrs Oral Presentation **Titan Aerial Explorer** E. Petro, University of Maeryland, College Park, MD	1430 hrs Oral Presentation **Impact of Turboprop Propulsion on Fuel Efficiency and Economic Feasibility** K. Antcliff, NASA Langley Research Center, Hampton, VA	1500 hrs Oral Presentation **Optimization of a Quiet Propeller for the GI-10 All-Electric Aircraft** X. Fei, Georgia Institute of Technology, Atlanta, GA	1530 hrs Oral Presentation **Performance and Noise Study of Propellers for Small Distributed Electric Propulsion Applications** B. Duvall, Old Dominion University, Norfolk, VA	1600 hrs Oral Presentation **Modeling and Control of Linked Aircraft Systems** J. Cooper, University of Connecticut, Mansfield, CT	1630 hrs Oral Presentation **Adaptive Robust Noise Control in an Active Headrest** J. Bean, Virginia Polytechnic Institute and State University, Blacksburg, VA	1700 hrs Oral Presentation **Development of a Method for Analysis & Incorporation of Rotor-craft Fluctuation in Synthesized Flyover Noise** N. Pera, Virginia Polytechnic Institute and State University, Blacksburg, VA	

Tuesday, 14 June 2016							
135-TP-5	**Radiation**						**Kalorama**
Chaired by: B. CRUDEN, ERC Inc at NASA Ames Research Center and D. ANDRIENKO, University of Michigan							
1400 hrs AIAA-2016-3256 **Non-equilibrium Radiation for Earth Entry** A. Brandis, Analytical Mechanics Associates, Inc., Moffett Field, CA; C. Johnston, NASA Langley Research Center, Hampton, VA; B. Cruden, Analytical Mechanics Associates, Inc., Moffett Field, CA	1430 hrs AIAA-2016-3257 **Echelle Spectroscopy for High Enthalpy Flow Diagnostics** S. Loehle, T. Hermann, F. Zander, University of Stuttgart, Stuttgart, Germany; T. Marynowski, Airbus, Oberkochen, Germany	1500 hrs AIAA-2016-3258 **Characterization of High-Enthalpy and non-Equilibrium Flows using Laser Absorption Spectroscopy** T. Mayer, B. Massuti-Ballester, G. Herdrich, S. Fasoulas, University of Stuttgart, Stuttgart, Germany	1530 hrs AIAA-2016-3259 **Refinements to Afterbody Radiative Heating Simulations for Earth Entry** C. Johnston, NASA Langley Research Center, Hampton, VA; A. Brandis, NASA Ames Research Center, Moffett Field, CA; M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL	1600 hrs AIAA-2016-3260 **A Tunable Laser Absorption Diagnostic for Measurements of CO in Shock-Heated Gases** M. MacDonald, Jacobs, Moffett Field, CA; B. Cruden, Analytical Mechanics Associates, Inc., Moffett Field, CA	1630 hrs AIAA-2016-3261 **Reduced Order Modeling of Non-equilibrium Radiation for CO_2.** A. Sahai, M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL		

Tuesday, 14 June 2016							
136-TP-6	**Special Session: Spacecraft Thermal Management**						**DuPont**
Chaired by: S. SMITH and W. TSAI, California State University, Maritime Academy							
1400 hrs AIAA-2016-3262 **Thermal Enhancements for Separable Thermal Mechanical Interfaces** M. Flannery, J. Schmidt, J. Weyant, Advanced Cooling Technologies, Inc., Lancaster, PA; K. Thorson, Lockheed Martin Corporation, Eagan, MN	1430 hrs AIAA-2016-3263 **An Advanced Card Lock for Space and Terrestrial Applications** N. Kattamis, J. Rozzi, Creare, Inc., Hanover, NH	1500 hrs AIAA-2016-3264 **Reduced-Order Modeling for Rapid Thermal Analysis and Evaluation of Spacecraft** D. Hengeveld, LoadPath, Albuquerque, NM	1530 hrs AIAA-2016-3265 **Single-Sided Guarded Hot Plate Method for Comparative Testing of Thermal Radiation Barriers in Vacuum** K. Irick, Applied Technology Associates, Albuquerque, NM; D. Hengeveld, LoadPath, Albuquerque, NM	1600 hrs AIAA-2016-3266 **Enabling Future Spacecraft Missions through Isothermal Bus Thermal Management** D. Hengeveld, LoadPath, Albuquerque, NM	1630 hrs AIAA-2016-3267 **Development of the Two Phase Flow Separator Experiment** E. Golliher, D. Gotti, K. Gilkey, J. Owens, N. Pham, P. Stehno, NASA Glenn Research Center, Cleveland, OH	1700 hrs AIAA-2016-3268 **Thermal Control of a Gravitational Reference Sensor** A. Alfauwaz, Stanford University, Stanford, CA; F. Alamri, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia; A. Zoellner, Stanford University, Stanford, CA; A. Alhussain, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia; S. Wang, S. Saraf, Stanford University, Stanford, CA; et al.	

Tuesday, 14 June 2016		
137-NW-4 **1600 - 1630 hrs**	**Networking Coffee Break**	**Columbia**
Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.		

Tuesday, 14 June 2016		
138-LEC-3 **1630 - 1730 hrs**	**Plasmadynamics and Lasers Award Lecture**	**International Ballroom (East)**
Aero-Optics: A Photon Odyssey **Eric J. Jumper** Roth-Gibson Professor of Aerospace and Mechanical Engineering, Department of Aerospace and Mechanical Engineering University of Notre Dame		

Tuesday, 14 June 2016		
139-NW-5 **1730 - 1900 hrs**	**Reception in the Exposition Hall**	**Columbia**
Take this opportunity to engage new contacts and refresh old ones. A ticket for the reception is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site.		

Wednesday

Wednesday, 15 June 2016		
140-SB-3 **0730 - 0800 hrs**	**Speakers' Briefing**	**Session Rooms**
Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 30-minute briefing on the day of their session to exchange bios and review final details prior to the session. Please attend on the day of your session.		

Wednesday, 15 June 2016		
141-PLNRY-4 **0800 - 0900 hrs**	**Plenary**	**International Ballroom (Center)**
Cybersecurity **Richard A. Clarke** Chairman & CEO Good Harbor Security Risk Management, LLC		

Wednesday, 15 June 2016		
142-NW-5 **0845 - 0930 hrs**	**Networking Coffee Break**	**Columbia**
Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.		

Wednesday, 15 June 2016							
143-AFM-9	**Flight Test, System Identification and Parameter Estimation I**						**Holmead West**
Chaired by: C. KARLGAARD, Analytical Mechanics Associates Inc and J. GRAUER, NASA Langley Research Center							
0930 hrs AIAA-2016-3269 **Longitudinal Aerodynamic Modeling of the Adaptive Compliant Trailing Edge Flaps on a GIII Aircraft and Comparisons to Flight Data** M. Smith, T. Bui, NASA Armstrong Flight Research Center, Edwards, CA; C. Garcia, Jacobs Technology, Inc., Edwards, CA; S. Cumming, NASA Armstrong Flight Research Center, Edwards, CA	1000 hrs AIAA-2016-3270 **Simultaneous Multi-step Excitations for Aircraft System Identification** P. Lichota, Warsaw University of Technology, Warsaw, Poland; P. Ohme, German Aerospace Center (DLR), Braunschweig, Germany; K. Sibilski, Warsaw University of Technology, Warsaw, Poland	1030 hrs AIAA-2016-3271 **Reconstruction of Aircraft Trajectories during Landing using a Rauch-Tung-Striebel Smoother, Instrument Landing System Deviation Information, and Taxiway Locations** L. Höhndorf, J. Siegel, J. Sembiring, P. Koppitz, F. Holzapfel, Technical University of Munich, Munich, Germany	1100 hrs AIAA-2016-3272 **Time-Domain System Identification of Rigid-Body Multipoint Loads Model** M. Preisighe Viana, German Aerospace Center (DLR), Braunschweig, Germany	1130 hrs AIAA-2016-3273 **Comparison of Static Pressure from Aircraft Trailing Cone Measurements and Numerical Weather Prediction Analysis** A. Giez, C. Mallaun, M. Zöger, A. Dörnbrack, U. Schumann, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	1200 hrs AIAA-2016-3274 **Stable and Unstable Aircraft Parameter Estimation in Presence of Noise Using Intelligent Estimation Technique** A. Ghosh Roy , N. Peyada, Indian Institute of Technology Kharagpur, Kharagpur, India		

Wednesday, 15 June 2016							
144-AFM-10	**Unmanned Aerial Systems III**						**Holmead East**
Chaired by: T. FIELDS, University of Missouri-Kansas City and D. MURRI, NASA Engineering and Safety Center and K. CUNNINGHAM, NASA Langley Research Center							
0930 hrs AIAA-2016-3275 **Optical Target Tracking with User Input for Automated RPA Recovery** C. Wilson, M. Anderson, M. Hyde, K. Jensen, U.S. Air Force Academy, Colorado Springs, CO	1000 hrs AIAA-2016-3276 **Robust Control of Wind Powered Autonomous Unmanned Aerial Vehicle** M. Sadraey, Daniel Webster College, Nashua, NH	1030 hrs AIAA-2016-3277 **Design of a Rocketsonde Launched UAS for Weather Prediction and Modeling** S. Fehrenbach, J. Jacob, Oklahoma State University, Stillwater, OK	1100 hrs AIAA-2016-3278 **Gramian-Inspired Unmanned Aerial Flight Control for Atmospheric Energy Capture** U. Saxena, I. Faruque, University of Maryland, College Park, College Park, MD	1130 hrs AIAA-2016-3279 **Development and Flight Test of Moving-mass Actuated Unmanned Aerial Vehicle** S. Vengate, S. Erturk, A. Dogan, University of Texas, Arlington, Arlington, TX	1200 hrs AIAA-2016-3280 **Propulsion System Design for Micro Aerial Vehicles** J. Vasconez, J. Grewal, E. Leonardo, M. Marwa, C. Guzman, R. Mankbadi, Embry-Riddle Aeronautical University, Daytona Beach, FL		

Wednesday, 15 June 2016							
145-AMT-6	**Highlighting the Contributions of Prof. Ron Hanson to Aerodynamic Measurement Technology (Invited)**						**Georgetown East**
Chaired by: P. DANEHY, NASA Langley Research Center and J. SEITZMAN, Georgia Institute of Technology							
0930 hrs Oral Presentation **Ron Hanson's Integrated Approach for Developing Effective Laser Diagnostics** J. Seitzman, Georgia Institute of Technology, Atlanta, GA	1000 hrs Oral Presentation **Laser absorption sensing from the laboratory to field applications (Invited)** J. Jeffries, R. Hanson, D. Davidson, Stanford University, Stanford, CA	1030 hrs Oral Presentation **Toward High-Speed Four-Dimensional Laser-Based Imaging** J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH	1100 hrs Oral Presentation **Impact of the Hanson Group's 1980's Fluorescence Experiments on Aerospace Measurement Technology (Invited)** P. Danehy, NASA Langley Research Center, Hampton, VA	1130 hrs Oral Presentation **Ron Hanson: Four Decades of Research Accomplishments** J. Tishkoff, Air Force Office of Scientific Research, Arlington, VA			

Wednesday, 15 June 2016							
146-APA-21	**High Angle of Attack and High Lift Aerodynamics**						**Columbia 9**
Chaired by: C. PASILIAO, AFRL/RWWV and J. LATZ, Northrop Grumman Aerospace Systems							
0930 hrs AIAA-2016-3281 **Analysis of Low-Speed Stall Aerodynamics of a Swept Wing with Seamless Flaps** T. Bui, NASA Armstrong Flight Research Center, Edwards, CA; S. Moini-Yekta, Science and Technology Corporation, Moffett Field, CA	1000 hrs AIAA-2016-3282 **Lattice-Boltzmann Simulations of the JAXA JSM High-Lift Configuration** B. Konig, E. Fares, Exa GmbH, Stuttgart, Germany; M. Murayama, Y. Ito, Y. Yokokawa, K. Yamamoto, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan; et al.	1030 hrs AIAA-2016-3283 **Numerical Study of Aerodynamics and Flow Physics of the 30P30N Three-Element Airfoil in Dynamic Ground Effect** Q. Qu, L. Huang, P. Liu, W. Wang, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO	1100 hrs AIAA-2016-3284 **Optimization of Chine-Shaped Forebody of an Aircraft in Terms of Providing Directional Stability** K. Makarov, A. Pavlenko, TsAGI, Zhukovsky, Russia				

Wednesday, 15 June 2016							
147-APA-22	**Ground Vehicle Aerodynamics**						**Albright**
Chaired by: A. SCLAFANI, Boeing Commercial Airplanes and X. WANG, Air Force Research Laboratory							
0930 hrs AIAA-2016-3285 **Forcing Boundary-Layer Transition on an Inverted Airfoil in Ground Effect at Varying Incidence** L. Roberts, M. Finnis, K. Knowles, Cranfield University, Shrivenham, United Kingdom	1000 hrs AIAA-2016-3286 **Wake Deceleration of a Racecar Multielement Airfoil in Ground Effect** S. Bansal, M. Selig, University of Illinois, Urbana-Champaign, Urbana, IL	1030 hrs AIAA-2016-3287 **Aerodynamics Simulation of a Sedan-type Road Vehicle in Cornering Motion with Roll Angle** R. Kono, T. Nakashima, Hiroshima University, Higashi, Japan; M. Tsubokura, Kobe University, Kobe, Japan; Y. Okada, T. Nouzawa, Mazda Motor Corporation, Aki, Japan	1100 hrs AIAA-2016-3288 **Dynamic Mode Decomposition of Flow around a Full-Scale Road Vehicle using Unsteady CFD** J. Ikeda, D. Matsumoto, Hokkaido University, Sapporo, Japan; M. Tsubokura, Kobe University, Kobe, Japan; M. Uchida, T. Hasegawa, R. Kobayashi, Fuji Heavy Industries, Ota, Japan				

Wednesday, 15 June 2016							
148-APA-23/FD-28	**Propeller/Rotorcraft/Wind Turbine Aerodynamics III**						**Northwest**
Chaired by: K. MULLENERS, EPFL and J. MURRAY, Sandia National Laboratories							
0930 hrs AIAA-2016-3289 **Towards the optimization of wind turbine rotor blades by means of computational fluid dynamics and the adjoint approach** L. Vorspel, University of Oldenburg, Oldenburg, Germany; B. Stoevesandt, Fraunhofer, Oldenburg, Germany; J. Peinke, I. Herraez, University of Oldenburg, Oldenburg, Germany	1000 hrs AIAA-2016-3290 **Ducted Wind Turbine Optimization** R. Venters, B. Helenbrook, K. Visser, Clarkson University, Potsdam, NY	1030 hrs AIAA-2016-3291 **Vestas V136 rotor: Design and testing of the tip airfoil** F. Grasso, Vestas, Newport, United Kingdom	1100 hrs AIAA-2016-3292 **Numerical Investigation of Self-Starting Capability of Vertical-Axis Wind Turbines at Low Reynolds Numbers** H. Tsai, T. Colonius, California Institute of Technology, Pasadena, CA	1130 hrs AIAA-2016-3293 **Effects of Leading-Edge Structures on Stall Behaviors of a NACA0015 Airfoil: A Multi-plane PIV Study** Y. Zhang, J. Estevadeordal, S. Bhusal, J. Krech, North Dakota State University, Fargo, ND			

Wednesday, 15 June 2016							
149-ASE-9	**NASA/FAA/ONERA Swept Wing Icing Research--SUNSET2**						**Columbia 12**
Chaired by: S. LEE, ASRC Aerospace Corporation and B. WOODARD, University of Illinois							
0930 hrs AIAA-2016-3294 **Ice-Accretion Test Results for Three Large-Scale Swept-Wing Models in the NASA Icing Research Tunnel** A. Broeren, M. Potapczuk, NASA Glenn Research Center, Cleveland, OH; S. Lee, Vantage Partners, LLC, Cleveland, OH; A. Malone, B. Paul, The Boeing Company, Seattle, WA; B. Woodard, University of Illinois, Urbana-Champaign, Urbana, IL	1000 hrs AIAA-2016-3295 **Computational and Experimental Ice Accretions of Large Swept Wings in the Icing Research Tunnel** G. Fujiwara, M. Bragg, S. Camello, C. Lum, University of Washington, Seattle, Seattle, WA	1030 hrs AIAA-2016-3296 **Validation of a 3D ice accretion tool on swept wings of the SUNSET2 program** E. Radenac, ONERA, Toulouse, France	1100 hrs AIAA-2016-3297 **Improved Delayed Detached-Eddy Simulation on a Swept Hybrid Model in IRT** C. Butler, University of Maryland, College Park, College Park, MD; C. Qin, E. Loth, University of Virginia, Charlottesville, Charlottesville, VA	1130 hrs AIAA-2016-3298 **Generation of Full-Span Leading-Edge 3D Ice Shapes for Swept-Wing Aerodynamic Testing** S. Camello, University of Washington, Seattle, Seattle, WA; S. Lee, Vantage Partners, LLC, Cleveland, OH; C. Lum, M. Bragg, University of Washington, Seattle, Seattle, WA			

Wednesday, 15 June 2016							
150-ASE-10	**Ice-Crystal (Engine) Icing Physics**						**Georgetown West**
Chaired by: D. FULEKI, National Research Council Canada and D. KNEZEVICI, GE Aviation							
0930 hrs AIAA-2016-3299 **Plans and Preliminary Results of Fundamental Studies of Ice Crystal Icing Physics in the NASA Propulsion Systems Laboratory** P. Struk, NASA Glenn Research Center, Cleveland, OH; J. Tsao, T. Bartkus, Ohio Aerospace Institute, Cleveland, OH	1000 hrs AIAA-2016-3300 **Numerical Analysis of Mixed-Phase Icing Cloud Simulations in the NASA Propulsion Systems Laboratory** T. Bartkus, Ohio Aerospace Institute, Cleveland, OH; P. Struk, NASA Glenn Research Center, Cleveland, OH; J. Tsao, Ohio Aerospace Institute, Cleveland, OH; J. Van Zante, NASA Glenn Research Center, Cleveland, OH	1030 hrs AIAA-2016-3301 **Experimental Results for Ice Crystal Icing on Hemispherical and Double Wedge Geometries at Varying Mach Numbers and Wet Bulb Temperatures** T. Currie, D. Fuleki, National Research Council Canada, Ottawa, Canada	1100 hrs AIAA-2016-3302 **Experimental Measurement of the Percentage of Partial Melting in A Single Ice Crystal** S. Yan, J. Palacios, Pennsylvania State University, University Park, PA	1130 hrs AIAA-2016-3303 **A comprehensive numerical model for mixed-phase and glaciated icing conditions** P. Trontin, G. Blanchard, P. Villedieu, ONERA, Toulouse, France	1200 hrs AIAA-2016-3304 **Mixed Phase Ice Accretion Prediction with TAICE** E. Ayan, S. Özgen, M. Canibek, Turkish Aerospace Industries, Inc., Ankara, Turkey		

Wednesday, 15 June 2016							
151-ATIO.ACD-5	**Aircraft Technologies and Concepts - Performance Studies and Design Methods**						**Gunston East**
Chaired by: T. TAKAHASHI, Arizona State University and M. ORR, Boeing Commercial Airplanes							
0930 hrs AIAA-2016-3305 **Conceptualizing Active-Load-Alleviation: Impacts on Transport Category Aircraft Wing Structural Design** M. Allyn, T. Takahashi, Arizona State University, Tempe, AZ	1000 hrs AIAA-2016-3306 **The Clean Sky Technology Evaluator: review and results of the environmental impact assessment at mission level** R. Lafage, S. Aubry, ONERA, Toulouse, France	1030 hrs AIAA-2016-3307 **Active Flow Control (AFC) and Insect Accretion and Mitigation (IAM) System Design and Integration on the Boeing 757 ecoDemonstrator** M. Alexander, F. Harris, NASA Langley Research Center, Hampton, VA; M. Spoor, S. Boyland, T. Farrell, D. Raines, The Boeing Company, Seattle, WA	1100 hrs AIAA-2016-3308 **Risk-Based Approach to Assessment of Advanced Technologies for Conceptual Design** A. Asmady, A. Drake, California Polytechnic State University, San Luis Obispo, CA	1130 hrs AIAA-2016-3309 **Integrated Design and Optimization of Aircraft Families and Air Transport Network** P. Jansen, R. Perez, Royal Military College of Canada, Kingston, Canada			

Wednesday, 15 June 2016							
152-ATIO.ATM-12	**Surface Operations Modeling and Analysis I**						**Embassy**
Chaired by: K. SWIERINGA, NASA Langley Research Center							
0930 hrs AIAA-2016-3310 **Using ASDE-X Surveillance for Taxi-Out Time Benchmarking and Delay Estimation** S. Hotle, GRA, Inc., Washington, D.C.; B. Baszczewski, J. Gulding, Federal Aviation Administration, Washington, D.C.	1000 hrs AIAA-2016-3311 **Methods for Determining Aircraft Surface State at Lesser-Equipped Airports** K. Roach, J. Null, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2016-3312 **A Mixed Integer Linear Program for Real-Time Computing the Optimal Push Back Time Windows** J. Coupe, D. Milutinovic, W. Malik, University of California, Santa Cruz, Santa Cruz, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2016-3313 **A Mixed Integer Linear Programming Approach for Computing the Optimal Chance-Constrained Push Back Time Windows** J. Coupe, D. Milutinovic, W. Malik, University of California, Santa Cruz, Santa Cruz, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA	1130 hrs AIAA-2016-3314 **A Concept of Operations for Trajectory-based Taxi Operations** J. Okuniek, I. Gerdes, J. Jakobi, T. Ludwig, German Aerospace Center (DLR), Braunschweig, Germany; B. Hooey, San Jose State University, Moffett Field, CA; D. Foyle, NASA Ames Research Center, Moffett Field, CA; et al.			

Wednesday, 15 June 2016							
153-ATIO.ATM-13	Environmental Impact Mitigation I						Fairchild East
Chaired by: K. MARAIS, Purdue University							
0930 hrs AIAA-2016-3315 **Aviation and Electrical Road Vehicles** J. Fregnani, B. Mattos, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1000 hrs AIAA-2016-3316 **Are Climate Restricted Areas a Viable Interim Climate Mitigation Option over the North Atlantic?** M. Niklass, German Aerospace Center (DLR), Hamburg, Germany; B. Lührs, Hamburg University of Technology, Hamburg, Germany; K. Dahlmann, V. Grewe, German Aerospace Center (DLR), Hamburg, Germany; V. Gollnick, Hamburg University of Technology, Hamburg, Germany	1030 hrs AIAA-2016-3317 **Green Airlines 2025: Environment and Sustainability in Commercial Aviation - A Scenario Study** F. Will, G. Tay, Technical University of Munich, Munich, Germany; A. Becker, Airbus, Hamburg, Germany; D. Carnelly, F. Eychenne, Airbus, Toulouse, France; M. Hornung, Technical University of Munich, Munich, Germany	1100 hrs AIAA-2016-3318 **Formation Generation in Huge Traffic Scenarios** F. Morscheck, German Aerospace Center (DLR), Braunschweig, Germany	1130 hrs AIAA-2016-3319 **Cost-Benefit Assessment of 2D and 3D Climate And Weather Optimized Trajectories** B. Lührs, Hamburg University of Technology, Hamburg, Germany; M. Niklass, German Aerospace Center (DLR), Hamburg, Germany; C. Froemming, V. Grewe, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; V. Gollnick, Hamburg University of Technology, Hamburg, Germany	1200 hrs AIAA-2016-3320 **Airline Competition in Duopoly Market and its Impact on Environmental Emissions: A Game Theory Approach** H. Chao, K. Ogunsina, K. Moolchandani, D. DeLaurentis, W. Crossley, Purdue University, West Lafayette, IN		

Wednesday, 15 June 2016							
154-ATIO.ATM-14	Data Mining in ATS I						Fairchild West
Chaired by: A. RAO, Purdue University							
0930 hrs AIAA-2016-3321 **Trajectory Clustering and Classification for Characterization of Air Traffic Flows** M. Conde Rocha Murca, Massachusetts Institute of Technology, Cambridge, MA; R. DeLaura, Lincoln Laboratory, Massachusetts Institute of Technology, Cambridge, MA; R. Hansman, Massachusetts Institute of Technology, Cambridge, MA; R. Jordan, T. Reynolds, Lincoln Laboratory, Massachusetts Institute of Technology, Cambridge, MA; H. Balakrishnan, Massachusetts Institute of Technology, Cambridge, MA	1000 hrs AIAA-2016-3322 **Multi-Scale Data Mining for Air Transportation System Diagnostics** R. DeLaura, R. Jordan, T. Reynolds, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; J. Avery, H. Balakrishnan, M. Conde Rocha Murca, Massachusetts Institute of Technology, Cambridge, MA; et al.	1030 hrs AIAA-2016-3323 **Identification of Convective Hazards in New York Oceanic Airspace** M. Veillette, R. DeLaura, MIT Lincoln Laboratory, Lexington, MA					

Wednesday, 15 June 2016							
155-ATIO.TFPC-7/ATIO.ACD-6/GEPC-1	Transformational Flight - Electric Thin-Haul/Commuters						Columbia 1
Chaired by: R. MCDONALD, California Polytechnic State University-San Luis Obispo and M. PATTERSON							
0930 hrs Oral Presentation **Thin-Haul Commuter Market Requirements and CONOPs** M. Patterson, M. Moore, K. Goodrich, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2016-3324 **Fuselage Boundary Layer Ingestion Propulsion Applied to a Thin Haul Commuter Aircraft for Optimal Efficiency** G. Veble Mikic, A. Stoll, J. Bevirt, Joby Aviation, Santa Cruz, CA; R. Grah, Institute of Science and Technology Austria, Klosterneuburg, Austria; M. Moore, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3325 **Application of Distributed Electric Propulsion to Thin-Haul Commuters** A. Stoll, G. Veble Mikic, J. Bevirt, Joby Aviation, Santa Cruz, CA	1100 hrs AIAA-2016-3326 **Sizing Power Components of an Electrically Driven Tail Cone Thruster and a Range Extender** R. Jansen, C. Bowman, A. Jankovsky, NASA Glenn Research Center, Cleveland, OH	1130 hrs AIAA-2016-3327 **Economics of Advanced Thin-Haul Concepts and Operations** A. Harish, C. Perron, D. Bavaro, J. Ahuja, M. Ozcan, C. Justin, Georgia Institute of Technology, Atlanta, GA; et al.	1200 hrs Oral Presentation **Leading in the new era of electric propulsion** B. Knapp, Tzunum Aircraft, LLC, Kirkland, WA		

Wednesday, 15 June 2016		
156-D4U-1 0930 - 1730 hrs	DEMAND for UNMANNED: Catalyst for the Machine Intelligence Revolution	International Ballroom (West)

0930-1030 hrs *The Changing Face of Aerospace: The Impact of UAS on Aviation*

Moderator: I. J. Hudson, Former Technology Reporter, NBC4 Washington (WRC-TV)

Panelists:

Michael S. Francis
Chief Advanced Programs & Senior Fellow
United Technologies Research Center

Parimal H. Kopardekar
Manager, Safe Autonomous System Operations Project,
and Principal Investigator, Unmanned Aerial Systems Traffic Management
NASA Ames Research Center

John S. Langford
Chairman and Chief Executive Officer
Aurora Flight Sciences Corporation

Richard Wlezien
Professor and Vance and Arlene Coffman Endowed Department Chair in Aerospace Engineering
and Director, Iowa Space Grant Consortium
Iowa State University

1030-1130 hrs *Invention, Entrepreneurship, and Unmanned Systems*

Moderator: John Langford, Chairman and Chief Executive Officer, Aurora Flight Sciences Corporation

1130-1400 hrs Break for Lunch

1400-1500 hrs *Perspectives on the Future of Autonomous Systems and Technology*

Mary Louise "Missy" Cummings
Associate Professor, Department of Mechanical Engineering and Materials Science,
and Director, Humans and Autonomy Laboratory
Duke University

1500-1530 hrs *The Autonomy "Dream"*

John-Paul Clarke
Professor, Daniel Guggenheim School of Aerospace Engineering,
and Director, Air Transportation Laboratory
Georgia Institute of Technology

1530-1600 hrs DEMAND for UNMANNED Networking Coffee Break

1600-1730 hrs *Technology Roadmaps for Intelligent Autonomous Systems*

Moderator: Jay Gundlach, Founder and President, Flighthouse Engineering LLC

Presenters:

Mark G. Ballin
Technology Integration Manager
NASA Airspace Operations and Safety Program

Sebastian Scherer
Systems Scientist, The Robotics Institute
Carnegie Mellon University

Roundtable Panelists:

Jay Gundlach
Founder and President
Flighthouse Engineering LLC

Mark G. Ballin
Technology Integration Manager
NASA Airspace Operations and Safety Program

John-Paul Clarke
Professor, Daniel Guggenheim School of Aerospace Engineering,
and Director, Air Transportation Laboratory
Georgia Institute of Technology

Sebastian Scherer
Systems ScientistThe Robotics Institute
Carnegie Mellon University

Wednesday, 15 June 2016		
157-F360-6 0930 - 1130 hrs	Cybersecurity Table Top War Gaming Exercise	International Ballroom (East)

Take part in a Table Top Exercise (TTX) focusing on the risks and complexities cyber events/cyber incidents can have on supply chain and supply chain management within the aviation domain. Participants will experience a facilitated Brown Paper War Game that will allow them to participate as responders (Blue Team) or threat actors (Red Team) in order to better understand the TTX process and provide them with the ability to discuss aviation-centric approaches to cyber security and risk management. During play, participants will be divided into sub teams representative of key functions within the supply chain domain and can expect to discuss topics such as threat actors, threat surfaces, and other cyber security issues.

Participants are encouraged to return at 1400 hrs for an extended Hot Wash forum session with industry thought leaders in cyber security and the aviation domain.

Those interested in becoming an active participant are expected to be present for the full two hour morning session and will need to pre-register. Those who wish to observe will also need to pre-register. Pre-register no later than 4PM on Tuesday, 14 June 2016, at https://www.surveymonkey.com/r/G22M7FF.

