AVIATION FORUM

17–21 JUNE 2019 DALLAS, TEXAS

SHAPING THE FUTURE OF FLIGHT

What's going on in

the HUB

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AIAA
SHAPING THE FUTURE OF AEROSPACE

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The American Institute of Aeronautics and Astronautics (AIAA) is the world's largest aerospace technical society. With nearly 30,000 individual members from 85 countries, and 95 corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense. For more information, visit aiaa.org, or follow us on Twitter @AIAA.

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Colin Britcher, National Institute of Aerospace

ITAR

Scott Sherer, Air Force Research Laboratory

Rich Graves, Air Force Research Laboratory

LIGHTER-THAN-AIR TECHNOLOGY

Don Hartsell, World Air League

Stojan Stevanovic, Proton Corporation

MESHING, VISUALIZATION, AND COMPUTATIONAL ENVIRONMENTS

Carl Ollivier-Gooch, University of British Columbia

MODELING AND SIMULATION TECHNOLOGIES

Christine Taylor, The MITRE Corporation

MULTIDISCIPLINARY DESIGN OPTIMIZATION

Douglas Allaire, Texas A&M University

Justin Gray, NASA Glenn Research Center

PLASMADYNAMICS AND LASERS

Alexey Shashurin, Purdue University

THERMOPHYSICS

S.A. Sherif, University of Florida

Eric L. Golliher, NASA Goddard Space Flight Center

UNIQUE AND/OR TRANSFORMATIONAL FLIGHT SYSTEMS

Simon Briceno, Georgia Institute of Technology

Kevin Antcliff, NASA Langley Research Center

VERTICAL/SHORT TAKE-OFF AND LANDING (V/STOL) AIRCRAFT SYSTEMS

Mark Calvert, U.S. Army

Geoffrey Jeram, U.S. Army

WELCOME TO

AVIATION FORUM

The 2019 AIAA AVIATION Forum Executive Steering Committee welcomes you to Dallas! We have worked hard this past year curating exciting and thought-provoking content around the forum theme, **Shaping the Future of Flight**. We hope these industry leaders, topics, and discussions inspire you. Make it a great week!

EXECUTIVE STEERING COMMITTEE

2019 AIAA AVIATION Forum

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FORUM OVERVIEW

	SAT./SUN. 15–16	MONDAY 17	TUESDAY 18
0730 hrs		Speaker Briefing	Speaker Briefing
0800 hrs	Continuing Education Courses and Workshops *0815–1730 hrs Saturday and Sunday*	Plenary	Plenary
0830 hrs			
0900 hrs		Networking Break / Aviation 101	Networking Break
0930 hrs		Forum 360 / Technical Sessions	Forum 360 / Technical Sessions
1000 hrs			
1030 hrs			
1100 hrs			
1130 hrs			
1200 hrs			
1230 hrs		Networking Lunch on Own	Excellence in Aerospace Awards Luncheon *(Purchase Required)*
1300 hrs			Exposition Hall Open
1330 hrs			
1400 hrs		Forum 360 / Technical Sessions	Forum 360 / Technical Sessions
1430 hrs			
1500 hrs			
1530 hrs	Student Ignite the Meeting *1530-1700 hrs Sunday*		
1600 hrs		Networking Break	Networking Break
1630 hrs		Rising Leaders Speed Mentoring and Reception	
1700 hrs	Meet the Employers *1700-1830 hrs Sunday*		
1730 hrs			Addressing Aviation and Education Challenges with NASA University Leadership Initiative: A dialog with Helen Reed
1800 hrs		Wright Brothers Lecture	
1830 hrs	Student Welcome Mixer *1830-1930 hrs Sunday*		Reception in the Exposition Hall *(Purchase Required)*
1900 hrs			
1930 hrs			
2000 hrs			

GROW Technical Career Development

CONNECT Networking

EXPLORE the HUB & Exposition

DISCOVER High Level

DEVELOPMENT Student & Young Professionals

FORUM OVERVIEW

	WEDNESDAY 19			THURSDAY 20			FRIDAY 21	
0730 hrs	Speaker Briefing			Speaker Briefing			Speaker Briefing	
0800 hrs	Plenary			Plenary			Plenary	
0830 hrs								
0900 hrs	Networking Break in Exposition Hall			Networking Break in Exposition Hall			Networking Break	
0930 hrs	Forum 360	Technical Sessions	Exposition Hall Open	Forum 360	Technical Sessions	Exposition Hall Open	Forum 360	Technical Sessions
1000 hrs								
1030 hrs								
1100 hrs								
1130 hrs								
1200 hrs								
1230 hrs	Networking Lunch on Own	Lunch and Learn: Shaping the Workforce of Tomorrow		Boxed Luncheon in Exposition Hall *(Purchase Required)*				
1300 hrs								
1330 hrs								
1400 hrs	Forum 360	Technical Sessions		Forum 360	Technical Sessions			
1430 hrs								
1500 hrs								
1530 hrs								
1600 hrs	Networking Break			Networking Break				
1630 hrs				RLA Keynote				
1700 hrs								
1730 hrs								
1800 hrs								
1830 hrs	AIAA Backyard BBQ *(Purchase Required)*			ADS Banquet *(Purchase Required)*				
1900 hrs								
1930 hrs								
2000 hrs								

GROW
Technical Career Development

CONNECT
Networking

EXPLORE
the HUB & Exposition

DISCOVER
High Level

DEVELOPMENT
Student & Young Professionals

PRE-FORUM ACTIVITIES

CONTINUING EDUCATION OFFERINGS

Stay at the top of your game with AIAA's continuing education offerings. You will leave with invaluable knowledge and solutions that you can put to immediate use.

SAT. 15 – SUN. 16 JUNE

0800–1700 HRS CORTEZ C

Designing Unmanned Aircraft Systems

This two-day course will provide a comprehensive treatment of the major disciplines that drive unmanned aircraft design.

0800–1700 HRS CORTEZ B

Hypersonic Flight: Propulsion Requirements and Vehicle Design

Development of hypersonic air-breathing propulsion (HAP) is crucial to extend the flight regime of aircraft, and to develop revolutionary reliable, affordable, routine Earth-to-orbit spacecraft. This two-day course provides the technical background in hypersonics and highlights the vehicle design methodology required to achieve the mission objectives of hypersonic flight.

0800–1700 HRS CORTEZ D

OpenFOAM® Foundations: The Open Source CFD Toolbox

This two-day course introduces the open source CFD toolbox, OpenFOAM. It provides a foundation for all aspects of OpenFOAM, from setting cases to parallel post-processing and best practices, so is useful to both new users and existing users wishing to broaden their basic knowledge of OpenFOAM.

0800–1730 HRS CORTEZ A

Practical Design Methods for Aircraft and Rotorcraft Flight Control for Manned and UAV Applications with Hands-On Training Using CONDUIT®

The two-day course will be a combination of lectures, interspersed with associated hands-on lab exercises (aircraft and rotorcraft) to be completed by the students on their own computers using the standalone version of CONDUIT® that is also provided with the book.

SUNDAY, 16 JUNE

0800–1700 HRS TOPAZ

Principles of eVTOL

Electric Vertical Take Off and Landing aircraft – or eVTOL – are aircraft propelled by electric power and capable of carrying people. The objective of this course is to introduce these technologies and barriers. It will cover aeromechanics of prop rotors (including coaxial and ducted rotors), advanced batteries (Li –ion and –Sulfur), hydrogen PEM fuel cells, permanent magnet machines, engine-generator hybrid drives, eVTOL performance in trim and transient flight, and eVTOL sizing.

0800–1700 HRS GOVERNORS LECTURE HALL

Workshop for Integrated Propeller Prediction (WIPP)

The objective of this workshop is to validate the aerodynamic efficiency benefits of wingtip-mounted propellers and the ability of CFD to accurately predict them using powered low speed wind tunnel test data on a generic configuration representative of the X-57.

0800–1700 HRS SENATORS LECTURE HALL

Workshop for Multifidelity Modeling in Support of Design and Uncertainty Quantification

The objectives of this workshop are to:

- Provide a series of tutorials aimed at dissemination of recent developments in multifidelity methods to the MDO and simulation-based design practitioner community
- Bring together academic, government, and industry experts to highlight success stories in multifidelity design and uncertainty quantification
- Provide a series of short research talks to highlight new and exciting research directions in multifidelity modeling
- Provide a forum for active discussion of challenges and opportunities, and for identifying new collaborations

STUDENT DAY

SUNDAY, 16 JUNE

1530–1700 HRS PEACOCK TERRACE

Student Ignite the Meeting

Nothing can be more intimidating than being a newcomer or young person at a forum or event where everyone already knows one another! At this high-energy and fun workshop, attendees will gather tips and techniques on networking and relationship building that will make the event more enjoyable and productive. We'll focus on creating an introduction, understanding how to engage with others, playing off the unique networking styles of introverts and extroverts, and some of the absolute do nots of networking. Then the interaction kicks in with an activity designed to foster quick friendships so that throughout the forum the participants will never enter a session or party where they are the stranger!

1700–1830 HRS WEDGWOOD BALLROOM

Meet the Employers

This event offers students and young professionals the opportunity to meet AIAA corporate members and government agency representatives. This is a fun and dynamic environment where students and professionals interact with organizations regarding employment opportunities. Participating companies/organizations will present a brief organizational overview and opportunities available, then have follow-on discussions with the attendees. Organizations will host a table and attendees will switch every 10 minutes. On Wednesday, 19 June, another Meet the Employers will take place from 0900–1000 hrs in the HUB. This is an opportunity for students and attendees to meet with any of the employers that they didn't have a chance to talk with on Sunday evening, and for any employers that could not participate in Sunday's session to meet with prospective employees.

1830–1930 HRS PEACOCK TERRACE

Student Welcome Mixer

Mingle with your peers and hear from AIAA leadership! This networking event provides you with the opportunity to meet your fellow students and learn more about the opportunities available to you as an AIAA student member. *Proof of student registration is required. Appetizers will be provided, and a cash bar will be available.*

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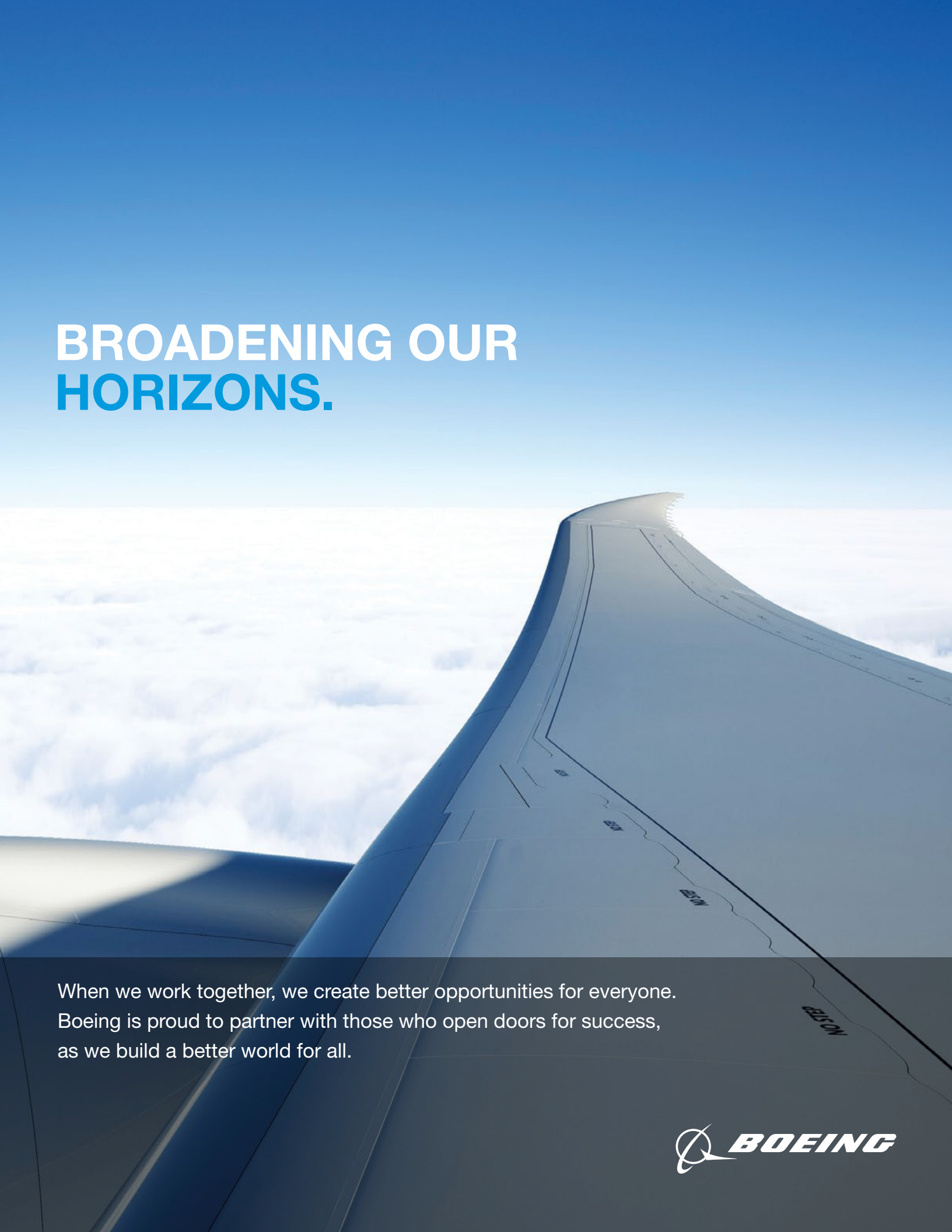
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PLENARY & FORUM 360 SESSIONS

MONDAY, 17 JUNE

0800–0900 HRS GRAND BALLROOM

Living in the Age of Airplanes

KEYNOTE: Brian J. Terwilliger, Producer and Director

MODERATOR: Amanda Simpson, Vice President, Research and Technology, Airbus Americas Inc.

FORUM 360° 0930–1130 HRS CORONADO A-D

The Operations of Flying Further and Higher

MODERATOR: Karina Drees, Chief Executive Officer and General Manager, Mojave Air & Space Port

PANELISTS:
Juan J. Alonso, Professor, Department of Aeronautics and Astronautics, Stanford University

John Cavolowsky, Director, Transformative Aeronautics Concepts Program, Aeronautics Research Mission Directorate, NASA

Steve Ericson, Director, Advanced Design, The Spaceship Company

Warren Frick, Manager, Business Development, Northrop Grumman Innovation Systems

Dean Fulmer, Principal System Engineer, Portfolio Manager, Space Transportation, The MITRE Corporation

Karl Garman, Deputy Director of Research, FAA Office of Commercial Space Transportation

FORUM 360° 1400– 1600 HRS CORONADO A-D

Flying Faster with the Science of Hypersonics: Challenges and Opportunities

MODERATOR: Kevin Bowcutt, Senior Technical Fellow and Chief Scientist of Hypersonics, The Boeing Company

PANELISTS:
Graham Candler, McKnight Presidential Professor, Distinguished McKnight University Professor, Russell J. Penrose Professor, and Associate Department Head, University of Minnesota

Richard Hallion, Aerospace Historian and Founding Museum Curator, National Air and Space Museum, Smithsonian Institution (ret.)