Wednesday, 15 June 2016							
158-FC-7	Internal Flow Control						Columbia 11
Chaired by: C. BOURASSA, GE Aviation and O. SAHNI, Rensselaer Polytech Inst							
0930 hrs AIAA-2016-3328 **Comparison of vortex generators effect on shock wave induced separation** P. Flaszynski, Polish Academy of Sciences, Gdansk, Poland	1000 hrs AIAA-2016-3329 **Vortex generators effectiveness compared to active flow control techniques in a transonic diffuser** J. Gartner, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	1030 hrs AIAA-2016-3330 **Active Flow Control of Separation in a Branched Duct** C. Peterson, B. Vukasinovic, A. Glezer, Georgia Institute of Technology, Atlanta, GA; K. Saripalli, The Boeing Company, St. Louis, MO; N. Packard, The Boeing Company, Seattle, WA					

Wednesday, 15 June 2016							
159-FC-8	Circulation Control						Columbia 11
Chaired by: R. JOSLIN, Office of Naval Research and H. DONG, University of Virginia							
0930 hrs **No Presentations**				1130 hrs AIAA-2016-3331 **NACA0015 Circulation Control Airfoil Using Synthetic Jets at Low Angles of Attack and Low Reynolds Number** P. Itsariyapinyo, R. Sharma, University of Auckland, Auckland, New Zealand	1200 hrs AIAA-2016-3332 **Multipoint Optimisation of Coanda Surfaces for Transonic Circulation Control using the Adjoint Method** M. Forster, University of Liverpool, Liverpool, United Kingdom; M. Biava, R. Steijl, University of Glasgow, Glasgow, United Kingdom		

Wednesday, 15 June 2016							
160-FC-9/PDL-4/FD-29	Physics of Plasma Actuators						Gunston West
Chaired by: M. KOKLU, NASA Langley Research Center							
0930 hrs AIAA-2016-3333 **Modelling of Dielectric Barrier Discharge Plasma Actuators for Direct Numerical Simulations** T. Brauner, S. Laizet, Imperial College London, London, United Kingdom; N. Benard, E. Moreau, University of Poitiers, Poitiers, France	1000 hrs AIAA-2016-3334 **Active Multiple Jets System Using Surface Plasma Actuator** N. Benard, University of Poitiers, Futuroscope, France; A. Mizuno, University of Toyoashi, Toyoashi, Japan; E. Moreau, University of Poitiers, Futuroscope, France	1030 hrs AIAA-2016-3335 **Oblique Shock Control by Surface Arc Discharge Plasma** H. Yan, F. Liu, J. Xu, Northwestern Polytechnical University, Xi'an, China	1100 hrs AIAA-2016-3336 **Dynamic Characteristics of the Density Field near Wall Region Actuated by Plasma** L. Feng, C. Gao, Z. Lv, B. Wu, Northwestern Polytechnical University, Xi'an, China				

Wednesday, 15 June 2016							
161-FD-30/APA-24	**Modal Decomposition Methods and Analyses**						**Columbia 4**
Chaired by: B. MCGRATH, JHU/Applied Physics Laboratory and H. HU, Iowa State University							
0930 hrs AIAA-2016-3337 **Modal and non-modal global instability analyses of low-Re massively separated flow around a NACA 0015 airfoil** R. Gioria, University of São Paulo, São Paulo, Brazil; W. He, J. Perez, Technical University of Madrid, Madrid, Spain; V. Theofilis, Universidade Federal Fluminense, Niteroi, Brazil	1000 hrs AIAA-2016-3338 **Analysis of Wake Structures Behind an Oscillating Square Cylinder Using Dynamic Mode Decomposition** B. Wang, University of Kansas, Lawrence, Lawrence, KS; M. Yu, University of Maryland, Baltimore County, Baltimore, MD	1030 hrs AIAA-2016-3339 **Analysis of Turbine Wake Characteristics using Proper Orthogonal Decomposition (POD) and Triple Decomposition Methods** P. Premaratne, T. Wei, H. Hu, Iowa State University, Ames, IA	1100 hrs AIAA-2016-3340 **Learning Wake Regimes from Snapshot Data** M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN	1130 hrs AIAA-2016-3341 **Extraction and analysis of the second mode instability wave based on singular-value decomposition and empirical mode decomposition** S. Xie, F. Ji, China Academy of Aerospace Aerodynamics, Beijing, China			

Wednesday, 15 June 2016							
162-FD-32/FC-10	**In Honor of John Lumley's Lasting Legacy to Fluid Dynamics (Invited)**						**Jefferson East**
Chaired by: D. SMITH, Office of Naval Research							
0930 hrs Oral Presentation **Remembering John L. Lumley** A. Smits, Princeton University, Princeton, NJ	1000 hrs Oral Presentation **John Lumley's Turbulence Closure Modeling Legacy** S. Girimaji, Texas A&M University, College Station, TX	1030 hrs Oral Presentation **The fusion of POD with stochastic estimation and compressive sensing to extract low-dimensional physics for understanding and control of turbulent flows** M. Glauser, Syracuse University, Syracuse, NY	1100 hrs Oral Presentation **Understanding Atmospheric Turbulence Structure through Simulation and Field Data, a Lumley Legacy** J. Brasseur, University of Colorado, Boulder, Boulder, CO	1130 hrs Oral Presentation **Rational Control of Turbulent Boundary Layers – John Lumley's Legacy** D. Rempfer, Illinois Institute of Technology, Chicago, IL			

Wednesday, 15 June 2016							
163-FD-33	**Boundary-Layer Transition: Crossflow**						**Lincoln East**
Chaired by: B. WHEATON, JHU Applied Physics Laboratory and H. REED, Texas A&M University							
0930 hrs AIAA-2016-3342 **Influence of Stationary Crossflow Modulation on Secondary Instability** M. Choudhari, F. Li, P. Paredes, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2016-3343 **Stationary Crossflow Breakdown due to Mixed Mode Spectra of Secondary Instabilities** F. Li, M. Choudhari, NASA Langley Research Center, Hampton, VA; L. Duan, Missouri University of Science and Technology, Rolla, MO	1030 hrs AIAA-2016-3344 **Instability analysis and transition prediction on a swept RAE2822 airfoil with constant lift coefficient** Z. Jing, Z. Huang, Tianjin University, Tianjin, China	1100 hrs AIAA-2016-3345 **Tomographic PIV investigation of crossflow instability of swept wing boundary layers** J. Serpieri, M. Kotsonis, Delft University of Technology, Delft, The Netherlands	1130 hrs AIAA-2016-3346 **Spatio-temporal characteristics of secondary instabilities in swept wing boundary layers** J. Serpieri, M. Kotsonis, Delft University of Technology, Delft, The Netherlands	1200 hrs AIAA-2016-3347 **Investigations of the Effect of Unsteady Pressure Gradient and Cross-Flow on the Structure and Dynamics of Laminar Separation Bubbles** S. Hosseinverdi, University of Arizona, Tucson, Tucson, AZ		

Wednesday, 15 June 2016							
164-FD-34	**RANS and LES Methods**						**Columbia 10**
Chaired by: G. ARAYA, University of Puerto Rico Mayaguez and C. SCHROCK, Air Force Research Laboratory							
0930 hrs AIAA-2016-3348 **Discrete Filtering Formulations for Large-Eddy Simulations** A. Edoh, University of California, Los Angeles, Los Angeles, CA; N. Mundis, Air Force Research Laboratory, Edwards AFB, CA; A. Karagozian, University of California, Los Angeles, Los Angeles, CA; V. Sankaran, Air Force Research Laboratory, Edwards AFB, CA	1000 hrs AIAA-2016-3349 **Passive separation control on a backward facing ramp** S. Shinde, S. Tandon, K. Maki, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2016-3350 **An Assessment of Various Turbulence Models for Preconditioned High-Order Solutions of Flow Around Submersibles** O. Tong, Y. Yanagita, A. Katz, Utah State University, Logan, UT	1100 hrs AIAA-2016-3351 **Near-wall modification of Spalart-Allmaras Turbulence Model for Immersed Boundary Method** Y. Tamaki, M. Harada, T. Imamura, University of Tokyo, Tokyo, Japan	1130 hrs AIAA-2016-3352 **A Study of LES Methods for Simulation of Ship Airwakes** D. Linton, B. Thornber, University of Sydney, Sydney, Australia; R. Widjaja, Defence Science and Technology Group, Melbourne, Australia	1200 hrs AIAA-2016-3353 **LES modeling of scalar transport based on high-order discontinuous finite-element method: Assessment of implicit LES and scalar variance modeling** Y. Lv, M. Ihme, Stanford University, Stanford, CA		

Wednesday, 15 June 2016							
165-FD-35	**Facilities and Measurement Techniques**						**Monroe**
Chaired by: R. DELOACH, NASA-Langley Research Center and T. ROSSMANN, Lafayette College							
0930 hrs AIAA-2016-3354 **Characterization and Validation of an Anechoic Facility for High-Temperature Jet Noise Studies** J. Craft, P. Upadhyay, T. Worden, F. Alvi, Florida State University, Tallahassee, FL	1000 hrs AIAA-2016-3355 **An Investigation of the Role of an Upstream Burst Diaphragm on Flow Quality within a Ludwieg Tube using RANS** S. Lindörfer, P. Anusonti-Inthra, J. Schmisseur, C. Combs, University of Tennessee, Tullahoma, Tullahoma, TN	1030 hrs AIAA-2016-3356 **A Numerical Comparison of Symmetric and Asymmetric Supersonic Wind Tunnels** K. Clark, P. Orkwis, University of Cincinnati, Cincinnati, OH	1100 hrs AIAA-2016-3357 **Volumetric PIV Measurements in the Wake of a Wavy Cylinder** A. Ahmed, Auburn University, Auburn, AL; M. Khan, Tuskegee University, Tuskegee, AL	1130 hrs AIAA-2016-3358 **Studies of the Large-Scale Structure in Turbulent Boundary Layers Using Simultaneous Velocity-Wavefront Measurements** S. Gordeyev, University of Notre Dame, Notre Dame, IN; A. Smith, MZA Associates Corporation, Dayton, OH			

Wednesday, 15 June 2016							
166-FD-36	**Adjoints and Error Estimation**						**Oak Lawn**
Chaired by: K. FIDKOWSKI, University of Michigan and D. MOTT, Naval Research Laboratory							
0930 hrs AIAA-2016-3359 **A Comprehensive Study of Adjoint-Based Optimization of Non-Linear Systems with Application to Burgers' Equation** A. Fikl, V. Le Chenadec, T. Sayadi, University of Illinois, Urbana-Champaign, Urbana, IL; P. Schmid, Imperial College London, London, United Kingdom	1000 hrs AIAA-2016-3360 **Output Error Estimation for Chaotic Flows** Y. Shimizu, K. Fidkowski, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2016-3361 **An Extension of Adjoint Method Capabilities** M. Hayashi, E. Volpe, University of São Paulo, São Paulo, Brazil	1100 hrs AIAA-2016-3362 **Optimal Mesh Adaptation for 1D Euler Equations with Multi-Mesh Applications** C. Jackson, H. Wang, C. Roy, Virginia Polytechnic Institute and State University, Blacksburg, VA; C. Schrock, Air Force Research Laboratory, Dayton, OH	1130 hrs AIAA-2016-3363 **Improved Functional-Based Error Estimation and Adaptation without Adjoints** W. Tyson, K. Swirydowicz, J. Derlaga, C. Roy, E. de Sturler, Virginia Polytechnic Institute and State University, Blacksburg, VA	1200 hrs AIAA-2016-3364 **Multiresolution Wavelet Approach for Feature Detection in Adaptive Mesh Refinement with High-Order Shock- and Interface-Capturing Scheme** M. Wong, S. Lele, Stanford University, Stanford, CA		

Wednesday, 15 June 2016							
167-FD-37	**CFD for Engineering Applications**						**Morgan**
Chaired by: M. GHOREYSHI, United States Air Force Academy and B. JOLLY, US Air Force							
0930 hrs AIAA-2016-3365 **Development and Use of Engineering Standards for Computational Fluid Dynamics for Complex Aerospace Systems** H. Lee, Bettis Laboratory, West Mifflin, PA; U. Ghia, University of Cincinnati, Cincinnati, OH; S. Bayyuk, ESI Group, Huntsville, AL; W. Oberkampf, WLO Consulting, Austin, TX; C. Roy, Virginia Polytechnic Institute and State University, Blacksburg, VA; J. Benek, Air Force Research Laboratory, Wright-Patterson AFB, OH; et al.	1000 hrs AIAA-2016-3366 **Computational Investigation of a Boundary Layer Ingestion Propulsion System for the Common Research Model** B. Blumenthal, A. Elmiligui, K. Geiselhart, R. Campbell, NASA Langley Research Center, Hampton, VA; M. Maughmer, S. Schmitz, Pennsylvania State University, State College, PA	1030 hrs AIAA-2016-3367 **Parametric optimization of an existing supersonic-subsonic ejector design by means of computational fluid dynamics** M. Diaz Brito, Pall, Portsmouth, United Kingdom	1100 hrs AIAA-2016-3368 **Back-Pressure Stall Prediction in Eductor-Jet Pumps** W. Liu, K. Pochiraju, Stevens Institute of Technology, Hoboken, NJ	1130 hrs AIAA-2016-3369 **Investigation of Helicopter Ditching Angle on Fuselage Pressure Load using a SPH Method** Z. Lu, T. Xiao, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1200 hrs AIAA-2016-3370 **Large Eddy Simulation of a 3D Transonic Fan** R. Bhaskaran, T. Wood, U. Paliath, A. Breeze-Stringfellow, General Electric Company, Niskayuna, NY		

Wednesday, 15 June 2016							
168-GT-4	**Ground Testing for High Speed Flight and Reentry**						**Lincoln West**
Chaired by: B. WILLIAMS, Aerospace Coporation and P. MACALUSO, US Air Force							
0930 hrs AIAA-2016-3371 **Basic characteristics of the free-piston driven expansion tube JAXA HEK-X** H. Tanno, T. Komuro, K. Sato, K. Itoh, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; K. Arai, Tokai University, Hiratsuka, Japan; K. Yamada, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1000 hrs AIAA-2016-3372 **Theoretical Considerations to Extend the Operational Map of the VKI Longshot Hypersonic Wind Tunnel** G. Grossir, Z. Ilich, S. Paris, O. Chazot, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium	1030 hrs AIAA-2016-3373 **Baseline characterization of the 30kW miniature arc jet facility mARC at NASA Ames** A. Nawaz, T. Ho, Jacobs, Moffett Field, CA; D. Philippidis, Qualis Corporation, Moffett Field, CA; M. MacDonald, Jacobs, Moffett Field, CA; M. McGlaughlin, D. Driver, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2016-3374 **Development of a Hypersonic Flutter Test Capability** C. Ji, Z. Liu, N. Chen, L. Feng, China Academy of Aerospace Aerodynamics, Beijing, China	1130 hrs AIAA-2016-3375 **Investigation on Aerodynamic Measurement of Hypersonic Wind Tunnel with Cable Driven Parallel Suspension System** X. Wang, Q. Lin, Xiamen University, Xiamen, China	1200 hrs AIAA-2016-3376 **Development of a Thermal Simulator to Thermally Test the Solar Probe Plus Spacecraft** E. Congdon, E. Abel, E. Heisler, T. Hartka, Johns Hopkins University Applied Physics Laboratory, Laurel, MD		

Wednesday, 15 June 2016							
169-ITAR-3	**CITMAV**						**Cabinet**
Chaired by: T. FISHER and K. YERKES, Air Force Reseach Laboratory							
0930 hrs Oral Presentation **Effects of Thermal Management on the Beam Quality of High Power Laser Diode Bars** T. Fisher, P. Bermel, D. Konopa, Purdue University, West Lafayette, IN	1000 hrs Oral Presentation **Hardware-In-The-Loop Validation of Advanced Fuel Thermal Management Control** H. Pangborn, University of Illinois, Urbana-Champaign, Urbana, IL; J. Hey, Purdue University, West Lafayette, IN; T. Deppen, PC Krause and Associates, West Lafayette, IN; A. Alleyne, University of Illinois, Urbana-Champaign, Urbana, IL; T. Fisher, Purdue University, West Lafayette, IN	1030 hrs AIAA-2016-3377 **An Exact Solution for Temperature Excursions in Flat Plates with Step Changes in Surrounding Temperatures** L. Byrd, Air Force Research Laboratory, Wright-Patterson AFB, OH	1100 hrs Oral Presentation **Cooling of Transient, High-Heat-Flux Loads Generated by Thermally Sensitive Devices** J. Engerer, T. Fisher, Purdue University, West Lafayette, IN	1130 hrs Oral Presentation **A Cryogenic Based Aviation Thermal Management System** A. Donovan, S. Nuzum, M. Wolff, R. Roberts, Wright State University, Dayton, OH	1200 hrs AIAA-2016-3378 **CTE Matched High Heat Flux Spreader for Space Systems Applications** B. Richard, D. Pellicone, C. Chen, Advanced Cooling Technologies, Inc., Lancaster, PA		

Wednesday, 15 June 2016							
170-MAO-10	**Shape and Topology Optimization V**						**Columbia 3**
Chaired by: T. HEARN, NASA Glenn Research Center and S. FERGUSON, North Carolina State University							
0930 hrs AIAA-2016-3379 **Thermal Topology Optimization in OptiStruct Software** X. Qu, N. Pagaldipti, R. Fleury, J. Saiki, Altair Engineering, Inc., Irvine, CA	1000 hrs AIAA-2016-3380 **Shape Optimization of Acoustic Metamaterials and Phononic Crystals with a Time-Dependent Adjoint Formulation: Three-Dimensional Applications** W. Lin, J. Newman, W. Anderson, X. Zhang, University of Tennessee, Chattanooga, Chattanooga, TN	1030 hrs AIAA-2016-3381 **CAD-based Aerodynamic Shape Optimization Using Geometry Surrogate Model And Adjoint Methods** K. Bobrowski, Technical University of Madrid, Madrid, Spain; H. Barnewitz, Airbus, Bremen, Germany; E. Ferrer, E. Valero, Technical University of Madrid, Madrid, Spain	1100 hrs AIAA-2016-3382 **Multidisciplinary, Multiobjective Analysis and Optimization for the Design of Missile Jet Vane** C. Citak, M. Akdemir, M. Yumusak, ROKETSAN Missile Industries, Inc., Ankara, Turkey	1130 hrs AIAA-2016-3383 **Transonic Nacelle Aerodynamic Optimization Based on Hybrid Genetic Algorithm** X. Fang, Y. Zhang, S. Li, H. Chen, Tsinghua University, Beijing, China			

Wednesday, 15 June 2016							
171-MST-9	**Modeling and Simulation of Aeroelasticity I**						**Piscataway**
Chaired by: A. ELMILIGUI, NASA Langley Research Center and D. KEATING							
0930 hrs AIAA-2016-3384 **Nonlinear and Linear Aeroelastic Modeling and Experimental Analysis of Flexibles Wings for Wind Tunnel Flutter Test** M. Westin, R. da Silva, J. Balthazar, A. Nabarrete, M. Pereira, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1000 hrs AIAA-2016-3385 **Flutter Suppression for a Prototype Wing – Numerical Modeling, Control Law Design, and Experimental Results** K. Lai, Z. Lu, Y. Cui, National University of Singapore, Singapore, Singapore; K. Lum, National Chi Nan University, Puli Township Nantou County, Taiwan	1030 hrs AIAA-2016-3386 **Effects of Turbulence Model on Flutter Prediction of a Transonic Fan** X. Zhang, Y. Wang, N. Wang, A. Tian, Beijing University of Aeronautics and Astronautics, Beijing, China	1100 hrs AIAA-2016-3387 **Transonic Aeroelastic Moving Gust Responses and Alleviation based on CFD** Z. Qiang, G. Chen, Y. Li, Xi'an Jiaotong University, Xi'an, China; A. Da Ronch, University of Southampton, Southampton, United Kingdom	1130 hrs AIAA-2016-3388 **Maneuver Loads Calculation with Enhanced Aerodynamics for a UCAV Configuration** A. Voss, T. Klimmek, German Aerospace Center (DLR), Göttingen, Germany			

Wednesday, 15 June 2016							
172-TP-7	**Advanced Modeling I - DSMC**						**Jefferson West**
Chaired by: T. SCHWARTZENTRUBER, University of Minnesota and K. STEPHANI, University of Illinois at Urbana-Champaign							
0930 hrs AIAA-2016-3389 **State-to-State Vibrational Energy Modeling in DSMC using Quasiclassical Trajectory Calculations for O + O2** T. Wilson, K. Stephani, University of Illinois, Urbana-Champaign, Urbana, IL	1000 hrs AIAA-2016-3390 **DSMC Shock Simulation of Saturn Entry Probe Conditions** K. Higdon, University of Texas, Austin, Austin, TX; B. Cruden, A. Brandis, NASA Ames Research Center, Moffett Field, CA; D. Liechty, NASA Langley Research Center, Hampton, VA; D. Goldstein, P. Varghese, University of Texas, Austin, Austin, TX	1030 hrs AIAA-2016-3391 **Heat Flux and Drag Correlations for High Speed Flight at any Knudsen Number** N. Singh, T. Schwartzentruber, University of Minnesota, Minneapolis, Minneapolis, MN	1100 hrs AIAA-2016-3392 **Finite-rate oxidation model for carbon surfaces from molecular beam experiments** S. Poovathingal, T. Schwartzentruber, University of Minnesota, Minneapolis, Minneapolis, MN; V. Murray, T. Minton, Montana State University, Bozeman, MT; G. Candler, University of Minnesota, Minneapolis, Minneapolis, MN	1130 hrs AIAA-2016-3393 **Reducing Statistical Scatter in DSMC Solutions of Hypersonic Ionizing Flows** C. Kaplan, E. Oran, U. Aggarwal, University of Maryland, College Park, College Park, MD	1200 hrs AIAA-2016-3394 **Adapting vibrational relaxation models in DSMC and CFD to ab-initio calculations** M. Kulakhmetov, I. Sebastiao, A. Alexeenko, Purdue University, West Lafayette, IN		

Wednesday, 15 June 2016		
173-RLA-3 **1130 - 1230 hrs**	**Rising Leaders in Aerospace Keynote**	**Columbia 9**
Innovations, Technology, and Skills for the Next 100 Years in Aerospace **Greg Hyslop** Senior Vice President, Engineering, Test & Technology The Boeing Company		

Wednesday, 15 June 2016		
174-LNCH-2 **1230 - 1400 hrs**	**Networking Luncheon**	**International Ballroom (Center)**
A ticket for the luncheon is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site, as space is available.		

Wednesday, 15 June 2016							
175-AFM-11	**Aerodynamic Prediction Methods**						**Holmead East**
Chaired by: C. SUCHOMEL, USAF and T. LAVIN, Sandia National Laboratories and B. JOLLY, US Air Force							
1400 hrs Oral Presentation **Computing Aerodynamic Derivatives Based on Harmonic Balance Method by Using Open-Source SU²** A. Shi, J. Wang, Northwestern Polytechnical University, Xi'an, China	1430 hrs AIAA-2016-3395 **Application of an Autoregressive Moving Average Approach in Flight Trajectory Simulation** Y. Xing, G. Wang, Y. Zhu, Northwestern Polytechnical University, Xi'an, China	1500 hrs AIAA-2016-3396 **Angle of Attack Upset Detection for Passenger Airliners using Classification of Anemometric and Inertial Sensor Data** P. Malan, J. Engelbrecht, H. Engelbrecht, Stellenbosch University, Stellenbosch, South Africa	1530 hrs AIAA-2016-3397 **Towards Three-Dimensional Global Stability Analysis of Transonic Shock Buffet** S. Timme, R. Thormann, University of Liverpool, Liverpool, United Kingdom	1600 hrs AIAA-2016-3398 **Experimental Study of a Morphing Wing Configuration with Multi-Slotted Variable-Camber Mechanism** M. Maki, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan	1630 hrs AIAA-2016-3399 **Flight Dynamics Mode Identification and Model Reduction using Computational Fluid Dynamics** G. Pagliuca, S. Timme, University of Liverpool, Liverpool, United Kingdom	1700 hrs AIAA-2016-3400 **Accurate Prediction for Non-Gravitational Aerodynamic Forces acting on the GOCE Satellite Using the Test Particle Monte Carlo Method** X. Jin, F. Huang, X. Cheng, J. Yu, China Academy of Aerospace Aerodynamics, Beijing, China	

Wednesday, 15 June 2016							
176-AFM-12	**Flight Test, System Identification and Parameter Estimation II**						**Holmead West**
Chaired by: A. VANDERWYST, Leidos and J. GRAUER, NASA Langley Research Center							
1400 hrs AIAA-2016-3401 **Aerodynamic Modeling, System Identification and Analysis of Iced Aircraft Configurations** C. Deiler, German Aerospace Center (DLR), Braunschweig, Germany	1430 hrs AIAA-2016-3402 **An Easy to Use Engineering Method for Identification of Complex Flight Dynamics From Flight Test Data** R. Larsson, Saab, Linköping, Sweden; M. Enqvist, Linköping University, Linköping, Sweden	1500 hrs AIAA-2016-3403 **Virtual Flight Testing of High Performance Fighter Aircraft Using High-Resolution CFD** C. Ratcliff, D. Bodkin, J. Clifton, M. Willis, Air Force SEEK EAGLE Office, Eglin AFB, FL	1530 hrs AIAA-2016-3404 **Aerodynamic Flight Test Results for the Adaptive Compliant Trailing Edge** S. Cumming, M. Smith, A. Ali, T. Bui, J. Ellsworth, NASA Armstrong Flight Research Center, Edwards, CA; C. Garcia, Jacobs, Edwards, CA	1600 hrs AIAA-2016-3405 **Aerodynamic Parameter Estimation of a Supersonic Air to Air Missile with Rapid Speed Variation** T. Bayoğlu, O. Nalci, A. Kutay, ROKETSAN Missile Industries, Inc., Ankara, Turkey	1630 hrs AIAA-2016-3406 **Design and Control of a Micro UAV** D. Kaya, A. Büyükkoçak, A. Kutay, O. Tekinalp, Middle East Technical University, Ankara, Turkey	1700 hrs AIAA-2016-3407 **A flutter boundary prediction technique based on atmospheric turbulence excitation responses** Y. Li, L. Zhou, Nanjing University of Aeronautics and Astronautics, Nanjing, China	

Wednesday, 15 June 2016							
177-AMT-7	**Recent Advancements in Gas Temperature Measurements in Gas Turbines (Invited)**						**Columbia 2**
Chaired by: D. RICHARDSON, Air Force Research Laboratory							
1400 hrs Oral Presentation **The Evolution of Temperature Sensing in Combustion/Propulsion Flows using Laser-Induced Absorption and Fluorescence (Invited)** R. Hanson, J. Jeffries, D. Davidson, Stanford University, Stanford, CA		1500 hrs Oral Presentation **Optical Measurements of Temperature and Species Concentrations in Gas Turbine Components and Full-Scale Engines (Invited)** J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs Oral Presentation **Diagnostic to Measure Turbine Blade Temperatures During Engine Operation (Invited)** T. Jenkins, MetroLaser, Inc., Laguna Hills, CA; S. Allison, Emerging Measurements, Inc., Knoxville, TN; J. Eldridge, NASA Glenn Research Center, Cleveland, OH	1600 hrs Oral Presentation **Recent Advances in Temperature Measurements Using Coherent Anti-Stoles Raman Scattering (CARS) (Invited)** R. Lucht, A. Satija, L. Thomas, Purdue University, West Lafayette, IN	1630 hrs Oral Presentation **Cooling Effectiveness Measurements for Air Film Cooling of Thermal Barrier Coated Surfaces in a Burner Rig Test Environment Using Phosphor Thermometry** J. Eldridge, V. Shyam, A. Wroblewski, D. Zhu, NASA Glenn Research Center, Cleveland, OH; M. Cuy, Vantage Partners, LLC, Cleveland, OH; D. Wolfe, Pennsylvania State University, College Township, PA		

Wednesday, 15 June 2016							
178-APA-25/FD-38	**Aerodynamic Design Methodologies I**						**Albright**
Chaired by: B. DETERT, Boeing Commercial Airplanes and M. POST, USAF Academy							
1400 hrs AIAA-2016-3408 **Data-Driven Probabilistic Boundary Layer Modeling for Airfoil Performance Prediction** A. Marques, Q. Wang, Y. Marzouk, Massachusetts Institute of Technology, Cambridge, MA	1430 hrs AIAA-2016-3409 **Aerodynamic Shape Optimization by Variable-fidelity Models and Gradient-Enhanced Manifold Mapping** L. Leifsson, Iowa State University, Ames, IA; Y. Tesfahunegn, S. Koziel, Reykjavik University, Reykjavik, Iceland	1500 hrs AIAA-2016-3410 **A Locally Adaptive Subdivision Parameterisation Scheme for Aerodynamic Shape Optimisation** D. Masters, University of Bristol, Bristol, United Kingdom; N. Taylor, MBDA, Filton, United Kingdom; T. Rendall, C. Allen, University of Bristol, Bristol, United Kingdom	1530 hrs AIAA-2016-3411 **Development of An Efficient Three-Dimensional Tightly Coupled Euler/Panel Solver for Transonic Flow Analysis** Y. Jo, D. Lee, Korea Advanced Institute of Science and Technology, Daejeon, South Korea; S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA	1600 hrs AIAA-2016-3412 **Three Dimensional Design Optimization Using Adjoint Method** A. Yildirim, S. Eyi, Middle East Technical University, Ankara, Turkey	1630 hrs AIAA-2016-3413 **A New Formulation of Gradient-Enhanced Surrogate Model and Application to Aerodynamic Design** C. Song, Z. Han, Y. Zhang, Northwestern Polytechnical University, Xi'an, China	1700 hrs AIAA-2016-3414 **Optimization of Flap position using a Modified Discrete Vortex method** B. Narayanarao, P. Mondal, A. Kanale, Indian Institute of Science, Bengaluru, India; N. Shende, R. Wadnerkar, S&I Engineering Solutions Pvt., Ltd., Bengaluru, India	

Wednesday, 15 June 2016							
179-APA-26	**Aerodynamic - Structural Dynamics Interactions I**						**Northwest**
Chaired by: J. AZEVEDO and L. WANG, NASA Langley Research Center							
1400 hrs AIAA-2016-3415 **Development of a Fluid-Structure Interaction Framework Using Unstructured Cartesian CFD Methods** M. Bopp, S. Ruffin, Georgia Institute of Technology, Atlanta, GA	1430 hrs AIAA-2016-3416 **Understanding Energy Transfer in Aeroelastic Flutter** P. Deshpande, A. Kelkar, Iowa State University, Ames, IA	1500 hrs AIAA-2016-3417 **A Reduced Order Model for Aeroelastic Response Prediction to Continuous Turbulence Encounter including CFD Aerodynamics** D. Quero-Martin, W. Krüger, German Aerospace Center (DLR), Göttingen, Germany; G. Jenaro, Airbus, Hamburg, Germany					

Wednesday, 15 June 2016							
180-APA-27	**Innovative Aerodynamic Concepts & Designs**						**Columbia 9**
Chaired by: N. HALL and G. GATLIN, NASA Langley Research Center							
1400 hrs AIAA-2016-3418 **Aerodynamic Design of Blended Wing-Body and Lifting-Fuselage Aircraft** T. Reist, D. Zingg, University of Toronto, Toronto, Canada	1430 hrs AIAA-2016-3419 **Aerodynamic Design of the Hybrid Wing Body with Nacelle: N3-X Propulsion-Airframe Configuration** M. Liou, NASA Glenn Research Center, Cleveland, OH; D. Gronstal, University of Alabama, Tuscaloosa, Tuscaloosa, AL; H. Kim, SAIC, Cleveland, OH; M. Liou, NASA Glenn Research Center, Cleveland, OH	1500 hrs AIAA-2016-3420 **Design and Analyses of High Aspect Ratio Nozzles for Distributed Propulsion Acoustic Measurements** V. Dippold, NASA Glenn Research Center, Cleveland, OH	1530 hrs AIAA-2016-3421 **Virtual Flight Demonstration of the Stratospheric Dual-Aircraft Platform** W. Engblom, Embry-Riddle Aeronautical University, Daytona Beach, FL; R. Decker, NASA Marshall Space Flight Center, Huntsville, AL	1600 hrs AIAA-2016-3422 **Efficient Design Optimization of Flexible CROR Blade for Low-level Noise** S. Yi, D. Lee, Korea Advanced Institute of Science and Technology, Daejeon, South Korea; S. Choi, D. Im, Virginia Polytechnic Institute and State University, Blacksburg, VA	1630 hrs AIAA-2016-3423 **Wing-In-Ground-Effect Craft as a Potential Domestic Transport Vehicle** S. Wiriadidjaja, Z. Mohamad, A. Mohd Rafie, Universiti Putra Malaysia (UPM), Serdang, Malaysia; M. Elhadi, Karary University, Khartoum, Sudan; A. Fariduzzaman, F. Hasim, Agency for Assessment & Application of Technology, Jakarta-Pusat, Indonesia		

Wednesday, 15 June 2016							
181-APA-28	**Aerodynamic Testing: Flight, Wind-Tunnel and Flight Testing**						**Columbia 4**
Chaired by: C. ROSEMA, US Army AMRDEC and D. O'BRIEN, US Army RDECOM							
1400 hrs AIAA-2016-3424 **Experimental Visualization of Junction Separation Bubbles at Low- to Moderate-Reynolds Numbers** M. Kuester, A. Borgoltz, W. Devenport, Virginia Polytechnic Institute and State University, Blacksburg, VA	1430 hrs AIAA-2016-3425 **Investigation of the Aerodynamic Characteristics of a Lifting Body in Ground Proximity** J. Holt, K. Garry, T. Smith, Cranfield University, Bedford, United Kingdom	1500 hrs AIAA-2016-3426 **Wind Tunnel Test of Subscale Ringsail and Disk-Gap-Band Parachutes** C. Zumwalt, J. Cruz, NASA Langley Research Center, Hampton, VA; C. O'Farrell, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; D. Keller, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2016-3427 **Aerodynamic Models for the Low Density Supersonic Declerator (LDSD) Test Vehicles** J. Van Norman, Analytical Mechanics Associates, Inc., Hampton, VA; A. Dyakonov, M. Schoenenberger, J. Davis, NASA Langley Research Center, Hampton, VA; S. Muppidi, Analytical Mechanics Associates, Inc., Hampton, VA; C. Tang, NASA Ames Research Center, Moffett Field, CA; et al.	1600 hrs AIAA-2016-3428 **Robust SJA-Based Nonlinear Trajectory Tracking Control Using Unmanned Aircraft LPV Model** P. Kazarin, V. Golubev, W. MacKunis, Embry-Riddle Aeronautical University, Daytona Beach, FL; S. Borener, D. Hufty, Federal Aviation Administration, Washington, D.C.		

Wednesday, 15 June 2016							
182-ASE-11	**Numerical Weather Prediction (Invited)**						**Columbia 12**
Chaired by: V. TALLAPRAGADA and N. AHMAD, NASA Langley Research Center							
1400 hrs Oral Presentation **Next Generation Unified Global Modeling System Development at NCEP for Seamless Weather and Climate Predictions (Invited)** V. Tallapragada, National Oceanic and Atmospheric Administration, College Park, MD	1430 hrs Oral Presentation **Forecasting Airship Operations in Remote Areas (Invited)** D. Bacon, A. Sarma, Leidos, Reston, VA	1500 hrs Oral Presentation **Numerical Weather Prediction at Deutscher Wetterdienst (DWD, Germany) (Invited)** D. Majewski, Deutscher Wetterdienst (DWD), Offenbach, Germany	1530 hrs AIAA-2016-3429 **A High-Order Multiscale Global Atmospheric Model (Invited)** R. Nair , National Center for Atmospheric Research, Boulder, CO	1600 hrs Oral Presentation **Implementation of new Global Forecast Icing products at NCEP's Operations based on NCAR's Aviation Algorithms (Invited)** V. Tallapragada, H. Chuang, Y. Mao, National Oceanic and Atmospheric Administration, College Park, MD	1630 hrs AIAA-2016-3430 **Design of Representing Multi-scale Interactions in the HWRF Modeling System (Invited)** X. Zhang, S. Gopalakrishnan, National Oceanic and Atmospheric Administration, Miami, FL	1700 hrs AIAA-2016-3431 **Comparison of Fully-Compressible Equation Sets for Atmospheric Dynamics (Invited)** N. Ahmad, NASA Langley Research Center, Hampton, VA	

Wednesday, 15 June 2016							
183-ASE-12	**NASA PSL LF11 Engine Icing Test Campaign**						**Georgetown West**
Chaired by: M. BRAVIN, Boeing Commercial Airplanes and E. LOTH, University of Virginia							
1400 hrs AIAA-2016-3432 **Turbofan Ice Crystal Rollback Investigation and Preparations Leading to the Second, Heavily Instrumented, Ice Crystal Engine Test at NASA PSL-3 test Facility** R. Goodwin, Honeywell International, Inc., Phoenix, AZ	1430 hrs AIAA-2016-3433 **Determination of engine recovery after an ice accretion rollback, engine performance deterioration and health monitoring using minimal instrumentation during icing testing at NASA Glenn PSL3** D. Walker, Honeywell International, Inc., Phoenix, AZ	1500 hrs AIAA-2016-3434 **Preliminary Results from a Heavily Instrumented Engine Ice Crystal Icing Test in a Ground Based Altitude Test Facility** A. Flegel, M. Oliver, NASA Glenn Research Center, Cleveland, OH	1530 hrs AIAA-2016-3435 **Modeling of Highly Instrumented Honeywell Turbofan Engine Tested with Ice Crystal Ingestion in the NASA Propulsion System Laboratory** J. Veres, P. Jorgenson, S. Jones, NASA Glenn Research Center, Cleveland, OH	1600 hrs Oral Presentation **Test Point Selection for Engine Crystal Icing Test at NASA PSL-3 for focused sensitivity, peak intensity, and anti-ice evaluations** D. Dischinger, W. Sandel, Honeywell International, Inc., Phoenix, AZ	1630 hrs AIAA-2016-3436 **NASA Glenn Propulsion Systems Lab Ice Crystal Cloud Characterization Update 2015** J. Van Zante, T. Bencic, T. Ratvasky, NASA Glenn Research Center, Cleveland, OH	1700 hrs Oral Presentation **Aircraft engine icing instrumentation used in the NASA Glenn Propulsion Systems Laboratory** T. Bencic, NASA Glenn Research Center, Cleveland, OH	

Wednesday, 15 June 2016							
184-ATIO.ATM-15	**Surface Operations Modeling and Analysis II**						**Embassy**
Chaired by: Y. JUNG, NASA Ames Research Center							
1400 hrs AIAA-2016-3437 **A Data Driven Approach for Characterization of Ramp Area Push Back and Ramp-Taxi Processes** J. Coupe, D. Milutinovic, W. Malik, University of California, Santa Cruz, Santa Cruz, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA	1430 hrs AIAA-2016-3438 **System Performance of an Integrated Airborne Spacing Algorithm with Ground Automation** K. Swieringa, S. Wilson, B. Baxley, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2016-3439 **Queue Buffer Sizing for Efficient and Robust Integrated Departure Scheduling** H. Idris, N. Shen, Engility Corporation, Billerica, MA; A. Saraf, J. Bertino, N. Luch, ATAC Corporation, Santa Clara, CA					

Wednesday, 15 June 2016							
185-ATIO.ATM-16	**Environmental Impact Mitigation II**						**Fairchild East**
Chaired by: J. CISTONE, Sullivan Aviation Services, LLC							
1400 hrs AIAA-2016-3440 **Development of a New Aircraft Noise Prediction Program** A. Filippone, University of Manchester, Manchester, United Kingdom	1430 hrs AIAA-2016-3441 **Logistics for Air to Air Refuelling in Civil Aviation, Step Jump in Fuel/Weight / Cost Efficiency & Smaller Tankers Needed** R. Nangia, Nangia Aero Research Associates, Bristol, United Kingdom	1500 hrs AIAA-2016-3442 **How Slow is Too Slow? Economics of Aircraft Concepts with Reduced Cruise Speeds** A. Evans, University of California, Santa Cruz, Moffett Field, CA	1530 hrs AIAA-2016-3443 **AIRNOISE: a Tool for Preliminary Noise-Abatement Terminal Approach Route Design** J. Li, B. Sridhar, M. Xue, H. Ng, NASA Ames Research Center, Moffett Field, CA	1600 hrs AIAA-2016-3444 **Operational Shortfalls and Potential Benefits of Path-Based Wind Shear Prediction** C. Reiche, M. Robinson, C. Craun, AvMet Applications, Inc., Reston, VA; R. Bass, Federal Aviation Administration, Washington, D.C.	1630 hrs AIAA-2016-3445 **Delayed Deceleration Approach Noise Assessment** T. Reynolds, M. Sandberg, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; J. Thomas, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA	1700 hrs AIAA-2016-3446 **Contrail Mitigation Through 3D Aircraft Trajectory Optimization** S. Hartjes, T. Hendriks, D. Visser, Delft University of Technology, Delft, The Netherlands	

Wednesday, 15 June 2016							
186-ATIO.ATM-17	**Data Mining in ATS II**						**Fairchild West**
Chaired by: B. HOLGUIN, Federal Aviation Administration							
1400 hrs AIAA-2016-3447 **An Integrated Gate Turnaround Management Concept Leveraging Big Data/ Analytics for NAS Performance Improvements** W. Chung, SAIC, Moffett Field, CA	1430 hrs AIAA-2016-3448 **Taxi-Out Time Prediction for Departures at Charlotte Airport Using Machine Learning Techniques** H. Lee, W. Malik, University of California, Santa Cruz, Moffett Field, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA	1500 hrs AIAA-2016-3449 **Association Rules for Traffic Flow Management Decision Support** E. Vargo, C. Taylor, C. Wanke, MITRE Corporation, McLean, VA	1530 hrs AIAA-2016-3450 **Airport Gate Operation Monitoring Using Computer Vision Techniques** H. Lu, S. Vaddi, V. Cheng, Optimal Synthesis, Inc., Los Altos, CA				

Wednesday, 15 June 2016							
187-ATIO.GA-2	**General Aviation Safety**						**Gunston East**
Chaired by: T. DOWNEN, Gulfstream and A. PRZEKOP, NASA							
1400 hrs AIAA-2016-3451 **General Aviation Approach and Landing Analysis using Flight Data Records** T. Puranik, E. Harrison, S. Min, H. Jimenez, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1430 hrs AIAA-2016-3452 **Detecting Safety Events during Approach in General Aviation Operations** N. Fala, K. Marais, Purdue University, West Lafayette, IN	1500 hrs AIAA-2016-3453 **Energy-Based Metrics for General Aviation Flight Data Record Analysis** T. Puranik, E. Harrison, S. Min, H. Jimenez, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1530 hrs AIAA-2016-3454 **Comparing Hazardous States and Trigger Events in Fatal and Non-Fatal Helicopter Accidents** A. Rao, K. Marais, Purdue University, West Lafayette, IN	1600 hrs AIAA-2016-3455 **Integration of Affordable Information Technology Products into General Aviation Training and Research** V. Risukhin, Western Michigan University, Battle Creek, MI	1630 hrs AIAA-2016-3456 **Designing an Automatic Beacon Ejection System for Aircraft** L. Peters, RMIT University, Melbourne, Australia	1700 hrs AIAA-2016-3457 **Aircraft Loss-Of-Control Recovery Strategy Using High Order Sliding Mode Control Based on Optimal Trim Condition** W. Zhang, H. Chen, Beihang University, Beijing, China	

Wednesday, 15 June 2016							
188-ATIO.TFPC-8/ATIO. FT-1/GEPC-2	**Transformational Flight - SCEPTOR Distributed Electric Propulsion X-Plane**						**Columbia 1**
Chaired by: A. GIBSON, Empirical Systems Aerospace and S. GINN, NASA AFRC							
1400 hrs AIAA-2016-3458 **Design and Performance of the NASA SCEPTOR Distributed Electric Propulsion Flight Demonstrator** N. Borer, M. Patterson, J. Viken, M. Moore, NASA Langley Research Center, Hampton, VA; J. Bevirt, A. Stoll, Joby Aviation, Santa Cruz, CA; et al.	1430 hrs Oral Presentation **Comparison of Mixed-Order Aero-Propulsive Performance Predictions for Distributed Electric Propulsion Configurations** N. Borer, M. Patterson, J. Derlaga, B. Litherland, K. Deere, NASA Langley Research Center, Hampton, VA; A. Stoll, Joby Aviation, Santa Cruz, CA	1500 hrs AIAA-2016-3459 **High-Lift Propeller System Configuration Selection for NASA's SCEPTOR Distributed Electric Propulsion Flight Demonstrator** M. Patterson, J. Derlaga, N. Borer, NASA Langley Research Center, Hampton, VA	1530 hrs Oral Presentation **Analysis of Propeller Designs and Integration Strategies During Conceptual Design via Computational Fluid Dynamics with Overset Grids** J. Derlaga, N. Borer, M. Patterson, M. Moore, NASA Langley Research Center, Hampton, VA	1600 hrs Oral Presentation **Cooling of electric motors used for propulsion on SCEPTOR** R. Christie, NASA Glenn Research Center, Cleveland, OH; A. Dubois, Joby Aviation, Santa Cruz, CA; J. Derlaga, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2016-3460 **Design of an Electric Propulsion System for SCEPTOR's Outboard Nacelle** A. Dubois, M. van der Geest, J. Bevirt, Joby Aviation, Santa Cruz, CA; R. Christie, NASA Glenn Research Center, Cleveland, OH; N. Borer, NASA Langley Research Center, Hampton, VA; S. Clarke, NASA Armstrong Flight Research Center, Edwards, CA	1700 hrs Oral Presentation **SCEPTOR Power System Design** S. Clarke, NASA Armstrong Flight Research Center, Edwards, CA	

Wednesday, 15 June 2016		
189-F360-7 **1400 - 1600 hrs**	**TTX Hot Wash and Cybersecurity Interactive Training Session**	**International Ballroom (East)**

Following the TTX, teams will participate in a "hot wash" session that will review the TTX's learning objectives and results. Participants will gain further instruction and insights when a panel of thought leaders in cybersecurity, risk management, threat assessment, and role-based training for cyber awareness engage in discussion and answer questions. The day promises to be both instructive and entertaining.

Moderator: David Shaw, Founder & CEO, Global Business Analysis (Moderator)

Panelists:

Briguette Carstensen
Vice President & Director of Research
Global Business Analysis

Barbara Endicott-Popovsky
Professor, University of Washington Institute of Technology & Executive Director
Center for Information Assurance and Cybersecurity

Faye Francy
Executive Director
The Aviation ISAC

Ilanko Subramaniam
GBA CISO, President
Global Business Analysis

Russell Syphert
Senior Threat Analyst
Global Business Analysis

Wednesday, 15 June 2016							
190-FC-11	**Crossflow Transition and Separation**						**Columbia 11**
Chaired by: L. PACK MELTON, NASA-Langley Research Center and D. BRZOZOWSKI, The Boeing Company							
1400 hrs AIAA-2016-3461 **Full-scale Flight Demonstration of an Active Flow Control Enhanced Vertical Tail** E. Whalen, The Boeing Company, Hazelwood, MO; M. Spoor, P. Vijgen, J. Tran, The Boeing Company, Mukilteo, WA; A. Shmilovich, The Boeing Company, Huntington Beach, CA; J. Lin, NASA Langley Research Center, Hampton, VA; et al.	1430 hrs AIAA-2016-3462 **A Comparative Study of Hybrid Flow Control System Architectures for an A320 Aircraft** M. Jabbal, S. Everett, Brunel University London, Uxbridge, United Kingdom; G. Kalarikovilagam Srinivasan, German Aerospace Center (DLR), Braunschweig, Germany; S. Raghu, Advanced Fluidics, LLC, Columbia, MD	1500 hrs AIAA-2016-3463 **Numerical Simulations of an Airplane with an Active Flow Control System** A. Shmilovich, Y. Yadlin, E. Whalen, The Boeing Company, Huntington Beach, CA	1530 hrs AIAA-2016-3464 **Plasma-Based Control of Excrescence-Generated Transition on a Swept Wing** D. Rizzetta, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2016-3465 **The influence of the spatial frequency content of discrete roughness distributions on the development of the crossflow instability** E. van Bokhorst, M. Placidi, C. Atkin, City University London, London, United Kingdom	1630 hrs AIAA-2016-3466 **Numerical Simulation of a High-Lift Configuration Embedded with High Momentum Fluidic Actuators** V. Vatsa, NASA Langley Research Center, Hampton, VA; B. Duda, E. Fares, Exa GmbH, Munich, Germany; J. Lin, NASA Langley Research Center, Hampton, VA	1700 hrs AIAA-2016-3467 **Sensitivity analysis of crossflow boundary layer and transition delay using plasma actuator** Z. Wang, L. Wang, S. Fu, Tsinghua University, Beijing, China	

Wednesday, 15 June 2016							
191-FD-39	**Shock-Dominated Flows I**						**Oak Lawn**
Chaired by: P. GNOFFO, NASA-Langley Research Center and V. NARAYANASWAMY, North Carolina State Univ							
1400 hrs AIAA-2016-3468 **A highly temperature sensitive and ultra-fast response TSP (Temperature-Sensitive-Paints) for unsteady aerothermodynamics on shock-tube wall** H. Ozawa, Tokyo Metropolitan University, Hino, Japan	1430 hrs AIAA-2016-3469 **Experimental study of shock wave patterns over an airfoil** A. Avelar, J. Falcao Filho, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil; H. Leite, R. Annes da Silva, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; J. Hsu, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil	1500 hrs AIAA-2016-3470 **Oscillation Characteristics of the Shock Waves around a Supersonic Deceleration-Device Model with Aerospike** T. Mizukaki, Tokai University, Hiratsuka, Japan; K. Yamada, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1530 hrs AIAA-2016-3471 **Experimental Investigation of Interactions Between a Normal Shock Wave and Various Counter Flows Using Counter-Driver Shock Tube** T. Tamba, M. Kayumi, H. Kawasaki, A. Iwakawa, A. Sasoh, Nagoya University, Nagoya, Japan	1600 hrs AIAA-2016-3472 **Large-Eddy Simulation of Shock Train in a Supersonic Turbulent Pipe Flow** S. Ghosh, S. Mahapatra, Indian Institute of Technology Kharagpur, Kharagpur, India	1630 hrs AIAA-2016-3473 **Experimental Research on Flow Characteristics around Combination of Forward jet and Spike** J. Zhang, H. Ma, Y. Qin, China Academy of Aerospace Aerodynamics, Beijing, China		

Wednesday, 15 June 2016							
192-FD-40	**Turbulence Modeling - Validation and Applications**						**Jay**
Chaired by: B. SMITH, Lockheed Martin Aeronautics							
1400 hrs AIAA-2016-3474 **The Effect of the DNS Data Averaging Time on the Accuracy of RANS-DNS Simulations** S. Poroseva, University of New Mexico, Albuquerque, Albuquerque, NM; E. Jeyapaul, Missouri University of Science and Technology, Rolla, MO; S. Murman, NASA Ames Research Center, Moffett Field, CA; J. Colmenares, University of New Mexico, Albuquerque, Albuquerque, NM	1430 hrs AIAA-2016-3475 **Verification and Validation of the k-kL Turbulence Model in FUN3D and CFL3D Codes** K. Abdol-Hamid, J. Carlson, C. Rumsey, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2016-3476 **Reynolds-stress and triple-product models applied to flows with rotation and curvature** M. Olsen, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2016-3477 **Computation of Turbulent Flow in a Rotating Pipe using the Elliptic Blending Reynolds Stress Model** N. Ashton, University of Manchester, Manchester, United Kingdom; M. Stoellinger, University of Wyoming, Laramie, Laramie, WY	1600 hrs AIAA-2016-3478 **Application of a Full Reynolds Stress Model to High Lift Flows** E. Lee-Rausch, C. Rumsey, NASA Langley Research Center, Hampton, VA; V. Togiti, B. Eisfeld, German Aerospace Center (DLR), Braunschweig, Germany			

Wednesday, 15 June 2016							
193-FD-41/FC-12	**Wing Aerodynamics: Separation and Control**						**Morgan**
Chaired by: D. WILLIAMS, Illinois Institute of Technology and K. TAIRA, Florida State University							
1400 hrs AIAA-2016-3479 **Revisiting Conventional Flaps at High Deflection-Rate: Separation Control** M. Ol, A. Medina, Air Force Research Laboratory, Wright-Patterson AFB, OH; P. Mancini, A. Jones, University of Maryland, College Park, College Park, MD	1430 hrs AIAA-2016-3480 **The effect of free-stream turbulence on the structure of laminar separation bubbles** M. Istvan, J. Kurelek, S. Yarusevych, University of Waterloo, Waterloo, Canada	1500 hrs AIAA-2016-3481 **Numerical Simulation of Wing Section Near Stall** A. Gross, New Mexico State University, Las Cruces, NM; J. Little, H. Fasel, University of Arizona, Tucson, Tucson, AZ	1530 hrs AIAA-2016-3482 **The effect of acoustic excitation on the later stages of transition in a laminar separation bubble** J. Kurelek, S. Yarusevych, University of Waterloo, Waterloo, Canada	1600 hrs AIAA-2016-3483 **Numerical Investigation on Flow Separation Control of Low Reynolds Number Sinusoidal Aerofoils** J. Joy, Nanyang Technological University, Singapore, Singapore; I. Ibrahim, University of Glasgow, Glasgow, United Kingdom; T. New, Nanyang Technological University, Singapore, Singapore	1630 hrs AIAA-2016-3484 **Control of Gortler vortices by means of staggered surface streaks** A. Sescu, L. Taoudi, Mississippi State University, Starkville, MS; M. Afsar, Imperial College London, London, United Kingdom; D. Thompson, Mississippi State University, Starkville, MS		

Wednesday, 15 June 2016							
194-FD-42	**High-Speed Boundary-Layer Transition II**						**Lincoln East**
Chaired by: T. JULIANO, University of Notre Dame and J. JEWELL, Air Force Research Laboratory							
1400 hrs AIAA-2016-3485 **Characterizing the Transient Growth Mechanism on a Hypersonic Blunt Body at a High Angle of Attack** E. Reshotko, Case Western Reserve University, Cleveland, OH; A. Leidy, F. Siddiqui, R. Bowersox, Texas A&M University, College Station, TX	1430 hrs AIAA-2016-3486 **Direct Numerical Simulations of Transitional Boundary Layer over a Flat Plate in Hypersonic Free-Stream** A. Novikov, Moscow Institute of Physics and Technology (MIPT), Zhukovsky, Russia; I. Egorov, Central Aerohydrodynamic Institute (TsAGI), Zhukovsky, Russia	1500 hrs AIAA-2016-3487 **Transition Route of Klebanoff Type in Hypersonic Boundary Layers** X. Wu, Imperial College London, London, United Kingdom; J. Luo, Tianjin University, Tianjin, China	1530 hrs AIAA-2016-3488 **Secondary instabilities of Görtler vortices in high-speed boundary layer flows** J. Ren, S. Fu, Tsinghua University, Beijing, China	1600 hrs AIAA-2016-3489 **Effects of Vibrational Relaxation and Dissociation on Hypersonic Boundary-Layer Stability** X. Wang, E. Josyula, Air Force Research Laboratory, Wright-Patterson AFB, OH	1630 hrs AIAA-2016-3490 **Nonlinear Transient Growth and Boundary Layer Transition** P. Paredes, M. Choudhari, F. Li, NASA Langley Research Center, Hampton, VA		

Wednesday, 15 June 2016							
195-FD-43	**Combustion Simulation II**						**Monroe**
Chaired by: J. EDWARDS and O. SAMIMI ABIANEH, Georgia Southern University							
1400 hrs AIAA-2016-3492 **Improved 4D Data Assimilation for Large-Eddy Simulation of High-Speed Turbulent Combustion** J. Edwards, C. Patton, T. Wignall, T. Echekki, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2016-3493 **RANS Modeling and Uncertainty Quantification of Supersonic Reacting Flows in a Scramjet Combustor** N. Arnold-Medabalimi, K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI	1500 hrs AIAA-2016-3494 **Numerical Simulation of Liquid Kerosene Combustion in a Dual-Mode Scramjet Combustor Using Flamelet/Progress Variable Approach** J. Niu, Y. Piao, Tsinghua University, Beijing, China	1530 hrs AIAA-2016-3495 **CFD simulations of acoustic and thermoacoustic phenomena in internal flows** E. Gonzalez, Combustion Science & Engineering, Inc., Columbia, MD	1600 hrs AIAA-2016-3496 **A comparison study of predicted pressure-based ignition delay time of n-dodecane fuel using various skeletal kinetic mechanisms** O. Samimi Abianeh, Georgia Southern University, Statesboro, GA			

Wednesday, 15 June 2016							
196-FD-44	**Solver Techniques II**						**Columbia 10**
Chaired by: T. ECONOMON, Stanford University							
1400 hrs AIAA-2016-3497 **A Fast Differential Deficit Control Volume Approach for Modeling Turbine-Turbine Interactions** M. DiPaola, D. Willis, University of Massachusetts, Lowell, Lowell, MA	1430 hrs AIAA-2016-3498 **Stability Analysis of Dual-time Stepping** J. Chiew, Stanford University, Stanford, CA; T. Pulliam, NASA Ames Research Center, Moffett Field, CA	1500 hrs AIAA-2016-3499 **Application of Nonlinear Krylov Acceleration to a Reconstructed Discontinuous Galerkin Method for Compressible Flows** C. Wang, North Carolina State University, Raleigh, NC; J. Cheng, Beihang University, Beijing, China; M. Berndt, N. Carlson, Los Alamos National Laboratory, Los Alamos, NM; H. Luo, North Carolina State University, Raleigh, NC	1530 hrs AIAA-2016-3500 **Multi-GPU, Implicit Time Stepping for High-order Methods on Unstructured Grids** J. Watkins, J. Romero, A. Jameson, Stanford University, Stanford, CA	1600 hrs AIAA-2016-3501 **Robust uniform time sampling approach for the harmonic balance method** S. Nimmagadda, T. Economon, J. Alonso, C. Ilario da Silva, Stanford University, Stanford, CA	1630 hrs AIAA-2016-3502 **Preconditioned pseudo-compressibility methods for Three-dimensional incompressible Navier-Stokes equations** Z. Qian, Aviation Industry Corporation of China (AVIC), Beijing, China	1700 hrs AIAA-2016-3503 **Parallelization of the flow and transport code ADVED_NS using the MPI porting library, UGLIB** Y. Khine, Engility Corporation, Chantilly, VA; R. Rosenberg, W. Szymczak, Naval Research Laboratory, Washington, D.C.	