Ivett Leyva, Program Officer, Engineering and Complex Systems, Air Force Office of Scientific Research

Eric Marineau, Program Officer, Hypersonics, Office of Naval Research

Michael White, Assistant Director, Hypersonics, Office of the Under Secretary of Defense for Research and Engineering

TUESDAY, 18 JUNE

0800–0900 HRS GRAND BALLROOM

NASA Aeronautics

KEYNOTE: Stephen Jurczyk, Associate Administrator, NASA

MODERATOR: Richard Wahls, Strategic Technical Advisor, Advanced Air Vehicles Program, Aeronautics Research Mission Directorate, NASA

FORUM 360° 0930–1130 HRS CORONADO A-D

NASA Aeronautics Shaping the Future of Flight

MODERATOR: Richard Wahls, Strategic Technical Advisor, Advanced Air Vehicles Program, Aeronautics Research Mission Directorate, NASA

OPENING REMARKS: Jon Montgomery, Deputy Associate Administrator for Policy, Aeronautics Research Mission Directorate, NASA

PANELISTS:
Bryan Barmore, Deputy Project Manager for Technology, Air Traffic Management – Exploration Project, Airspace Operations and Safety Program, Aeronautics Research Mission Directorate, NASA

Barbara Esker, Acting Director, Advanced Air Vehicles Program, Aeronautics Research Mission Directorate, NASA

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

Davis Hackenberg, Strategy Advisor for Urban Air Mobility, Aeronautics Research Mission Directorate, NASA

David Richwine, Deputy Project Manager for Technology, Low-Boom Flight Demonstrator Project, Integrated Aviation Systems Program, Aeronautics Research Mission Directorate, NASA

FORUM 360° 1400–1600 HRS CORONADO A-D

Why Wait? Point-to-Point Mobility Today!

MODERATOR: Steven C. Udvar-Hazy, Senior Vice President, OEM Relations & Market Development, Aviation Capital Group

PANELISTS:
James A. Haas, Regional Director-Product Marketing, Boeing Commercial Airplanes

Clément Monnet, Chief Executive Officer, Voom, an Airbus Company

Trey Urbahn, Chief Commercial Officer and Executive Board Member, TAP Air Portugal

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PLENARY & FORUM 360 SESSIONS

WEDNESDAY, 19 JUNE

0800–0900 HRS — GRAND BALLROOM

The Reality of a Vertical Dream

KEYNOTE: Christopher Emerson, President, and Head, North America Region, Airbus Helicopters

MODERATOR: Amanda Simpson, Vice President, Research and Technology, Airbus Americas Inc.

FORUM 360° 0930–1130 HRS — CORONADO A-D

Innovation in Vertical Lift

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

PANELISTS:
Adam Besachio, Guidance, Navigation, and Control, Manager, Northrop Grumman Corporation

Ryan Ehinger, V-280 Valor Program Manager, Bell

Nick Lappos, Senior Technical Fellow, Advanced Technology, Sikorsky, A Lockheed Martin Company

Jeff Trang, Vice President, Technology and Flight Operations, Airbus Helicopters

FORUM 360° 1400–1600 HRS — CORONADO A-D

Enabling the Engineering Transformation

MODERATOR: John Cavolowsky, Director, Transformative Aeronautics Concepts Program, Aeronautics Research Mission Directorate, NASA

PANELISTS:
Gene Holloway, Vice President of Boomless Cruise™ & Environmental Responsibility, Aerion Supersonic

Lesa Roe, Chancellor, University of North Texas System

Tom Shih, J. William Uhrig and Anastasia Vournas Head, and Professor, Aeronautics and Astronautics, Purdue University

Kristi Shryock, Associate Department Head, Department of Aerospace Engineering, Texas A&M University

THURSDAY, 20 JUNE

0800–0900 HRS — GRAND BALLROOM

The Future of Mobility – Aviation is Changing the World

KEYNOTE: Greg Hyslop, Chief Technology Officer, The Boeing Company

MODERATOR: Benjamin C. Linder, Director of Flight Sciences, Boeing Commercial Airplanes

FORUM 360° 0930–1130 HRS — CORONADO A-D

Autonomous Operation in an Evolving Ecosystem

MODERATOR: Parker Vascik, Aerospace Engineering, Technology and Policy, Massachusetts Institute of Technology

PANELISTS:
Ella Atkins, Professor, Aerospace Engineering, University of Michigan

Thomas Edwards, Chief Technical Officer, Crown Consulting

Brock Lascara, Lead Aviation Systems Engineer, The MITRE Corporation

Chad Stecker, NEXUS Program Manager, Bell

FORUM 360° 1400–1600 HRS — CORONADO A-D

Building on Today's Safety Foundation for Tomorrow's Mobility

MODERATOR: Brian Yutko, Senior Vice President, Programs, Aurora Flight Sciences

FRIDAY, 21 JUNE

0800–0900 HRS — GRAND BALLROOM

Apollo's Legacy and Impact on Modern Flight

SPEAKERS:
Bill Barry, Chief Historian, NASA

James R. Hansen, Author, *First Man: The Life of Neil A. Armstrong*, and Professor Emeritus, History, Auburn University

FORUM 360° 0930–1130 HRS — CORONADO A-D

Accelerating Through the TRL Scale

MODERATOR: Starr Ginn, Deputy Aeronautics Research Director, NASA Armstrong Flight Research Center

PANELISTS:
Mark Cousin, Chief Executive Officer, A^3 by Airbus

Steve Ericson, Director, Advanced Design, The Spaceship Company

Jonathan Hartman, Disruptive Technologies Lead, Sikorsky, A Lockheed Martin Company

Brian Hershberger, Conceptual Design, Senior Manager, Advanced Development Programs, Lockheed Martin Aeronautics Company

Jim Scooler, Director, Aerodynamics, Gulfstream Aerospace

RISING LEADERS IN AEROSPACE

This multidimensional program, planned by the Young Professionals Group, features sessions with the 35-and-under crowd in mind. These exciting and energetic activities will provide access to top aerospace leaders and their perspectives, with subject matter relevant to your career. Participating in this program will allow you the opportunity to build your network of fellow peers.

SUNDAY, 16 JUNE

1700–1800 HRS **TOWER MEZZANINE FOYER**

AIAA Aircraft Technology, Integration and Operation Meet and Greet

Meet members of the Aircraft Technology, Integration and Operations (ATIO) Group and learn about the exciting work and volunteer opportunities in ATIO technical committees:

- Aerodynamic Decelerator Systems
- Air Transportation Systems
- Aircraft Design
- Aircraft Operations
- Balloon Systems
- Flight Testing
- General Aviation
- HyTASP (Hypersonics)
- Lighter-Than-Air Systems
- Product Support
- V/STOL Aircraft Systems

Light refreshments will be served.

MONDAY, 17 JUNE

1630–1800 HRS **PEACOCK TERRACE**

Speed Mentoring

Accomplished professionals from a variety of backgrounds 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 industry leaders 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.

1800–1900 HRS **PEACOCK TERRACE**

Networking Reception

Continue your conversations and networking at the reception that will immediately follow. Take time to socialize with your fellow young professionals who are also attending the forum. Having just participated in the speed mentoring, you'll definitely have at least one thing in common. Don't miss this rewarding opportunity.

WEDNESDAY, 19 JUNE

1230–1400 HRS **PEACOCK TERRACE**

Lunch and Learn: Shaping the Workforce of Tomorrow

We are living through a fundamental transformation in the way we work. Organizations achieve goals by working with interdisciplinary teams of individuals from diverse educational backgrounds, work cultures, skill sets, and attitudes. As the workforce becomes steadily more diverse, it presents employers with a myriad of both opportunities and challenges. Although diversity in the workforce has been shown to have tremendous value to organizations, a lack of inclusion poses a challenge. Further, higher levels of automation that are replacing human tasks are changing the skills that organizations are looking for in their people. These momentous changes raise huge organizational, talent and HR challenges. To discuss these challenges and the steps we need to shape the workforce of tomorrow, the AIAA YPs put together a panel of learning practitioners and industry experts.

MODERATOR: Joseph Sikorski, Aeronautical Engineer Associate, Lockheed Martin Corporation

SPEAKERS:

Alex Carrere, Configuration Design Engineer, Multidisciplinary Design Analysis and Optimization, Boeing Research and Technology

Nancy J. Currie-Gregg, Professor of Engineering Practice, Texas A&M University

Ashley Purkey, Manager, Aerodynamics Analysis and Testing, Boeing Research and Technology

Holly Rollins, Principal Senior Director, Booz Allen Hamilton

THURSDAY, 20 JUNE

1630–1730 HRS **DESOTO B**

Rising Leaders in Aerospace Keynote

SPEAKER: Amanda Simpson, Vice President, Research and Technology, Airbus Americas Inc.

Rising Leaders in Aerospace Sponsor

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SPECIAL PROGRAMMING

TUESDAY, 18 JUNE

1400–1600 HRS CHANTILLY BALLROOM FOYER

CFD Flow Visualization Showcase

Authors of CFD visualizations papers will describe their work and the significance of their animation as it displays on a large screen monitor. Multiple visualizations will be shown during each of the four 30-minute time slots during the event.

1730–1830 HRS PEACOCK TERRACE

Addressing Aviation and Education Challenges with NASA University Leadership Initiative: A Dialog with Helen Reed

NASA's University Leadership Initiative (ULI) provides the opportunity for university teams to exercise technical and organizational leadership in proposing unique technical challenges, defining interdisciplinary solutions, establishing peer review mechanisms, and applying innovative teaming strategies to strengthen the research impact. This is a conversation between Helen Reed and John Cavolowsky about Helen's experiences while working on two of NASA Aeronautics' multiyear, multimillion-dollar ULI awards. Their conversation will span the importance of her work, research freedom under the ULI philosophy, the opportunities created for undergraduate and graduate students, and experiences within a multidisciplinary team of academics and industrial partners.

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ITAR SESSIONS

AIAA offers authors the opportunity to present information that is covered by the U.S. International Traffic in Arms Regulations (ITAR), in U.S.-Only sessions during the forum. These sessions provide an opportunity for discussion of topics and presentations that is not possible in an open forum.

If you want to attend any of these special sessions, you will need to complete an additional registration and verification process. In addition to a forum registration that includes access to sessions, a separate registration process is required to attend these restricted sessions. To register, please bring the required documentation with you to the on-site ITAR registration desk: most important is proof of U.S. citizenship. (Please note that a CAC card IS NOT official proof of U.S. citizenship.) See the specific requirements below to determine individual requirements.

Access to ITAR Sessions

All attendees, presenters, and session chairs participating in ITAR sessions will need to register for the forum (using one of the options that includes access to sessions), and then complete the ITAR registration process, including validating U.S. citizenship as well as government employment or contractor status. The following are the documents required to register for the ITAR sessions:

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(One of the following is required for all those registering for ITAR sessions)
Valid U.S. passport
Birth certificate
Certificate of citizenship
~CAC Cards are not Proof of U.S. citizenship~

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Proof of U.S. citizenship
CAC card or other proof of government employment

Non-U.S. Government Attendees
AIAA forum badge
Proof of U.S. citizenship
Corporate badge, or business card and photo ID
Copy of approved and active **DD2345** contractor certificate** ^

**Please note that if your paycheck comes from someone other than the U.S. government, for example, a university, you will need to follow the process of the non-U.S. Government Attendees.*

*** If you are not familiar with the DD2345, please check with your Corporate Security Officer.*

^DD2345 certificates are office location specific.

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TUESDAY, 18 JUNE

0930–1200 HRS — MOROCCO ROOM
ITAR-01 General Topics

1400–1700 HRS — MOROCCO ROOM
ITAR-02 Aero-Optics and Directed Energy

WEDNESDAY, 19 JUNE

0930–1230 HRS — MOROCCO ROOM
ITAR-04 Recent Capability Improvements and Expansions at the Arnold Engineering Development Complex

1400–1730 HRS — MOROCCO ROOM
ITAR-03 Kinetic Weapon Integration

ITAR Registration Hours:

Sunday, 16 June	1500–1900 hrs	Chantilly Foyer
Monday, 17 June	0900–1700 hrs	Chantilly Foyer
Tuesday, 18 June	0900–1630 hrs	Morocco Room Foyer
Wednesday, 19 June	0900–1730 hrs	Morocco Room Foyer

ITAR badges must be worn during the sessions.

Photo IDs and ITAR badges will be checked upon entrance to the ITAR session room(s).

ITAR Electronics Policy

Cell phones, computers, tablets, cameras, personal fitness devices, or other electronic devices with cameras, recording, or two-way transmission capabilities will not be permitted into the ITAR session room(s). 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.

Availability of Manuscripts from ITAR 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 Wednesday, 19 June 2019, between 1630-1700 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. Note this forum has a "no paper, no podium" and "no podium, no paper" policy and it is therefore not possible to get all papers until after the last presentation has occurred.

Please be advised that all policies and procedures MUST be followed or admittance to the restricted sessions will not be permitted. Anyone wishing to enter the restricted session room MUST abide by the policies, procedures, and submission of verified documents mandated by the DoD. No Exceptions!

RECOGNITION AND LECTURES

Join us at the 2019 AIAA AVIATION Forum as we recognize the very best in our industry—those individuals and teams who have taken aerospace technology to the next level, who have advanced the quality and depth of the aerospace profession, who have leveraged their aerospace knowledge for the benefit of society. Their achievements have inspired us to dream and to explore new frontiers.

MONDAY, 17 JUNE

1800–1900 HRS GRAND BALLROOM

Wright Brothers Lecture in Aeronautics

Justin Paines
Chief Test Pilot, Joby Aviation

Turning Flight Control on its Head for the F-35, eVTOL, and Beyond

TUESDAY, 18 JUNE

1230–1400 HRS GRAND BALLROOM

Excellence in Aerospace Awards Luncheon*

Each year, the dedicated members of our technical committees come together to identify and elevate the best and brightest practitioners in their field. Join us as we celebrate the excellence of the members of our aerospace community.

**Proof of purchase 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.*

TECHNICAL EXCELLENCE AWARDS

2019 AIAA Aerodynamics Award
Robert Gregg, III, Chief Aerodynamicist, The Boeing Company, Mukilteo, Washington

In recognition of innovations in Aircraft Design through inspirational leadership and technical contributions in the field of Aerodynamic design and advanced concepts.

2019 AIAA Aerodynamic Measurement Technology Award
Marcus Aldén, Professor, Lund University, Lund, Sweden

For wide ranging and pioneering work in developing and applying laser diagnostic techniques, including linear and non-linear approaches, for study of fundamental and practical combustion.

2019 AIAA Aircraft Design Award
Robert Parks, Boeing Technical Fellow, Aurora Flight Sciences, A Boeing Company, San Jose, California

For a lifetime of novel and innovative aircraft designs including multiple prototypes and the Odysseus and eVTOL personal air vehicle.

2019 AIAA Chanute Flight Test Award
David Minto, Technical Director, 96th Test Group, Air Force Test Center, Holloman Air Force Base, New Mexico

For outstanding contributions to the art, science and technology of test flight engineering and the capabilities delivered in support of the nation's defense.

2019 AIAA Fluid Dynamics Award
Hermann Fasel, Professor, University of Arizona, Tucson, Arizona

For pioneering innovation and leadership for using computational fluid dynamics as a tool for the scientific analysis of hydrodynamic instability mechanisms, transition to turbulence, and active flow control.

2019 AIAA Ground Testing Award
James Heineck, Physical Scientist and **Edward Schairer**, Aerospace Engineer, NASA Ames Research Center, Moffett Field, California

In recognition of outstanding contributions to the areas of optical measurement technique development and implementation, flow visualization, and high-speed photography across the NASA ground test community.

2019 AIAA Hap Arnold Award for Excellence in Aeronautical Program Management
Charles Cross, Chief, Turbine Engine Division, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio

For exemplary management and technical leadership of the Versatile Affordable Advance Turbine Engines (VAATE) Program to advance turbine engine technology through focused research and development.

2019 AIAA Losey Atmospheric Sciences Award
Marcia K. Politovich, Deputy Director for Science, Aviation Application Program (Retired), National Center for Atmospheric Research, Boulder, Colorado

For her outstanding contributions in atmospheric science research dedicated to continuous improvement in aviation safety in general and in-flight icing in particular.

2019 AIAA Plasmadynamics and Lasers Award
James A. Horkovich, Senior Principal Engineer, AEgis Technologies, Albuquerque, New Mexico

For professional commitment and leadership, education and mentoring of scientist engineers, and distinguished contributions to science and innovation of directed energy systems.

2019 AIAA Theodor W. Knacke Aerodynamic Decelerator Systems Award
Ricardo "Koki" A. Machin, Chief Engineer for Capsule Parachute Systems, NASA Johnson Space Center, Houston, Texas

For excellence in the area of design, test, and certification of human rated capsule recovery parachutes enabling mankind to explore beyond the Earth.

RECOGNITION AND LECTURES

2019 AIAA Sustained Service Award
Anthony Springer, Director, Integration and Management Office, NASA Headquarters, Washington, D.C.

For decades of sustained service to the Institute in the areas of Membership, Technical Activities and Publications at all levels, from the Section to serving on the Board of Directors.

TECHNICAL BEST PAPERS

The following Technical Best Papers were identified by their related technical committees as the best in their field from prior forum presentations.

From the Aerospace Sciences Community

2019 AIAA Aerodynamic Measurement Technology Best Paper "Evaluation of Wavelet-Based Optical Flow Velocimetry from OH Scalar Fields in Reacting Turbulent Flows" (AIAA 2019-0270) by Bryan E. Schmidt and Jeffrey A. Sutton, Ohio State University, Columbus, Ohio, and Colin A. Towery and Peter Hamlington, University of Colorado Boulder, Colorado.

2019 AIAA Applied Aerodynamics Best Paper "Multipoint Aerodynamic Shape Optimization for Subsonic and Supersonic Regimes" (AIAA 2019-0696) by Marco Mangano and Joaquim Martins, University of Michigan, Ann Arbor.

2018 AIAA Atmospheric and Space Environments Best Paper "Experimental Studies of Ice Crystal Accretion on an Axisymmetric Body at Engine-Realistic Conditions" (AIAA 2018-4223) by Alexander Bucknell, University of Oxford.

2018 AIAA Atmospheric Flight Mechanics Best Paper "Rapid Load Calculations Using an Efficient Unsteady Aerodynamic Solver" (AIAA 2018-3621) by Daniel Kharlamov, Jernej Drofelnik, Andrea Da Ronch and Scott Walker, University of Southampton.

2018 AIAA Modeling and Simulation Best Paper "Human-in-the-Loop Study on Angle-of-Attack Indicator Effectiveness for Transport Category Airplanes" (AIAA 2018-2938) by Angela Campbell, Somil Shah, and Mark Reisweber, Federal Aviation Administration, and Lisa R. Le Vie, NASA Langley Research Center, Hampton, Virginia.

2018 AIAA Fluid Dynamics Best Paper "Evaluation of Thermoacoustic-based Forcing for Control of Dynamic Stall" (AIAA 2018-3683) by Stuart I. Benton and Miguel R. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, Ohio.

2018 Plasmadynamics and Lasers Best Paper "Parallel Vortex Body Interaction Enabled by Active Flow Control" (AIAA 2018-3521) by Andre Weingaertner, Philipp Tewes, and Jesse C. Little, University of Arizona.

2018 Plasmadynamics and Lasers Best Student Paper "Radar REMPI Diagnostic for Low Neutral Density Measurements of Xenon in Helium Buffer Gas: Experiments and Modeling" (AIAA 2018-3435) by Christopher A. Galea, Mikhail N. Shneider, and Arthur Dogariu, Princeton University, Princeton, New Jersey; Tat Loon Chng, École Polytechnique, Palaiseau, France; and Richard B. Miles, Texas A&M University, College Station, Texas.

2018 AIAA Thermophysics Best Papers

- "Uncertainty Analysis of Coaxial Thermocouple Calorimeters used in Arc Jets" (AIAA 2018-3770) by David M. Driver, Daniel Philippidis, and Imelda Terrazas-Salinas, NASA Ames Research Center.
- "Conjugate Analyses of Ablation in the HIPPO Nozzle"(AIAA 2018-3271) by Peter G. Cross, Naval Air Warfare Center Weapons Division; and Iain D. Boyd, University of Michigan.

2018 AIAA Thermophysics Best Student Paper
"Aerothermodynamic modelling of meteor entry flows in the rarefied regime" (AIAA 2018-4180) by Federico Bariselli, Vrije Universiteit Brussel; Stefano Boccelli, Technical University of Milan; Thierry Magin, von Kármán Institute for Fluid Dynamics; Aldo Frezzotti, Technical University of Milan; and Annick Hubin, Vrije Universiteit Brussel.

From the Aircraft Technology, Integration and Operations Community

2018 Aircraft Design Best Paper "HALE Multidisciplinary Design Optimization Part I: Solar-Powered Single and Multiple-Boom Aircraft" (AIAA 2018-3028) by Dorian Colas, Nicholas H. Roberts, and Vishvas S. Suryakumar, Facebook, Inc., Menlo Park, California.

2018 Air Transportation Systems/Aircraft Operations Best Papers

- "Fairness Metric-Based Trajectory Negotiation for Merging Air Traffic Management" (AIAA 2018-3039) by Sang Gyun Park, Parikshit Dutta, and P. K. Menon, Optimal Synthesis Inc.
- "Testing Enabling Technologies for Safe UAS Urban Operations" (AIAA 2018-3200) by Andrew Moore, Swee Balachandran, Steven D. Young, Evan T. Dill, Michael J. Logan, Louis J. Glaab, Cesar Munoz, and Maria Consiglio, NASA Langley Research Center.

From the Aerospace Design and Structures Community

2018 AIAA Multidisciplinary Design Optimization Best Paper
"Efficient Multi-Resolution Approaches for Exploration of External Aerodynamic Shape and Topology"(AIAA 2018-3952) by Laurence Kedward, Alexandre Payot, Thomas Rendall, and C.B. Allen, University of Bristol.

All these papers can be found online at the Aerospace Research Central (**arc.aiaa.org**). Thank you to the Technical Committees who took the time to judge these papers and recognize the ongoing advancement of our aerospace community.

1730–1830 HRS CORONADO BALLROOM
Fluid Dynamics Award Lecture

1730–1830 HRS PERIDOT
Flight Test Award Lecture

WEDNESDAY, 19 JUNE

1730–1830 HRS CORONADO BALLROOM
MDO Lecture

Raymond Kolonay, Air Force Research Laboratory

Student paper awards presentations will follow the lecture.

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.

SUNDAY, 16 JUNE

1830–1930 HRS **PEACOCK TERRACE**

Student Welcome Mixer

Mingle with your peers and hear from AIAA leadership! This networking event provides you with the opportunity to meet your fellow students and learn more about the opportunities available to you as an AIAA student member. *Proof of student registration is required. Appetizers will be provided, and a cash bar will be available.*

Sponsor: LOCKHEED MARTIN

MONDAY, 17 JUNE

0930–1000 HRS **PEACOCK TERRACE**

AVIATION 101

Discover how you can make the most of your week at AIAA AVIATION Forum while meeting fellow attendees. This orientation is ideal for first-time attendees, but all are welcome!

TUESDAY, 18 JUNE

1830–2000 HRS **EXPOSITION HALL, CHANTILLY BALLROOM**

Welcome Reception in the Exposition Hall

(Proof of Purchase Required)

Discuss the day's events and talk with exhibitors over drinks and light fare in the Exposition Hall. Enjoy a performance by Jon Christopher Davis, a multi-published singer-songwriter and recording artist. JCD's songs have been covered by major-label artists, such as Dolly Parton, Timothy B. Schmit of the Eagles, Billy Ray Cyrus, and Rodney Atkins. "Little Bird," recorded by Sherrie Austin, peaked at number 4 on Billboard's Top Country Singles Sales Chart.

Stay Fit at AVIATION

Stay fit with your fellow attendees! Join AIAA staff on **Tuesday, 18 June, and Thursday, 20 June, at 0600 hrs** at the East Atrium Lobby by the Concierge Desk for a run/walk. All levels area welcome for a 1-3 mile route.

WEDNESDAY, 19 JUNE

1830–2000 HRS **ANATOLE SCULPTURE PARK**

AIAA Backyard BBQ *(Proof of Purchase Required)*

Relax at the end of the day, breathe in the fresh summer air, and enjoy a taste of Texas complete with barbecue and cold brews in the outdoor Anatole Sculpture Park. (Note: Cash bar only. If weather does not cooperate, the event will be moved indoors.)

THURSDAY, 20 JUNE

1230–1400 HRS **EXPOSITION HALL, CHANTILLY BALLROOM**

Luncheon in the Exposition Hall *(Proof of Purchase Required)*

Meet with dozens of companies and network with fellow attendees over lunch in the Exposition Hall.

1830–2100 HRS **PEACOCK TERRACE**

ADS Banquet

(Proof of Purchase Required)

Join the Aerodynamic Decelerator Systems Technical Committee in honoring the 2019 Theodor W. Knacke Aerodynamic Decelerator Systems Award recipient, and the 2019 student paper finalists and winner.

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, 17 June	0900–0930 hrs | Chantilly Foyer 1600–1630 hrs | Chantilly Foyer
Tuesday, 18 June	0900–0930 hrs | Chantilly Foyer 1600–1630 hrs | Exposition Hall
Tuesday coffee sponsor:	SMARTSKY NETWORKS
Wednesday, 19 June	0900–0930 hrs | Exposition Hall 1600–1630 hrs | Exposition Hall
Thursday, 20 June	0900–0930 hrs | Exposition Hall 1600–1630 hrs | Exposition Hall
Friday, 21 June	0900–0930 hrs | Chantilly Foyer

EXPOSITION HALL

EXPOSITION HALL HOURS

TUESDAY, 18 JUNE

1300–1630 HRS
1830–2000 HRS — RECEPTION*

WEDNESDAY, 19 JUNE

0845–1630 HRS

THURSDAY, 20 JUNE

0845–1630 HRS

**Proof of purchase is required and included in the registration fee where indicated.*

AIAA FOUNDATION
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Please join our generous donors in advancing aerospace with your gift today. With your help, we will continue to inspire and support the next generation of aerospace professionals. Be sure to stop by the silent auction in the HUB as we have some really cool aerospace items up for bid!

Meet the Authors

LELAND M. NICOLAI
Lessons Learned and *Fundamentals of Aircraft and Airship Design*

Tuesday, 18 June	Coffee Break: 1600–1630 hrs
Wednesday, 19 June	Coffee Break: 0900–0930 hrs Coffee Break: 1600–1630 hrs

LOCKHEED MARTIN
The F-35 Lightning II: From Concept to Cockpit

Presentation in the HUB with book available for purchase.

Thursday, 20 June	1230-1300 hrs

JAMES HANSEN
First Man: The Life of Neil A. Armstrong

Discussion, book signing, and film screening party.

Thursday, 20 June	1330–1630 hrs

AIAA Publications Pavilion within the HUB

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

30% OFF ALL BOOKS

AIAA Publications is offering a special show discount on all titles featured at the AIAA AVIATION Forum. 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!

the HUB

DAILY PRIZE DRAWINGS — VISIT THE HUB TO ENTER!

Visit the HUB in the Exposition Hall to drop your business card for a chance at **winning one of three gift cards!** Visit daily to enter as prize entry collection restarts each morning with an empty box. You must drop a business card each day to have a chance to win each day!

- Prize 1 drawing at 1945 hrs on Tuesday during reception in Exposition Hall.
- Prize 2 drawing at 1600 hrs on Wednesday.
- Prize 3 drawing at 1600 hrs on Thursday.

Please drop only one entry (business card) per day! Mulitple entries will be removed. You do not need to be present to win, but you may claim your prize in the HUB while at 2019 AIAA AVIATION Forum.

EXPOSITION HALL FLOOR PLAN

THE VALUE OF

KNOWING TRUE PERSISTENCE IS MEASURED IN DAYS, NOT HOURS.

In today's environment of evolving threats, ISR mission flexibility means everything. Only Northrop Grumman's Global Hawk offers a proven high-altitude, long endurance solution for our customers' constantly evolving requirements. With over 30 hours of uninterrupted flying time, flexible sensor payloads and cutting-edge open mission systems architecture, Global Hawk handles complex warfighter demands for less. ***That's why we're a leader in the future of autonomous systems.***

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the HUB

where great minds gather

The HUB is open Tuesday–Thursday during Exposition Hall hours!

This multi-use area built into the heart of AIAA expositions will feature many attendee-favorite activities like Q&A with keynote speakers, innovative programming, a silent auction and features such as design challenges, charging stations, a lounge area, and more.

Check out the complete schedule of activities:
aiaa.org/aviationthehub

Need to identify a place to meet up with friends?
Make the HUB that place!

HIGHLIGHTED SESSIONS

- Launch into AIAA Membership
- Paper Airplane Contest and Design Challenge
- Meet the Employers
- F-35 Lightning II Discussion
- Frontiers of Flight Presentation
- *First Man* Screening with James Hansen

Schedule subject to change.

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EXHIBITORS BY BOOTH NUMBER

310 **Aerion Supersonic ★**

603 **Aeronomics, Inc.**

220 **AeroTEC ★**

223 **AIAA North Texas Chapter**

515 **Air Force Research Laboratory**

602 **Airborne Systems ★**

403 **Airbus ★**

316 **Arnold Engineering Development Complex (AEDC)**

103 **Aurora Flight Sciences, A Boeing Company ★**

521 **Bell ★**

513 **BETA CAE Systems USA, Inc.**

203 **Boeing Technology Services ★**

224 **Central Intelligence Agency**

425 **DEWESoft LLC**

325 **Ennova Technologies**

505 **ESTECO**

324 **Faiteve Incorporated**

424 **G.R.A.S. Sound & Vibration**

509 **IC2 (Interdisciplinary Consulting Corp)**

517 **Kulite Semiconductor Products, Inc.**

221 **LaVision, Inc.**

609 **M4 Engineering, Inc. ★**

210 **MathWorks**

322 **Metacomp Technologies ★**

214 **NASA (HQ)**

616 **National Technical Systems ★**

503 **nTopology**

525 **PCB Piezotronics, Inc.**

612 **Phoenix Integration, Inc.**

211 **Photron**

314 **Pointwise, Inc. ★**

608 **Sensuron**

524 **SmartSky Networks, LLC ★**

507 **Tecplot ★**

222 **ZONA Technology Inc.**

★ *AIAA Corporate Member Company*

EXHIBITORS

Aerion Supersonic — 310

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Aerion, the industry leader in supersonic travel, is pioneering a new generation of efficient, economical, and environmentally responsible supersonic aircraft. The Mach 1.4 AS2 business jet is scheduled to begin flight testing in 2023. Aerion entered into a partnership with Boeing in February 2019 to develop the AS2 and advance the supersonic market. In October 2018, Aerion and GE Aviation unveiled the quiet and efficient GE AffinityTM engine, the first supersonic engine in more than 50 years.

Aeronomics, Inc. — 603

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Aeronomics is small business providing advanced solutions to system engineering design problems. Founded in 2017, our team of industry recognized experts excels in the areas of thermal protection systems, hypersonic aerothermodynamics, thermostructural analysis, electronics thermal management, flight test and evaluation, and aerothermal ground test and evaluation, strategic simulation planning, threat modeling, hypersonic missile systems, and integrated defense architecture characterization.

AeroTEC — 220

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AIAA North Texas Chapter — 223

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Air Force Research Laboratory — 515

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Air Force Research Laboratory (AFRL) is the only Air Force organization wholly dedicated to leading the discovery, development, and integration of warfighting technologies for the nation's air, space, and cyberspace forces.