Wednesday, 15 June 2016							
197-FD-45	**Novel CFD Algorithms**						**Jefferson East**
Chaired by: A. MAZAHERI, NASA-Langley Research Center and S. KARMAN, Pointwise, Inc.							
1400 hrs AIAA-2016-3504 **Third-Order Inviscid and Second-Order Hyperbolic Navier-Stokes Schemes for Three-Dimensional Inviscid and Viscous Flows** Y. Liu, H. Nishikawa, National Institute of Aerospace, Hampton, VA	1430 hrs AIAA-2016-3505 **Hyperbolic Method for Dispersive PDEs: Same High-Order of Accuracy for Solution, Gradient, and Hessian** A. Mazaheri, NASA Langley Research Center, Hampton, VA; M. Ricchiuto, French National Institute for Research in Computer Science and Control (INRIA), Bordeaux, France; H. Nishikawa, National Institute of Aerospace, Hampton, VA	1500 hrs AIAA-2016-3506 **Simultaneous Approximation Terms for Multidimensional Summation-by-parts Operators** J. Hicken, Rensselaer Polytechnic Institute, Troy, NY; D. Del Rey Fernández, D. Zingg, University of Toronto, Toronto, Canada	1530 hrs AIAA-2016-3507 **hp-Spectral Hull: A Minimum Degree of Freedom Enforcing Spectral Element Method For Nonlinear Conservation Laws with Application to Compressible Fluid Flow** A. Ghasemi, L. Taylor, J. Newman, University of Tennessee, Chattanooga, Chattanooga, TN	1600 hrs AIAA-2016-3508 **Development of A Multiscale Flow Solver Using Wavelet Decomposition for Error Control, Grid Adaptation, and Flow Data Compression** P. Anusonti-Inthra, University of Tennessee, Tullahoma, Tullahoma, TN	1630 hrs AIAA-2016-3509 **A Rotating Reference Frame, Integral Boundary Layer Method** M. DiPaola, D. Willis, University of Massachusetts, Lowell, Lowell, MA	1700 hrs AIAA-2016-3510 **Convergence Acceleration Based on Eigenvalue Analysis** S. Eyi, Middle East Technical University, Ankara, Turkey	

Wednesday, 15 June 2016							
198-FT-3/GT-5	**Correlation of Ground and Flight Test Data**						**DuPont**
Chaired by: B. MILLS, AEDC/ ATA and W. SCHUMAN							
1400 hrs AIAA-2016-3511 **Flight Simulation Training Device Qualification for Suborbital Spaceflight Simulator** E. Seedhouse, Embry-Riddle Aeronautical University, Daytona Beach, FL	1430 hrs AIAA-2016-3512 **Hardware in the Loop Simulation for Micro Air Vehicles** E. Ozger, T. Drouven, Ingolstadt University of Applied Sciences, Ingolstadt, Germany	1500 hrs AIAA-2016-3513 **Design of Experiments Enhanced Statistical Process Control for Wind Tunnel Check Standard Testing** B. Phillips, D. Landman, Old Dominion University, Norfolk, VA	1530 hrs AIAA-2016-3514 **Aerodynamic Characterization of an Off-the-Shelf Aircraft via Flight Test and Numerical Simulation** M. Bronz, G. Hattenberger, French Civil Aviation University, Toulouse, France	1600 hrs AIAA-2016-3515 **Investigation on correlation between wind tunnel and flight test data for boundary layer transition** Z. Liu, W. Yang, Q. Shen, China Academy of Aerospace Aerodynamics, Beijing, China			

Wednesday, 15 June 2016							
199-GT-6	**Employing CFD in Parallel with Ground Testing**						**Lincoln West**
Chaired by: R. KUMAR, Florida State University and R. RHEW, NASA-Langley Research Center							
1400 hrs AIAA-2016-3516 **An Application of CFD to Guide Forced Boundary-Layer Transition for Low-Speed Tests of a Hybrid Wing-Body Configuration** J. Luckring, K. Deere, NASA Langley Research Center, Hampton, VA; R. Childs, P. Stremel, Science and Technology Corporation, Moffett Field, CA; K. Long, NASA Ames Research Center, Moffett Field, CA	1430 hrs AIAA-2016-3517 **A Compressible Mixing Layer Facility for CFD Validation Measurements** G. Lee, K. Kim, B. Johnson, G. Elliott, J. Dutton, University of Illinois, Urbana-Champaign, Urbana, IL	1500 hrs AIAA-2016-3518 **CFD Simulations for Arc-Jet Panel Testing Capability Development Using Semi-Elliptical Nozzles** T. Gokcen, Analytical Mechanics Associates, Inc., Moffett Field, CA; J. Balboni, NASA Ames Research Center, Moffett Field, CA; G. Hartman, Jacobs, Moffett Field, CA					

Wednesday, 15 June 2016							
200-ITAR-4	**NASA Orion EFT-1 Aeroscience Results - Aerothermal I**						**Cabinet**
Chaired by: J. OLEJNICZAK, NASA Ames Research Center and A. BRANDIS, AMA Inc at NASA Ames							
1400 hrs AIAA-2016-3519 **Overview of the NASA Orion Exploration Flight Test-1 Reentry from an Aerosciences Perspective** J. Olejniczak, NASA Ames Research Center, Moffett Field, CA	1430 hrs AIAA-2016-3520 **Orion-MPCV Aerothermodynamic Database Design Methodology** A. Cassady, NASA Johnson Space Center, Houston, TX	1500 hrs AIAA-2016-3521 **EFT-1 Heatshield Aerothermal Environment Reconstruction** B. Oliver, A. Amar, NASA Johnson Space Center, Houston, TX; J. Droba, HX5, Houston, TX; V. Lessarad, NASA Langley Research Center, Hampton, VA; M. Mahzari, Analytical Mechanics Associates, Inc., Moffett Field, CA	1530 hrs AIAA-2016-3522 **Exploration Flight Test 1 Afterbody Aerothermal Environment Reconstruction** A. Hyatt, B. Oliver, A. Amar, NASA Johnson Space Center, Houston, TX; V. Lessarad, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2016-3523 **Orion Crew Module and Parachute System Aerodynamic Modeling** D. Owens, NASA Langley Research Center, Hampton, VA; L. Cassady, J. Powell, P. Stuart, NASA Johnson Space Center, Houston, TX	1630 hrs AIAA-2016-3524 **Orion EFT-1 FADS-Based Trajectory Reconstruction** K. Bibb, NASA Langley Research Center, Hampton, VA; L. Cassady, A. Schwing, NASA Johnson Space Center, Houston, TX	1700 hrs AIAA-2016-3525 **Reconstruction of the Orion Crew Module Aerodynamics for the EFT-1 Flight Test** K. Bibb, NASA Langley Research Center, Hampton, VA; P. Robinson, L. Cassady, NASA Johnson Space Center, Houston, TX	1730 hrs AIAA-2016-3526 **Quiet Hubless Ducted Fan Hybrid Propulsion** S. Wilson III, Self, Bethesda, MD; B. Bialczak, Self, Vertrees, KY; T. Streett, Self, Louisville, KY

Wednesday, 15 June 2016							
201-MAO-11	**Structural Optimization I**						**Columbia 3**
Chaired by: J. HICKEN, Rensselaer Polytechnic Institute and B. STANFORD, NASA Langley Research Center							
1400 hrs AIAA-2016-3527 **A Robust Analytical Sensitivity Analysis for Weakly Coupled Aero-Structural Systems** K. Gobal, R. Grandhi, Wright State University, Dayton, OH	1430 hrs AIAA-2016-3528 **Analysis and Sensitivity Calculation using High Fidelity Spectral Formulation-Based FSI and Coupled Adjoint Method** R. Prasad, H. Kim, D. Im, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA; S. Yi, Korea Advanced Institute of Science and Technology, Daejeon, South Korea	1500 hrs AIAA-2016-3529 **Aeroservoelastic Optimization of Wing Structure Using Curvilinear Spars and Ribs (SpaRibs)** J. Robinson, S. Doyle, G. Ogawa, M. Baker, M4 Engineering, Inc., Long Beach, CA; S. De, M. Jrad, Virginia Polytechnic Institute and State University, Blacksburg, VA; et al.	1530 hrs AIAA-2016-3530 **Active Aeroelastic Alteration to Reduce Off-Design Induced Drag** J. Lin, Control Research Corporation, Lexington, MA	1600 hrs AIAA-2016-3531 **Wing Aerostructural Optimization Using the Individual Discipline Feasible Strategy** J. Hoogervorst, A. Elham, Delft University of Technology, Delft, The Netherlands			

Wednesday, 15 June 2016							
202-MAO-12	**Surrogate Modeling and Non-Deterministic Design - Methods and Applications I**						**Cardozo**
Chaired by: V. TOROPOV, Queen Mary, University of London and S. CHOWDHURY, University at Buffalo							
1400 hrs AIAA-2016-3532 **Reducing Large Viking I Based Martian Entry, Descent and Landing Response Surface Methodology Produced Quadratic Models** N. Norman, Embry-Riddle Aeronautical University, Daytona Beach, FL; S. Smith, Howard University, Washington, D.C.	1430 hrs AIAA-2016-3533 **Uncertainty Quantification of Material Mechanical Properties Using Surrogate Models** C. Smith, B. Lapp, M. Glavicic, Rolls-Royce Group plc, Indianapolis, IN	1500 hrs AIAA-2016-3534 **Integrating Aerodynamic Uncertainty into Aircraft Maneuvers During Conceptual Design** A. Wendorff, J. Alonso, Stanford University, Stanford, CA; S. Bieniawski, B. Whitehead, The Boeing Company, Seattle, WA	1530 hrs AIAA-2016-3535 **Adding Flight Mechanics to Flight Loads Surrogate Model using Multi-Output Gaussian Processes** A. Chiplunkar, Airbus, Toulouse, France; E. Rachelson, University of Toulouse, Toulouse, France; M. Colombo, Airbus, Toulouse, France; J. Morlier, Higher Institute of Aeronautics and Space, Toulouse, France	1600 hrs AIAA-2016-3536 **Improvement of efficient global optimization with application to aircraft wing design** N. Bartoli, ONERA, Toulouse, France; M. Bouhlel, Safran Group, Paris, France; I. Kurek, R. Lafage, T. Lefebvre, ONERA, Toulouse, France; J. Morlier, University of Toulouse, Toulouse, France	1630 hrs AIAA-2016-3537 **A sequential sampling strategy for Kriging metamodel based on Delaunay triangulation and TOPSIS** P. Jiang, Y. Zhang, Q. Zhou, L. Shu, State Key Laboratory of Digital Manufacturing Equipment and Technology, Wuhan, China		

Wednesday, 15 June 2016							
203-MST-10	**Model and Simulation Integration**						**Georgetown East**
Chaired by: R. RUFF and D. GINGRAS, Bihrle Applied Research Inc.							
1400 hrs AIAA-2016-3538 **A simulating method of dynamic inter-connection between models** R. Hong, Z. Xiong, Q. Zhou, Aviation Industry Corporation of China (AVIC), Shanghai, China	1430 hrs AIAA-2016-3539 **Automated Model Integration Workflow for Supporting Pilot-in-the-Loop Testing in Model-Based Rotorcraft Design** U. Durak, T. Gerlach, German Aerospace Center (DLR), Braunschweig, Germany; A. Ozturk, V. Kargin, H. Aydemir, U. Zengin, Turkish Aerospace Industries, Inc., Ankara, Turkey	1500 hrs AIAA-2016-3540 **Ontology-Driven Metamodel Validation in Cyber-Physical Systems** D. Larkin, K. Lynch, G. Ball, Raytheon Company, Tucson, AZ; K. Collins, M. Schmit, Georgia Institute of Technology, Atlanta, GA; T. Bapty, MetaMorph, Nashville, TN; et al.	1530 hrs AIAA-2016-3541 **Development of a Physics-Based Weight (PBWeight) Prediction Tool for Conceptual Design** T. Winter, J. Marquez, B. Scheneman, M4 Engineering, Inc., Long Beach, CA	1600 hrs AIAA-2016-3542 **Multi-fidelity Geometry-centric Multi-disciplinary Analysis for Design** R. Haimes, Massachusetts Institute of Technology, Cambridge, MA; J. Dannenhoffer, Syracuse University, Syracuse, NY; N. Bhagat, Wright State Research Institute, Beavercreek, OH; D. Allison, Optimal Flight Sciences, LLC, Dayton, OH	1630 hrs AIAA-2016-3543 **Establishment of a C4ISR Interoperability Prototyping and LVC Environment** A. Coyle, The Boeing Company, Washington, D.C.		

Wednesday, 15 June 2016							
204-MST-11	**Modeling and Simulation of Aeroelasticity II**						**Piscataway**
Chaired by: T. BURRESS, Lockheed Martin and A. ELMILIGUI, NASA Langley Research Center							
1400 hrs AIAA-2016-3544 **Aeroelastic Analysis and Ground Vibration Testing of Ultra-WideBand Ice Radar Installations on the Basler BT-67** W. Liu, Design, Analysis and Research Corporation, Lawrence, KS; M. Ewing, R. Hale, University of Kansas, Lawrence, Lawrence, KS	1430 hrs AIAA-2016-3545 **Balancing the Efficiency and Stability of the Coupled Dynamics and Aerodynamics of a Flapping Flyer** J. Bluman, C. Kang, University of Alabama, Huntsville, Huntsville, AL	1500 hrs AIAA-2016-3546 **Frequency Domain Approach for Transonic Unsteady Aerodynamic Modelling applied to a 3D Wing** A. Poncet-Montanges, J. Cooper, D. Jones, A. Gaitonde, University of Bristol, Bristol, United Kingdom; Y. Lemmens, Siemens, Leuven, Belgium	1530 hrs AIAA-2016-3547 **Improved Servoelastic Response Prediction Models For Aircraft Using MultiObjective Optimization Techniques** P. Srinivasan, Aeronautical Development Agency, Bengaluru, India; A. Joshi, Indian Institute of Technology Bombay, Mumbai, India	1600 hrs AIAA-2016-3548 **Tracking Control System Design for Roll Maneuver via Active Wings Using Macro Fiber Composites** X. Wang, Dalian University of Technology, Dalian, China; W. Zhou, Z. Wu, State Key Laboratory of Structural Analysis for Industrial Equipment, Dalian, China; J. Xing, Dalian University of Technology, Dalian, China			

Wednesday, 15 June 2016							
205-PDL-5/FC-13	**DBD Actuators**						**Gunston West**
Chaired by: D. ASHPIS, NASA Glenn Research Center and S. ROY, University of Florida							
1400 hrs AIAA-2016-3549 **Characterization of DBD Plasma Actuators Performance without External Flow – Part I: Thrust-Voltage Quadratic Relationship in Logarithmic Space for Sinusoidal Excitation** D. Ashpis, NASA Glenn Research Center, Cleveland, OH; M. Laun, HX5 Sierra LLC, Glenn Research Center, Cleveland, OH	1430 hrs AIAA-2016-3550 **Basic Study on the Voltage Characteristic of Dual-Grounded Tri–Electrode Plasma Actuator by Plasma Simulation** A. Nakano, H. Nishida, Tokyo University of Agriculture and Technology, Koganei, Japan	1500 hrs AIAA-2016-3551 **Simulation of Body Force Effect on Steady and Unsteady Flow Induced by DBD Plasma Actuator** B. Wu, University of California, Irvine, Irvine, CA; C. Gao, Northwestern Polytechnical University, Xi'an, China; F. Liu, J. Xiong, University of California, Irvine, Irvine, CA	1530 hrs AIAA-2016-3552 **New Frequency Dependent Capacitance Based SDBD Plasma Model for Direct Simulation of 2D Navier-Stokes Equation** T. Sengupta, Indian Institute of Technology Kanpur, Kanpur, India; S. Sengupta, Ohio State University, Columbus, OH; P. Bagade, Indian Institute of Technology Kanpur, Kanpur, India	1600 hrs AIAA-2016-3553 **Experimental Investigation of Dynamic Stall in a Wide Range of Mach Numbers by Plasma Actuators with Combined Energy/Momentum Action** A. Starikovskiy, Princeton University, Princeton, NJ	1630 hrs AIAA-2016-3554 **Optimization of Dielectric Barrier Discharge Plasma Actuators for Conical-Forebody Flow Control** H. Hu, H. Li, X. Meng, X. Yan, Northwestern Polytechnical University, Xi'an, China; F. Liu, S. Luo, University of California, Irvine, Irvine, CA	1700 hrs AIAA-2016-3555 **Experimental Study of Anti-icing and Deicing on a Cylinder by DBD plasma actuation** X. Meng, J. Cai, Y. Tian, X. Han, D. Zhang, Northwestern Polytechnical University, Xi'an, China	

Wednesday, 15 June 2016							
206-TP-8	**Advanced Modeling II - Hypersonic Flows**						**Jefferson West**
Chaired by: M. PANESI, University of Illinois at Urbana Champaign							
1400 hrs Oral Presentation **Hypersonics Then and Now (Invited)** J. Anderson, Smithsonian Institution, National Air and Space Museum, Washington, D.C.		1500 hrs AIAA-2016-3556 **Vibrational relaxation and dissociation in O_2-O mixtures** D. Andrienko, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1530 hrs AIAA-2016-3557 **Radiative Gas Dynamics of Apollo Command Modules at Angles of Attack** S. Surzhikov, Russian Academy of Sciences, Moscow, Russia	1600 hrs AIAA-2016-3558 **Thermochemical Nonequilibrium Modeling for Hypersonic Flows Containing Oxygen** K. Neitzel, D. Andrienko, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1630 hrs AIAA-2016-3559 **Numerical Model Development for Thermochemical Nonequilibrium in Hypersonic Flows** J. Burt, E. Josyula, Air Force Research Laboratory, Wright-Patterson AFB, OH	1700 hrs AIAA-2016-3560 **SPARK: A Software Package for Aerodynamics, Radiation and Kinetics** B. Lopez, M. Lino Da Silva, Technical University of Lisbon, Lisbon, Portugal	

Wednesday, 15 June 2016		
207-NW-6 **1600 - 1630 hrs**	**Networking Coffee Break**	**Columbia**
Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.		

Wednesday, 15 June 2016		
208-LEC-4 **1730 - 1830 hrs**	**Thermophysics Award Lecture**	**Lincoln West**
Measurement of Thermophysical Properties from 4 to 4,000K **George Cunnington** CEO Cunnington and Associates		

Wednesday, 15 June 2016		
209-LEC-5 **1730 - 1830 hrs**	**Multidisciplinary Analysis and Optimization Award Lecture**	**International Ballroom (East)**
A 30-Year Retrospective of Structural and Multidisciplinary Optimization **Robert (Bob) A. Canfield** Professor & Assistant Department Head for Academic Affairs Virginia Polytechnic Institute and State University		

Wednesday, 15 June 2016		
210-FD-46 **1830 - 2200 hrs**	**Transition Open Forum**	**Cardozo**

Thursday, 16 June 2016

211-SB-4 0730 - 0800 hrs	Speakers' Briefing	Session Rooms

Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 30-minute briefing on the day of their session to exchange bios and review final details prior to the session. Please attend on the day of your session.

Thursday, 16 June 2016

212-PLNRY-5 0800 - 0900 hrs	Plenary	International Ballroom (Center)

The Ascent of (Un)manned
John S. Langford
Chairman and Chief Executive Officer
Aurora Flight Sciences Corporation

Thursday, 16 June 2016

213-NW-7 0900 - 0930 hrs	Networking Coffee Break	Meeting Room Foyers

Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.

Thursday, 16 June 2016

214-WKSP-1 0930 - 1715 hrs	Drag Prediction Workshop	Lincoln West

Agenda:

0930 – 1130 hrs Sessions 1, 2
1130 – 1300 hrs Break for Lunch
1300 – 1715 hrs Session 3, 4, 5

The focus of this workshop will be the NASA Common Research Model (CRM) with wind-tunnel measured wing twist; both wing-body and wing-body-pylon-nacelle configurations will be considered. CFD predictions of absolute and incremental force and moment values will be examined and compared. The workshop will include grid convergence and code verification studies. Additionally, an angle-of-attack sweep with static aero-elastic deformations will be considered. Grids will be made available for all required cases.

Optionally, participants are invited to perform solution-adaptation calculations and/or a coupled aero-structural simulation of the CRM wing-body configuration. A finite element model will be made available to participants to calculate twist/deflection due to aerodynamic load.

The objectives of this workshop will be to:
- To assess the state-of-the-art computational methods as practical aerodynamic tools for aircraft force and moment prediction of industry relevant geometries.
- To provide an impartial forum for evaluating the effectiveness of existing computer codes and modeling techniques using Navier-Stokes solvers.
- To identify areas needing additional research and development.

Thursday, 16 June 2016

215-AMT-8	Volumetric Measurement Techniques	Columbia 2

Chaired by: P. DANEHY, NASA Langley Research Center and W. KULATILAKA, Texas A & M University

0930 hrs AIAA-2016-3561 **20 kHz 3D measurements in a Mach 2 combustor based on tomographic chemiluminescence** Q. Lei, Y. Wu, L. Ma, Virginia Polytechnic Institute and State University, Blacksburg, VA; T. Ombrello, C. Carter, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2016-3562 **High-speed three-dimensional tomographic measurements for combustion systems** B. Halls, J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Jiang, M. Splichenko, S. Roy, Spectral Energies, LLC, Dayton, OH; T. Meyer, Purdue University, West Lafayette, IN	1030 hrs AIAA-2016-3563 **Single-Shot 3D Flame Imaging Using CH-Based VLIF (Volumetric Laser Induced Fluorescence)** L. Ma, W. Xu, Q. Lei, J. Ikeda, Virginia Polytechnic Institute and State University, Blacksburg, VA; C. Carter, Air Force Research Laboratory, Wright-Patterson AFB, OH	1100 hrs AIAA-2016-3564 **Volumetric Measurement of a Shock Wave-Turbulent Boundary Layer Interaction Using Plenoptic Particle Image Velocimetry** J. Bolton, B. Thurow, Auburn University, Auburn, AL; F. Alvi, N. Arora, Florida State University, Tallahassee, FL	1130 hrs AIAA-2016-3565 **5 kHz VLIF (Volumetric Laser Induced Fluoresence) Measurements in Turbulent Flows Seeded with Iodine** Y. Wu, Q. Lei, W. Xu, L. Ma, Virginia Polytechnic Institute and State University, Blacksburg, VA			

Thursday, 16 June 2016								
216-AMT-9	**MEMS and Novel Surface Sensors**							**Oak Lawn**
Chaired by: C. GOYNE, University of Virginia and H. HU, Iowa State University								
0930 hrs AIAA-2016-3566 **A New Skin Friction Gauge** B. Kinkade, A. Sullivan, Northrop Grumman Corporation, Redondo Beach, CA; R. Westphal, J. Gerhardt, California Polytechnic State University, San Luis Obispo, CA	1000 hrs AIAA-2016-3567 **Study on Effect of Thickness Simplification on High Frequency Measurement of Thin-Film Heat Flux Gauge** X. Xu, Q. Zhao, W. Luo, F. Tang, J. Li, Chinese Academy of Sciences, Beijing, China	1030 hrs AIAA-2016-3568 **Testing of a New Type of MEMS Thermal Shear-Stress Sensor** J. Weiss, Q. Schwaab, University of Québec, Montréal, Canada; A. Giani, C. Guigue, P. Combette, B. Charlot, University of Montpellier, Montpellier, France	1100 hrs AIAA-2016-3569 **Study on delta wing skin friction measurement based on liquid crystal coatings in hypersonic wind tunnel** X. Chen, S. Wen, J. Pan, D. Yao, China Academy of Aerospace Aerodynamics, Beijing, China	1130 hrs AIAA-2016-3570 **Development of a High-Resolution, Fast Pressure and Strain Measurement System for Unsteady Supersonic Testing** A. Wrist, J. Hubner, University of Alabama, Tuscaloosa, Tuscaloosa, AL; J. Crafton, Innovative Scientific Solutions, Inc., Dayton, OH			

Thursday, 16 June 2016								
217-APA-29	**Aerodynamic Design Methodologies II**							**Albright**
Chaired by: J. GUGLIELMO, Boeing Defense, Space & Security and C. PASILIAO, AFRL/RWWV								
0930 hrs AIAA-2016-3571 **Analysis of the Aerodynamic Performance of a Morphing Wing-Tip Demonstrator Using a Novel Nonlinear Vortex Lattice Method** S. Oliviu, A. Koreanschi, R. Botez, University of Québec, Montréal, Canada; M. Mamou, Y. Mebarki, National Research Council Canada, Ottawa, Canada	1000 hrs AIAA-2016-3572 **A Genetic Algorithm Optimization Method for a Morphing Wing Tip Demonstrator Validated Using Infra Red Experimental Data** A. Koreanschi, S. Oliviu, J. Acotto, R. Botez, University of Québec, Montréal, Canada; M. Mamou, Y. Mebarki, National Research Council Canada, Ottawa, Canada	1030 hrs AIAA-2016-3573 **Variable-Fidelity Multidisciplinary Design Optimization for Innovative Control Surface of Tailless Aircraft** J. Park, Virginia Polytechnic Institute and State University, Blacksburg, VA; Y. Jo, S. Yi, Korea Institute of Science and Technology, Daejeon, South Korea; J. Choi, P. Raj, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA	1100 hrs AIAA-2016-3574 **Transonic Aerodynamics Analysis for Multidisciplinary Design Optimization Applications** M. Segee, J. Schetz, R. Kapania, Virginia Polytechnic Institute and State University, Blacksburg, VA	1130 hrs AIAA-2016-3575 **Research on the Parameters Optimization of Combination of Spike and Forward-facing Jet** J. Zhang, H. Ma, Y. Qin, China Academy of Aerospace Aerodynamics, Beijing, China	1200 hrs AIAA-2016-3576 **Trajectory and Aerodynamic Control Optimization of Civil Aircraft Descent Under Hazard Situations Based on High-Fidelity Aerodynamic Database.** N. Othman, M. Kanazaki, Tokyo Metropolitan University, Hino, Japan		

Thursday, 16 June 2016								
218-APA-30	**Aerodynamic - Structural Dynamics Interactions II**							**Northwest**
Chaired by: D. O'BRIEN, US Army RDECOM and P. ANSELL, University of Illinois at Urbana-Champaign								
0930 hrs AIAA-2016-3577 **Aerodynamic Study of a Pusher-Propeller effects on a simple flap** S. Algozino, J. Marañon, J. Delnero, I. Echapresto Garay, National University of La Plata, La Plata, Argentina	1000 hrs AIAA-2016-3578 **Aerodynamic Excitation on MLG Door Exposed to Vortices Emanating from NLG of an Aircraft Model** S. Peng, A. Jirasek, M. Dalenbring, P. Eliasson, Swedish Defense Research Agency (FOI), Stockholm, Sweden	1030 hrs AIAA-2016-3579 **Unsteady Pressure Measurement of Transonic Buffet on NASA Common Research Model** S. Koike, M. Ueno, K. Nakakita, A. Hashimoto, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1100 hrs AIAA-2016-3580 **Steady Reynolds Averaged Navier Stokes Equation-Based Buffet Loads Estimation** T. Chyczewski, Northrop Grumman Corporation, Melbourne, FL	1130 hrs AIAA-2016-3581 **Delayed Detached Eddy Simulation of Supersonic Panel Aeroelasticity Using Fully Coupled Fluid Structure Interaction with High Order Schemes** J. Gan, G. Zha, University of Miami, Miami, FL	1200 hrs AIAA-2016-3582 **Validation of a Turbulent Boundary Layer Pressure Fluctuation Model for Hypersonic Flow over a Cone** J. Smith, M. Mesh, L. DeChant, K. Casper, R. Field, Sandia National Laboratories, Albuquerque, NM		

Thursday, 16 June 2016								
219-APA-32	**Low Boom Activities I**							**Jefferson West**
Chaired by: L. BANGERT, NASA Langley Research Center and D. FINLEY, Lockheed Martin Aeronautics								
0930 hrs AIAA-2016-3583 **Near-Field Measurement of Post-Shock Pressure Modulation Induced by Supersonic Flight Model past a Grid Turbulence** A. Sasoh, A. Iwakawa, D. Furukawa, Y. Aoki, Nagoya University, Nagoya, Japan	1000 hrs AIAA-2016-3584 **The Research of Supersonic Aircraft Low Sonic Boom Configuration Design and Optimizations** X. Hao, C. Su, J. Zhou, China Academy of Aerospace Aerodynamics, Beijing, China	1030 hrs AIAA-2016-3585 **Inlet Trade Study for a Low Boom Aircraft Demonstrator** C. Heath, J. Slater, NASA Glenn Research Center, Cleveland, OH; S. Rallabhandi, National Institute of Aerospace, Hampton, VA						

Thursday, 16 June 2016							
220-ASE-13	Icing Instrumentation and Test Facilities						Columbia 12
Chaired by: K. AL-KHALIL, Cox & Company, Inc. and D. ORCHARD, National Research Council Canada							
0930 hrs AIAA-2016-3586 **An Assessment of the Icing Blade and the SEA Multi-Element Sensor for Liquid Water Content Calibration of the NASA GRC Icing Research Tunnel** L. Steen, R. Ide, HX5, Cleveland, OH; J. Van Zante, NASA Glenn Research Center, Cleveland, OH	1000 hrs AIAA-2016-3587 **Development and Validation of Compact Isokinetic Total Water Content Probe for Wind Tunnel Characterization** C. Davison, M. Benner, C. Landreville, D. Fuleki, National Research Council Canada, Ottawa, Canada	1030 hrs AIAA-2016-3588 **Simulating natural ice crystal cloud conditions for icing wind tunnel experiments - A review on the design, commissioning and calibration of the TU Braunschweig ice crystal generation system** A. Baumert, S. Bansmer, S. Sattler, Technical University of Braunschweig, Braunschweig, Germany; H. Pervier, Cranfield University, Cranfield, United Kingdom; B. Esposito, Italian Aerospace Research Center (CIRA), Capua, Italy	1100 hrs AIAA-2016-3589 **Simulating the Behavior of Droplets entrained into the Wake Flow of Spray Bar** H. Tang, S. Chang, Beihang University, Beijing, China; Z. Cheng, Aircraft Strength Research Institute of China, Xi'an, China	1130 hrs AIAA-2016-3590 **Vibrating-Wire, Supercooled Liquid Water Content Sensor Calibration and Characterization Progress** M. King, NASA Glenn Research Center, Cleveland, OH; J. Bognar, D. Guest, Anasphere, Inc., Belgrade, MT			

Thursday, 16 June 2016							
221-ASE-14	HAIC/HIWC 2014 Darwin and 2015 Cayenne Flight Campaigns Update I						Georgetown West
Chaired by: M. WADEL, NASA Glenn Research Center and F. DEZITTER, Airbus Operations S.A.S							
0930 hrs AIAA-2016-3591 **HAIC/HIWC field campaigns - Specific findings on ice crystals characteristics in high ice water content cloud regions** D. Leroy, P. Coutris, F. Emmanuel, A. Schwarzenboeck, National Center for Scientific Research (CNRS), Clermont Ferrand, France; J. Strapp, Met Analytics, Inc., Toronto, Canada; L. Lilie, Science Engineering Associates, Mansfield Center, CT; et al.	1000 hrs Oral Presentation **An Update on the Assessment of Appendix D/P Total Water Content from In-Situ Measurements of Deep Convective Clouds: Measurements from Two HAIC-HIWC Flight Campaigns** J. Strapp, Met Analytics, Inc., Aurora, Canada; A. Schwarzenboeck, National Center for Scientific Research (CNRS), Clermont Ferrand, France; J. Delanoe, National Center for Scientific Research (CNRS), Paris, France; F. Dezitter, Airbus, Toulouse, France; C. Dumont, Federal Aviation Administration, Atlantic City, NJ; A. Grandin, Airbus, Toulouse, France; et al.	1030 hrs AIAA-2016-3592 **Description and Results for a Simple Ice Crystal Detection System for Airborne Applications** L. Lilie, C. Sivo, D. Bouley, Science Engineering Associates, Tolland, CT	1100 hrs AIAA-2016-3593 **Isokinetic TWC Evaporator Probe: Development of the IKP2 and Performance Testing for the HAIC-HIWC Darwin 2014 and Cayenne Field Campaigns** J. Strapp, Met Analytics, Inc., Aurora, Canada; L. Lilie, Science Engineering Associates, Mansfield Center, CT; T. Ratvasky, NASA Glenn Research Center, Cleveland, OH; C. Davison, National Research Council Canada, Ottawa, Canada; C. Dumont, Federal Aviation Administration, Atlantic City, NJ	1130 hrs AIAA-2016-3594 **Isokinetic TWC Evaporator Probe: Calculations and Systemic Error Analysis** C. Davison, National Research Council Canada, Ottawa, Canada; J. Strapp, Met Analytics, Inc., Toronto, Canada; L. Lilie, Science Engineering Associates, Mansfield Hollow, CT; T. Ratvasky, NASA Glenn Research Center, Cleveland, OH; C. Dumont, Federal Aviation Administration, Atlantic City, NJ			

Thursday, 16 June 2016							
222-ATIO.ACD-7/ATIO.TFPC-9	Unconventional, Innovative, and Transformative Concepts						Gunston East
Chaired by: E. DIGIROLAMO, Lockheed Martin Aeronautics and D. HALL, DHC Engineering							
0930 hrs AIAA-2016-3595 **Suborbital Air-Launch of Very Light Payloads from a Fixed Wing Platform** A. Sobester, A. Lock, University of Southampton, Southampton, United Kingdom	1000 hrs AIAA-2016-3596 **Design, Build and Fly: Basler BT-67 with External Antenna Fairings** W. Anemaat, W. Liu, M. Yang, Design, Analysis and Research Corporation, Lawrence, KS; R. Hale, University of Kansas, Lawrence, Lawrence, KS	1030 hrs AIAA-2016-3597 **Research on Design Domain of Propeller-Driven Hybrid-Mode Aerial Vehicle** W. Wenkai, Z. Hou, Z. Guo, Q. Chen, B. Wang, B. Zhu, National University of Defense Technology, Changsha, China	1100 hrs AIAA-2016-3598 **Aeropropulsive Interaction and Thermal System Integration within the ECO-150: A Turboelectric Distributed Propulsion Airliner with Conventional Electric Machines** B. Schiltgen, J. Freeman, Empirical Systems Aerospace, Inc., Pismo Beach, CA	1130 hrs AIAA-2016-3599 **Synthesized analysis to the aircraft configuration with open rotor engines** C. Ma, Z. Tan, D. Wu, Commercial Aircraft Corporation of China, Ltd. (COMAC), Shanghai, China			

Thursday, 16 June 2016							
223-ATIO.ATM-18	En-Route ATM I						Fairchild East
Chaired by: J. BRONSVOORT, Airservices Australia							
0930 hrs Oral Presentation **Using Sector Capacity Indicators for Tracking and Improving ATC Performance** Y. Zhang, Y. Wang, University of South Florida, Tampa, FL; J. Gulding, K. Hanson, Federal Aviation Administration, Washington, D.C.	1000 hrs AIAA-2016-3600 **Traffic Aware Planner for Cockpit-based Trajectory Optimization** S. Woods, R. Vivona, Engility Corporation, Billerica, MA; D. Wing, K. Burke, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3601 **Design and Development of a Flight Route Modification Logging and Communication Network** D. Merlino, University of North Texas, Denton, TX; C. Wilson, University of Maryland, College Park, College Park, MD; L. Carboneau, Florida Gulf Coast University, Fort Meyers, FL; A. Wilder, University of Kentucky, Lexington, Lexington, KY; M. Underwood, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-3602 **Methods of Selecting Forecast Winds for Flight Management Systems to Support Four Dimensional Trajectory-Based Operations** J. Jones, M. McPartland, T. Reynolds, Y. Glina, C. Edwards, S. Troxel, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA				

Thursday, 16 June 2016							
224-ATIO.ATM-19	Runway Management						Embassy
Chaired by: H. IDRIS, Engility Corporation (HQ)							
0930 hrs AIAA-2016-3603 **Analysis of the Capacity Potential of Current Day and Novel Runway Configurations for New York's John F. Kennedy Airport** P. Glaab, NASA Langley Research Center, Hampton, VA; R. Tamburro, Port Authority of New York and New Jersey, New York, NY; P. Lee, NASA Ames Research Center, Moffett Field, CA	1000 hrs AIAA-2016-3604 **Evaluation of a standardized single runway airport model with respect to runway capacity** S. Kern, M. Schultz, German Aerospace Center (DLR), Braunschweig, Germany	1030 hrs AIAA-2016-3605 **Exact and Heuristic Algorithms for Runway Scheduling** W. Malik, University of California, Santa Cruz, Moffett Field, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2016-3606 **Runway Scheduling for Charlotte Douglas International Airport** W. Malik, H. Lee, University of California, Santa Cruz, Moffett Field, CA; Y. Jung, NASA Ames Research Center, Moffett Field, CA				

Thursday, 16 June 2016							
225-ATIO.ATM-20	Data Mining in ATS III						Fairchild West
Chaired by: A. EVANS, University of California Santa Cruz							
0930 hrs AIAA-2016-3607 **Cluster Analysis of Fuel Flow in Operational Flight Data** P. Koppitz, D. Sauterleute, F. Holzapfel, Technical University of Munich, Munich, Germany	1000 hrs AIAA-2016-3608 **Classification of Conflict Resolution Methods using Data-Mining Techniques** K. Kim, I. Hwang, Purdue University, West Lafayette, IN; B. Yang, Optimal Synthesis, Inc., Los Altos, CA	1030 hrs AIAA-2016-3609 **Application of data mining to forecast air traffic: a 3-stage model using discrete choice modeling** J. Busquets, City University London, London, United Kingdom; A. Evans, University of California, Santa Cruz, Santa Cruz, CA; E. Alonso, City University London, London, United Kingdom	1100 hrs AIAA-2016-3610 **Clustering Algorithm for Large-Scale Flight Data Analysis of Cockpit Human Machine Interaction Issues** A. Vaidya, S. Lee, I. Hwang, Purdue University, West Lafayette, IN	1130 hrs AIAA-2016-3611 **Extraction of Helicopter Flight Information from Cockpit Video Data using DBSCAN Clustering** S. Shin, I. Hwang, Purdue University, West Lafayette, IN			

Thursday, 16 June 2016							
226-ATIO.TFPC-10/ATIO.VSTOL-2	Transformational Flight - DARPA VTOL X-Plane Concepts						Columbia 1
Chaired by: M. MOORE, NASA Langley Research Center and A. GIBSON, Empirical Systems Aerospace							
0930 hrs Oral Presentation **PhantomSwift Quad-Ducted Fan Aircraft Configuration Development** R. Lacy, P. Ziegenbein, E. Gianopulos, R. Preator, The Boeing Company, Ridley Park, PA	1000 hrs Oral Presentation **Sikorsky / LM RBW Tail Sitter and Future Applications** M. Alber, Sikorsky Aircraft Corporation, Stratford, CT						

Thursday, 16 June 2016		
227-D4U-2 0930 - 1700 hrs	DEMAND for UNMANNED: Catalyst for the Machine Intelligence Revolution	International Ballroom (West)

0930-1045 hrs — *Transformation in the National Airspace System*

Moderator: Dallas Brooks, Director, Raspet Flight Research Laboratory, Mississippi State University and Co-Chair, FAA/DoD/NASA/DHS Unmanned Aircraft System (UAS) Science and Research Panel

Panelists:

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

Pete Dumont
Executive Director
ATCA

Jonathan Evans
CEO
Skyward

Steven Pennington
Executive Director
DoD Policy Board on Federal Aviation

Michael Singer
CEO
DroneView Technologies

1100-1215 hrs — *ASSURE: FAA Center of Excellence for UAS Research*

Moderator: Sabrina Saunders-Hodge, NextGen R&D Integration Division Manager, Federal Aviation Administration

Panelists:

David Arterburn
Director, Rotorcraft Systems Engineering and Simulation Center
The University of Alabama in Huntsville

Mark Anthony Askelson
Associate Professor
University of North Dakota

Dallas Brooks
Director, Raspet Flight Research & Associate Director for Research, ASSURE FAA UAS Center of Excellence

Major General James Poss (Ret.)
Executive Director, Alliance for System Safety of UAS through Research Excellence

Richard Stansbury
Associate Professor
Embry-Riddle Aeronautical University

1230-1400 hrs — Break for Lunch

1400-1545 hrs — *UAS Traffic Management System*

Session Chair: Parimal H. Kopardekar, Manager, Safe Autonomous System Operations Project, and Principal Investigator, Unmanned Aerial Systems Traffic Management, NASA Ames Research Center
Moderator: Gretchen West, Senior Advisor of Innovation and Technology, Hogan Lovells and Advisory Board Member, DroneWorld Expo

Panelists:

Gregory Agvent
Senior Director, News Operations
CNN

Sean Cassidy
Director, Strategic Partnerships
Amazon Prime Air

R. John Hansman
T. Wilson Professor of Aeronautics & Astronautics and Director of the International Center for Air Transportation
Massachusetts Institute of Technology

Jesse Kallman
Director of Business Development & Regulatory Affairs
Airware

Craig Marcinkowski
Director, Strategy and Business Development
Gryphon Sensors

Ashok N. Srivastava
Chief Data Scientist
Verizon

Peng Wei
Assistant Professor, Aerospace Engineering
Iowa State University

1545-1600 hrs — DEMAND for UNMANNED Networking Coffee Break

1600-1700 hrs — *Visions of the Future*

Chuck Howell
Chief Engineer, Portfolio Programs and Integration
MITRE

Jean-Charles Ledé
Program Manager, Tactical Technology Office
Defense Advanced Research Projects Agency

Dale Richards
Senior Research Fellow in Human Factors
Coventry University

Thursday, 16 June 2016								
228-F360-8 0930 - 1130 hrs	Restoring the Foundation of Aviation							International Ballroom (East)

Moderator: Gregory J. Bowles, Director, European Regulatory Affairs & Engineering

Panelists:

Nicholas K. Borer
Principal Investigator, Aeronautics Systems Analysis Branch
NASA Langley Research Center

Lowell Foster
ACE 111, FAA Regulations and Policy, FAA Small Airplane Flight Test Engineer
FAA Small Plane Certification

Andy Supinie
Director, Aerosciences
Textron Aviation

Rick Peri
Vice President, Government and Industry Affairs
Aircraft Electronics Association

Thursday, 16 June 2016								
229-FC-14	Bluff Body Flow Control							Morgan
Chaired by: A. AHMED, Auburn University								
0930 hrs AIAA-2016-3612 **Aerodynamic Flow Control of Wake Dynamics Coupled to a Moving Bluff Body** T. Lambert, B. Vukasinovic, A. Glezer, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2016-3613 **Computational Design of Drag Diminishing Active Flow Control Systems for Heavy Vehicles** D. Manosalvas, T. Economon, Stanford University, Stanford, CA; C. Othmer, Volkswagen of America, Inc., Belmont, CA; A. Jameson, Stanford University, Stanford, CA	1030 hrs AIAA-2016-3614 **Closed-Loop Flow Control of the Oscillations of a Free-Suspended Cylinder at Low Reynolds Numbers** A. Hillier, O. Friedland, A. Seifert, Tel Aviv University, Tel Aviv, Israel	1100 hrs AIAA-2016-3615 **Validation of a Plasma Actuator Model by Simulation of the Detached Flow Over a Half-Cylinder** R. Futrzynski, G. Efraimsson, Royal Institute of Technology (KTH), Stockholm, Sweden					

Thursday, 16 June 2016								
230-FC-15	Vortex Generators							Columbia 11
Chaired by: S. YARUSEVYCH, University of Waterloo								
0930 hrs AIAA-2016-3616 **An Aerodynamic Model for Vane-Type Vortex Generators** D. Poole, R. Bevan, C. Allen, T. Rendall, University of Bristol, Bristol, United Kingdom	1000 hrs AIAA-2016-3617 **Evaluation of Some Wedge-shaped Vortex Generators Using Swirl Center Tracking** J. Sandhu, S. Subramanian, S. Ghosh, Indian Institute of Technology Madras, Chennai, India; P. Sharma, Indian Institute of Technology Kanpur, Kanpur, India	1030 hrs AIAA-2016-3618 **Experimental and Numerical Investigation of Static and Dynamic Vortex Generators on an Airfoil with a Deflected Flap** T. Rice, R. Cummings, Rensselaer Polytechnic Institute, Troy, NY; D. Clingman, The Boeing Company, Seattle, WA; O. Sahni, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	1100 hrs AIAA-2016-3619 **Separation Control over a Flapped NACA 0012 Model using an Array of Low Aspect Ratio Cylindrical Pins** S. Gildersleeve, Rensselaer Polytechnic Institute, Troy, NY; D. Clingman, The Boeing Company, Seattle, WA; M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	1130 hrs AIAA-2016-3620 **The Effects of Freestream Turbulence on Steady VGJ Flow Control on a Highly Loaded Transonic LPT Cascade** C. Sacco, M. Hossain, J. Bons, Ohio State University, Columbus, OH	1200 hrs AIAA-2016-3621 **Tomographic PIV measurements of turbulent boundary layer perturbed by a dynamic cylinder roughness element** Z. Tang, Hebei University of Technology, Tianjin, China; Y. Wu, Nanyang Technological University, Singapore, Singapore		

Thursday, 16 June 2016								
231-FD-48	Jet Flows I							Holmead West
Chaired by: D. MCLAUGHLIN and M. TACHIE								
0930 hrs AIAA-2016-3622 **Uncertainty Quantification and Sensitivity Analysis applied to an under-expanded single jet** F. Granados-Ortiz, University of Greenwich, London, United Kingdom; C. Perez Arroyo, CERFACS, Toulouse, France; C. Lai, University of Greenwich, London, United Kingdom; G. Puigt, CERFACS, Toulouse, France; C. Airiau, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France	1000 hrs AIAA-2016-3623 **Application of Navier-Stokes based Mean-Flow Perturbation Method to Supersonic Jet Noise** S. Bhaumik, D. Gaitonde, K. Goparaju, S. Unnikrishnan, M. Waindim, Ohio State University, Columbus, OH	1030 hrs AIAA-2016-3624 **Influence of Different Subgrid Scale Models in LES of Supersonic Jet Flows** C. Junqueira-Junior, S. Yamouni, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; J. Azevedo, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil; W. Wolf, University of Campinas, Campinas, Brazil	1100 hrs AIAA-2016-3625 **Lagrangian Characterization of Supersonic Jet Near-Fields** D. Gonzalez, Naval Surface Warfare Center, Indian Head, MD; D. Gaitonde, Ohio State University, Columbus, OH; M. Lewis, Science and Technology Policy Institute, Washington, D.C.	1130 hrs AIAA-2016-3626 **Effect of Asymmetric Nozzle Configuration on Jet Flow Characteristics** S. Sengupta, L. Agostini, D. Gaitonde, Ohio State University, Columbus, OH			

Thursday, 16 June 2016							
232-FD-49	Opportunities in Future Fluid Dynamics Research (Invited)						Jefferson East
Chaired by: H. LUO, Vanderbilt University and D. BODONY, University of Illinois at Urbana-Champaign							
0930 hrs Oral Presentation **Environmentally Responsible Aviation and the Role of Fluid Dynamics** F. Collier, NASA Headquarters, Washington, D.C.	1000 hrs Oral Presentation **Opportunities in Turbulence and Unsteady Flows** A. Smits, Princeton University, Princeton, NJ	1030 hrs Oral Presentation **Future Paradigm Shifts in Computing Fluid Dynamics** J. Boris, Naval Research Laboratory, Washington, D.C.	1100 hrs Oral Presentation **Data-Driven Models and Their Role in Understanding and Controlling Fluids** C. Rowley, Princeton University, Princeton, NJ	1130 hrs Oral Presentation **Bringing the Future of Fluids into the Present** E. Whalen, The Boeing Company, St. Louis, MO	1200 hrs Oral Presentation **Problems Looking for Solutions: Fluid Dynamics Research in Propulsion and Energy Systems** A. Karagozian, University of California, Los Angeles, Los Angeles, CA		

Thursday, 16 June 2016							
233-FD-50	High-Speed Facilities and Test Methods						Lincoln East
Chaired by: T. WADHAMS, CUBRC and T. ROSSMANN, Lafayette College							
0930 hrs AIAA-2016-3627 **Design and Characterization of the Lafayette College Expansion Tube for High-Speed Turbulent Combustion** R. Sanzi, D. Jones, T. Rossmann, Lafayette College, Easton, PA	1000 hrs AIAA-2016-3628 **Analysis of Hypersonic Flow Effects on Sensor Performance** L. Mackey, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2016-3629 **Porous Injection Effect on Surface Heat Flux in High-enthalpy High-Reynolds number flow** H. Tanno, T. Komuro, K. Sato, K. Itoh, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; M. Kuhn, I. Petkov, German Aerospace Center (DLR), Stuttgart, Germany					

Thursday, 16 June 2016							
234-FD-53	Multiphase Flows I						Columbia 10
Chaired by: D. KESSLER and Y. LIAN, University of Louisville							
0930 hrs AIAA-2016-3630 **A Numerical Study of Transient Deformation and Drag Properties of Accelerating and Decelerating Liquid Drops** Q. Qu, P. Ma, P. Liu, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO	1000 hrs AIAA-2016-3631 **A Study of the Effects of Turning Angle on Particle Deposition in Turbine Combustor Effusion Cooling Holes** S. Whitaker, J. Bons, R. Blunt, Ohio State University, Columbus, OH	1030 hrs AIAA-2016-3632 **Compressible and Non-Expanding Fluid Model for Simulation of Impact Phenomena** K. Suzuki, University of Tokyo, Kashiwa, Japan	1100 hrs AIAA-2016-3633 **Numerical Study of the Prompt Splashing Caused by a Droplet Impinging on a Liquid Film** Q. Qu, Y. Zhang, P. Liu, Beihang University, Beijing, China; F. Zhang, China Aerospace Science and Industry Corporation (CASIC), Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO	1130 hrs AIAA-2016-3634 **Application of the Discrete Element Method to Ice Accretion Geometries** D. Hanson, M. Kinzel, Pennsylvania State University, University Park, PA	1200 hrs AIAA-2016-3635 **Computational Skin Friction and Heat Transfer Modeling of Ice Roughened Airfoils** D. Hanson, M. Kinzel, Y. Han, J. Palacios, Pennsylvania State University, University Park, PA		

Thursday, 16 June 2016							
235-GT-7	Experimental Investigations of High Speed Air Breathing Propulsion						Cardozo
Chaired by: C. JORGENS, Boeing and K. BUTLER, Aerospace Testing Alliance/AEDC/4001							
0930 hrs AIAA-2016-3636 **Experimental Investigation of Dynamic Separation for a Hypersonic Inlet Cover in Mach 6 Flow** G. Zhu, L. Wang, Beijing Aerospace Technology Institute, Beijing, China	1000 hrs AIAA-2016-3637 **Measurement of heat flux distribution of supercritical kerosene fueled supersonic combustor** D. Cheng, China Academy of Aerospace Aerodynamics, Beijing, China; J. Wang, Chinese Academy of Sciences, Beijing, China; J. Gong, China Academy of Aerospace Aerodynamics, Beijing, China; L. Yang, W. Yao, L. Li, Chinese Academy of Sciences, Beijing, China; et al.						

Thursday, 16 June 2016							
236-ITAR-5	**NASA Orion EFT-1 Aeroscience Results - Aerothermal II**						**Cabinet**
Chaired by: A. AMAR, NASA Johnson Space Center and D. OWENS, NASA-Langley Research Center							
0930 hrs AIAA-2016-3638 **Characterization of EFT-1 Radiative Heating and Radiometer Data** B. Cruden, Analytical Mechanics Associates, Inc., Moffett Field, CA; C. Johnston, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2016-3639 **Aerothermal Analysis of Compression Pad Features on the Orion EFT-1 Heatshield** R. Thompson, V. Lessard, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3640 **Orion Exploration Flight Test Reaction Control System Jet Interaction Heating Environment from Flight Data** M. White, A. Hyatt, NASA Johnson Space Center, Houston, TX	1100 hrs AIAA-2016-3641 **Orion EFT-1 Cavity Heating and Catalytic Tile Experiments.** G. Salazar, A. Amar, B. Oliver, A. Hyatt, NASA Johnson Space Center, Houston, TX; M. Rezin, NASA Ames Research Center, Moffett Field, CA	1130 hrs AIAA-2016-3642 **Reentry Communication Ionization Blackout for Orion EFT-1 Flight Test** D. Gulick, Lockheed Martin Corporation, Denver, CO; R. Thompson, NASA Langley Research Center, Hampton, VA	1200 hrs AIAA-2016-3643 **Aerothermal Analyses for Orion MPCV TPS Design** R. McDaniel, NASA Ames Research Center, Moffett Field, CA		

Thursday, 16 June 2016							
237-MAO-13	**Structural Optimization II**						**Columbia 3**
Chaired by: J. GRAY, NASA Glenn Research Center and S. CHOI, Virginia Polytechnic Institute and State University							
0930 hrs AIAA-2016-3644 **Design of Thermally-Stressed Panels Subject to Transonic Flutter Constraints** M. Bhatia, Mississippi State University, Mississippi State, MS; P. Beran, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2016-3645 **On the Trade-off between Stress and Dynamic Responses in the Design of Thermal Structures** J. Deaton, Adjoint Technologies, LLC, Dayton, OH; P. Beran, Air Force Research Laboratory, Wright-Patterson AFB, OH	1030 hrs AIAA-2016-3646 **An Uncoupled Approach to Compute Aero-Structure Gradients Using High-Fidelity CFD-CSM** T. Achard, C. Blondeau, ONERA, Châtillon, France; R. Ohayon, National Conservatory of Arts and Crafts, Paris, France	1100 hrs AIAA-2016-3647 **Aeroelastic Optimization of Variable Stiffness Composite Wing with Blending Constraints** M. Bordogna, ONERA, Châtillon, France; T. Macquart, Delft University of Technology, Delft, The Netherlands; D. Bettebghor, ONERA, Châtillon, France; R. De Breuker, Delft University of Technology, Delft, The Netherlands	1130 hrs AIAA-2016-3648 **A linear aerodynamics-based preconditioner for high-fidelity aeroelastic analysis and sensitivity analysis** K. Jovanov, R. De Breuker, M. Abdalla, Delft University of Technology, Delft, The Netherlands; C. Blondeau, ONERA, Paris, France			

Thursday, 16 June 2016							
238-MAO-14	**Emerging Methods, Algorithms, and Dynamic Data Driven Systems**						**Columbia 4**
Chaired by: K. WILLCOX, Massachusetts Institute of Technology and D. ALLAIRE, Texas A&M University							
0930 hrs AIAA-2016-3649 **Methodology for Path Planning with Dynamic Data-Driven Flight Capability Estimation** V. Singh, K. Willcox, Massachusetts Institute of Technology, Cambridge, MA	1000 hrs AIAA-2016-3650 **A Dynamic Data-Driven Approach to Multiple Task Capability Estimation for Self-Aware Aerospace Vehicles** B. Burrows, B. Isaac, D. Allaire, Texas A&M University, College Station, TX	1030 hrs AIAA-2016-3651 **Dynamic-Data-Driven Damage Prediction in Aerospace Composite Structures** A. Korobenko, X. Deng, M. Pigazzini, Y. Bazilevs, University of California, San Diego, La Jolla, CA	1100 hrs AIAA-2016-3652 **Adjoint-based Mesh Adaptation Techniques for Aggregation Functionals in Structural Design Optimization** G. Kennedy, Georgia Institute of Technology, Atlanta, GA	1130 hrs AIAA-2016-3653 **Route-Planning for Real-Time Safety-Assured Autonomous Aircraft** R. Cowlagi, Worcester Polytechnic Institute, Worcester, MA; J. Chambers, N. Baltadjiev, Aurora Flight Sciences, Manassas, VA	1200 hrs AIAA-2016-3654 **Real-Time Safety-Assured Autonomous Aircraft** J. Chambers, Aurora Flight Sciences, Manassas, VA; N. Baltadjiev, Aurora Flight Sciences, Cambridge, MA; R. Cowlagi, Worcester Polytechnic Institute, Worcester, MA		

Thursday, 16 June 2016							
239-MST-12	**Model and Simulation Design, Development, Testing, and Validation**						**Piscataway**
Chaired by: U. DURAK, DLR-German Aerospace Center and M. ALVAREZ, NASA Langley Research Center							
0930 hrs AIAA-2016-3655 **Running High Level Architecture in Real-Time for Flight Simulator Integration** T. Gerlach, U. Durak, A. Knüppel, T. Rambau, German Aerospace Center (DLR), Braunschweig, Germany	1000 hrs AIAA-2016-3656 **Toward Qualification Standards for Future Simulation Training Devices and Applications – Experiences, Opportunities and Challenges** M. Roza, A. Gerretsen, J. Field, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands	1030 hrs AIAA-2016-3657 **Matching of Aerodynamic databank with Flight test data – Longitudinal Dynamics** A. de Paula, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; M. Sousa, Federal University of Itajubá, Itajubá, Brazil; F. Porto, EMBRAER, São José dos Campos, Brazil; S. Cunha Junior, Federal University of Itajubá, Itajubá, Brazil	1100 hrs AIAA-2016-3658 **Aerodynamic Longitudinal Coefficient Modeling During Aircraft Design Phases** A. de Paula, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; F. Magalhães Porto, Embraer, São José dos Campos, Brazil; M. Sousa, Federal University of Itajubá, Itajubá, Brazil				

Thursday, 16 June 2016								
240-MST-13	Fault Detection and Health Monitoring							Georgetown East
Chaired by: J. KRUEP, Aerojet Rocketdyne and R. RUFF								
0930 hrs AIAA-2016-3659 **Synchronizing Design Knowledge and Real Time Monitoring Information for Aircraft Complex System Diagnosis** X. Chen, H. Ren, Shanghai Engineering Research Center of Civil Aircraft Health Monitoring, Shanghai, China; C. Bil, RMIT University, Melbourne, Australia; Y. Sun, Institute of Sensor and Reliability Engineering, Harbin, China	1000 hrs AIAA-2016-3660 **A Fault Diagnosis Method for Complex System Based on Hierarchical Bayesian Network** W. Niu, W. Niu, Aviation Industry Corporation of China (AVIC), Xi'an, China; J. Cheng, Xi'an Institute of Applied Optics, Xi'an, China	1030 hrs AIAA-2016-3661 **Reliability assessment method for Integrated Modular Avionics System Based on Bayesian network** D. Ling, Beihang University, Beijing, China	1100 hrs AIAA-2016-3662 **Component-level Modeling and Simulation of Cable Fault Detection System** J. Mao, L. Wang, Nanjing University of Aeronautics and Astronautics, Nanjing, China; G. Cheng, Shanghai Aircraft Design and Research Institute, Shanghai, China	1130 hrs AIAA-2016-3663 **Multi-signal Model in Application of Spacecraft Power System Testability** Z. Dai, L. Wang, S. Yang, Nanjing University of Aeronautics and Astronautics, Nanjing, China; J. Zhao, Shandong Institute of Aerospace Electronics Technology, Yantai, China			

Thursday, 16 June 2016								
241-PDL-6	Plasma and Laser Technologies							Gunston West
Chaired by: J. ZIMMERMAN, CU Aerospace and S. LEONOV, University of Notre Dame								
0930 hrs AIAA-2016-3664 **Multiphysics modeling of plasma-assisted methane combustion with direct comparisons to experiments** J. Zimmerman, A. Palla, D. King, D. Carroll, CU Aerospace, LLC, Champaign, IL; R. Rajasegar, C. Mitsingas, University of Illinois, Urbana-Champaign, Urbana, IL; et al.	1000 hrs AIAA-2016-3665 **Internal structure of LSD wave based on a 1-D Laser-induced Discharge model: comparison between numerical simulation and experiment** J. Ofosu, R. Kawashima, K. Matsui, T. Shimano, K. Komurasaki, University of Tokyo, Tokyo, Japan; K. Shimamura, University of Tsukuba, Tsukuba, Japan; et al.	1030 hrs AIAA-2016-3666 **Numerical Analysis of Comb Shaped Plasma Front Propagation in Millimeter-Wave Discharge under Atmospheric Pressure** Y. Nakamura, M. Fukunari, T. Yamaguchi, K. Komurasaki, H. Koizumi, University of Tokyo, Tokyo, Japan	1100 hrs AIAA-2016-3667 **Remote Lasing in Humid Air from Atomic Hydrogen** T. Chng, A. Dogariu, R. Miles, Princeton University, Princeton, NJ	1130 hrs AIAA-2016-3668 **Measurement of Heat-Flux for Magneto-Aerodynamic Interaction Studies in a Hypersonic Flow** A. Kkn, K. Reddy, Indian Institute of Science, Bengaluru, India	1200 hrs AIAA-2016-3669 **Comparative Study of Nonequilibrium Plasma Generation and Plasma-Assisted Ignition for Different C2 Hydrocarbons** A. Starikovskiy, Princeton University, Princeton, NJ		

Thursday, 16 June 2016								
242-TP-9	Special Session: Thermal Management Systems							DuPont
Chaired by: J. DIDION, NASA-Goddard Space Flight Center and L. BYRD								
0930 hrs AIAA-2016-3670 **Performance of a Loop Heat Pipe Subjected to a Phase-Coupled Heat Input to an Acceleration Field** K. Yerkes, J. Scofield, Air Force Research Laboratory, Wright-Patterson AFB, OH; D. Courson, University of Dayton Research Institute, Dayton, OH	1000 hrs Oral Presentation **Silicon Vapor Chamber: A Chip-level Super Heat Spreader** S. Cai, A. Bhunia, Teledyne Technologies, Inc., Thousand Oaks, CA	1030 hrs AIAA-2016-3671 **Nonlinear Dynamics in Loop Heat Pipe Operation** T. Hoang, TTH Research, Inc., Clifton, VA; R. Baldauff, Naval Research Laboratory, Washington, D.C.	1100 hrs Oral Presentation **Single-phase and Two-phase Flow Distribution Control in Meso-scale via Electrohydrodynamic Conduction Pumping** L. Yang, M. Talmor, J. Seyed-Yagoobi, Worcester Polytechnic Institute, Worcester, MA	1130 hrs AIAA-2016-3672 **Two Phase Thermal Protection of the Hypersonic Leading Edge** J. Maxwell, Naval Research Laboratory, Washington, D.C.; T. Hoang, TTH Research, Inc., Clifton, VA	1200 hrs AIAA-2016-3673 **High Fidelity Modeling of Energy Transfer in the N_2 + N system for Strong Shock Conditions** T. Zhu, University of Illinois, Urbana-Champaign, Urbana, IL; Z. Li, Pennsylvania State University, University Park, PA; D. Levin, University of Illinois, Urbana-Champaign, Urbana, IL		

Thursday, 16 June 2016

243-TP-10 — **High Enthalpy Ground Testing** — **Jay**

Chaired by: D. KUNTZ, Sandia National Laboratories

0930 hrs
AIAA-2016-3674
Blunt-Body Heating and Pressure Database from High-Enthalpy, CO_2 Testing in an Expansion Tunnel
B. Hollis, NASA Langley Research Center, Hampton, VA; D. Prabhu, ERC, Inc., Moffett Field, CA; M. MacLean, CUBRC, Buffalo, NY

1000 hrs
AIAA-2016-3675
Operational Envelope of the Low Power Plasma Facilities at the University of Kentucky
H. Koch, B. Butler, M. Winter, University of Kentucky, Lexington, Lexington, KY; C. Arnold, University of Stuttgart, Stuttgart, Germany

1030 hrs
AIAA-2016-3676
Flow Characterization Studies of the 10-MW TP3 Arc-Jet Facility
T. Gokcen, A. Alunni, Analytical Mechanics Associates, Inc., Moffett Field, CA

1100 hrs
AIAA-2016-3677
Experimental Thermal Response and Demisability Investigations on five Aerospace Structure Materials under Simulated Destructive Re-Entry Conditions
A. Pagan, B. Massuti-Ballester, G. Herdrich, University of Stuttgart, Stuttgart, Germany

1130 hrs
AIAA-2016-3678
Analysis and Rebuilding of Experiments on a Reinforced-Carbon-Carbon model in X2 Expansion Tunnel
J. Mora-Monteros, P. Leyland, U. Sheikh, E. Fahy, S. Lewis, Swiss Federal Institute of Technology, Lausanne, Switzerland; T. McIntyre, University of Queensland, Brisbane, Australia; et al.

1200 hrs
AIAA-2016-3679
High-Pressure H2/He/O2 Combustion Experiments for the Design of the ESTHER Shock-Tube Driver
M. Lino Da Silva, B. Carvalho, Technical University of Lisbon, Lisbon, Portugal

Thursday, 16 June 2016

244-LNCH-3 — **Awards Luncheon: Celebrating the Achievements in Aircraft and Atmospheric Systems** — **International Ballroom (Center)**

1230 - 1400 hrs

A ticket for the luncheon is required and included in the registration fee where indicated. Additional tickets for guests may be purchased upon registration or on site, as space is available.