Airborne Systems — 602

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Airborne Systems is a world leader in the design, development, and manufacture of best-of-class parachutes for space and air vehicle recovery systems, deceleration systems for high-performance aircraft, military, personnel, and cargo parachute systems as well as airbags, weapons delivery systems and ordnance flare chutes.

Airbus — 403

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EXHIBITORS

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The Arnold Engineering Development Complex (AEDC) conducts developmental test and evaluation of weapon, propulsion, aerodynamic and space systems for the Nation through modeling, simulation, ground and flight test. Team AEDC seeks to be the Nation's best value test and analysis source for aerospace and defense systems. AEDC is part of the Air Force Test Center, an Air Force Materiel Command organization.

Aurora Flight Sciences, A Boeing Company 103

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Aurora Flight Sciences, A Boeing Company is an innovative technology company which strives to create smarter aircraft through the development of versatile and intuitive autonomous systems. Operating at the intersection of technology and robotic aviation, Aurora leverages the power of autonomy to make manned and unmanned flight safer and more efficient. Headquartered in Manassas, Virginia, Aurora has more than 550 employees and operates in six locations

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BETA CAE Systems USA, Inc. 513

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BETA CAE Systems USA, Inc, est. 1997, is an engineering company based in Farmington Hills Michigan. For over 20 years it has been known for its distribution of the ANSA and META Software Suite and continued commitment to offering industry leading software support and services. In addition to this, the company also provides consulting services in high-end Finite Element modeling and analysis, and places specialists for contract positions on client sites.

Boeing Technology Services 203

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Faiteve Inc is the first company to promote the recent breakthrough discovery in aircraft nonlinear dynamics. It published the book, Nonlinear Instability and Inertial Coupling Effects - The Root Causes Leading to Aircraft Crashes, Land Vehicle Rollovers, and Ship Capsizes. The nonlinear inertial coupling terms which have been neglected completely in the aircraft rotational dynamic equations in the industry have been proved to cause many aircraft crashes using their FDR data in the book.

G.R.A.S. Sound & Vibration 424

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IC2 (Interdisciplinary Consulting Corp) 509

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LaVision, Inc. 221

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www.lavision.com

LaVision provides integrated measurement systems for experimental fluid dynamics, combusting and multiphase flows,

EXHIBITORS

material characterization, and in cylinder measurement. LaVision is the market leader in image based measurement systems playing a pioneering role in the development of techniques such as PIV, LIF, DIC and BOS. LaVision stays at the forefront of measurement science strives for customer satisfaction.

M4 Engineering, Inc. 609

Dan J. Abir
4020 Long Beach Blvd, Floor 2
Long Beach, CA 90807
Phone: 562-735-3803
Email: dabir@m4-engineering.com

M4 Engineering works with a broad range of customers in aerospace and other industries. Inventors, through cutting edge startups, and established OEM's and their supply chains, come to us to solve "the unsolvable" problems, while saving time and money. We combine state-of-the-art software development with expertise in multidisciplinary design analysis and optimization (MDAO) helping our customers solve the most complex problems. Working together, we can help you save time and reduce the costs associated with the design, analysis, optimization and fabrication of high-performance systems/structures typically found in Urban Air Mobility/eVTOL, Flying cars, Electric and Supersonic Aircraft, Unmanned and Autonomous Vehicles. We provide Conceptual Design, Weight Prediction, Aeroelasticity and Loads, Aerodynamic Performance, Flutter and Blade/Rotor services and software.

MathWorks 210

Greg Drayer Andrade
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Natick, MA 01760
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mathworks.com

The MATLAB and Simulink product families are fundamental applied math and computational tools adopted by more than 5000 universities and colleges. MathWorks products help prepare students for careers in industry, where the tools are widely used for data analysis, mathematical modeling, and algorithm development in collaborative research and new product development.

Metacomp Technologies 322

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www.metacomptech.com

Metacomp Technologies is at the forefront of cutting edge simulation technology with software products for Computational Fluid Dynamics ICFD++, Aero-Acoustics ICAA++, Mesh Generation IMIME and Structural Mechanics ICSM++ including MetaFSI for fluid-structure interactions. Founded in 1994 by pioneers in CFD, validated by industry, government institutions, and universities worldwide, and with an unparalleled reputation for high-level support, Metacomp will be an Integral part of your success.

NASA (HQ) 214

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National Technical Systems 616

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Computational engineering software for design, simulation, & advanced manufacturing.

PCB Piezotronics, Inc. 525

Jennifer Gadomski
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Depew, NY 14043
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PCB Piezotronics Inc. is a designer and manufacturer of microphones, vibration, pressure, force, torque, load, and strain sensors, as well as the pioneer of ICP® technology. This instrumentation is used for flight testing, wind tunnels, modal analysis, satellite testing and acoustics for cabin noise. PCB® stands behind their products with the valuable services, including a 24-hour SensorLines, a global distribution network, and the industry's only commitment to Total Customer Satisfaction.

EXHIBITORS

Phoenix Integration, Inc. 612

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Phoenix Integration's ModelCenter® is the environment for Model Based Engineering. ModelCenter® is a vendor-neutral software framework for creating and automating multi-tool workflows, optimizing product designs, and enabling Model Based Systems Engineering (MBSE). It is used by leading organizations worldwide to reduce development costs, improve engineering efficiency, stimulate innovation, and design more competitive products.

Photron 211

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San Diego, CA 92126
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Email: Jennifer@photron.com

Photron's wide range of light sensitive high-speed cameras including systems ideally suited to PIV and DIC, mega pixel to 21,000 frames per second (fps) and 4M pixels producing HD to 2,000fps. Photron has a slow-motion camera for every application.

Pointwise, Inc. 314

Travis Carrigan
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Email: sales@pointwise.com
www.pointwise.com

Pointwise, Inc. is solving the top problem facing computational fluid dynamics (CFD) today – reliably generating high-fidelity meshes. The Pointwise software generates structured, unstructured, overset and hybrid meshes; interfaces directly with CFD solvers; utilizes native CAD geometry; runs on Windows, Linux, and Mac; and has a scripting language for automation. More information about Pointwise is available at www.pointwise.com.

Sensuron 608

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www.sensuron.com

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SmartSky Networks, LLC 524

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SmartSky Networks is transforming inflight connectivity by launching the most secure air-to-ground network to deliver the most compelling user experience. Working with leading aerospace and technology partners, SmartSky's network employs patented spectrum reuse, advanced beamforming technologies and 60 MHz of spectrum to produce high speeds and low latency comparable to ground-based service. This real-time, bidirectional data link makes SmartSky a key enabler for the new and enhanced apps, services, and hardware that will usher in the digitization of the aviation industry.

Tecplot 507

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Bellevue, WA 98006
Phone: 425-460-8290
Email: m.connelly@tecplot.com
www.tecplot.com

Tecplot empowers those working fluid dynamics to discover, analyze and understand information in complex data. Whether performing simulations or experiments, visualization provides insight and understanding hidden inside your data. This information can be critical in pinpointing and solving problems, optimizing designs, and in explaining physical observations. Professional, high-resolution images and animations can be exported to help you effectively communicate your results to others.

ZONA Technology Inc. 222

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ZONA Technology, Inc. provides the aerospace community with commercialized software in the areas of Aeroelasticity, Aeroservoelasticity, Aerothermoelasticity, Structure Optimization, Multidisciplinary Design and Optimization and Flight Loads. Current ZONA software consist of: ZAERO, ZEUS, ZONAIR, ZMORPH, ZAMS, and ASTROS. ZMORPH is a recent addition that provides the ability to morph Structural Finite Element or Computational Fluid Dynamics mesh geometries during multidisciplinary optimization.

GENERAL INFORMATION

AIAA Registration and Information Center Hours

The AIAA Registration and Information Center will be located in the Chantilly Foyer. Hours are as follows:

Sunday, 16 June:	1500–1900 hrs
Monday, 17 June – Thursday, 20 June:	0700–1730 hrs
Friday, 21 June:	0700–1300 hrs

ITAR Registration Hours:

Sunday, 16 June	1500-1900 hrs	Chantilly Foyer
Monday, 17 June	0900–1730 hrs	Chantilly Foyer
Tuesday, 18 June	0700–1630 hrs	Morocco Room Foyer
Wednesday, 19 June	0800–1200 hrs	Morocco Room Foyer

Wi-Fi Internet Access On Site

AIAA provides limited Wi-Fi service for attendees to use while onsite. 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.

Network Name: **AIAA AVIATION** Password: **AVIATION19**

AIAA Livestream Channel

Visit **https://livestream.com/AIAAvideo/aviation2019** 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.

Social Media at #aiaaAVIATION

Watch the social media kiosks spaced throughout the forum for announcements and content shared by attendees using the hashtag #aiaaAVIATION.

Win prizes including gift cards. See contest official rules: **https://www.aiaa.org/aviation/SocialMedia**

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 17 June 2019. Please follow the instructions below to access the proceedings:

1. To view proceedings visit **aiaa.org** >ARC>Meeting Papers.
   a. Log in with the link at the top right of the page.
   b. To browse, click on the **Meeting Papers** link at the top of the page and select the appropriate conference from the list.
   c. To search for individual papers, use the **Quick Search** toolbar at the top:
      i. Use the **Search** textbox to find papers by author, title or keyword
      ii. To search by paper number - click the **Anywhere** drop down, select **Find by Paper**, select the conference year, and enter the paper number
2. All manuscript files submitted four days prior to the conference are currently in the proceedings.
3. Direct any questions concerning access to proceedings and/or ARC to **arcsupport@aiaa.org**.

Manuscript Corrections

Check for updates

1. The manuscript in the proceedings is the version of record and may not be edited. All changes will be available through the Crossmark feature. View corrections by clicking the Crossmark icon, located on every article's page and PDF. Please visit **arc.aiaa.org/page/crossmark** for more information.
2. Corrections will be available online approximately 15 business days after the last day of the conference.

Certificate of Attendance

The Certificates of Attendance will be sent to all registered attendees on Friday, 21 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 **careercenter.aiaa.org**.

Membership

AIAA is a great resource for networking with other aerospace professionals, continuing your education, staying up to date on the latest news, and furthering your career. Aerospace is a field where Membership Matters. Regardless of what aerospace area you are involved with, being an active member of AIAA can accelerate and strengthen your professional life. Don't miss any of the benefits that come with being a part of the largest professional association built by and for aerospace practitioners. **aiaa.org/membership**

Continue the Conversation on Engage

Just because the forum ends, the conversation doesn't have to end too. AIAA Engage allows you to connect with a community of nearly 30,000 of your AIAA colleagues online. Continue your conversations from the forum on the Engage platform. Discuss the sessions, connect with attendees you met at the forum, and share your experiences. Visit **engage.aiaa.org** to start connecting.

Badge Policy

AIAA forum badges are provided to those individuals who have paid for a registration to the event. Badges must be worn at all times to participate in all forum activities. Badges are not provided at the registration desk for committee meeting attendance. To obtain an AIAA AVIATION Forum badge, one must register for the forum.

Nondiscriminatory Practices

AIAA accepts registrations irrespective of age, race, creed, sex, sexual orientation, color, physical handicap, and national or ethnic origin.

Restrictions

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

GENERAL INFORMATION

AIAA Photography and Video Notice

Attendance at, or participation in, this American Institute of Aeronautics and Astronautics (hereinafter "AIAA") event constitutes consent to the use and distribution by AIAA and its employees, agents and assignees of the attendee's image and/or voice for purposes related to the mission of AIAA, including but not limited to, publicity, marketing, other electronic forms of media, and promotion of AIAA and its various programs and events. Please contact AIAA's Communications Director John Blacksten at johnb@aiaa.org with requests or questions.

Anti-Harrassment Policy

All attendees, including members, students, guests, staff, organizers, exhibitors, and speakers, must adhere to the Institute's Anti-Harassment Policy found at **aiaa.org/Anti-Harassment-Policy.**

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.

AUTHOR AND SESSION CHAIR INFORMATION

Speakers' Briefing 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 Speakers' Briefing preparation slides will be provided in each session room. Speakers' Briefings will be held, **Monday, 17 June–Friday, 21 June: 0730 hrs.**

Speakers' Practice Room

Speakers who wish to practice their presentations may do so in the **Senators Lecture Hall**. 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 at **gocanvas.com/m**. If you do not have a tablet or a smartphone, 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, 21 June 2019**.

Audiovisual

Each session room will be preset with the following: Laptop computer, LCD projector, screen, microphone and sound system (if necessitated by room size), and a laser pointer. You may use your own laptop if you wish. 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" Policies

If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the forum. It is also the responsibility of those authors whose papers or presentations are accepted to ensure that a representative attends the forum to present the paper. If a paper is not presented at the forum, it will be withdrawn from the forum proceedings. These policies are intended to eliminate no-shows, to improve the quality of the forum for all participants, and to ensure that the published proceedings accurately represent the presentations made at a forum.

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**.

COMMITTEE MEETINGS

TIME	COMMITTEE AND ANCILLARY MEETINGS/EVENTS	ROOM
	Sunday, 16 June	
1300-1700	**ATIO Group Workshop**	Sapphire
1400-1500	**APATC New Member Orientation**	101 (28th Floor)
1400-1500	**GTTC Steering**	Monet
1430-1500	**APATC Liaison Subcommittee Meeting**	109 & 110 (28th Floor)
1500-1530	**GTTC New Members / Intro**	Monet
1500-1600	**APATC Education Subcommittee**	101 (28th Floor)
1500-1600	**APATC Honors and Awards Subcommittee**	109 & 110 (28th Floor)
1500-1600	**APATC Membership Subcommittee**	119 (28th Floor)
1500-1600	**APATC Publicity and Publications Subcommittee**	114 & 115 (28th Floor)
1500-1600	**APATC Planning Subcommittee**	124 (28th Floor)
1530-1630	**GTTC Program**	Monet
1600-1700	**APATC Technical Activities**	126 (28th Floor)
1630-1700	**GTTC Awards**	Monet
1700-1730	**GTTC Conferences**	Monet
1700-1800	**APATC Steering Committee**	114 & 115 (28th Floor)
1730-1800	**GTTC Education & Student Activities**	Monet
1730-2030	**Pointwise 25th Anniversary Reception**	De La Salle
1800-1830	**GTTC Membership**	Monet
1800-2200	**Applied Aerodynamics Technical Committee**	Metropolitan
1830-1900	**GTTC Publications**	Monet
1900-1930	**GTTC Standards**	Monet
1900-2030	**FDTC Transition Discussion Group**	Monte Carlo
1900-2200	**ATIO Group Meeting**	Emerald
	Monday, 17 June	
0900-1200	**GTTC Internal Strain Gage Balance Working Group**	Ming
1200-1500	**Aerospace Sciences Group**	Monte Carlo
1200-1500	**General Aviation Technical Committee**	De La Salle
1245-1345	**FDTC New Members Orientation**	Peacock Terrace
1300-1400	**Lighter-Than-Air Technical Committee**	Opal
1400-1600	**GTTC Creating an Aerospace Workforce Community of Practice**	Sapphire
1400-1600	**GTTC Model Deformation Working Group**	101 (28th Floor)
1730-1830	**FDTC Non-Equilibrium Discussion Group**	Opal
1730-1900	**APATC Aerodynamic/Propulsive Discussion Group**	Monte Carlo
1730-1900	**FDTC Turbulence Model Benchmarking Discussion Group**	Madrid
1730-2100	**Transformational Flight Integration and Outreach Committee**	Topaz
1800-1900	**HyTASP TC Steering Committee**	Metropolitan
1800-1930	**APATC/FDTC Flow Control Applications and Impacts Discussion Group**	De La Salle
1800-1930	**APATC Simulation of Rotor in Hover Discussion Group**	101 (28th Floor)
1830-1930	**FDTC Solver Technology for Turbulent Flows**	Lalique
1830-1930	**FDTC Uncertainty Quantification Discussion Group**	Manchester
1830-2130	**Aircraft Operations Technical Committee Meeting**	109 & 110 (28th Floor)
1830-2200	**Aircraft Design Technical Committee**	Monet
1900-2000	**FDTC Large Datasets in Fluid Dynamics Discussion Group**	Steuben

COMMITTEE MEETINGS

TIME	COMMITTEE AND ANCILLARY MEETINGS/EVENTS	ROOM
1900-2000	**FDTC Reduced Complexity Flow Modeling & Analysis Discussion Group**	Peridot
1900-2000	**FDTC Theoretical Fluid Mechanics Discussion Group**	114 & 115 (28th Floor)
1900-2030	**APATC Sailplane Aerodynamics & Design Discussion Group**	Opal
1900-2030	**APATC Collaborative Experiments & Computations Discussion Group**	Travertine
1900-2100	**FDTC High-Speed Fluid-Structure Interaction Discussion Group**	Sapphire
1900-2100	**3rd AIAA Geometry and Mesh Generation Workshop (GMGW-3) Meeting**	Ming
1900-2100	**Modeling and Simulation Technical Committee**	Emerald
1900-2200	**Air Transportation Systems Technical Committee**	Morocco
1900-2200	**HyTASP Technical Committee**	Metropolitan
1930-2030	**FDTC Large Eddy Simulation (LES) Discussion Group**	Obelisk A
1930-2030	**FDTC High-Order Methods Algorithms Discussion Group**	Obelisk B
1930-2100	**FDTC Massively Separated Flows Discussion Group**	Monte Carlo
1930-2200	**CFD 2030 Integration Committee**	Miro
2000-2100	**AMT Conferences Subcommittee**	Milan
2100-2200	**AMT Awards and Nominations Subcommittee**	Milan
	Tuesday, 18 June	
0800-1200	**GTTC Model Attitude Meas Working Group**	Desoto A
0900-1100	**GTTC Utilizing Computational Modeling and Methods to improve Experimental Ground Testing**	Monte Carlo
0930-1130	**Certification/Qualification by Analysis COI Steering Committee**	Monet
1300-1500	**AIAA Standards Steering Committee (SSC)**	Monet
1400-1600	**GTTC Flow Quality Working Group**	Opal
1600-1630	**Thermophysics TC - Best Paper Subcommittee**	109 & 110 (28th Floor)
1600-1630	**Thermophysics TC Publications Subcommittee**	101 (28th Floor)
1630-1700	**Thermophysics TC Awards Subcommittee**	Monte Carlo
1630-1730	**FDTC Computational Methods for High-Speed Multiphase Flows**	Sapphire
1700-1730	**Thermophysics TC - Nominations Subcommittee**	109 & 110 (28th Floor)
1700-1900	**AIAA Computational Fluid Dynamic CoS**	Monet
1730-1800	**Thermophysics TC - Education Subcommittee**	114 & 115 (28th Floor)
1730-1830	**APATC Missile and Projectile Aeroprediction Discussion Group**	Monte Carlo
1730-1900	**MVCE Meshing Working Group**	Ming
1800-1830	**Thermophysics TC - Publicity Subcommittee**	109 & 110 (28th Floor)
1800-1900	**APATC Stability and Control Discussion Group**	Sapphire
1830-1900	**Thermophysics TC - Emerging Technologies Subcommittee**	114 & 115 (28th Floor)
1900-1930	**Thermophysics TC - Conferences Subcommittee**	109 & 110 (28th Floor)
1900-2100	**Meshing Subcommittee**	Milan
1900-2100	**Unmanned Systems Integration Committee**	De La Salle
1900-2100	**FDTC Flow Control and Fluid Applications SC**	Monte Carlo
1900-2100	**FDTC CFD Methods SC**	Madrid
1900-2100	**FDTC Fundamentals of Flow Phenomena SC**	Opal
1900-2200	**Plasmadynamics and Lasers Technical Committee**	Manchester
1930-2200	**Thermophysics Technical Committee**	Metropolitan
2000-2200	**Aerodynamic Measurement Technology (AMT) Technical Committee**	Morocco

COMMITTEE MEETINGS

TIME	COMMITTEE AND ANCILLARY MEETINGS/EVENTS	ROOM
	Wednesday, 19 June	
0800-1200	**GTTC High Speed Wind Tunnel Calibration Working Group**	De La Salle
0900-1200	**GTTC Dual Flow Reference Nozzle Working Group**	Wyeth
0900-1200	**Certification/Qualification by Analysis COI (Section Leaders/Writers)**	Topaz
1100-1200	**2020 AVIATION Forum Technical Program Committee**	Monet
1230-1400	**FDTC Steering Committee**	Monte Carlo
1300-1600	**GTTC Uncertainty Standard Working Group**	De La Salle
1530-1700	**Lockheed Martin Aeronautics Company Meeting**	Monet
1700-1830	**APATC Low Boom Discussion Group**	Monte Carlo
1730-1900	**APATC CFD Transition Modeling Discussion Group**	De La Salle
1730-2000	**APATC High Lift Common Research Model Applications Discussion Group**	Topaz
1800-2100	**Atmospheric and Space Environments Technical Committee**	Desoto B
1800-2100	**VSTOL Aircraft Systems Technical Committee**	Peacock Terrace
1800-2100	**Flight Test Technical Committee**	Peridot
1830-2130	**Multidisciplinary Design Optimization Technical Committee**	Monet
1830-2130	**Design Engineering Technical Committee**	Opal
1900-2100	**Meshing, Visualization and Computational Environments Technical Committee**	Monte Carlo
1900-2200	**Fluid Dynamics Technical Committee Plenary**	Sapphire
	Thursday, 20 June	
0800-1200	**GTTC Future of Ground Test Working Group**	Desoto B
0900-1200	**GTTC Statistically Defensible Test Methods Focus Group**	Monte Carlo
0900-1200	**GTTC Recommended Practice; Wind Tunnel Focus Group**	Monet
0930-1100	**Certification/Qualification by Analysis COI - Open Meeting**	De La Salle
1730-2130	**GTTC Committee Meeting**	Metropolitan
1900-2100	**Geometry Modeling Working Group**	Monte Carlo
1900-2200	**Aerospace Traffic Management Integration Committee**	De La Salle
	Friday, 21 June	
0900-1030	**Aerodynamic Decelerator Systems Technical Committee**	Monte Carlo

Sunday

Sunday, 16 June 2019		
1-NW-1 1530 - 1700 hrs	Ignite the "Meet"ing	Peacock Terrace

Sunday, 16 June 2019		
2-NW-2 1700 - 1830 hrs	Meet the Employers Recruiting Event	Wedgewood Ballroom

Sunday, 16 June 2019		
3-RLA-1 1700 - 1800 hrs	RLA and Aircraft Technology, Integration and Operations Meet & Greet	Tower Mezzanine Foyer

Sunday, 16 June 2019		
4-NW-3 1830 - 1930 hrs	Student Welcome Mixer	Peacock Terrace

Monday

Monday, 17 June 2019		
5-SB-1 0730 - 0800 hrs	Monday Speaker Briefing	Session Rooms

Monday, 17 June 2019		
6-PLNRY-1 0800 - 0900 hrs	Monday Plenary: Living in the Age of Airplanes	Grand Ballroom

Moderator: Amanda Simpson, Vice President, Research and Technology, Airbus Americas Inc.

Keynote Speaker
Brian J. Terwilliger
Producer and Director

Monday, 17 June 2019		
7-NW-4 0900 - 0930 hrs	AVIATION 101	Peacock Terrace

Monday, 17 June 2019		
8-NW-5 0900 - 0930 hrs	Networking Break	Technical Session Foyers

Monday, 17 June 2019						
9-ACD-1	Aircraft Performance Methods I					Inverness
Chaired by: I. CHAKRABORTY, Auburn University and D. LEVY, Sierra Nevada Corporation						
0930 hrs AIAA-2019-2800 **Sizing of LEVCON Surface for Turn Performance and Controllability** R. Pillai, H. Patel, University of Texas, Arlington, Arlington, TX	1000 hrs AIAA-2019-2801 **Energy-Based Sizing and Mission Performance Analysis Approach for Novel Flight Vehicle Concepts** I. Chakraborty, R. Hartfield, Auburn University, Auburn, AL; V. Ahuja, Research in Flight, Auburn, AL	1030 hrs AIAA-2019-2802 **Evaluating Optimal Paths for Aircraft Subsystem Electrification in Early Design** M. Bendarkar, D. Rajaram, Y. Cai, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1100 hrs AIAA-2019-2803 **A Methodology to Evaluate Electric Environmental Control System Impact on Aircraft Drag and Mission Performance** C. Crabé, A. Joksimovic, E. Benichou, X. Carbonneau, Higher Institute of Aeronautics and Space, Toulouse, France			

Monday, 17 June 2019						
10-ACD-2	**Aircraft Requirements Studies I**					**Fleur De Lis B**
Chaired by: R. PEREZ, Royal Mil College of Canada and J. MERRET, University of Illinois at Urbana-Champaign						
0930 hrs AIAA-2019-2804 **An Evaluation of the Potential of Local Electric Power Packages on Aircraft Fleet Level** R. Doering, F. Thielecke, Hamburg University of Technology, Hamburg, Germany	1000 hrs AIAA-2019-2805 **Study of Aircraft with Hybrid Laminar Flow Control Based on Exergy Analysis** Y. Yanagimoto, K. Rinoie, University of Tokyo, Tokyo, Japan					

Monday, 17 June 2019		
11-ADS-1 **0930 - 1230 hrs**	**Advancements in Parachute Materials**	**Plum Blossom A**

Advancements in parachute material processing and understanding are always of value to the parachute design community. Material experts have been invited to participate in a panel discussion on recent advancements and studies that have been performed in industry. Time will be reserved for audience questions after the panel.

Panelists:

Peter Hill
Director of Woven Fabrics
Heatcoat Fabrics Limited

Dick Bohannon
Product Development Manager
Bally Ribbon Mills

Forrest Sloan
Manager of International Marketing, Vectran Fiber Division
Kuraray America, Inc.

Monday, 17 June 2019						
12-AMT-1/GT-1	**Advanced Measurement Techniques in Wind Tunnel Testing I**					**Desoto A**
Chaired by: E. HUBBARD, NASA Glenn Research Center and E. SCHUCH, Calspan						
0930 hrs AIAA-2019-2806 **Shape and Angle-of-Attack Measurements of Ram-Air Parachutes by Stereo Photogrammetry in the National Full-Scale Aerodynamics Complex** E. Schairer, J. Heineck, L. Kushner, NASA Ames Research Center, Moffett Field, CA; K. Desabrais, K. Bergeron, Army Research, Development and Engineering Command, Natick, MA; J. Ellerbee, National Full-Scale Aerodynamics Complex (NFAC), Moffett Field, CA; et al.	1000 hrs AIAA-2019-2807 **Cryogenic Angle Measurement at NASA Langley** K. Toro, P. Parker, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2019-2808 **Characterization of Laminar Separation Bubbles Using Infrared Thermography** D. Wynnychuk, S. Yarusevych, University of Waterloo, Waterloo, Canada	1100 hrs AIAA-2019-2809 **Development of A Dual-Component Phosphor System for Simultaneous Pressure and Temperature Measurements in High Temperature Environment** Y. Li, T. Cai, D. Peng, X. Zhao, Y. Liu, Shanghai Jiao Tong University, Shanghai, China	1130 hrs AIAA-2019-2810 **Lagrangian Coherent Structures in Unsteady Airfoil Wakes** B. Harter, G. Altamirano, W. Zhu, M. McCrink, J. Gregory, J. Bons, Ohio State University, Columbus, OH	1200 hrs AIAA-2019-2811 **Characterization of a Fully-Differential, Dual-Axis, Capacitive Wall Shear Stress Sensor System for Low-Speed Wind Tunnels** D. Mills, W. Patterson, Interdisciplinary Consulting Corporation, Gainesville, FL; B. Freidkes, University of Florida, Gainesville, Gainesville, FL; C. Keane, Sandia National Laboratories, Albuquerque, NM; M. Sheplak, University of Florida, Gainesville, Gainesville, FL	

Monday, 17 June 2019						
13-APA-1	**Special Session: Waverider Technology Development**					**Cortez C**
Chaired by: R. GRAVES, Air Force Research Laboratory and J. MAXWELL, Naval Research Laboratory						
0930 hrs AIAA-2019-2812 **Design of a Sounding Rocket Flight Experiment to Validate Transonic Drag Minimized Waveriders (Invited)** P. Rodi, Rice University, Houston, TX; H. Stoldt, C. Hill, C. Johansen, University of Calgary, Calgary, Canada	1000 hrs AIAA-2019-2813 **Validation of a Crossflow Velocity Model Between Waverider Flowfield Planes (Invited)** J. Clegg, P. Rodi, A. Meade, Rice University, Houston, TX	1030 hrs Oral Presentation **Transverse Jet Effectiveness on a Waverider Configuration (Invited)** K. Kontis, E. Erinc, University of Glasgow, Glasgow, United Kingdom	1100 hrs AIAA-2019-2814 **Reduced-Order Modeling of Waverider Entry Vehicles (Invited)** J. Maxwell, Naval Research Laboratory, Washington, D.C.			

Monday, 17 June 2019						
14-APA-2	**Special Session: Low Speed and Motorless Flight**					**Cortez D**
Chaired by: J. MILGRAM, US Navy and M. MAUGHMER, Pennsylvania State University						
0930 hrs AIAA-2019-2815 **Flight Testing Stability and Controllability Otto Lilienthal's Monoplane Design from 1893 (Invited)** M. Raffel, F. Wienke, A. Dillmann, German Aerospace Center (DLR), Göttingen, Germany	1000 hrs AIAA-2019-2816 **Aerodynamic Design of a Morphing Wing Sailplane (Invited)** J. Achleitner, Technical University of Munich, Munich, Germany; K. Rohde-Brandenburger, P. Rogalla von Bieberstein, German Aerospace Center (DLR), Brunswick, Germany; F. Sturm, M. Hornung, Technical University of Munich, Munich, Germany	1030 hrs AIAA-2019-2817 **Studies of Anisotropic Wing Shell Concepts for a Sailplane with a Morphing Forward Wing Section (Invited)** F. Sturm, J. Achleitner, M. Hornung, Technical University of Munich, Garching, Germany	1100 hrs AIAA-2019-2818 **Flight Trajectory Optimization of a Sailplane after Rope Break during Tow-Assisted Takeoff (Invited)** A. Collazo Garcia, P. Ranjan, K. James, P. Ansell, University of Illinois, Urbana-Champaign, Urbana, IL	1130 hrs AIAA-2019-2819 **Stability and Stability Augmentation of Dynamic Soaring Orbits (Invited)** B. Swaminathan, Indian Institute of Technology Madras, Chennai, India		

Monday, 17 June 2019						
15-APA-3	**Transonic Aerodynamics**					**Cortez A**
Chaired by: J. GREGORY, The Ohio State University and J. HOWISON, The Citadel						
0930 hrs AIAA-2019-2820 **Reynolds Number Effects on Wing Shock Buffet Unsteadiness** L. Masini, S. Timme, University of Liverpool, Liverpool, United Kingdom; A. Peace, Aircraft Research Association, Ltd., Bedford, United Kingdom	1000 hrs AIAA-2019-2821 **A Methodology for Buffet Boundary Prediction via CFD and Vortex Generators Effects** G. Becker, G. Filho, R. Granzoto, Embraer, São José dos Campos, Brazil	1030 hrs AIAA-2019-2822 **Wing Shape Improvement in the Presence of an Over-the-Wing Mounted UHBR Engine for a Short Range Transport Aircraft** F. Lange, R. Rudnik, German Aerospace Center (DLR), Braunschweig, Germany				