The following awards will be presented:

Aircraft Design Award

Gardner-Lasser Aerospace Literature Award

Hap Arnold Award For Excellence in Aeronautical Program Management

Multidisciplinary Design Optimization Award

Piper General Aviation Award

Thursday, 16 June 2016

245-AMT-10/GT-8 — **Ground Test Applications of Aerodynamic Measurement Technology** — **Columbia 2**

Chaired by: K. LOWE, Virginia Tech and T. WAYMAN, Gulfstream Aerospace Corporation

1400 hrs
AIAA-2016-3680
Assessment of the Uniqueness of Wind Tunnel Strain-Gage Balance Load Predictions
N. Ulbrich, Jacobs, Moffett Field, CA

1430 hrs
AIAA-2016-3681
Investigation rear-end of flow structures on a 6:1 prolate spheroid by using the magnetic suspension and balance system
T. Ambo, Tohoku University, Sendai, Japan; T. Otsuki, Georgia Institute of Technology, Atlanta, GA; S. Taniguchi, D. Numata, K. Asai, Tohoku University, Sendai, Japan; T. Liu, Western Michigan University, Kalamazoo, MI

1500 hrs
AIAA-2016-3682
Consolidated Laser-Induced Fluorescence Diagnostic Systems for the NASA Ames Arc Jet Facilities
J. Grinstead, M. Wilder, NASA Ames Research Center, Moffett Field, CA; B. Porter, Aerospace Computing, Inc., Moffett Field, CA; J. Brown, Analytical Mechanics Associates, Inc., Moffett Field, CA; D. Yeung, Jacobs, Moffett Field, CA; S. Battazzo, NASA Ames Research Center, Moffett Field, CA; et al.

1530 hrs
AIAA-2016-3683
Non-Intrusive Measurement of Gas Turbine Engine Exhaust Characteristics using Acoustic Measurements.
R. Otero, K. Lowe, W. Ng, L. Ma, C. Kim, Virginia Polytechnic Institute and State University, Blacksburg, VA

1600 hrs
AIAA-2016-3684
Pressure-Sensitive Paint Measurements on a Moving Store in the NRC 1.5 m Blowdown Wind Tunnel
Y. Mebarki, National Research Council Canada, Ottawa, Canada

1630 hrs
AIAA-2016-3685
Feasibility of Dynamic Stability Measurements of Planetary Entry Capsules Using a Magnetic Suspension and Balance System
C. Britcher, Old Dominion University, Norfolk, VA

Thursday, 16 June 2016							
246-APA-33/FD-54	**Unsteady Wing Aerodynamics**						**Kalorama**
Chaired by: C. SHENG, The University of Toledo and J. AZEVEDO							
1400 hrs AIAA-2016-3686 **Model Reduction in Discrete Vortex Methods for 2D Unsteady Aerodynamic Flows** A. Suresh Babu, North Carolina State University, Raleigh, NC; K. Ramesh, University of Glasgow, Glasgow, United Kingdom; A. Gopalarathnam, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2016-3687 **Nonlinear Lifting-Line Algorithm for Unsteady and Post-stall Conditions** J. Dias, University of Maryland, College Park, College Park, MD	1500 hrs AIAA-2016-3688 **A Subsonic Indicial Aerodynamics for the Unsteady Loads of Trapezoidal Wings** M. Righi, Zurich University of Applied Sciences, Zurich, Switzerland; M. Berci, University of Leeds, Leeds, United Kingdom; M. Franciolini, Marche Polytechnic University, Ancona, Italy; A. Da Ronch, University of Southampton, Southampton, United Kingdom	1530 hrs AIAA-2016-3689 **Dynamic Stall Simulations on a Pitching Finite Wing** K. Kaufmann, C. Merz, A. Gardner, German Aerospace Center (DLR), Göttingen, Germany	1600 hrs AIAA-2016-3690 **Dynamic Ground Effect Analysis using a Novel Sinking Grid Methodology** P. Mondal, Indian Institute of Science, Bengaluru, India; M. Nagaram, N. Shende, S&I Engineering Solutions Pvt., Ltd., Bengaluru, India; B. Narayanarao, Indian Institute of Science, Bengaluru, India	1630 hrs AIAA-2016-3691 **Low-dimensional Modeling and Aerodynamics of Flexible Wings in Flapping Flight** Y. Ren, H. Dong, University of Virginia, Charlottesville, Charlottesville, VA	1700 hrs AIAA-2016-3692 **An investigation into the effect of airfoil camber on the aerodynamics of MAV scale cycloidal propeller under hovering status** H. Zhang, Y. Hu, G. Wang, Z. Fan, Y. Wang, Northwestern Polytechnical University, Xi'an, China	

Thursday, 16 June 2016							
247-APA-34/FD-55	**Vortex/Vortical Flows I**						**Northwest**
Chaired by: M. YU, University of Maryland, Baltimore County and R. DOWGWILLO, The Boeing Company							
1400 hrs AIAA-2016-3693 **Vortex Induced Aerodynamic Forces on a Flat Plate in Ground Proximity** J. Holt, K. Garry, Cranfield University, Cranfield, United Kingdom	1430 hrs AIAA-2016-3694 **The Vortex Aerodynamics of Delta Wings** S. Lee, CLAS Consultants, Lake Forest Park, WA	1500 hrs AIAA-2016-3695 **Numerical investigations of the vortical flow on swept wings with round leading edges** A. Schuette, German Aerospace Center (DLR), Braunschweig, Germany	1530 hrs AIAA-2016-3696 **An Assessment of the Fast Multipole Method Applied to a Vortex Sheet Roll-Up Problem** T. Rodarte Ricciardi, W. Wolf, University of Campinas, Campinas, Brazil; A. Bimbato, São Paulo State University, Guaratingueta, Brazil	1600 hrs AIAA-2016-3697 **Numerical Investigation of Vortex Breakdown** T. van Jindelt, University of Twente, Enschede, The Netherlands; J. van der Burg, Airbus, Bremen, Germany; E. van der Weide, H. Hoeijmakers, University of Twente, Enschede, The Netherlands	1630 hrs AIAA-2016-3698 **Investigation of Unsteady Characteristics of Vortex Breakdown** L. Chen, China Academy of Aerospace Aerodynamics, Beijing, China; J. Wang, L. Feng, Beihang University, Beijing, China; H. Hu, China Aerodynamics Research and Development Center, Mianyang, China	1700 hrs AIAA-2016-3699 **Effect of Ground Obstacle Separation Distance on Wake Vortex Dissipation** C. Wang, D. Zhao, Nanyang Technological University, Singapore, Singapore; J. Schluter, Deakin University, Melbourne, Australia; F. Holzäpfel, A. Stephan, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	

Thursday, 16 June 2016							
248-APA-35	**Airfoil/Wing/Configuration Aerodynamics**						**Columbia 9**
Chaired by: D. FINLEY, Lockheed Martin Aeronautics							
1400 hrs AIAA-2016-3700 **Research of the effects of power on aerodynamic characteristics of a civil aircraft** G. Shao Jie, P. Zhou, W. Bin, Y. Zhong Yan, China Academy of Aerospace Aerodynamics, Beijing, China	1430 hrs AIAA-2016-3701 **Design, Analysis, and Evaluation of a Propulsive Wing Concept** M. Kerho, Rolling Hills Research Corporation, El Segundo, CA; P. Ansell, S. D'Urso, G. Ananda, A. Perry, University of Illinois, Urbana-Champaign, Urbana, IL	1500 hrs AIAA-2016-3702 **Canard-Wing Interference Effects on the Flight Characteristics of a Transonic Passenger Aircraft** S. Harrison, R. Darragh, P. Hamlington, University of Colorado, Boulder, Boulder, CO; M. Ghoreyshi, A. Lofthouse, U.S. Air Force Academy, Colorado Springs, CO	1530 hrs AIAA-2016-3703 **Numerical Investigation of the Aerodynamics of an Inverted Three-Element Airfoil in Ground Effect for Race Car Application** Q. Qu, P. Zuo, Y. Qin, P. Liu, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO				

Thursday, 16 June 2016							
249-APA-36	**Aerodynamic Design Methodologies III**						**Albright**
Chaired by: N. HARIHARAN, CREATE-AV and J. DOYLE, US Army AMRDEC							
1400 hrs AIAA-2016-3704 **An Application for Air on a New Form of Prandtl Meyer Function** M. Salhi, T. Zebbiche, University of Blida 1, Blida, Algeria	1430 hrs AIAA-2016-3705 **Numerical Simulation of Wake FlowField Behind the C-130H Cargo Ramp** M. Ghoreyshi, U.S. Air Force Academy, Colorado Springs, CO; K. Bergeron, Army Research, Development and Engineering Command, Natick, MA; A. Lofthouse, U.S. Air Force Academy, Colorado Springs, CO	1500 hrs AIAA-2016-3706 **Research on the Effect of Propeller Slipstream on Twin boom UAV Trim Characteristic** L. Chen, Z. Guo, Z. Hou, National University of Defense Technology, Changsha, China	1530 hrs AIAA-2016-3707 **Detailed Study of Effects of Crosswind and Turbulence Intensity on Aircraft Wake-Vortex in Ground Proximity** S. Paramasivam, D. Zhao, M. Skote, Nanyang Technological University, Singapore, Singapore; J. Schluter, Deakin University, Geelong, Australia	1600 hrs AIAA-2016-3708 **Shock Effects on Rotating Detonation Waves in the Hydrogen-Air Mixture** Y. Wang, Southwest University of Science and Technology, Mianyang, China	1630 hrs AIAA-2016-3709 **A Comparison of Computational and Experimental Results for Three-Dimensional Flow over a Undulating Inflatable Wing** J. Beltz, S. Kota, G. Spencer, J. Krofta, R. LeBeau, Saint Louis University, St. Louis, MO	1700 hrs AIAA-2016-3710 **Design of a Cooling Duct for the Solar Cells on a Solar Powered Unmanned Aerial Vehicle to Improve Performance** R. Murzello, M. Nazarinia, A. Hughes, Heriot-Watt University, Dubai, United Arab Emirates	

Thursday, 16 June 2016							
250-APA-37	**Low Boom Activities II (Invited)**						**Jefferson West**
Chaired by: A. ELMILIGUI, NASA Langley Research Center and J. MORGENSTERN, Lockheed Martin Aeronautics							
1400 hrs Oral Presentation **Overview of NASA's Commercial Supersonic Technology Project** P. Coen, NASA Langley Research Center, Hampton, VA	1430 hrs Oral Presentation **Development of High Fidelity Tools and Robust Design Approaches for Low Boom Aircraft** L. Bangert, L. Ozoroski, NASA Langley Research Center, Hampton, VA	1500 hrs Oral Presentation **Development of Metrics and Models for Assessing Community Response to Supersonic En Route Noise** A. Loubeau, NASA Langley Research Center, Hampton, VA	1530 hrs Oral Presentation **Designing Supersonic Airliners to Meet Airport Noise Regulations** J. Bridges, NASA Glenn Research Center, Cleveland, OH	1600 hrs Oral Presentation **Status and Plans for NASA's Low-Boom Flight Demonstration and Quiet SuperSonic Technology Aircraft** D. Richwine, NASA Langley Research Center, Hampton, VA	1630 hrs Oral Presentation **Concept Development of the Quiet Supersonic Technology Aircraft** P. Iosifidis, Lockheed Martin Corporation, Palmdale, CA		

Thursday, 16 June 2016							
251-ASE-15	**Atmospheric Environments**						**Columbia 12**
Chaired by: Z. ZHENG, The University of Kansas and M. PRUIS, Northwest Research Associates Inc							
1400 hrs AIAA-2016-3711 **Contrail flight data from petroleum and bio-fuel emissions at cruise altitude** A. Brown, M. Bastian, S. Alavi, National Research Council Canada, Ottawa, Canada; M. Wasey, Wasey Consultants, Toronto, Canada	1430 hrs AIAA-2016-3712 **Meteorological Data Collection for Three-Dimensional Forecasting Advancements** N. Foster, J. Jacob, Oklahoma State University, Stillwater, OK	1500 hrs AIAA-2016-3713 **Rebuilding freestream atmospheric conditions using surface pressure and heat flux data** A. Cortesi, P. Congedo, National Institute for Research in Computer Science and Control, Talence, France; T. Magin, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; B. Van Hove, O. Karatekin, Royal Observatory of Belgium, Brussels, Belgium	1530 hrs AIAA-2016-3714 **Spline Trajectory Algorithm Development: Bézier Curve Control Point Generation for UAVs** L. Howell, B. Allen, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2016-3716 **Drifting Ice Giant Dark Spots and Their Potential Connections to Terrestrial Hurricanes** R. LeBeau, Saint Louis University, St. Louis, MO; C. Palotai, Florida Institute of Technology, Melbourne, FL	1630 hrs AIAA-2016-3717 **Development of Wind Sensing from Small UAS with Distributed Pressure Sensors** R. Laurence, B. Argrow, E. Frew, University of Colorado, Boulder, Boulder, CO		

Thursday, 16 June 2016							
252-ASE-16	HAIC/HIWC 2014 Darwin and 2015 Cayenne Flight Campaigns Update II and AIRA Forum						Georgetown West
Chaired by: D. MARCOTTE and T. RATVASKY, NASA Glenn Research Center							
1400 hrs Oral Presentation **Instrumentation and preliminary results obtained from the NRC Convair-580 during the High Ice Water Content field campaign in Cayenne in May 2015** A. Korolev, Environment Canada, Toronto, Canada; M. Wolde, National Research Council Canada, Ottawa, Canada	1430 hrs AIAA-2016-3718 **Characterization of the Pilot X-band radar responses to the HIWC environment during the Cayenne HAIC-HIWC 2015 Campaign** M. Wolde, C. Nguyen, National Research Council Canada, Ottawa, Canada; A. Korolev, Environment Canada, Toronto, Canada; M. Bastian, National Research Council Canada, Ottawa, Canada	1500 hrs AIAA-2016-3719 **In-situ Wind-fields Measured by the NRC Convair during HAIC-HIWC 2015** A. Brown, M. Wolde, National Research Council Canada, Ottawa, Canada; A. Korolev, Environment Canada, Toronto, Canada	1530 hrs AIAA-2016-3720 **Numerical Simulation of HIWC Conditions with the Terminal Area Simulation System** F. Proctor, NASA Langley Research Center, Hampton, VA; G. Switzer, Analytical Mechanics Associates, Inc., Hampton, VA	1600 hrs Oral Presentation **History of AIRA and an Overview of AIRA Sponsored Projects** J. MaCleod, National Research Council Canada, Ottawa, Canada	1630 hrs Oral Presentation **75 Years of Icing at the National Research Council of Canada** J. MaCleod, National Research Council Canada, Ottawa, Canada	1700 hrs Oral Presentation **Reduction of Aviation Icing Risk** D. Marcotte, National Research Council Canada, Ottawa, Canada	

Thursday, 16 June 2016							
253-ATIO.ATM-21	En-Route ATM II						Fairchild East
Chaired by: C. TAYLOR, The MITRE Corporation							
1400 hrs AIAA-2016-3721 **Analysis of Multiple Flight Common Route for Traffic Flow Management** K. Sheth, NASA Ames Research Center, Moffett Field, CA; A. Clymer, A. Morando, University of California, Santa Cruz, Moffett Field, CA; F. Shih, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA	1430 hrs AIAA-2016-3722 **Aircraft Vertical Reference Trajectory Optimization With a RTA Constraint Using the ABC Algorithm** A. Murrieta Mendoza, A. Bunel, R. Botez, University of Québec, Montréal, Canada	1500 hrs AIAA-2016-3723 **Lateral Reference Trajectory Algorithm Using Ant Colony Optimization** A. Murrieta Mendoza, A. Hamy, R. Botez, University of Québec, Montréal, Canada	1530 hrs AIAA-2016-3724 **Proof-of-Concept Demonstrations of a Flight Adjustment Logging and Communication Network** M. Underwood, NASA Langley Research Center, Hampton, VA; D. Merlino, University of North Texas, Denton, TX; L. Carboneau, Florida Gulf Coast University, Fort Meyers, FL; C. Wilson, University of Maryland, College Park, College Park, MD; A. Wilder, University of Kentucky, Lexington, Lexington, KY	1600 hrs AIAA-2016-3725 **Cruise Altitude and Speed Optimization Implemented in a Pilot Decision Support Tool** S. Folse, H. Tran, L. Jensen, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA	1630 hrs AIAA-2016-3726 **A Vision and Roadmap for Increasing User Autonomy in Flight Operations in the National Airspace** W. Cotton, R. Hilb, National Institute of Aerospace, Hampton, VA; S. Koczo, Self, Cedar Rapids, IA; D. Wing, NASA Langley Research Center, Hampton, VA		

Thursday, 16 June 2016							
254-ATIO.ATM-22	Reliability and Safety						Embassy
Chaired by: J. O`CALLAGHAN, NTSB							
1400 hrs AIAA-2016-3727 **Air Traffic Impacts Caused by Lightning Safety Procedures** M. Steiner, W. Deierling, K. Ikeda, National Center for Atmospheric Research, Boulder, CO; M. Robinson, A. Klein, J. Bewley, AvMet Applications, Inc., Reston, VA; et al.	1430 hrs AIAA-2016-3728 **Development of a Metrics Framework for Real-time System-Wide Safety Assurance** H. Jimenez, Georgia Institute of Technology, Atlanta, GA; M. Blake, Crown Consulting, Inc., Arlington, VA; J. Nowinski, NASA Ames Research Center, Moffett Field, CA	1500 hrs AIAA-2016-3729 **Development of Real-time System-wide Safety Assurance Definitions and Concept Fundamentals** D. Rinehart, Architecture Technology Corporation, Arlington, VA; H. Jimenez, Georgia Institute of Technology, Atlanta, GA; M. Blake, Crown Consulting, Inc., Arlington, VA; J. Nowinski, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2016-3730 **Initial Case Studies Demonstrating the Real-Time Safety Analysis Framework for the National Airspace System** I. Roychoudhury, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; K. Goebel, M. Daigle, NASA Ames Research Center, Moffett Field, CA; S. Sankararaman, C. Kulkarni, J. Ossenfort, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; et al.	1600 hrs AIAA-2016-3731 **Climbing While Turning: Combat Energy Management Principles Applied to Civilian Obstacle Clearance** T. Takahashi, Arizona State University, Tempe, AZ; L. Bays, DragonFly Aeronautics, LLC, Alpharetta, GA			

Thursday, 16 June 2016							
255-ATIO.ATM-23	Arrival Management						Fairchild West
Chaired by: S. CAMPBELL, MIT Lincoln Laboratory and T. REYNOLDS, Massachusetts Institute of Technology							
1400 hrs AIAA-2016-3732 **Assessment of Delivery Accuracy in an Operational Like Environment** S. Sharma, NASA Ames Research Center, Moffett Field, CA; M. Wynnyk, MITRE Corporation, McLean, VA	1430 hrs AIAA-2016-3733 **An Operator-Focussed Metric for Measuring Predictability and Efficiency of Descent Operations** J. Bronsvoort, T. Huynh, Airservices Australia, Melbourne, Australia; G. Enea, TASC, Inc., Billerica, MA	1500 hrs AIAA-2016-3734 **Measuring Terminal Arrival Efficiency Rates using Individual Runways** R. Galaviz-Schomisch, J. Gulding, Z. Zou, Federal Aviation Administration, Washington, D.C.	1530 hrs AIAA-2016-3735 **Integrated Demand Management: Coordinating Strategic and Tactical Flow Scheduling Operations** N. Smith, C. Brasil, P. Lee, N. Buckley, C. Gabriel, C. Mohlenbrink, NASA Ames Research Center, Moffett Field, CA; et al.				

Thursday, 16 June 2016							
256-ATIO.LTA-1	Lighter-than-Air Systems						Gunston East
Chaired by: R. VAN TREUREN							
1400 hrs AIAA-2016-3736 **Modeling Transient Heat Transfer in Stratospheric Airships** M. Alam, R. Pant, Indian Institute of Technology Bombay, Mumbai, India	1430 hrs AIAA-2016-3737 **Lighter-Than-Air (LTA) "AirStation" - Unmanned Aircraft System (UAS) Carrier Concept** R. Hochstetler, SAIC, Washington, D.C.; J. Bosma, Bosma & Associates, Baltimore, MD; G. Chachad, SAIC, Washington, D.C.	1500 hrs AIAA-2016-3738 **Stability Augmentation System for a Tethered Airship** J. Santos, S. Stevanovic, K. Kondak, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; F. Holzapfel, Technical University of Munich, Munich, Germany; L. Góes, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; R. Pant, Indian Institute of Technology Bombay, Mumbai, India	1530 hrs AIAA-2016-3739 **Dynamic simulation of breakaway aerostat with emergency deflation valves** A. Kshirsagar, R. Pant, K. Bodi, Indian Institute of Technology Bombay, Mumbai, India	1600 hrs Oral Presentation **Airship Industry Study** R. Hochstetler, G. Chachad, SAIC, Washington, D.C.; J. Melton, NASA Ames Research Center, Moffett Field, CA			

Thursday, 16 June 2016							
257-ATIO.TFPC-11/ATIO.IS-1	Transformational Flight - NASA Langley Autonomy Incubator						Columbia 1
Chaired by: B. ALLEN, NASA Langley Research Center							
1400 hrs Oral Presentation **Enabling Non-UAV Pilots to Control Multiple Heterogeneous UAVs** A. Trujillo, NASA Langley Research Center, Hampton, VA; J. Lemanski, Northrop Grumman Corporation, Hampton, VA; B. Kelley, Analytical Mechanics Associates, Inc., Hampton, VA; J. Puig-Navarro, S. Mehdi, University of Illinois, Urbana-Champaign, Urbana, IL; M. Chandarana, Carnegie Mellon University, Pittsburgh, PA; et al.	1430 hrs Oral Presentation **A Natural Interaction Interface for UAVs Using Intuitive Gesture Recognition** M. Chandarana, Carnegie Mellon University, Pittsburgh, PA; A. Trujillo, NASA Langley Research Center, Hampton, VA; J. Puig-Navarro, S. Mehdi, University of Illinois, Urbana-Champaign, Champaign, IL; L. Tran, J. Neilan, NASA Langley Research Center, Hampton, VA; et al.	1500 hrs AIAA-2016-3741 **Bézier Curves for Safe Cooperative Atmospheric Missions with Multiple Heterogeneous UAS** J. Puig-Navarro, S. Mehdi, University of Illinois, Urbana-Champaign, Urbana, IL; A. Trujillo, P. Rothhaar, NASA Langley Research Center, Hampton, VA; M. Chandarana, Carnegie Mellon University, Pittsburgh, PA; L. Tran, NASA Langley Research Center, Hampton, VA; et al.	1530 hrs Oral Presentation **Multi Sensor Self-Localization for Small UAVs** L. Tran, NASA Langley Research Center, Hampton, VA; M. Chandarana, Carnegie Mellon University, Pittsburgh, PA; A. Hagiopol, Georgia Institute of Technology, Atlanta, GA; J. Neilan, P. Rothhaar, NASA Langley Research Center, Hampton, VA; J. Puig-Navarro, University of Illinois, Urbana-Champaign, Urbana, IL; et al.	1600 hrs Oral Presentation **Using Deep Neural Networks for MAV in-flight Object Detection and Classification** J. Neilan, D. Atha, P. Rothhaar, L. Tran, A. Trujillo, G. Qualls, NASA Langley Research Center, Hampton, VA; et al.	1630 hrs Oral Presentation **3D Reconstruction From Tracked Maximally Stable Extremal Regions (MSERs)** A. Hagiopol, F. Dellaert, Georgia Institute of Technology, Atlanta, GA; J. Neilan, P. Rothhaar, L. Tran, A. Trujillo, NASA Langley Research Center, Hampton, VA; et al.		

Thursday, 16 June 2016		
258-F360-9 1400 - 1600 hrs	Aircraft Design and Testing—Today and Tomorrow	International Ballroom (East)

Moderator: Irene M. Gregory, Senior Technologist for Advanced Control Theory and Applications, NASA Langley Research Center

Panelists:

Jay Brandon
Senior Research Engineer, Flight Dynamics Branch
NASA Langley Research Center

Clay Harden
Principal Engineer, AAP Flight Sciences Integration
Gulfstream

Alan Lawless
Chief Flight Test Engineer
Honda Aircraft Company

Anthony Washburn
Langley Sr. Technologist for Aerosciences
NASA Langley Research Center

Thursday, 16 June 2016							
259-FC-16	Physics of Sweeping and Synthetic Jet Actuators						Morgan
Chaired by: J. SEIDEL, USAF Academy							
1400 hrs AIAA-2016-3742 **Sweeping Jet Optimization Studies** L. Pack Melton, M. Koklu, M. Andino, J. Lin, L. Edelman, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2016-3743 **Experimental and Numerical Study of the Frequency Response of a Fluidic Oscillator for Active Flow Control** S. Wang, Beihang University, Beijing, China; L. Baldas, S. Colin, S. Orieux, University of Toulouse, Toulouse, France; A. Kourta, N. Mazellier, University of Orléans, Orléans, France	1500 hrs AIAA-2016-3744 **Exeprimental and Numerical Studies of a Plasma Fluidic Device for Active Flow Control** L. Chen, J. Turner, M. Bacic, P. Ireland, Oxford University, Oxford, United Kingdom	1530 hrs AIAA-2016-3745 **Optimization of Synthetic Jet Actuator design for noise reduction and velocity enhancement** J. Jeyalingam, M. Jabbal, Brunel University London, Uxbridge, United Kingdom	1600 hrs AIAA-2016-3746 **Effect of Downstream Microjet Fluidic Injection on Mixing Characteristics of Supersonic Jet** H. Pourhashem, I. Kalkhoran, NYU Tandon School of Engineering, Brooklyn, NY	1630 hrs AIAA-2016-3747 **Synthetic Jet and Turbulent Boundary Layer Interaction Quantification** D. Schatzman, J. Wilson, Army Research, Development and Engineering Command, Moffett Field, CA; M. Chandrasekhara, Naval Postgraduate School, Monterey, CA		

Thursday, 16 June 2016							
260-FC-17/FD-56	Dynamic Stall with Flow Control						Columbia 11
Chaired by: J. NAUGHTON, University of Wyoming and K. GRANLUND, North Carolina State University							
1400 hrs AIAA-2016-3748 **Control of Dynamically Stalled Flowfield around a Pitching Airfoil by DBD Plasma Actuator** H. Fukumoto, University of Tokyo, Sagamihara, Japan; H. Aono, Tokyo University of Science, Katsushika, Japan; T. Nonomura, A. Oyama, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; K. Fujii, Tokyo University of Science, Shinjuku, Japan	1430 hrs AIAA-2016-3749 **Goman-Khrabrov Model on a Pitching Airfoil with Flow Control** D. Greenblatt, H. Mueller-Vahl, Technion–Israel Institute of Technology, Haifa, Israel; D. Williams, Illinois Institute of Technology, Chicago, IL; F. Reissner, Technical University of Berlin, Berlin, Germany	1500 hrs AIAA-2016-3750 **Investigation of High-Frequency Separation Control Mechanisms for Delay of Unsteady Separation** S. Benton, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2016-3751 **Smart rotor: controlling dynamic stall by means of an actuated flap** M. Raiola, A. Ianiro, S. Discetti, Charles III University of Madrid, Leganés, Spain; T. Gillebaart, D. Ragni, G. van Kuik, Delft University of Technology, Delft, The Netherlands; et al.	1600 hrs AIAA-2016-3752 **High-Fidelity Simulations of Dynamic Stall over a Finite-Aspect-Ratio Wing** M. Visbal, D. Garmann, Air Force Research Laboratory, Wright-Patterson AFB, OH	1630 hrs AIAA-2016-3753 **Numerical Investigation of Helicopter Blade Section Undergoing Time-Periodic Motions** A. Gross, G. Wen, New Mexico State University, Las Cruces, NM		

Thursday, 16 June 2016							
261-FC-18/FD-57	Hypersonic Boundary Layer and Control						Lincoln East
Chaired by: D. YOUNG, Raytheon Missile Systems and T. JULIANO, University of Notre Dame							
1400 hrs AIAA-2016-3754 **Spontaneous radiation of sound by instability of a highly cooled hypersonic boundary layer** P. Chuvakhov, TsAGI, Zhukovsky, Russia; A. Fedorov, Moscow Institute of Physics and Technology, Zhukovsky, Russia	1430 hrs AIAA-2016-3755 **The Reynolds Number Effect on Receptivity to a Localized Disturbance in a Hypersonic Boundary Layer** J. Sivasubramanian, A. Tumin, H. Fasel, University of Arizona, Tucson, Tucson, AZ	1500 hrs AIAA-2016-3756 **Boundary-layer receptivity and breakdown in hypersonic flow over a swept blunt wedge with three-dimensional freestream acoustic disturbances** A. Cerminara, N. Sandham, University of Southampton, Southampton, United Kingdom	1530 hrs AIAA-2016-3757 **Reynolds Stresses in a Hypersonic Boundary Layer with Streamline Curvature-Driven Adverse Pressure Gradients** I. Neel, A. Leidy, R. Bowersox, Texas A&M University, College Station, TX; N. Tichenor, Physics, Materials, and Applied Mathematics Research, LLC, Bryan, TX	1600 hrs AIAA-2016-3758 **Reflection of Acoustic Wave in Real Atmosphere for Hypersonic Boundary Layer Control** P. Lv, China Academy of Aerospace Aerodynamics, Beijing, China; T. Pagliaroli, Roma Tre University, Rome, Italy; J. Gong, Y. Zhang, China Academy of Aerospace Aerodynamics, Beijing, China; F. Mohd-Zawawi, University of Technology, Johor Bahru, Malaysia	1630 hrs AIAA-2016-3759 **Passive hypersonic boundary layer control: The Potential of an Ultrasonically Absorptive Ceramic for HEXAFLY-INT** V. Wartemann, A. Wagner, T. Eggers, German Aerospace Center (DLR), Braunschweig, Germany		