Monday, 17 June 2019						
16-APA-4	**Rotary-Wing and Propeller Aerodynamics**					**Cortez B**
Chaired by: P. VENTURA DIAZ, NASA Ames Research Center and M. BRONZ, ENAC						
0930 hrs AIAA-2019-2823 **A Hybrid Blade Element Momentum Model for Flight Simulation of Rotary Wing Unmanned Aerial Vehicles** B. Davoudi, K. Duraisamy, University of Michigan, Ann Arbor, Ann arbor, MI	1000 hrs AIAA-2019-2824 **Simulation and validation of the aerodynamic performance of a quadcopter in hover condition using overset mesh** J. Céspedes, O. Lopez, University of the Andes, Bogota, Colombia	1030 hrs AIAA-2019-2825 **Simulations of Ducted and Coaxial Rotors for Air Taxi Operations** P. Ventura Diaz, NASA Ames Research Center, Moffett Field, CA; R. Caracuel Rubio, University of Illinois, Urbana-Champaign, Urbana, IL; S. Yoon, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2019-2826 **Flight Dynamics of Boomerangs: Impact of Reversal of Airflow, Reversal of Angle-of-Attack and Asymmetric Lift** P. Gudem, University of California, San Diego, San Diego, CA; M. Schütz, WKS KV Bildung, Bern, Switzerland; K. Holland, Qualcomm Technologies, Inc., San Diego, CA	1130 hrs AIAA-2019-2827 **Modeling Multirotor Aerodynamic Interactions Through the Vortex Particle Method** E. Alvarez, A. Ning, Brigham Young University, Provo, UT	1200 hrs AIAA-2019-2828 **The Side-by-Side Urban Air Taxi Concept** P. Ventura Diaz, W. Johnson, J. Ahmad, S. Yoon, NASA Ames Research Center, Moffett Field, CA	

Monday, 17 June 2019						
17-ATOMS-1	**ATC - En Route**					**Steuben**
Chaired by: G. ZHU, Iowa State University						
0930 hrs AIAA-2019-2829 **In-Trail Procedure for Improved Oceanic Air Traffic Operations** A. Izadi, N. Hinze, A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA; J. Post, Federal Aviation Administration, Washington, D.C.	1000 hrs AIAA-2019-2830 **Controller Workload-Based Approach to Establishing Monitor Alert Parameters for En Route Sectors** B. Kell, B. Marr, MITRE Corporation, McLean, VA	1030 hrs AIAA-2019-2831 **A Quantitative Evaluation on Potential Benefits Assessment of Dynamic Airborne Reroute Procedures (DARP)** N. Wickramasinghe, Y. Nakamura, H. Hirabayashi, M. Brown, National Institute of Maritime Port and Aviation Technology, Chofu, Japan	1100 hrs AIAA-2019-2832 **Methodology for Estimation of Closest Point of Approach between Aircraft in ATM** A. Errico, V. Di Vito, Italian Aerospace Research Center (CIRA), Capua, Italy			

Monday, 17 June 2019						
18-ATOMS-2	**UAS Traffic Management I**					**Travertine**
Chaired by: J. KOELLING, NASA-Langley Research Center						
0930 hrs AIAA-2019-2833 **Using Genetic Algorithm to Modify Scheduled Flights to Track Regular Traffic** L. Piñero, Bell Helicopter Textron, Inc., Arlington, TX	1000 hrs AIAA-2019-2834 **Moving the Validation and Verification Frontier: the System-Wide Safety March Towards Scalability and Autonomy** G. Brat, M. Davies, NASA Ames Research Center, Moffett Field, CA; J. Koelling, J. Maddalon, P. Miner, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2019-2835 **Modelling Head Injury due to Unmanned Aircraft Systems Collision: Crash Dummy vs Human Body** B. Rattanagraikanakorn, M. Schuurman, Delft University of Technology, Delft, The Netherlands; D. Gransden, Laurentian University, Sudbury, Canada; R. Happee, C. De Wagter, A. Sharpanskykh, Delft University of Technology, Delft, The Netherlands; et al.	1100 hrs AIAA-2019-2836 **Post-Disaster Flight Risk Modeling with Unmanned Aircraft System (UAS) Relay Communications: An Object-Oriented Bayesian Network Approach** V. McKeown, P. Kantesaria, Rutgers University, Piscataway, NJ; C. Luxhoj, U.S. Coast Guard, Borinquen, ; J. Luxhoj, Rutgers University, Piscataway, NJ		

Monday, 17 June 2019						
19-CFD-1	**Transition Predictions**					**Obelisk A**
Chaired by: X. ZHONG, University of California Los Angeles						
0930 hrs AIAA-2019-2837 **Laminar to turbulent transition prediction in hypersonic flows with neural networks committee** F. Danvin, M. Olazabal, French Alternative Energies and Atomic Energy Commission, Le Barp, France; F. Pinna, von Kármán Institute for Fluid Dynamics, Brussels, Belgium	1000 hrs AIAA-2019-2838 **Computations of Turbulent Transition in Boundary Layer with LES** M. Kim, J. Lim, S. Kim, S. Jee, Gwangju Institute of Science and Technology, Gwangju, South Korea; J. Park, D. Park, Pusan National University, Busan, South Korea	1030 hrs AIAA-2019-2839 **Generation of Steady-States with Discontinuities Using Minimal Gain Marching Schemes** R. Santos, L. Alves, Fluminense Federal University (UFF), Niterói, Brazil				

Monday, 17 June 2019						
20-CFD-2/FD-1	**CFD for Turbomachinery**					**Obelisk B**
Chaired by: A. GROSS, New Mexico State University and S. BENTON, Air Force Research Laboratory						
0930 hrs AIAA-2019-2840 **Implicit Large Eddy Simulation of Low Pressure Turbine Airfoils Using a High Order Navier-Stokes Solver** M. Bolinches-Gisbert, Technical University of Madrid, Madrid, Spain; R. Corral, F. Gisbert, A. Sotillo, ITP, Alcobendas, Spain	1000 hrs AIAA-2019-2841 **Implicit Large-Eddy Simulation of Wind Turbine Wakes and Turbine-Wake Interactions using the Vorticity Transport Equations** D. Foti, K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2019-2842 **Experimental and Numerical Investigations on the Flow Characteristics of Tower-type Labyrinth Seal in a Compressor Stator Well** Z. Lei, X. Kong, G. Liu, Q. Feng, L. Zheng, Northwestern Polytechnical University, Xi'an, China	1100 hrs AIAA-2019-2843 **Large Eddy Simulation of dense gas flow around a turbine cascade** J. Hoarau, P. Cinnella, X. Gloerfelt, Paris Institute of Technology, Paris, France			

Monday, 17 June 2019						
21-CPS-1	**Advances in Computer Systems for Aviation**					**Plum Blossom B**
Chaired by: M. VELEV, Aries Design Automation, LLC						
0930 hrs AIAA-2019-2844 **On the End-User Productivity of a Pseudo-Constrained Parallel Data Refinement Method for the Advancing Front Local Reconnection Mesh Generation Software** K. Garner, P. Thomadakis, T. Kennedy, C. Tsolakis, N. Chrisochoides, Old Dominion University, Norfolk, VA	1000 hrs AIAA-2019-2845 **Formal Verification of Collision Avoidance for Turning Maneuvers in UAVs** E. Adler, J. Jeannin, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2019-2846 **Global Network Access Terminal as a Multi-Modem Solution for Network Convergence** J. Lyke, Air Force Research Laboratory, Kirtland AFB, NM				

Monday, 17 June 2019

22-F360-1 0930 - 1130 hrs	Monday Morning Forum 360: The Operations of Flying Further and Higher	Coronado Ballroom

Moderator: Karina Drees, Chief Executive Officer and General Manager, Mojave Air & Space Port

Panelists:

Juan J. Alonso	John Cavolowsky	Steve Ericson	Warren Frick	Dean Fulmer	Karl Garman
Professor Department of Aeronautics and Astronautics Stanford University	Director Transformative Aeronautics Concepts Program Aeronautics Research Mission Directorate NASA	Director Advanced Design The Spaceship Company	Manager Business Development Northrop Grumman Innovation Systems	Principal System Engineer Portfolio Manager Space Transportation The MITRE Corporation	Deputy Director of Research FAA Office of Commercial Space Transportation

Monday, 17 June 2019

23-FD-2	Theoretical Fluid Mechanics (Invited)	Manchester

Chaired by: M. MUNSON, U.S. Army Research Office and M. BELISLE, Northrop Grumman Corporation

0930 hrs Oral Presentation **Dynamics of Turbulent Taylor-Couette Flow via Exact Navier-Stokes Solutions** R. Grigoriev, Georgia Institute of Technology, Atlanta, GA	1000 hrs Oral Presentation **The Geometry and Topology of Turbulent Blobs** W. Irvine, University of Chicago, Chicago, IL	1030 hrs Oral Presentation **High-Reynolds-Number Dynamics of Topologically Complex Vortices** C. Scalo, Purdue University, West Lafayette, IN	1100 hrs Oral Presentation **Emerging Role of Fractional Modeling in Anomalous Flow Phenomena** M. Zayernouri, Michigan State University, East Lansing, MI	1130 hrs Oral Presentation **Observability in Classical Field Theory for Complex Flows** K. Mohseni, University of Florida, Gainesville, Gainesville, FL		

Monday, 17 June 2019

24-FD-3	Special Session: Validation-Quality Experiments and Verification Methods for LES	Milan

Chaired by: D. GARMANN, Air Force Research Laboratory and D. GONZALEZ, Naval Surface Warfare Center

0930 hrs AIAA-2019-2847 **Compressible Mixing Layer Experiments for CFD Validation** J. Dutton, G. Elliott, K. Kim, University of Illinois, Urbana-Champaign, Urbana, IL	1000 hrs Oral Presentation **Mach 2.5 Shock-Wave/Boundary-Layer Interaction Experiments for CFD Validation in the NASA Glenn 225 cm^2 Wind Tunnel** H. Reising, D. Davis, NASA Glenn Research Center, Cleveland, OH; J. Sasson, Case Western Reserve University, Cleveland, OH	1030 hrs AIAA-2019-2848 **Revisiting Bachalo-Johnson: The Sandia Axisymmetric Transonic Hump and CFD Challenge** K. Lynch, M. Barone, S. Beresh, R. Spillers, J. Henfling, M. Soehnel, Sandia National Laboratories, Albuquerque, NM	1100 hrs AIAA-2019-2849 **Evidence of Surface Curvature Effects in Smooth Body Flow Separation Experiments** D. Simmons, F. Thomas, T. Corke, University of Notre Dame, Notre Dame, IN	1130 hrs Oral Presentation **Wall-Resolved Large-Eddy Simulations of Smooth-Body Flow Separation** A. Uzun, National Institute of Aerospace, Hampton, VA; M. Malik, NASA Langley Research Center, Hampton, VA		

Monday, 17 June 2019

25-FD-4	Stability and Transition I: High-Speed I	Miro

Chaired by: J. EPPINK, NASA Langley Research Center and C. CHANG, NASA-Langley Research Center

0930 hrs AIAA-2019-2850 **Multiple Boundary Layer Instability Modes with Nonequilibrium and Wall Temperature Effects Using LASTRAC** H. Kline, National Institute of Aerospace, Hampton, VA; C. Chang, F. Li, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2019-2851 **Effect of CO2 Concentration in the Hypersonic Boundary Layer on Second Mode Disturbances** O. Elliott, R. Greendyke, Air Force Institute of Technology, Wright-Patterson AFB, OH; J. Jewell, Air Force Research Laboratory, Wright-Patterson AFB, OH; J. Komives, Air Force Institute of Technology, Wright-Patterson AFB, OH	1030 hrs AIAA-2019-2852 **Effects of Wall Cooling on Supersonic Modes in High- Enthalpy Hypersonic Boundary Layers over a Cone** C. Chang, NASA Langley Research Center, Hampton, VA; H. Kline, National Institute of Aerospace, Hampton, VA; F. Li, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2019-2853 **Weak Non-Parallel Effects on Chemically Reacting Hypersonic Boundary Layer Stability** L. Zanus, F. Miró Miró, F. Pinna, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium	1130 hrs AIAA-2019-2854 **On Decoupling Ablation Effects on Boundary-Layer Stability and Transition** F. Miró Miró, F. Pinna, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium		

Monday, 17 June 2019						
26-FT-1/TF-1	**Current State of the X-57 Design, Integration and Testing: Briefing to Industry I**					**Desoto B**
Chaired by: S. GINN, NASA AFRC and M. REEDER, Air Force Institute of Technology						
0930 hrs AIAA-2019-2855 **Flight Performance Maneuver Planning for NASA's X-57 "Maxwell" Flight Demonstrator - Part 1: Power-Off Glides** N. Borer, D. Cox, NASA Langley Research Center, Hampton, VA; R. Wallace, NASA Armstrong Flight Research Center, Edwards, CA	1000 hrs Oral Presentation **Overview of the X-57 Structural Requirements, Modifications, and Airworthiness** W. Li, E. Miller, NASA Armstrong Flight Research Center, Edwards, CA	1030 hrs Oral Presentation **X-57 GIMC-SCEPTOR High Lift Motor Controller Overview** D. Avanesian, NASA Glenn Research Center, Cleveland, OH	1100 hrs Oral Presentation **Implementation of Lessons Learned into Mod II of the X-57 project - Part I** A. Cash, Empirical Systems Aerospace, San Luis Obispo, CA	1130 hrs Oral Presentation **Implementation of Lessons Learned into Mod II of the X-57 project - Part II** M. Shemenski, Empirical Systems Aerospace, San Luis Obispo, CA		

Monday, 17 June 2019						
27-GT-2	**Reactivation and Commissioning Efforts of Ground Test Facilities**					**Emerald**
Chaired by: T. WAYMAN, Gulfstream Aerospace Corporation and D. MYREN, AERO Systems Engineering, Inc.						
0930 hrs AIAA-2019-2856 **Reactivation of VKF Wind Tunnel D by AFRL at AEDC: Supersonic Performance and Freestream Characterizations** J. Hofferth, D. Ogg, Air Force Research Laboratory, Arnold AFB, TN	1000 hrs AIAA-2019-2857 **Build-up of the second-generation 30 kW miniature arc jet (mARC II) at NASA Ames Research Center** M. MacDonald, Jacobs, Moffett Field, CA; D. Philippidis, Aerospace Computing, Inc., Moffett Field, CA; T. Ho, Jacobs, Moffett Field, CA; M. Haw, Science and Technology Corp., Moffett Field, CA; J. Hartman, Sierra Lobo, Inc., Moffett Field, CA; M. McGlaughlin, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2019-2858 **Development and Validation of a Continuous, Open-Return Transonic Wind Tunnel** A. Collazo Garcia, P. Ansell, University of Illinois, Urbana-Champaign, Urbana, IL	1100 hrs AIAA-2019-2859 **Design and Preliminary Calibration of the UTSA Mach 7 Hypersonic Ludwieg Tube** I. Bashor, E. Hoffman, G. Gonzalez, C. Combs, University of Texas, San Antonio, San Antonio, TX	1130 hrs AIAA-2019-2860 **HyperTERP: A newly commissioned hypersonic shock tunnel at the University of Maryland** C. Butler, S. Laurence, University of Maryland, College Park, College Park, MD	1200 hrs AIAA-2019-2861 **Wind and Weather Facility for Testing Free-Flying Drones** F. Noca, University of Applied Sciences, Geneva, Switzerland; G. Catry, N. Bosson, L. Bardazzi, S. Marquez, A. Gros, WindShape, Geneva, Switzerland	

Monday, 17 June 2019						
28-LTA-1	**Advanced Airship Concepts and Helium Availability**					**Edelweiss**
Chaired by: A. FARNHAM						
0930 hrs AIAA-2019-2862 **Lenticular Cargo Airships: The Case for Carbon-Free Fuel Operation** J. Bock, U. Apel, Bremen University of Applied Sciences, Bremen, Germany; R. Van Treuren, Naval Airship Association, Pensacola, FL	1000 hrs AIAA-2019-2863 **Low Carbon Airship** S. Sarkar, V. Gautam, University of Petroleum and Energy Studies, Dehradun, India	1030 hrs **Panel: Global Helium Production and Supply**				

Monday, 17 June 2019		
29-MDO-1 **0930 - 1230 hrs**	**MDO Student Paper Competition Finalists Panel**	**Wyeth**
This session is the final stage of the MDO Student Paper Competition, during which oral presentations will be made.		