Thursday, 16 June 2016							
262-FD-58	**Jet Flows II**						**Holmead West**
Chaired by: D. GONZALEZ, Naval Surface Warfare Center and D. GAITONDE, The Ohio State University							
1400 hrs AIAA-2016-3760 **Turbulent Characteristics of Submerged Twin Jets** E. Essel, A. Laban, S. Mali, M. Tachie, University of Manitoba, Winnipeg, Canada	1430 hrs AIAA-2016-3761 **Turbulent Structure of Submerged Twin Jets** E. Essel, A. Laban, M. Rahman, M. Tachie, University of Manitoba, Winnipeg, Canada	1500 hrs AIAA-2016-3762 **An Investigation of Compressible Gas Jets Submerged Into Water** M. Fronzeo, M. Kinzel, Pennsylvania State University, University Park, PA	1530 hrs AIAA-2016-3763 **A Validation Effort of a Dual, Impinging-Jet Flow** J. Valenti, M. Fronzeo, M. Kinzel, L. Myers, Pennsylvania State University, University Park, PA	1600 hrs AIAA-2016-3764 **Thermal Characterization of a Dual Impinging Jet Flow Field with a Heated Jet** N. Rudenko, S. Hromisin, D. McLaughlin, Pennsylvania State University, University Park, PA	1630 hrs AIAA-2016-3765 **Investigation of the Plume Dynamics and the Near-field of a Supersonic Twinjet** K. Goparaju, D. Gaitonde, S. Bhaumik, Ohio State University, Columbus, OH; D. Garmann, Air Force Research Laboratory, Wright-Patterson AFB, OH		

Thursday, 16 June 2016							
263-FD-59/FC-19/APA-38	**Gust Response**						**Columbia 10**
Chaired by: K. MULLENERS, EPFL and C. TILMANN, AFRL/RQV							
1400 hrs AIAA-2016-3766 **Isolated Gust Generation for the Investigation of Airfoil-Gust Interaction** E. Hufstedler, B. McKeon, California Institute of Technology, Pasadena, CA	1430 hrs AIAA-2016-3767 **Experimental investigation of a large aspect ratio flat plate encountering a steam-wise gust** K. Mulleners, Swiss Federal Institute of Technology, Lausanne, Switzerland; P. Mancini, A. Jones, University of Maryland, College Park, College Park, MD	1500 hrs AIAA-2016-3768 **2D and 3D gust response using a prescribed velocity method in viscous flows** S. Huntley, D. Jones, A. Gaitonde, University of Bristol, Bristol, United Kingdom	1530 hrs AIAA-2016-3769 **Linear Frequency Domain Reduced Order Modelling of Aerofoil Gust Response** A. Bagheri, D. Jones, A. Gaitonde, University of Bristol, Bristol, United Kingdom	1600 hrs AIAA-2016-3770 **Application of Reduced Order Models in Aircraft Gust Response Studies** S. Williams, D. Jones, A. Gaitonde, C. Wales, S. Huntley, University of Bristol, Bristol, United Kingdom	1630 hrs AIAA-2016-3771 **Towards Experimental Validation of Robust Control of Gust-induced Airfoil Limit Cycle Oscillations Using Synthetic Jet Actuators** S. Krishnappa, N. Jogi, L. Nguyen, S. Gudmundsson, W. MacKunis, V. Golubev, Embry-Riddle Aeronautical University, Daytona Beach, FL		

Thursday, 16 June 2016							
264-FD-60	**Identifying the Impact of Non-Equilibrium Mechanisms on Engineering Flows (Invited)**						**Jefferson East**
Chaired by: J. BURT, Universal Technology Corporation and K. STEPHANI, University of Illinois at Urbana-Champaign							
1400 hrs Oral Presentation **Non-equilibrium Mechanisms in Rarefied Hypersonic Flows** I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1430 hrs Oral Presentation **Recent Advancement of Non-equilibrium Radiation** M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL; C. Johnston, NASA Langley Research Center, Hampton, VA	1500 hrs Oral Presentation **The Role of Nonequilibrium in Understanding Expansions from Propulsion Flows** D. Levin, University of Illinois, Urbana-Champaign, Urbana, IL	1530 hrs Oral Presentation **Evaluating Effects of Nonequilibrium in Hypervelocity Ground Testing** J. Austin, California Institute of Technology, Pasadena, CA	1600 hrs Oral Presentation **Aerospace Engineering Applications of Non-equilibrium Plasmas** I. Blankson, NASA Glenn Research Center, Cleveland, OH	1630 hrs Oral Presentation **The Effects of Thermal Nonequilibrium on Instability Growth and Turbulent Motion** G. Candler, University of Minnesota, Minneapolis, Minneapolis, MN		

Thursday, 16 June 2016							
265-FD-61	**Multiphase Flows II**						**Holmead East**
Chaired by: D. KESSLER, Naval Research Laboratory and Q. QU							
1400 hrs AIAA-2016-3772 **A model and numerical method for high speed flows with capillary, viscous and heat conduction effects** K. Schmidmayer, F. Petitpas, E. Daniel, University of Provence, Marseille, France	1430 hrs AIAA-2016-3773 **An Arbitrary Lagrangian-Eulerian Reconstructed Discontinuous Galerkin method for Compressible Multiphase flows** A. Pandare, H. Luo, North Carolina State University, Raleigh, NC	1500 hrs AIAA-2016-3774 **Droplets Evaporation Effects on Scalar Dissipation Rate in Supersonic Turbulent Shear Flows** Z. Ren, B. Wang, Tsinghua University, Beijing, China	1530 hrs AIAA-2016-3775 **Analysis of LN2 Filling, Draining, Stratification and Sloshing Experiments** M. Konopka, P. Noeding, J. Klatte, P. Behruzi, Airbus, Bremen, Germany; J. Gerstmann, A. Stark, German Aerospace Center (DLR), Bremen, Germany; et al.	1600 hrs AIAA-2016-3776 **Dynamics of Redirected Flashing Jets of a Fire Suppression Agent** D. Kessler, B. Taylor, A. Corrigan, D. Mott, Naval Research Laboratory, Washington, D.C.	1630 hrs AIAA-2016-3777 **Investigation of Multiphase Flow in a Packed Bed Reactor under Microgravity Conditions** Y. Lian, University of Louisville, Louisville, KY; B. Motil, E. Rame, NASA Glenn Research Center, Cleveland, OH		

Thursday, 16 June 2016							
266-FD-62	**Shock-Dominated Flows II**						**Oak Lawn**
Chaired by: C. BRUNER, Sandia National Laboratories and N. BISEK, Air Force Reseach Laboratory							
1400 hrs AIAA-2016-3778 **Supersonic Cones at Zero Incidence** R. Ferreyra, National University of Cordoba, Córdoba, Argentina	1430 hrs AIAA-2016-3779 **High-Fidelity Simulations of the HIFiRE-6 Flow Path at Angle of Attack** N. Bisek, Air Force Research Laboratory, Wright-Patterson AFB, OH	1500 hrs AIAA-2016-3780 **Tapping the Brake for Entry, Descent, and Landing** P. Gnoffo, K. Thompson, A. Korzun, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2016-3781 **Performance Evaluation of Turbine-Based Combination Cycle Propulsion Systems with Advanced Nozzle Integration** H. Takahashi, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan	1600 hrs AIAA-2016-3782 **A Morphing Continuum Approach to Compressible Flows: Shock Wave-Turbulent Boundary Layer Interaction** L. Wonnell, J. Chen, Kansas State University, Manhattan, KS			

Thursday, 16 June 2016							
267-ITAR-6	**NASA Orion EFT-1 Aeroscience Results - Aerodynamics**						**Cabinet**
Chaired by: S. BOUSLOG, NASA-Johnson Space Center and A. BRANDIS, AMA Inc at NASA Ames							
1400 hrs AIAA-2016-3783 **Boundary Layer Transition During the Orion Exploration Flight Test 1 (EFT-1)** L. Kirk, NASA Johnson Space Center, Houston, TX	1430 hrs AIAA-2016-3784 **NASA CFD Overview for Orion's Aerodynamic Database Development** J. Garcia, S. Rogers, S. Murman, J. Melton, NASA Ames Research Center, Moffett Field, CA; J. Greathouse, D. Vicker, NASA Johnson Space Center, Houston, TX; et al.	1500 hrs AIAA-2016-3785 **Orion Crew Module CFD Validation from Wind Tunnel to Exploration Flight Test-1** R. Childs, Science and Technology Corporation, Hampton, VA; J. Garcia, S. Murman, S. Rogers, NASA Ames Research Center, Moffett Field, CA; J. Greathouse, NASA Johnson Space Center, Houston, TX	1530 hrs AIAA-2016-3786 **Computational Assessment of Orion Command-Module RCS Jet Interaction** S. Rogers, NASA Ames Research Center, Moffett Field, CA; A. Schwing, D. Vicker, NASA Johnson Space Center, Houston, TX; K. Bibb, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2016-3787 **Numerical Simulations of Afterbody Heating on the Orion Multi-Purpose Crew Vehicle for the Exploration Flight Test 1** C. Tang, NASA Ames Research Center, Moffett Field, CA	1630 hrs AIAA-2016-3788 **Infrared Observations of the Orion Capsule During EFT-1 Hypersonic Re-entry** T. Horvath, S. Rufer, D. Schuster, NASA Langley Research Center, Hampton, VA; G. Mendeck, B. Oliver, NASA Johnson Space Center, Houston, TX; R. Schwartz, NASA Langley Research Center, Hampton, VA; et al.	1700 hrs AIAA-2016-3789 **Processing Near-Infrared Imagery of the Orion Heatshield During EFT-1 Hypersonic Reentry** T. Spisz, J. Taylor, D. Gibson, S. Kennerly, K. Osei-Wusu, Johns Hopkins University Applied Physics Laboratory, Laurel, MD; T. Horvath, NASA Langley Research Center, Hampton, VA; et al.	1730 hrs AIAA-2016-3790 **Comparisons Between Pretest Prediction and Flight Test Data of Aerodynamic Loads for EFT-1** A. Schwing, NASA Johnson Space Center, Houston, TX

Thursday, 16 June 2016							
268-MAO-16	**Surrogate Modeling and Non-Deterministic Design - Methods and Applications II**						**Cardozo**
Chaired by: E. BOEKELOO, Boeing and V. KALIVARAPU, Iowa State University							
1400 hrs AIAA-2016-3791 **Polynomial Chaos Decomposition with Differentiation Operation** M. Thapa, S. Mulani, University of Alabama, Tuscaloosa, Tuscaloosa, AL; R. Walters, Virginia Polytechnic Institute and State University, Blacksburg, VA	1430 hrs AIAA-2016-3792 **A Probabilistic Multi-Fidelity Aero-Engine Preliminary Design Optimization Framework: Technical and Commercial Perspectives** J. Gramatyka, M. Eres, J. Scanlan, University of Southampton, Southampton, United Kingdom; M. Moss, P. Holloway, R. Bates, Rolls-Royce Group plc, Derby, United Kingdom	1500 hrs AIAA-2016-3793 **Reliability based design optimization of structures considering several incomplete configurations** C. Cid, A. Baldomir, S. Hernandez, University of A Coruña, A Coruña, Spain	1530 hrs AIAA-2016-3794 **Reliability estimation for low cycle fatigue life of a gas turbine disk** H. Feng, Y. Wang, X. Jiang, Beihang University, Beijing, China	1600 hrs AIAA-2016-3795 **Aeroelastic Optimization of Flap-gliding Micro Air Vehicle wings** D. Xue, B. Song, W. Song, W. Yang, Z. Han, Northwestern Polytechnical University, Xi'an, China			

Thursday, 16 June 2016							
269-MAO-17	Emerging Methods, Algorithms, and Large Scale Applications in MAO I						Columbia 4
Chaired by: D. ALLAIRE, Texas A&M University and B. STANFORD, NASA Langley Research Center							
1400 hrs AIAA-2016-3796 **Multi-Fidelity Design Optimization via Low-Fidelity Correction Technique** C. Fischer, R. Grandhi, Wright State University, Dayton, OH	1430 hrs AIAA-2016-3797 **On Active Subspaces in Car Aerodynamics** C. Othmer, Volkswagen of America, Inc., Belmont, CA; T. Lukaczyk, Stanford University, Stanford, CA; P. Constantine, Colorado School of Mines, Golden, CO; J. Alonso, Stanford University, Stanford, CA	1500 hrs AIAA-2016-3798 **Design Space Dimensionality Reduction for Single- and Multi-Disciplinary Shape Optimization** M. Diez, A. Serani, E. Campana, Italian Institute for Naval Hydrodynamic Research and Ship Model Basin, Rome, Italy; F. Stern, University of Iowa, Iowa City, Iowa City, IA	1530 hrs AIAA-2016-3799 **A Deterministic Constrained Global Optimization Algorithm Without Penalty Function** J. Kou, T. Long, Z. Wang, Y. Wen, L. Liu, Beijing Institute of Technology, Beijing, China	1600 hrs AIAA-2016-3800 **Optimization of Turbine Engine Cycle Analysis with Analytic Derivatives** T. Hearn, E. Hendricks, J. Chin, J. Gray, NASA Glenn Research Center, Cleveland, OH	1630 hrs AIAA-2016-3801 **Adaptive Cell Network Design Using S.A.N.DY For A Battery Pack-Switching Algorithm aNd cell DYnamics (S.A.N.DY), A Novel Approach For Optimum Discharging/Charging Of A Lithium-Polymer Battery Pack For Hybrid/Electric UAVs. -** J. Mishra, Siddaganga Institute of Technology, Tumkur, India		

Thursday, 16 June 2016							
270-MST-15	Special Modeling and Simulation Topics						Georgetown East
Chaired by: F. CARDULLO, State University of NY and P. ZAAL, NASA Ames Research Center							
1400 hrs AIAA-2016-3802 **Objective ARX Model Order Selection for Multi-Channel Human Operator Identification** N. Roggenkämper, D. Pool, Delft University of Technology, Delft, The Netherlands; F. Drop, Max Planck Institute for Biological Cybernetics, Tübingen, Germany; M. van Paassen, M. Mulder, Delft University of Technology, Delft, The Netherlands	1430 hrs AIAA-2016-3803 **Key Performance Indicator for Security Measurement at Airports** O. Milbredt, A. Deutschmann, German Aerospace Center (DLR), Braunschweig, Germany	1500 hrs AIAA-2016-3804 **Analytical Determination of Trim Values for Nonlinear Fixed Wing Aircraft Models** M. Rhudy, Pennsylvania State University, Reading, PA	1530 hrs AIAA-2016-3805 **Modeling Carbon Tax Policy Impacts on U.S. Commercial Airlines using Agent-Based Modeling and Crowdsourced Data** B. Horio, V. Kumar, D. Levin, P. Sung, LMI, Tysons, VA	1600 hrs AIAA-2016-3806 **Modeling and Simulation of Rectangular Cable in Application of Optimization of the Main Feeder Wiring Strategy** Y. Zhang, L. Wang, L. Ruan, Nanjing University of Aeronautics and Astronautics, Nanjing, China; Y. Hui, Commercial Aircraft Corporation of China, Ltd. (COMAC), Beijing, China; J. Zhao, Shanghai Aircraft Design and Research Institute, Shanghai, China			

Thursday, 16 June 2016							
271-PDL-7	Plasma Aerodynamics						Gunston West
Chaired by: A. STARIKOVSKIY, Princeton University and S. LEONOV, University of Notre Dame							
1400 hrs AIAA-2016-3807 **Transient Plasma Impact on Spectra of Flow Disturbances in a Corner Separation Zone at Mach 4.5** A. Houpt, B. Hedlund, S. Gordeyev, T. Juliano, S. Leonov, University of Notre Dame, Notre Dame, IN	1430 hrs AIAA-2016-3808 **Numerical Rebuilding of Shock Layer Ionization for Two Flight Tests** S. Surzhikov, Russian Academy of Sciences, Moscow, Russia	1500 hrs AIAA-2016-3809 **Controllable Shock Wave Generation by Near-Surface Electrical Discharge** S. Leonov, A. Houpt, B. Hedlund, University of Notre Dame, Notre Dame, IN; T. Ombrello, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2016-3810 **Ionization Processes in Combined High-Voltage Nanosecond – Laser Discharges in Inert Gas** I. Semenov, University of Maryland, College Park, College Park, MD; A. Starikovskiy, M. Shneider, Princeton University, Princeton, NJ	1600 hrs AIAA-2016-3811 **Trajectory Control of Small Rotating Projectiles by Laser Discharges** A. Starikovskiy, Princeton University, Princeton, NJ	1630 hrs AIAA-2016-3812 **Aerodynamic Effects of Microwave-Excited Plasmas** N. Hu, X. Shi, H. Ma, China Academy of Aerospace Aerodynamics, Beijing, China		

Thursday, 16 June 2016							
272-TP-11	**Thermophysics**						**DuPont**
Chaired by: D. HENGEVELD and K. IRICK							
1400 hrs AIAA-2016-3813 **Fluid Flow Through Tree-Like Networks of Varying Scale** D. Calamas, L. Zamora, Georgia Southern University, Statesboro, GA; D. Dannelley, Embry-Riddle Aeronautical University, Prescott, AZ	1430 hrs AIAA-2016-3814 **PLIF Experiments on Evaporating Isolated Droplet and Droplets Array** H. Rehman, A. Mohammed-Taifour, J. Weiss, P. Seers, École de Technologie Supérieure, Montréal, Canada	1500 hrs AIAA-2016-3815 **Analysis of opportunities for comparing models of effective thermal conductivity** R. Wyczolkowski, H. Radomiak, T. Wylecial, D. Urbaniak, Czestochowa University of Technology, Czestochowa, Poland	1530 hrs AIAA-2016-3816 **Numerical study on heat transfer in aeronautical systems using different conductivity laws and different materials** A. Carozza, Italian Aerospace Research Center (CIRA), San Marco Evangelista, Italy	1600 hrs AIAA-2016-3817 **Influences of Multi-Temperature Models on the Shock Structures of Weakly Ionized Hypersonic Flows** P. Raghunandan, S. Ruffin, Georgia Institute of Technology, Atlanta, GA			

Thursday, 16 June 2016							
273-TP-12	**Advanced Modeling III - DNS and State to State**						**Jay**
Chaired by: S. MUPPIDI and C. JOHNSTON, NASA-Langley Research Center							
1400 hrs AIAA-2016-3818 **Rovibrational grouping for $N_2(^1\Sigma^+_g)$-$N_2(^1\Sigma^+_g)$ energy transfer using state-to-state model** R. Macdonald, A. Munafò, M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL	1430 hrs AIAA-2016-3819 **State-to-State Kinetic Modeling of Oxygen in Hypersonic Nonequilibrium Flows** E. Josyula, J. Burt, Air Force Research Laboratory, Wright-Patterson AFB, OH; V. Laporta, National Research Council (CNR), Bari, Italy; P. Vedula, University of Oklahoma, Norman, Norman, OK	1500 hrs AIAA-2016-3820 **Numerical Modeling of Reacting Turbulence Using State-to-State Kinetic Approach for High Speed ISR Missions** K. Vogiatzis, Engility Corporation, Dayton, OH; P. Vedula, University of Oklahoma, Norman, Norman, OK; E. Josyula, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2016-3821 **A Coupled Vibration-Dissociation Model for Nitrogen from Direct Molecular Simulation** N. Singh, P. Valentini, T. Schwartzentruber, University of Minnesota, Minneapolis, Minneapolis, MN	1600 hrs AIAA-2016-3822 **Analysis of Dissociation and Internal Energy Transfer in High-Energy N_2+O_2 Collisions using the Quasiclassical Trajectory Method** R. Chaudhry, J. Bender, P. Valentini, T. Schwartzentruber, G. Candler, University of Minnesota, Minneapolis, Minneapolis, MN			

Thursday, 16 June 2016		
274-NW-8 **1600 - 1630 hrs**	**Networking Coffee Break**	**Meeting Room Foyers**
Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.		

Thursday, 16 June 2016		
275-D4U-3 **1730 - 1900 hrs**	**DEMAND for UNMANNED Student Competition Alpha Test**	**International Ballroom (Center)**
Teams from the University of Michigan, University of Maryland, and McKinley Technology High School in Washington, D.C., will use a UAV quadrotor to participate in a two-part competition that includes autonomy and manual flight skills.		

Thursday, 16 June 2016		
276-LEC-6 **1730 - 1830 hrs**	**Aerodynamic Measurement Technology Award Lecture**	**International Ballroom (East)**
CARS – The First Twenty Years **Alan C. Eckbreth** Management/Engineering Consultant		

Friday, 17 June 2016		
277-SB-5 0730 - 0800 hrs	Speakers' Briefing	Session Rooms
Authors who are presenting papers will meet with session chairs and co-chairs in their session rooms for a short 30-minute briefing on the day of their session to exchange bios and review final details prior to the session. Please attend on the day of your session.		

Friday, 17 June 2016		
278-PLNRY-6 0800 - 0900 hrs	Plenary	International Ballroom (Center)

Concept to Reality — Our Journey to Transforming Aviation
Charles F. Bolden Jr.
Administrator
NASA

Friday, 17 June 2016		
279-NW-9 0900 - 0930 hrs	Networking Coffee Break	Meeting Room Foyers
Networking coffee breaks allow even more time for making new contacts, continuing discussions from sessions, visiting the Exposition Hall, or checking emails and voicemails to keep in touch with the office while you are at the forum.		

Friday, 17 June 2016							
280-AMT-11	Flow Visualization and Data Acquisition Methods						Columbia 2
Chaired by: T. MIZUKAKI, Tokai University and G. JONES, NASA-Langley Research Center							
0930 hrs AIAA-2016-3823 **Developing an Image-Based Analysis of the Dynamics of Transitional Shock Wave-Boundary Layer Interactions** E. Lash, C. Combs, J. Schmisseur, E. Beckman, University of Tennessee, Tullahoma, Tullahoma, TN	1000 hrs AIAA-2016-3824 **Investigation of a Cylinder-Induced Transitional Shock Wave-Boundary Layer Interaction using Laser Diagnostics** C. Combs, E. Lash, J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN	1030 hrs AIAA-2016-3825 **Features of the Upgraded Imaging for Hypersonic Experimental Aeroheating Testing (IHEAT) Software** M. Mason, S. Rufer, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-3826 **Low-Cost Arduino-Based Data Acquisition System with Android Mobile Interface for Undergraduate Aerodynamics Laboratories** Q. Schwaab, J. Weiss, C. Belleau, F. Morency, University of Québec, Montréal, Canada	1130 hrs AIAA-2016-3827 **Studies of a Hot Wire Anemometer with Digital Feedback** C. Britcher, Old Dominion University, Norfolk, VA; R. White, J. Bledsoe, A. Favaregh, ViGYAN, Inc., Hampton, VA			

Friday, 17 June 2016							
281-APA-39	Aerodynamic Design Methodologies IV						Albright
Chaired by: M. SCHOENENBERGER, NASA-Langley Research Center							
0930 hrs AIAA-2016-3828 **Evaluation of Reduced-Order Models for Predictions of Separated and Vortical Flows** R. Darragh, P. Hamlington, University of Colorado, Boulder, Boulder, CO; M. Ghoreyshi, A. Lofthouse, U.S. Air Force Academy, Colorado Springs, CO	1000 hrs AIAA-2016-3829 **Natural Laminar Flow Design for Wings with Moderate Sweep** R. Campbell, M. Lynde, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3830 **Expanding the Natural Laminar Flow Boundary for Supersonic Transports** M. Lynde, R. Campbell, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-3831 **Towards an Effective Nonplanar Wing Design Strategy** M. Lee, K. Visser, Clarkson University, Potsdam, NY	1130 hrs AIAA-2016-3832 **Revisiting the Transonic Similarity Rule: Critical Mach Number Prediction Using Potential Flow Solutions** J. Kirkman, T. Takahashi, Arizona State University, Tempe, AZ	1200 hrs AIAA-2016-3833 **Aerodynamic Design Guidelines of Aircraft Dorsal Fin** F. Nicolosi, D. Ciliberti, P. Della Vecchia, University of Naples "Federico II", Naples, Italy		

Friday, 17 June 2016							
282-APA-40	**Weapons Aerodynamics: Missile/Projectile/Guided-Munitions, Carriage and Store Separation**						**Columbia 9**
Chaired by: C. PASILIAO, AFRL/RWWV and J. DOYLE, US Army AMRDEC							
0930 hrs AIAA-2016-3834 **Numerical Study on Bending Body Projectile Aerodynamics** E. Youn, U.S. Military Academy, West Point, NY; S. Silton, Army Research Laboratory, Aberdeen Proving Ground, MD	1000 hrs AIAA-2016-3835 **Flight Behaviors of a Complex Projectile using a Coupled CFD-based Simulation Technique: Closed-loop Control** J. Sahu, F. Fresconi, Army Research Laboratory, Aberdeen Proving Ground, MD	1030 hrs AIAA-2016-3836 **A Computationally Efficient, Multi-fidelity Assessment of Jet Interactions for Highly Maneuverable Missiles** A. Vanderwyst, A. Shelton, C. Martin, Leidos, Fort Walton Beach, FL	1100 hrs AIAA-2016-3837 **Nonlinear Rolling Motion of Triform Finned Missiles** J. Morote, G. Liaño, J. Jiménez, National Institute of Aerospace Technology (INTA), Madrid, Spain	1130 hrs AIAA-2016-3838 **Store Separation Analyses by Means of Response Surface Modeling** O. Özgür, A. Çetiner, B. Yagiz, G. Guzel, ASELSAN, Inc., Ankara, Turkey	1200 hrs AIAA-2016-3839 **CFD Based Response Surface Modeling with an Application in Missile Aerodynamics** A. Çetiner, B. Yagiz, G. Guzel, O. Özgür, I. Koc, ASELSAN, Inc., Ankara, Turkey		

Friday, 17 June 2016							
283-APA-41/FD-63	**Low Speed, Low Reynolds Number Aerodynamics**						**Jefferson East**
Chaired by: M. GREEN, Syracuse University and M. YU, University of Maryland, Baltimore County							
0930 hrs AIAA-2016-3840 **Evolution of the Non-linear and Unsteady Low Reynolds Number Laminar Separation Bubble around the Airfoil with Small angle of attack** B. Peng, F. Li, Q. Liu, H. Zhan, China Academy of Aerospace Aerodynamics, Beijing, China	1000 hrs AIAA-2016-3841 **Toward Simulating a Pitch-Up Maneuver for a Small Unmanned Aerial Vehicle** J. Blake, D. Thompson, Mississippi State University, Mississippi State, MS	1030 hrs AIAA-2016-3842 **Quantification and Analysis of Propulsive Wake Topologies in Finite Aspect-Ratio Pitching-Rolling Plates** C. Li, H. Dong, University of Virginia, Charlottesville, Charlottesville, VA	1100 hrs AIAA-2016-3843 **Modeling of Pitching and Plunging Airfoils in Proximity for Thrust Generation** A. Povitsky, University of Akron, Akron, OH	1130 hrs AIAA-2016-3844 **Experimental Investigation of Aspect-Ratio-One Wing Characteristics at Low Reynolds Numbers** M. Mizoguchi, H. Itoh, National Defense Academy, Yokosuka, Japan	1200 hrs AIAA-2016-3845 **An experimental and numerical study of laminar separation on elliptic airfoil at low Reynolds numbers** L. Yang, X. Meng, X. Yan, Northwestern Polytechnical University, Xi'an, China; F. Liu, S. Luo, University of California, Irvine, Irvine, CA		

Friday, 17 June 2016							
284-APA-42/FD-64	**Vortex/Vortical Flows II**						**Northwest**
Chaired by: M. OL, US Air Force Reseach Laboratory and G. GATLIN, NASA Langley Research Center							
0930 hrs AIAA-2016-3846 **Further Investigations of the Tip Vortex on an Oscillating NACA0012 Wing** D. Garmann, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2016-3847 **Effect of Upsweep Angle on Afterbody Vortices** D. Bulathsinghala, Z. Wang, I. Gursul, University of Bath, Bath, United Kingdom	1030 hrs AIAA-2016-3848 **Vortical Flow Structure Genesis of Lobed Nozzle Flows** M. Ruetten, German Aerospace Center (DLR), Göttingen, Germany; F. Woldegiorgis, University of Kassel, Kassel, Germany	1100 hrs AIAA-2016-3849 **Co-rotating equal strength vortex pair merging in pressure gradient environment** Y. Yi, P. Liu, T. Hu, Beihang University, Beijing, China	1130 hrs AIAA-2016-3850 **Dynamical System Analysis on the Onset of Recirculating Flow Region Associated with Vorex Breakdown** K. Yamada, University of Tokyo, Bunkyo, Japan; K. Suzuki, University of Tokyo, Kashiwa, Japan	1200 hrs AIAA-2016-3851 **Flow Past Rotating Low Axis Ratio Elliptic Cylinder** S. Naik, S. Vengadesan, K. Arul, Indian Institute of Technology Madras, Chennai, India		

Friday, 17 June 2016							
285-ASE-17	**Icing CFD**						**Georgetown West**
Chaired by: M. POTAPCZUK, NASA Glenn Research Center and D. THOMPSON, Mississippi State University							
0930 hrs AIAA-2016-3852 **Validation Process for LEWICE by Use of a Naviér-Stokes Solver** W. Wright, Vantage Partners, LLC, Cleveland, OH	1000 hrs AIAA-2016-3853 **Simulations of ice accretion, runback and droplet re-emission in a multi-stage model of aeronautical engine** G. Gomez de Segura Solay, E. Radenac, R. Chauvin, C. Laurent, ONERA, Toulouse, France	1030 hrs AIAA-2016-3854 **Sensitivity analysis of ice piece trajectory calculation** L. Védie, University of Bordeaux, Boredeaux, France; F. Morency, École de Technologie Supérieure, Montréal, Canada; N. Kubler, University of Toulouse, Chasseneuil-du-Poitou, France	1100 hrs AIAA-2016-3855 **Atmospheric Considerations of the Cercigani, Lampis, and Lord Model for Gas-Surface Interaction in DSMC Simulations** P. Braden, Joint Information Operations Warfare Center, Lackland AFB, TX	1130 hrs AIAA-2016-3856 **Multi-physics Simulation of Aircraft Ice Protection System and Ice Impact with Turbofan Blades** G. Baruzzi, M. Oswald, A. Pett, B. Gerber, P. Rajarao, B. Sasanapuri, ANSYS, Inc., Pune, India; et al.			

Friday, 17 June 2016							
286-ATIO.ATM-24	**NextGen and Future Concepts**						**Embassy**
Chaired by: D. DELAURENTIS, Purdue University							
0930 hrs AIAA-2016-3857 **Cyber- Threat Assessment for the Air Traffic Management System: A Network Controls Approach** S. Roy, Washington State University, Pullman, WA; B. Sridhar, NASA Ames Research Center, Moffett Field, CA	1000 hrs AIAA-2016-3858 **NextGen Far-Term Concept Exploration for Integrated Gate-to-Gate Trajectory-Based Operations** S. Johnson, Adaptive Aerospace Group, Inc., Hampton, VA; B. Barmore, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3859 **Role of Extended Projected Profile Down-Link to Achieve Trajectory Synchronisation in support of Trajectory Based Operations** J. Bronsvoort, Airservices Australia, Melbourne, Australia; G. McDonald, Self, Melbourne, Australia; S. Torres, Lockheed Martin Corporation, Arlington, VA; M. Paglione, C. Young, Federal Aviation Administration, Atlantic City, NJ; J. Hochwarth, General Electric Company, Grand Rapids, MI; et al.					