Monday, 17 June 2019						
30-MST-1	**Novel Approaches to Modeling and Simulation**					**Peridot**
Chaired by: R. RUFF, The MathWorks, Inc. and D. KEATING, The Charles Stark Draper Laboratory, Inc.						
0930 hrs AIAA-2019-2864 **Evaluation of Aerodynamic Modeling with Artificial Neural Networks from the Viewpoint of Performance Considerations** K. Yayla, B. Görür, ROKETSAN Missile Industries, Inc., Ankara, Turkey	1000 hrs AIAA-2019-2865 **An Innovative Approach for integrated Airline Network and Aircraft Family Optimization** J. Fregnani, B. Mattos, J. Hernandes, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1030 hrs AIAA-2019-2866 **External Rate Sensing for Gyrowheel System via a Novel Model Simplification Approach** Y. Zhao, H. Zhao, X. Huo, Y. Yao, Harbin Institute of Technology, Harbin, China				

Monday, 17 June 2019						
31-PDL-1	**Plasma Flow Control I**					**Ruby**
Chaired by: C. LIMBACH, Texas A&M University and A. TROPINA, Texas A&M University						
0930 hrs AIAA-2019-2867 **Supersonic and hypersonic non-equilibrium flow control using laser energy deposition** A. Alberti, A. Munafò, C. Pantano, M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL	1000 hrs AIAA-2019-2868 **Study of the transition between modes of nanosecond repetitive pulsed discharge** X. Wang, A. Shashurin, Purdue University, West Lafayette, IN	1030 hrs AIAA-2019-2869 **Streamer Discharges Development in a Medium with Sharp Density Gradients** A. Starikovskiy, Princeton University, Princeton, NJ	1100 hrs AIAA-2019-2870 **Impacts of Repetitive Laser Pulse Energy Deposition on Supersonic Intakes** A. Sasoh, M. Myokan, A. Kubota, K. Maeda, Y. Wu, Nagoya University, Nagoya, Japan			

Monday, 17 June 2019						
32-TF-2	**On-Demand Mobility Concepts and Market Studies**					**Lalique**
Chaired by: V. SCHULTZ, NASA Langley Research Center and S. BRICENO, Georgia Institute of Technology						
0930 hrs AIAA-2019-2871 **A Survey to Model Demand for eVTOL Urban Air Trips and Competition with Autonomous Ground Vehicles** L. Garrow, B. German, P. Mokhtarian, J. Glodek, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2019-2872 **Exploration of Near-Term Urban Air Mobility Operations with Retrofitted Electric General Aviation Aircraft** M. Kotwicz Herniczek, A. Garbo, M. Lau, B. German, L. Garrow, Georgia Institute of Technology, Atlanta, GA	1030 hrs AIAA-2019-2873 **Conceptual Design and Mission Analysis for eVTOL Urban Air Mobility Flight Vehicle Configurations** A. Kadhiresan, M. Duffy, Cornell University, Ithaca, NY	1100 hrs AIAA-2019-2874 **Urban Air Mobility Minimum Viable Product** A. Kunchulia, T. Edwards, S. Hasan, G. Price, Crown Consulting, Inc., Arlington, VA	1130 hrs AIAA-2019-2875 **Innovation and Convergence-Divergence** G. Price, Crown Consulting, Inc., Arlington, VA; S. Briceno, O. Pinon, Georgia Institute of Technology, Atlanta, GA; J. Wang, Quid, Inc., San Francisco, CA; M. Waszak, NASA Langley Research Center, Hampton, VA		

Monday, 17 June 2019						
33-TP-1	**Ablation: Modeling, Experiments, and Applications I**					**Fleur De Lis A**
Chaired by: M. HOWARD, Sandia National Laboratories and A. MARTIN, University of Kentucky						
0930 hrs AIAA-2019-2876 **Towards a High-Fidelity Multiphase Solver with Application to Space Debris Aerothermal Ablation Modeling** D. Henneaux, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; P. Schrooyen, Cenaero, Gosselies, Belgium; B. Dias, A. Turchi, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; P. Chatelain, Catholic University of Louvain, Louvain-la-Neuve, Belgium; T. Magin, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium	1000 hrs AIAA-2019-2877 **Coupled Simulations of Finite-Rate Ablation with Pyrolysis in Rocket Nozzles** P. Cross, Naval Air Warfare Center, China Lake, CA	1030 hrs AIAA-2019-2878 **Finding Ablation Rates via Temperature Measurements from the Mars Science Laboratory** R. McMasters, M. Malone, G. Larus, M. Hutwelker, R. Fricke, Virginia Military Institute, Lexington, VA	1100 hrs AIAA-2019-2879 **Sensitivity Analysis in Material Response for Ablation Problem** R. Fu, C. Setters, J. Roger, H. Weng, A. Martin, University of Kentucky, Lexington, Lexington, KY			

Monday, 17 June 2019						
34-ACD-3	**Aircraft System Design Studies**					**Fleur De Lis B**
Chaired by: W. ANEMAAT, DARcorporation and F. NICOLOSI, University of Naples						
1400 hrs AIAA-2019-2880 **Far-Term Exploration of Advanced Single-Aisle Subsonic Transport Aircraft Concepts** J. Quinlan, T. Marien, N. Blaesser, J. Kirk, NASA Langley Research Center, Hampton, VA; H. Perkins, K. Fisher, NASA Glenn Research Center, Cleveland, OH	1430 hrs AIAA-2019-2881 **Multi-Disciplinary-Optimization of a N+1 Technology Mid-Market-Aircraft** T. Takahashi, K. Cullymore, C. Hines, J. Soldevilla, N. Patrick, C. Loo, Arizona State University, Tempe, AZ	1500 hrs AIAA-2019-2882 **Longitudinal stability issues including propulsive effects on an innovative commercial propeller-driven aircraft** V. Cusati, F. Nicolosi, S. Corcione, D. Ciliberti, P. Della Vecchia, University of Naples "Federico II", Naples, Italy	1530 hrs AIAA-2019-2883 **Design, Analysis and Tests of a Tri–Tiltrotor Aircraft** Y. Chen, J. Zheng, Z. Shen, P. Xiao, M. Tong, Nanjing University of Aeronautics and Astronautics, Nanjing, China; L. Guo, Sichuan AOSSCI Co., Ltd., Chengdu, China; et al.	1600 hrs AIAA-2019-2884 **High Lift Aerodynamic characteristics of a Three Lifting Surfaces Turboprop Aircraft** S. Corcione, F. Nicolosi, P. Della Vecchia, University of Naples "Federico II", Naples, Italy	1630 hrs AIAA-2019-2885 **Integrated Sizing and Optimization of Hybrid Wing Body Aircraft in Conceptual Design** J. Xie, Y. Cai, M. Chen, D. Mavris, Georgia Institute of Technology, Atlanta, GA	

Monday, 17 June 2019						
35-ACD-4	**Design Frameworks and Infrastructure**					**Inverness**
Chaired by: P. RAJ, Virginia Tech						
1400 hrs AIAA-2019-2886 **Automatically Generating the Technology Compatibility Matrix Using Graph Transformations** M. Roelofs, R. Vos, Delft University of Technology, Delft, The Netherlands; K. Amadori, C. Jouannet, Saab, Linköping, Sweden	1430 hrs AIAA-2019-2887 **Digital Twin Concept for Aircraft System Failure Detection and Correction** O. Hazbon, L. Gutierrez, Pontifical Bolivarian University, Medellin, Colombia; C. Bil, RMIT University, Melbourne, Australia; M. Napolitano, University of West Virginia, Morgantown, Morgantown, WV; M. Fravolini, University of Perugia, Perugia, Italy	1500 hrs AIAA-2019-2888 **Multi-response Gaussian Process Regression models for Multidisciplinary Design Optimization** J. Park, A. Arora, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA	1530 hrs AIAA-2019-2889 **Development of a Knowledge-Based Engineering Framework for Modeling Aircraft Production** J. Page Risueno, B. Nagel, German Aerospace Center (DLR), Hamburg, Germany	1600 hrs AIAA-2019-2890 **Pneumatic Canard Configuration for Control and Aerodynamic Dilemma** M. Zhang, C. Yuan, Northwestern Polytechnical University, Xi'an, China		

Monday, 17 June 2019						
36-ADS-2	**Textiles**					**Plum Blossom A**
Chaired by: U. FRAIRE and C. EVANS, NASA Johnson Space Center						
1400 hrs AIAA-2019-2891 **Feasibility of Weaved Distributed Fiber Optic Sensors in Parachute Broadcloth for Strain Measurement** J. Bazin, Airborne Systems, Santa Ana, CA; E. Mendoza, Redondo Optics, LLC, Redondo Beach, United Kingdom; B. Tutt, Airborne Systems, Santa Ana, CA; P. Hill, Heathcoat Fabrics, Tiverton, United Kingdom	1430 hrs AIAA-2019-2892 **CPAS Light Weight Broadcloth Parachute Testing** S. Manning, J. Daum, NASA Johnson Space Center, Houston, TX	1500 hrs AIAA-2019-2893 **Dynamic Ground Testing of Standard Type XXVI Nylon Parachute Extraction Lines and Data Collection for Airdrop Applications** U. Fraire, K. Connolly, A. Meloni, M. Tardiff, Army Research, Development and Engineering Command, Natick, MA	1530 hrs AIAA-2019-2894 **Textile Material Lessons Learned During the Design and Qualification of the NASA Orion Capsule Parachute Assembly System** B. Anderson, J. Daum, NASA Johnson Space Center, Houston, TX; S. Tawdros, Airborne Systems, Santa Ana, CA	1600 hrs AIAA-2019-2895 **Characterization of Torsional Vibration Properties of Parachute Suspension Lines** B. Olson, C. Barry, J. Sherwood, D. Willis, University of Massachusetts, Lowell, Lowell, MA; K. Bergeron, Army Research, Development and Engineering Command, Natick, MA		

Monday, 17 June 2019						
37-ADS-3	**Sub-Orbital Earth Test of Deployable Aeroshells for Planetary Entry - ADEPT-SR1**					**Plum Blossom B**
Chaired by: J. DAUM, NASA, JSC, Flight Mechanics & Traj Design Branch and S. DUTTA, NASA Langley Research Center						
1400 hrs AIAA-2019-2896 **ADEPT Sounding Rocket One Flight Test Overview** A. Cassell, P. Wercinski, B. Smith, B. Yount, O. Nishioka, C. Kruger, NASA Ames Research Center, Moffett Field, CA	1430 hrs AIAA-2019-2897 **Aerodynamics for the ADEPT SR-1 Flight Experiment** A. Korzun, S. Dutta, NASA Langley Research Center, Hampton, VA; R. McDaniel, NASA Ames Research Center, Moffett Field, CA; C. Karlgaard, J. Tynis, Analytical Mechanics Associates, Inc., Hampton, VA	1500 hrs AIAA-2019-2898 **Subsonic Dynamic Testing of a Subscale ADEPT Entry Vehicle** J. Cruz, J. Green, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2019-2899 **Reconstruction of the Adaptable Deployable Entry and Placement Technology Sounding Rocket One Flight Test** J. Tynis, C. Karlgaard, J. Williams, Analytical Mechanics Associates, Inc., Hampton, VA; S. Dutta, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2019-2900 **Flight Mechanics Modeling and Post-Flight Analysis of ADEPT SR-1** S. Dutta, J. Green, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2019-2901 **Developing an Entry Guidance and Control Design Capability Using Flaps for the Lifting Nano-ADEPT** S. D'Souza, W. Okolo, B. Nikaido, B. Yount, J. Tran, B. Margolis, NASA Ames Research Center, Moffett Field, CA; et al.	

Monday, 17 June 2019						
38-AMT-2/GT-3	**Advanced Measurement Techniques in Wind Tunnel Testing II**					**Desoto A**
Chaired by: B. BATHEL, NASA Langley Research Center and N. PARZIALE, Stevens Institute of Technology						
1400 hrs AIAA-2019-2902 **Application of Stereoscopic Particle Image Velocimetry in the Rutgers University Supersonic Wind Tunnel** R. Panco, E. DeMauro, Rutgers University, New Brunswick, NJ	1430 hrs AIAA-2019-2903 **Focused Laser Differential Interferometry Measurements at NASA Langley 20-Inch Mach 6** J. Weisberger, B. Bathel, S. Jones, G. Herring, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-2904 **Shockwave/Boundary-Layer Interaction Studies Performed in the NASA Langley 20-Inch Mach 6 Air Tunnel** B. Bathel, S. Jones, A. Watkins, S. Berry, K. Goodman, NASA Langley Research Center, Hampton, VA; C. Combs, University of Texas, San Antonio, San Antonio, TX; et al.	1530 hrs AIAA-2019-2905 **Time-resolved surface pressure and model deformation measurements in an industrial transonic wind tunnel** T. Davidson, N. Stokes, D. Roberts, Aircraft Research Association, Ltd., Bedford, United Kingdom; M. Quinn, University of Manchester, Manchester, United Kingdom	1600 hrs AIAA-2019-2906 **Development and Wind Tunnel Testing of a Novel 3D Scanning Lidar for Global Velocimetry** A. Mylapore, AeroMancer Technologies Corporation, Washington, D.C.; N. Prasad, NASA Langley Research Center, Hampton, VA; S. Gerashchenko, AeroMancer Technologies Corporation, Washington, D.C.	1630 hrs AIAA-2019-2907 **A Qualitative Investigation of Selected Infrared Flow Visualization Image Processing Techniques** T. Garbeff, J. Baerny, NASA Ames Research Center, Moffett Field, CA	