Friday, 17 June 2016							
287-ATIO.ATM-25	**Optimal Flight Routes**						**Fairchild West**
Chaired by: M. UNDERWOOD, NASA Langley Research Center							
0930 hrs AIAA-2016-3860 **Optimized Route Capability (ORC) Intelligent Offloading of Congested Arrival Routes** S. Zelinski, NASA Ames Research Center, Moffett Field, CA; M. Xue, University of California, Santa Cruz, Moffett Field, CA; P. Bassett, Federal Aviation Administration, Washington, D.C.	1000 hrs AIAA-2016-3861 **Oceanic Flights and Airspace: Improving Efficiency by Trajectory-Based Operations** A. Fernandes, J. Rebollo, Mosaic ATM, Inc., Leesburg, VA; M. Koch, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3862 **Measuring Flight Efficiency in the National Airspace System** J. DeArmon, W. Cooper, T. Masek, A. Tien, MITRE Corporation, McLean, VA	1100 hrs AIAA-2016-3863 **Wind-optimal ATS Route Redesign: A Methodology and its Application to Route A461 in China** M. Swaid, German Aerospace Center (DLR), Hamburg, Germany; K. Cai, National Key Laboratory of CNS/ATM, Beihang University, Beijing, China; F. Linke, German Aerospace Center (DLR), Hamburg, Germany; B. Lührs, V. Gollnick, Institute of Air Transportation Systems,Hamburg University of Technology, Hamburg, Germany	1130 hrs AIAA-2016-3864 **Computing Wind-Optimal Routes for Flight Performance Benchmarking** F. Cheng, J. Gulding, Federal Aviation Administration, Washington, D.C.		

Friday, 17 June 2016							
288-ATIO.ATM-26	**Safe Landings**						**Fairchild East**
Chaired by: S. CAMPBELL, MIT Lincoln Laboratory							
0930 hrs AIAA-2016-3865 **Development of Airport Low-level Wind Information (ALWIN)** N. Matayoshi, T. Iijima, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan; K. Yamamoto, E. Fujita, Japan Meteorological Agency, Choyoda, Japan	1000 hrs AIAA-2016-3866 **Uncertainty Analysis for Calculating Reverse Thrust using In Situ Data** A. Campbell, A. Cheng, Federal Aviation Administration, Atlantic City, NJ	1030 hrs AIAA-2016-3867 **Slippery When Wet: The Case for More Conservative Wet Runway Braking Coefficient Models** J. O`Callaghan, National Transportation Safety Board, Washington, D.C.					

Friday, 17 June 2016							
289-ATIO.GA-3	**Environmentally-Conscious Concepts and Technologies for General Aviation**						**Gunston East**
Chaired by: K. HOFFLER, Adaptive Aerospace Group, Inc.							
0930 hrs AIAA-2016-3868 **Prediction of Community Noise Impacts from Commercialization of Vertical Takeoff and Landing Personal Air Vehicles** J. Kim, D. Lim, S. Min, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2016-3869 **Fuel Flow Rate and Duration of General Aviation Landing and Takeoff Cycle** C. Huang, M. Johnson, Purdue University, West Lafayette, IN	1030 hrs AIAA-2016-3870 **Sustainability assessment of hydro-processed renewable jet fuel from algae from market-entry year 2020: Use in passenger aircrafts** S. Jagtap, Georgia Institute of Technology, Atlanta, GA	1100 hrs AIAA-2016-3871 **Open loop morphing wing architecture based ANFIS controller** D. Nguyen, M. Tchatchueng Kammegne, R. Botez, L. Grigorie, University of Québec, Montréal, Canada				

Friday, 17 June 2016							
290-ATIO.TFPC-12	**Transformational Flight - UAS Emerging Markets and Technologies**						**Columbia 1**
Chaired by: S. BRICENO, Georgia Institute of Technology and A. GIBSON, Empirical Systems Aerospace							
0930 hrs AIAA-2016-3872 **An Unmanned VTOL and Fixed Wing Vehicle Equipped for Package Retrieval and Delivery** Z. Bassett, University of Texas, Austin, Austin, TX; M. Holdren, Case Western Reserve University, Cleveland, OH; D. Vutetakis, University of North Carolina, Charlotte, Charlotte, NC; A. Bass, Illinois Institute of Technology, Chicago, IL; P. Finch , New York University, New York , NY; A. Flock , Kent State University, Kent, OH; et al.	1000 hrs AIAA-2016-3873 **An Airborne Package Retrieval & Delivery System with Mechanized CG Relocation** Z. Bassett, University of Texas, Austin, Austin, TX; M. Holdren, Case Western Reserve University, Cleveland, OH; D. Vutetakis, University of North Carolina, Charlotte, Charlotte, NC; A. Bass, Illinois Institute of Technology, Chicago, IL; H. Kwan, State University of New York, Buffalo, NY; P. Finch , New York University, New York, NY; et al.	1030 hrs AIAA-2016-3874 **Evaluation of Concepts of Operations for sUAS Package Delivery** D. Locascio, M. Levy, K. Ravikumar, H. Maniar, B. German, S. Briceno, Georgia Institute of Technology, Atlanta, GA; et al.	1100 hrs AIAA-2016-3875 **Mission Analysis of Solar, High-Altitude, Long-Endurance UAVs for Weather Operations** C. Chamchalaem, A. Drake, California Polytechnic State University, San Luis Obispo, CA	1130 hrs AIAA-2016-3876 **Assessing the Impact of Operational Constraints on the Near-Term Unmanned Aircraft System Traffic Management Supported Market** P. Vascik, Massachusetts Institute of Technology, Cambridge, MA; J. Jung, NASA Ames Research Center, Moffett Field, CA			

Friday, 17 June 2016							
291-ATIO.TFPC-13/ATIO. ATM-27	**Transformational Flight - Clean Slate Design for Autonomy in Vehicles and Airspace**						**Gunston West**
Chaired by: N. ALEXANDROV, NASA Langley Research Center and T. LEWIS, NASA Langley Research Center							
0930 hrs AIAA-2016-3877 **Design for Survivability: An Approach to Assured Autonomy** N. Alexandrov, NASA Langley Research Center, Hampton, VA; T. Ozoroski, Analytical Mechanics Associates, Inc., Hampton, VA	1000 hrs AIAA-2016-3878 **Flight Simulation of Clean-Slate (Ab Initio) National Airspace System (NAS) Designs** B. Allen, J. Neilan, P. Rothhaar, L. Tran, A. Trujillo, N. Alexandrov, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3879 **Probabilistic Modeling of Aircraft Trajectories for Dynamic Separation Volumes** T. Lewis, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2016-3880 **Entropy-based Design of Air Traffic Management** M. Lowry, NASA Ames Research Center, Moffett Field, CA	1130 hrs AIAA-2016-3881 **Toward n-Ship Computation of Trajectories for Shared Airspace** D. Moerder, R. Butler, P. Rothhaar, NASA Langley Research Center, Hampton, VA			

Friday, 17 June 2016		
292-F360-10 **0930 - 1130 hrs**	**Hypersonic and Re-Entry Flight Testing—X-15 to Space Shuttle and Beyond**	**International Ballroom (East)**

Moderator: Sandra H. Magnus, Executive Director, AIAA

Panelists:

Doug Cooke
Principal
Cooke Concepts and Solutions

Colonel Lee Archambault
Chief Systems Engineer and Test Pilot
Sierra Nevada Corporation
United States Air Force (Ret.) and NASA Astronaut (Ret.)

Major General Joe H. Engle
United States Air Force, Air National Guard (Ret.) and
NASA Astronaut (Ret.)

John Olson
Vice PresidentSpace Exploration Systems
Sierra Nevada Corporation

Friday, 17 June 2016							
293-FD-65	**Roughness-Induced Transition**						**Lincoln East**
Chaired by: E. WHITE, Texas A&M University and P. SUBBAREDDY							
0930 hrs AIAA-2016-3882 **Numerical Simulation of Interactions Between Görtler Vortex and Roughness-Induced Disturbances in Hypersonic Boundary Layers** M. Yu, Z. Zhu, X. Yuan, China Academy of Aerospace Aerodynamics, Beijing, China	1000 hrs AIAA-2016-3883 **Trip-induced transition of a Mach 5.65 low Reynolds number boundary layer** P. Shrestha, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN	1030 hrs AIAA-2016-3884 **Compressible Boundary Layer Receptivity to Freestream Disturbances and Step Excrescences: Numerical Study** A. Sescu, S. Yassir, Mississippi State University, Starkville, MS; M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1100 hrs AIAA-2016-3885 **Wake flow instability studies behind discrete roughness elements on a generic re-entry capsule** A. Theiss, S. Hein, German Aerospace Center (DLR), Göttingen, Germany; S. Ali, R. Radespiel, Technical University of Braunschweig, Braunschweig, Germany	1130 hrs AIAA-2016-3886 **BiGlobal Stability Analysis of a Micro-Ramp Wake using PIV Base Flows** K. Groot, Q. Ye, Delft University of Technology, Delft, The Netherlands; Y. Zhang, Nanjing University of Aeronautics and Astronautics, Nanjing, China; F. Pinna, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; B. van Oudheusden, Delft University of Technology, Delft, The Netherlands	1200 hrs AIAA-2016-3887 **Understanding the Effects of Surface Roughness on the Growth of Disturbances** M. Gaster, City University London, London, United Kingdom		

Friday, 17 June 2016							
294-FD-66	**Flow Stability**						**Kalorama**
Chaired by: Z. RUSAK, Rensselaer Polytechnic Institute and D. ZHAO, Nanyang Technological University							
0930 hrs AIAA-2016-3888 **A classical linear stability analysis of normal mode instability of the compressible planar mixing-layer flow of a supercritical fluid** L. Alves, Fluminese Federal University (UFF), Niterói, Brazil	1000 hrs AIAA-2016-3889 **Numerical study of transonic shock buffet instability mechanism** Y. Liu, G. Wang, S. Zhu, Z. Ye, Northwestern Polytechnical University, Xi'an, China	1030 hrs AIAA-2016-3890 **The Dynamics of Three-Dimensional Perturbations a Solid-Body Rotation Flow in a Circular Pipe** R. Gong, S. Wang, University of Auckland, Auckland, New Zealand; Z. Rusak, Rensselaer Polytechnic Institute, Troy, NY	1100 hrs AIAA-2016-3891 **Flow Simulations of The Dynamics of a Perturbed Solid-Body Rotation Flow** C. Feng, Northwestern Polytechnical University, Xi'an, China; Y. Liu, Peking University, Beijing, China; F. Liu, University of California, Irvine, Irvine, CA; Z. Rusak, Rensselaer Polytechnic Institute, Troy, NY; S. Wang, University of Auckland, Auckland, New Zealand				

Friday, 17 June 2016							
295-FD-67	**Computational Modeling for Propulsion Applications**						**Columbia 10**
Chaired by: L. VILLASMIL, Rochester Institute of Technology and X. GAO, Colorado State Univ							
0930 hrs AIAA-2016-3892 **Advanced Modelling of Turbulent Heat-Flux in Turbofan Engines with Lobed Mixers** J. Trümner, C. Mundt, University of the German Federal Armed Forces, Neubiberg, Germany	1000 hrs AIAA-2016-3893 **Numerical Investigation of Asymmetric Lobe Structure on Aerodynamic Performance of a Lobed S-Shaped Nozzle** L. Du, Y. Liu, Y. Ding, H. Ren, Beihang University, Beijing, China	1030 hrs AIAA-2016-3894 **Scramjet Combustor Flow Analysis Using Coupled Navier-Stokes and Finite Rate Chemical Equations** R. Rouzbar, S. Eyi, Middle East Technical University, Ankara, Turkey	1100 hrs AIAA-2016-3895 **Numerical Simulations of Gas-Centered Swirl-Coaxial Injectors for Rocket Engine Applications. Evaluating the ability of "standard" turbulence models in capturing the complex nature of spray atomization.** L. Villasmil, Rochester Institute of Technology, Rochester, NY; S. Danczyk, M. Lightfoot, S. Shumaker, A. Himansu, Air Force Research Laboratory, Edwards AFB, CA	1130 hrs AIAA-2016-3896 **Evaluation of CFD Codes for Swirl-Driven Combustors** G. Talamantes, B. Maicke, Pennsylvania State University, Middletown, PA			

Friday, 17 June 2016							
296-FD-68	**Theoretical/Fundamental Fluid Dynamics**						**Columbia 12**
Chaired by: A. GOPALARATHNAM, North Carolina State University and G. ARAYA, University of Puerto Rico Mayaguez							
0930 hrs AIAA-2016-3897 **Advanced Kinetic Theory for Polyatomic Gases at Equilibrium** J. Chen, Kansas State University, Manhattan, KS	1000 hrs AIAA-2016-3898 **Spatio-Temporal Response of a Laminar Separation Bubble Under Impulsive Forcing** T. Michelis, M. Kotsonis, Delft University of Technology, Delft, The Netherlands	1030 hrs AIAA-2016-3899 **Phase relationships between velocity, wall pressure, and wall shear stress in a forced turbulent boundary layer** K. Rosenberg, S. Duvvuri, M. Luhar, B. McKeon, California Institute of Technology, Pasadena, CA; C. Barnard, B. Freidkes, University of Florida, Gainesville, Gainesville, FL; et al.	1100 hrs AIAA-2016-3900 **Spatial Evolution of Large Scale Structures in Supersonic Shear Layers** X. Shi, G. Zhang, W. Wang, T. Wang, China Academy of Aerospace Aerodynamics, Beijing, China; C. Shu, Brown University, Providence, RI				

Friday, 17 June 2016							
297-FD-69	**Uncertainty Quantification and Sensitivity Analysis**						**Morgan**
Chaired by: Q. WANG, MIT and K. DURAISAMY, University of Michigan, Ann Arbor							
0930 hrs AIAA-2016-3901 **A Multi Level Monte Carlo Algorithm for the Treatment of Geometrical and Operational Uncertainties in Internal and External Aerodynamics** M. Pisaroni, P. Leyland, F. Nobile, Swiss Federal Institute of Technology, Lausanne, Switzerland	1000 hrs AIAA-2016-3902 **Sensitivity analysis on chaotic dynamical system by Non-Intrusive Least Square Shadowing (NI-LSS)** A. Ni, P. Blonigan, M. Chater, Q. Wang, Massachusetts Institute of Technology, Cambridge, MA	1030 hrs AIAA-2016-3903 **The Effect of Grid Topology and Flow Solver on Turbulence Model Closure Coefficient Uncertainties for a Transonic Airfoil** J. Schaefer, The Boeing Company, Saint Louis, MO; S. Hosder, Missouri University of Science and Technology, Rolla, MO; M. Mani, A. Cary, J. Krakos, The Boeing Company, Saint Louis, MO	1100 hrs AIAA-2016-3904 **Uncertainty Quantification of Turbulence Model Coefficients in OpenFOAM and Fluent for Mildly Separated Flows** K. Stephanopoulos, I. Witte, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO				

Friday, 17 June 2016							
298-ITAR-7	**NASA Orion EFT-1 Thermal Protection System**						**Cabinet**
Chaired by: B. CRUDEN, ERC Inc at NASA Ames Research Center and R. THOMPSON, NASA-Langley Research Center							
0930 hrs AIAA-2016-3905 **Development, Manufacturing and Qualification of the MPCV Heat Shield for the Exploration Flight Test-1** S. Bouslog, M. Fowler, J. Kowal, NASA Johnson Space Center, Houston, TX	1000 hrs AIAA-2016-3906 **Flight Performance of the Thermal Protection System during the Orion Exploration Flight Test-1 Mission** J. Kowal, NASA Johnson Space Center, Houston, TX; J. Vander Kam, NASA Ames Research Center, Moffett Field, CA; S. Bouslog, NASA Johnson Space Center, Houston, TX; M. Rezin, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2016-3907 **Development of the Avcoat Ablation Model for the MPCV Exploration Flight Test – 1** B. Remark, NASA Johnson Space Center, Houston, TX	1100 hrs AIAA-2016-3908 **Estimating Orion Heat Shield Failure Due To Ablator Cracking During The EFT-1 Mission** J. Vander Kam, NASA Ames Research Center, Moffett Field, CA; P. Gage, Neerim Corporation, Mountain View, CA	1130 hrs AIAA-2016-3909 **Orion EFT-1 Purge and Venting Performance** R. Smith, Lockheed Martin Corporation, Houston, TX; J. Hall, J. Chuhta, Lockheed Martin Corporation, Denver, CO	1200 hrs AIAA-2016-3910 **Post-Flight Assessment of the Avcoat Thermal Protection System for the Orion Exploration Flight Test-1** J. Vander Kam, D. Bose, NASA Ames Research Center, Moffett Field, CA; E. Rodriguez, J. Santos, Jacobs, Moffett Field, CA; J. Feldman, M. Mahzari, Analytical Mechanics Associates, Inc., Moffett Field, CA; et al.		

Friday, 17 June 2016							
299-MAO-18	**Surrogate Modeling and Non-Deterministic Design - Methods and Applications III**						**Cardozo**
Chaired by: V. TOROPOV, Queen Mary, University of London and M. STELMACK, Lockheed Martin Aeronautics							
0930 hrs AIAA-2016-3911 **Sequential Robust Design of a Ram Air Turbine** M. Walter, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2016-3912 **Sensitivity Analysis of Chaotic Problems using a Fourier Approximation of the Least-Squares Adjoint** A. Ashley, J. Hicken, Rensselaer Polytechnic Institute, Troy, NY	1030 hrs AIAA-2016-3913 **Efficient Aircraft Routing Algorithm Based on Ant Colony Optimization** R. Entz, Airbus, Munich, Germany; H. Andrade Porto, University of São Paulo, São Carlos, Brazil; R. Fernandes de Oliveira, Airbus, Munich, Germany; R. Alves de Lima, University of São Paulo, São Carlos, Brazil	1100 hrs AIAA-2016-3914 **A Kriging-PDD surrogate model for low-cost sensitivity analysis** A. Cortesi, P. Congedo, French National Institute for Research in Computer Science and Control (INRIA), Talence, France	1130 hrs AIAA-2016-3915 **Reliability Estimation Using MCMC Based Tail Modeling** E. Acar, G. Bayrak, TOBB University of Economics and Technology, Ankara, Turkey	1200 hrs AIAA-2016-3916 **Composite Structure Optimization for Satellite Using Discrete Dynamic Radial Basis Function Metamodel** L. Jian, T. Long, R. Shi, B. Yuan, L. Liu, Beijing Institute of Technology, Beijing, China		

Friday, 17 June 2016							
300-MST-16	**Modeling and Simulation of Propulsion Systems**						**Georgetown East**
Chaired by: D. KEATING and U. DURAK, DLR-German Aerospace Center							
0930 hrs AIAA-2016-3917 **Antares Liquid Rocket Engine IOP and Transient Flow Entertainment: AJ-26 to RD-181** D. Patel, Orbital ATK, Chandler, AZ	1000 hrs AIAA-2016-3918 **Antares Liquid Rocket Engine Convective Base Heating: AJ-26 to RD-181** D. Patel, Orbital ATK, Chandler, AZ	1030 hrs AIAA-2016-3919 **A 3-D Computational Model for Optimum Design and Analysis of Vertical Take-off in Aircraft** U. Jain, Purdue University, West Lafayette, IN; Y. Mukkamala, Vellore Institute of Technology, Vellore, India	1100 hrs AIAA-2016-3920 **Simulation of Fuel Spray and Combustion of Compression Ignition Heavy-oil Engine** J. Qiu, M. Zhou, Tsinghua University, Beijing, China				

Friday, 17 June 2016							
301-MST-17	**Modeling and Simulation of Structures and Structural Dynamics**						**Piscataway**
Chaired by: M. ALVAREZ, NASA Langley Research Center and R. RUFF							
0930 hrs AIAA-2016-3921 **Linear Elasticity Finite Volume Based Structural Dynamics Solver** M. Selim, R. Koomullil, D. McDaniel, University of Alabama, Birmingham, Birmingham, AL	1000 hrs AIAA-2016-3922 **Structural Configuration Systems Analysis for Advanced Aircraft Fuselage Concepts** V. Mukhopadhyay, J. Welstead, J. Quinlan, M. Guynn, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2016-3923 **Nonlinear State Estimation for Aeroelastic Multi-Body Models** T. Benoit, Y. Lemmens, Siemens, Leuven, Belgium; W. Desmet, Catholic University of Leuven, Leuven, Belgium	1100 hrs AIAA-2016-3924 **Simulation and Control of a Space Web Deployed by Centrifugal Forces in a Sounding Rocket Experiment** H. Mao, Royal Institute of Technology (KTH), Stockholm, Sweden; T. Sinn, M. Vasile, University of Strathclyde, Glasgow, United Kingdom; G. Tibert, Royal Institute of Technology (KTH), Stockholm, Sweden				

Friday, 17 June 2016							
302-TP-13	**Heat Transfer in Aerospace Applications**						**DuPont**
Chaired by: E. SHORT, Raytheon Company and A. WILLIAMS, Air Force Reseach Laboratory							
0930 hrs AIAA-2016-3925 **Comparison of Heat Flux Gages for High Enthalpy Flows - NASA Ames and IRS** S. Loehle, University of Stuttgart, Stuttgart, Germany; A. Nawaz, Jacobs, Moffett Field, CA; G. Herdrich, S. Fasoulas, University of Stuttgart, Stuttgart, Germany; E. Martinez, G. Raiche, NASA Ames Research Center, Moffett Field, CA	1000 hrs AIAA-2016-3926 **Blockage-Ratio Effect of a Bluff-Body Stabilized Flame on Aerosol Behavior of Carbonaceous (Soot) Nano-PM in a Combustor Burning Jet Propulsion Fuel** M. Darbandi, M. Ghafourizadeh, Sharif University of Technology, Tehran, Iran; G. Schneider, University of Waterloo, Waterloo, Canada	1030 hrs AIAA-2016-3927 **A Mini-Scale Primary-Air Injector Mass-Flow-Rate Effect on Soot Nano-Aerosol Formation in a JP-Fueled Gas-Turbine Combustor** M. Darbandi, M. Ghafourizadeh, Sharif University of Technology, Tehran, Iran; G. Schneider, University of Waterloo, Waterloo, Canada	1100 hrs AIAA-2016-3928 **Experimental and Numerical Study on the Flame Base of Premixed Flame after a Small Size V-Gutter** F. Gong, Y. Huang, Beihang University, Beijing, China	1130 hrs AIAA-2016-3929 **Investigation of Nose Cone Electrothermal Anti-icing Control Law** L. Ding, S. Chang, S. Yang, M. Leng, Beihang University, Beijing, China	1200 hrs AIAA-2016-3930 **Exploring Mechanisms of Particle Size Effects of Iron Oxide on Thermal Behaviors and Combustion Characteristics for 5AT/Sr(NO3)2 Propellant** D. Zhang , S. Lu, H. Zhang, University of Science and Technology of China, Hefei, China	1230 hrs AIAA-2016-3931 **Aerodynamic Heating Prediction Tool for a Supersonic Vehicle for Conceptual Design Phase** B. Simsek, B. Kuran, M. Ak, ROKETSAN Missile Industries, Inc., Ankara, Turkey; S. Uslu, TOBB University of Economics and Technology, Ankara, Turkey	

Friday, 17 June 2016							
303-TP-14	**Advanced Modeling IV**						**Jay**
Chaired by: S. MUPPIDI and E. JOSYULA, Air Force Reseach Laboratory							
0930 hrs AIAA-2016-3932 **Rarefaction effects for the transonic airfoils in low Reynolds number regime** C. Pekardan, A. Alexeenko, Purdue University, West Lafayette, IN	1000 hrs AIAA-2016-3933 **Inviscid-flow Approximation of Radiative Ablation of Cometary Meteoroids** C. Park, Korea Advanced Institute of Science and Technology, Daejeon, South Korea	1030 hrs AIAA-2016-3934 **Inelastic Electron Scattering by Nitrogen Atoms** M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL; C. Johnston, NASA Langley Research Center, Hampton, VA; R. Macdonald, University of Illinois, Urbana-Champaign, Urbana, IL	1100 hrs AIAA-2016-3935 **Application of A New Thermal-Mechanical Coupling Solver for Ablation** R. Fu, H. Weng, J. Wenk, A. Martin, University of Kentucky, Lexington, Lexington, KY	1130 hrs AIAA-2016-3936 **Modeling of Electron Transpiration Cooling for Hypersonic Vehicles** K. Hanquist, University of Michigan, Ann Arbor, Ann Arbor, MI; K. Hara, Princeton Plasma Physics Laboratory, Princeton, NJ; I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1200 hrs AIAA-2016-3937 **Assessment of continuum breakdown for high-speed chemically reacting wake flows** S. Subramaniam, K. Swaminathan Gopalan, K. Stephani, University of Illinois, Urbana-Champaign, Urbana, IL	1230 hrs AIAA-2016-3938 **Extension of Kestrel to General Thermochemical Models, Part I** R. Bond, Arnold Engineering Development Complex, Arnold AFB, TN; R. Nichols, University of Alabama, Birmingham, Arnold AFB, TN; G. Power, Arnold Engineering Development Complex, Arnold AFB, TN	

Friday, 17 June 2016		
304-WKSP-2 **0930 - 1630 hrs**	**Drag Prediction Workshop**	**Lincoln West**

Agenda:

0930 -1125 hrs	Sessions 6, 7
1130 – 1245 hrs	Break for Lunch
1245 – 1430 hrs	Session 8, 9, 10

The focus of this workshop will be the NASA Common Research Model (CRM) with wind-tunnel measured wing twist; both wing-body and wing-body-pylon-nacelle configurations will be considered. CFD predictions of absolute and incremental force and moment values will be examined and compared. The workshop will include grid convergence and code verification studies. Additionally, an angle-of-attack sweep with static aero-elastic deformations will be considered. Grids will be made available for all required cases.

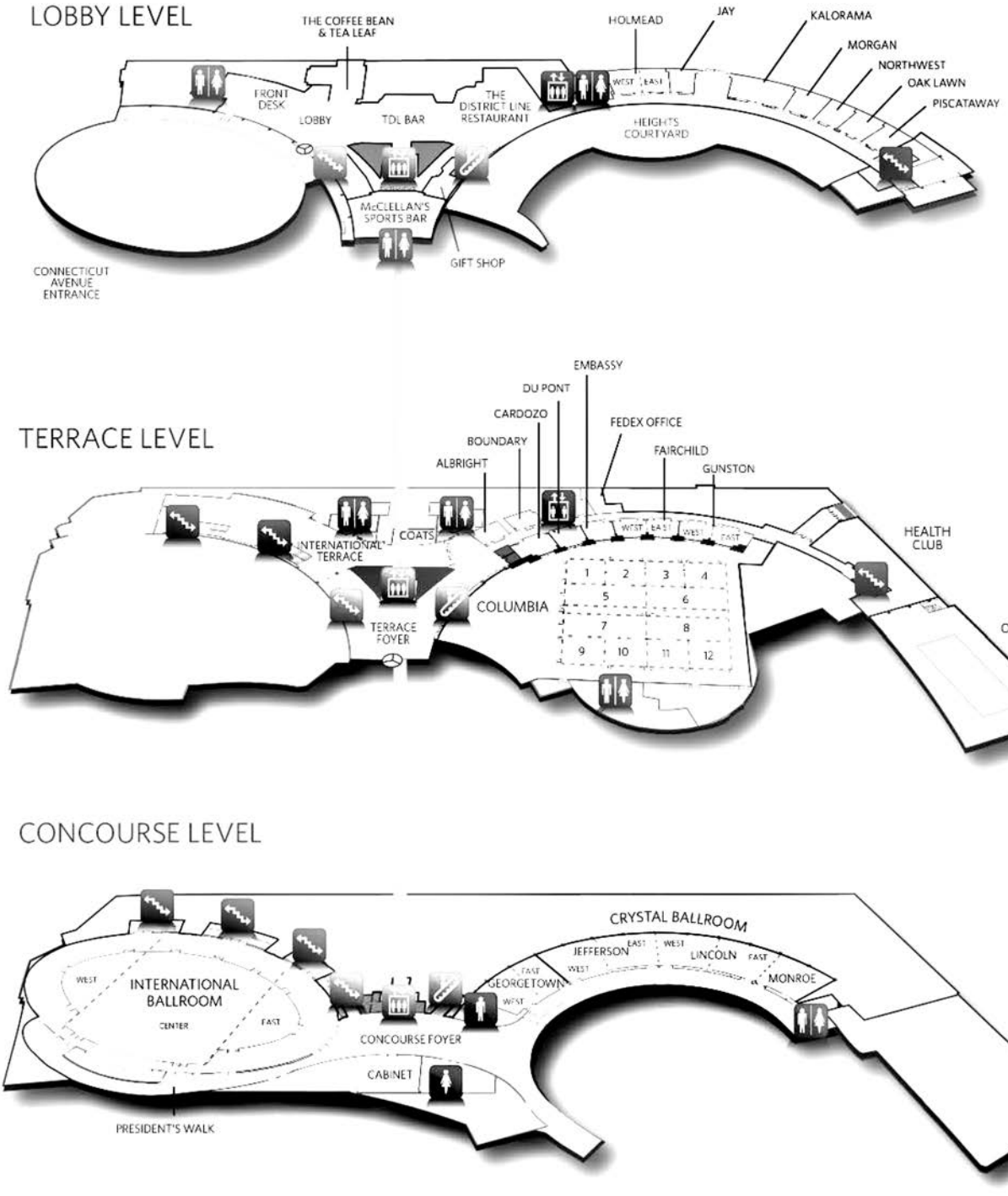
Optionally, participants are invited to perform solution-adaptation calculations and/or a coupled aero-structural simulation of the CRM wing-body configuration. A finite element model will be made available to participants to calculate twist/deflection due to aerodynamic load.

The objectives of this workshop will be to:

- To assess the state-of-the-art computational methods as practical aerodynamic tools for aircraft force and moment prediction of industry relevant geometries.
- To provide an impartial forum for evaluating the effectiveness of existing computer codes and modeling techniques using Navier-Stokes solvers.
- To identify areas needing additional research and development.

Venue Map

Washington Hilton



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- AIAA Atmospheric Flight Mechanics Conference
- 9th AIAA Atmospheric and Space Environments Conference
- 17th AIAA Aviation Technology, Integration, and Operations Conference
- AIAA Flight Testing Conference
- 47th AIAA Fluid Dynamics Conference
- 18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference
- AIAA Modeling and Simulation Technologies Conference
- 48th Plasmadynamics and Lasers Conference
- AIAA Balloon Systems Conference
- 23rd AIAA Lighter-Than-Air Systems Technology Conference
- 23rd AIAA/CEAS Aeroacoustics Conference
- 8th AIAA Theoretical Fluid Mechanics Conference
- AIAA Complex Aerospace Systems Exchange
- 23rd AIAA Computational Fluid Dynamics Conference
- 47th Thermophysics Conference

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