Monday, 17 June 2019						
39-APA-5	**Special Session: H2020 Smart Morphing and Sensing (SMS) Project**					**Cortez C**
Chaired by: J. VOS, CFS Engineering and M. BRAZA						
1400 hrs AIAA-2019-2908 **Design of a Large-Scale High-Lift Morphing A320 Wing Based on Electro-Mechanical Actuators and Shape Memory Alloys (Invited)** Y. Bmegaptche Tekap, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; A. Giraud, NOVATEM SAS, Toulouse, France; G. Jodin, C. Nadal, National Polytechnic Institute of Toulouse, Toulouse, France; A. Marouf, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; I. Gortazar Martinez, National Polytechnic Institute of Toulouse, Toulouse, France; et al.	1430 hrs AIAA-2019-2909 **Aerodynamic performance of a bio-inspired A320 morphing wing in the transonic regime (Invited)** J. Tô, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; P. Flaszynski, Polish Academy of Sciences, Gdansk, Poland; N. Simiriotis, A. Marouf, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; R. Szwaba, P. Doerffer, Polish Academy of Sciences, Gdansk, Poland; et al.	1500 hrs AIAA-2019-2910 **Experimental study of electroactive morphing effects in the aerodynamic performance of a cambered A320 wing by means of time-resolved PIV (Invited)** M. Carvalho, C. Nadal, G. Jodin, J. Rouchon, National Polytechnic Institute of Toulouse, Toulouse, France; M. Triantafyllou, Massachusetts Institute of Technology, Cambridge, MA; S. Cazin, National Polytechnic Institute of Toulouse, Toulouse, France; et al.	1530 hrs AIAA-2019-2911 **Synthesis on High-Fidelity Numerical simulation of a morphing A320 wing in subsonic speeds and sensitivity evaluation (Invited)** N. Simiriotis, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; K. Diakakis, National Technical University of Athens (NTUA), Athens, Greece; G. Jodin, National Polytechnic Institute of Toulouse, Toulouse, France; F. Kramer, CFD Software GmbH, Berlin, Germany; A. Marouf, Y. Hoarau, University of Strasbourg, Strasbourg, France; et al.	1600 hrs AIAA-2019-2912 **Evaluation of the aerodynamic performance increase thanks to a morphing A320 wing with high-lift flap by means of CFD Hi-Fi approaches (Invited)** A. Marouf, Y. Hoarau, University of Strasbourg, Strasbourg, France; J. Vos, D. Charbonnier, CFS Engineering, Lausanne, Switzerland; Y. Bmegaptche Tekap, M. Braza, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France	1630 hrs AIAA-2019-2913 **Adaptive flow control laws: A simulation based comparison with low order models (Invited)** C. Raibaudo, P. Mouyon, C. Doll, ONERA, Toulouse, France	

Monday, 17 June 2019						
40-APA-6	**Morphing Structure Aerodynamics and Technologies**					**Cortez D**
Chaired by: J. ESTEVADEORDAL, Innovative Scientific Solutions Incorporated and D. HUNSAKER, Utah State University						
1400 hrs AIAA-2019-2914 **Computational Analysis of the Aerodynamics of Camber Morphing** S. Huntley, B. Woods, C. Allen, University of Bristol, Bristol, United Kingdom	1430 hrs AIAA-2019-2915 **Large Eddy Simulation of Flow over Surging Airfoils with Active Reflex Camber** J. Rane, F. Gandhi, O. Sahni, Rensselaer Polytechnic Institute, Troy, NY	1500 hrs AIAA-2019-2916 **Experimental Evaluation of the Performance of Parabolic Flaps** A. Ullah, A. Stolt, J. Estevadeordal, North Dakota State University, Fargo, ND; D. Hunsaker, Utah State University, Logan, UT	1530 hrs AIAA-2019-2917 **Minimum-Frequency Spanwise Twist for Yawing-Moment Control During Roll** D. Hunsaker, B. Moorthamers, Utah State University, Logan, UT; J. Joo, Air Force Research Laboratory, Wright-Patterson AFB, OH			

Monday, 17 June 2019						
41-APA-7	**Turbulence Modeling**					**Cortez A**
Chaired by: P. MORGAN, Ohio Aerospace Institute and N. RATNAYAKE, NASA Langley Research Center						
1400 hrs AIAA-2019-2918 **A wall function approach to account for rough surface heat transfer in Spalart-Allmaras turbulence model** A. Prakash, E. Laurendeau, Polytechnique Montréal, Montréal, Canada	1430 hrs AIAA-2019-2919 **Evaluation of Various RANS Turbulence Models for Predicting the Drag on an Ahmed Body** B. Thomas, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1500 hrs AIAA-2019-2920 **Comparison between fully turbulent and transition models on the prediction of the aerodynamics of a High-Lift configuration** O. Lopez, J. Alvarez, University of the Andes, Bogota, Colombia; J. Escobar, O. Salamanca, University of San Buenaventura, Bogota, Colombia	1530 hrs AIAA-2019-2921 **Numerical Simulation of Transonic and Supersonic Flow Over a Wall-Mounted Hemisphere** P. Morgan, Ohio Aerospace Institute, Dayton, OH; M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2019-2922 **RANS modeling of Laminar Separation Bubbles around Airfoils at Low Reynolds conditions** L. Bernardos, F. Richez, V. Gleize, ONERA, Meudon, France	1630 hrs AIAA-2019-2923 **CFD Simulations of a Triangular Airfoil for Martian Atmosphere in Low-Reynolds Number Compressible Flow** H. Yang, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1700 hrs AIAA-2019-2924 **Numerical Effects of Flux Calculation Schemes for Unstructured Grid Turbulent Flow Simulations** L. Carvalho, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; R. da Silva, J. Azevedo, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil

Monday, 17 June 2019						
42-APA-8	**Aerodynamic Design: Analysis and Methodologies I**					**Cortez B**
Chaired by: I. PETROPOULOS, ONERA and K. CASPER, Sandia National Laboratories						
1400 hrs AIAA-2019-2925 **2D Flow Field Analysis by the Exergetic Method** M. Aguirre, S. Duplaa, X. Carbonneau, Higher Institute of Aeronautics and Space, Toulouse, France	1430 hrs AIAA-2019-2926 **Investigation of an exergy balance approach for the aero-thermo-propulsive performance evaluation of aeronautic configurations** I. Petropoulos, C. Wervaecke, D. Bailly, T. Derweduwen, ONERA, Meudon, France	1500 hrs AIAA-2019-2927 **Feature-Based Recombined Deep Learning about Fluid System** Y. Wang, R. Han, D. Xu, G. Chen, Xi'an Jiaotong University, Xi'an, China	1530 hrs AIAA-2019-2928 **Application of Sparse Grid Surrogate Models to Airfoil Analysis and Design** N. Michael, R. Weed, Mississippi State University, Mississippi State, MS	1600 hrs AIAA-2019-2929 **Creation of Design and Analysis Tools for Large Design Space Reusable Launch Vehicle Shape Optimization** A. Cusick, K. Kontis, University of Glasgow, Glasgow, United Kingdom		

Monday, 17 June 2019						
43-ATOMS-3	**Airport Surface Ops**					**Peridot**
Chaired by: P. ROLING, Delft Technical University of Technology						
1400 hrs AIAA-2019-2930 **Departure Scheduling and Taxiway Path Planning under Uncertainty** J. Li, University of Southern California, Los Angeles, CA; M. Gong, Z. Liang, W. Liu, Z. Tong, L. Yi, Carnegie Mellon University, Mountain View, CA; et al.	1430 hrs AIAA-2019-2931 **Design of a Human-in-the-Loop Aircraft Taxi Optimisation System Using Autonomous Tow Trucks** S. Zaninotto, J. Gauci, University of Malta, Msida, Malta; G. Farrugia, HandsOn Systems, Qormi, Malta; J. Debattista, Malta Air Traffic Services, Kirkop, Malta	1500 hrs AIAA-2019-2932 **Design of a zero emission aircraft towing system** E. Baaren, P. Roling, Delft University of Technology, Delft, The Netherlands	1530 hrs AIAA-2019-2933 **Prediction of Pushback Times and Ramp Taxi Times for Departures at Charlotte Airport** H. Lee, J. Coupe, Y. Jung, NASA Ames Research Center, Moffett Field, CA	1600 hrs AIAA-2019-2934 **Electronic Departure Approval Requests in ATD-2 Daily Operations** T. Callantine, San Jose State University, Moffett Field, CA; R. Staudenmeier, Cavan Solutions, Washington, D.C.; L. Stevens, J. Coupe, NASA Ames Research Center, Moffett Field, CA; A. Churchill, Mosaic ATM, Inc., Leesburg, VA	1630 hrs AIAA-2019-2935 **Fixed Path Pull-In/Push Back Trajectories for Airliner Transport System** K. Rajendran, J. Kidd, Oklahoma State University, Stillwater, OK	

Monday, 17 June 2019						
44-ATOMS-4	**Special Session: Prognostics and Safety Assessment for ATM - NASA ULI Project I**					**Steuben**
Chaired by: Y. LIU, Arizona State University						
1400 hrs AIAA-2019-2936 **Aircraft Trajectory Prediction and Risk Assessment Using Bayesian Updating** Y. Wang, Y. Pang, Y. Liu, Arizona State University, Tempe, AZ; P. Dutta, B. Yang, Optimal Synthesis, Inc., Los Altos, CA	1430 hrs AIAA-2019-2937 **A Modeling Environment for Assessing Aviation Safety** P. Menon, P. Dutta, O. Chen, H. Iyer, B. Yang, Optimal Synthesis, Inc., Los Altos, CA	1500 hrs AIAA-2019-2938 **Mining and Classifying Aviation Accident Reports** P. Srinivasan, V. Nagarajan, S. Mahadevan, Vanderbilt University, Nashville, TN	1530 hrs AIAA-2019-2939 **Textual Indicator Extraction from Aviation Accident Reports** X. Hu, J. Wu, J. He, Arizona State University, Tempe, AZ	1600 hrs AIAA-2019-2940 **A Hybrid Learning Approach for the Simulation of Dynamics of Unmanned Aircraft Vehicle** Y. Yu, Y. Liu, Arizona State University, Tempe, AZ	1630 hrs AIAA-2019-2941 **Propagation of Trained Flight Performance and Observed Anomalies to Air Traffic Models** H. Lee, G. Li, A. Rai, A. Chattopadhyay, Arizona State University, Tempe, AZ	1700 hrs AIAA-2019-2942 **Active Learning-based Efficient Separation Risk Assessment in National Airspace System** Y. Gao, Y. Liu, Arizona State University, Tempe, AZ; P. Dutta, O. Chen, H. Iyer, B. Yang, Optimal Synthesis, Inc., Los Altos, CA

Monday, 17 June 2019						
45-CFD-3	**Special Session: Progress Towards CFD Vision 2030**					**Obelisk A**
Chaired by: A. CARY, Boeing Engineering Operations & Technology and M. MALIK, NASA-Langley Research Center						
1400 hrs Oral Presentation **NASA Aeronautics and CFD 2030** J. Cavolowsky, NASA Headquarters, Washington, D.C.	1430 hrs Oral Presentation **Progress Towards CFD Vision 2030 - An Industrial Perspective for Air and Space Vehicle Applications** J. Slotnick, The Boeing Company, Seattle, WA	1500 hrs AIAA-2019-2943 **Impact of Vision 2030 on CFD Practices in Propulsion Industry** G. Medic, United Technologies Corporation, East Hartford, CT	1530 hrs Oral Presentation **High Performance Computing Towards CFD Vision 2030** E. Nielsen, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2019-2944 **Progress in CFD Discretizations, Algorithms and Solvers for Aerodynamic Flows** D. Mavriplis, University of Wyoming, Laramie, Laramie, WY	1630 hrs AIAA-2019-2945 **Progress in Geometry Modeling and Mesh Generation Toward the CFD Vision 2030** J. Chawner, Pointwise, Inc., Fort Worth, TX; N. Taylor, MBDA, Filton, United Kingdom	1700 hrs Oral Presentation **Turbulence Prediction in Aerospace CFD: Reality and the Vision 2030 Roadmap** P. Spalart, The Boeing Company, Seattle, WA; M. Strelets, New Technologies and Services, St. Petersburg, Russia

Monday, 17 June 2019						
46-CFD-4/MVCE-1	**Adaptive Meshing and Error Analysis I**					**Obelisk B**
Chaired by: F. ALAUZET, INRIA and S. KARMAN, Pointwise, Inc.						
1400 hrs AIAA-2019-2946 **Geometry Modeling for Unstructured Mesh Adaptation** M. Park, W. Kleb, W. Jones, NASA Langley Research Center, Hampton, VA; J. Krakos, T. Michal, The Boeing Company, St. Louis, MO; A. Loseille, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France; et al.	1430 hrs AIAA-2019-2947 **3D RANS anisotropic mesh adaptation on the high-lift version of NASA's Common Research Model (HL-CRM)** F. Alauzet, L. Frazza, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France	1500 hrs AIAA-2019-2948 **Sketch-to-Solution: An Exploration of Viscous CFD with Automatic Grids** W. Kleb, M. Park, W. Wood, K. Bibb, K. Thompson, NASA Langley Research Center, Hampton, VA; R. Gomez, NASA Johnson Space Center, Houston, TX	1530 hrs AIAA-2019-2949 **Adjoint-based Anisotropic Mesh Adaptation for a Stabilized Finite-Element Flow Solver** A. Balan, M. Park, W. Anderson, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2019-2950 **Output-Based Mesh Optimization for the Embedded Discontinuous Galerkin Method** K. Fidkowski, University of Michigan, Ann Arbor, Ann Arbor, MI	1630 hrs AIAA-2019-2951 **Unsteady Combined Entropy and Output-based Adjoint Approach for Mesh Refinement and Error Estimation** K. Doetsch, K. Fidkowski, University of Michigan, Ann Arbor, Ann Arbor, MI	

Monday, 17 June 2019

47-CFD-5 — **High-Order Summation-by-Parts and Finite Difference** — **Morocco**

Chaired by: N. WUKIE, Air Force Research Laboratory and C. SCHROCK, Air Force Research Laboratory

1400 hrs
AIAA-2019-2952
Generalized Summation-By-Parts Methods: Coordinate Transformations, Quadrature Accuracy, and Functional Superconvergence
D. Craig Penner, D. Zingg, University of Toronto, Toronto, Canada

1430 hrs
AIAA-2019-2953
Optimization of Multi-dimensional Summation-by-Parts Operators
A. Marchildon, D. Zingg, University of Toronto, Toronto, Canada

1500 hrs
AIAA-2019-2954
Multidimensional Diagonal-Norm Summation-by-Parts Operators on Quadrilateral Elements
K. Mattalo, D. Zingg, University of Toronto, Toronto, Canada

1530 hrs
AIAA-2019-2955
A Strategy to Implement High-Order WENO Schemes on Unstructured Grids
C. Sheng, Q. Zhao, University of Toledo, Toledo, OH; D. Zhong, N. Ge, Nanjing University of Aeronautics and Astronautics, Nanjing, China

1600 hrs
AIAA-2019-2956
Optimized Rational Dispersion Relation Preserving (R-DRP) Method for High-Accuracy Flow Simulations
D. Hixon, University of Toledo, Toledo, OH

Monday, 17 June 2019

48-F360-2
1400 - 1600 hrs
Monday Afternoon Forum 360: Flying Faster with the Science of Hypersonics: Challenges and Opportunities
Coronado Ballroom

Moderator: Kevin Bowcutt, Senior Technical Fellow and Chief Scientist of Hypersonics, The Boeing Company

Panelists:

Graham Candler
McKnight Presidential Professor
Distinguished McKnight University Professor
Russell J. Penrose Professor
Associate Department Head
University of Minnesota

Richard Hallion
Aerospace Historian and Founding Museum Curator
National Air and Space Museum
Smithsonian Institution (ret.)

Ivett Leyva
Program Officer
Engineering and Complex Systems
Air Force Office of Scientific Research

Eric Marineau
Program Officer
Hypersonics
Office of Naval Research

Michael White
Assistant Director
Hypersonics
Office of the Under Secretary of Defense for Research and Engineering

Monday, 17 June 2019

49-FD-6 — **Theoretical Fluid Mechanics** — **Manchester**

Chaired by: M. MUNSON, U.S. Army Research Office and M. BELISLE, Northrop Grumman Corporation

1400 hrs
AIAA-2019-2957
A New Approach to Determine the Most Efficient Supersonic Mach Number
A. Shi, H. Wen, Northwestern Polytechnical University, Xi'an, China; E. Dowell, Duke University, Durham, NC; J. Chen, Northwestern Polytechnical University, Xi'an, China

1430 hrs
AIAA-2019-2958
Thermodynamic Decomposition of Compressible Wave Drag in the Euler Equations
J. Coder, University of Tennessee, Knoxville, State College, TN; S. Schmitz, Pennsylvania State University, State College, PA

1500 hrs
AIAA-2019-2959
A Jacobi spectral collocation method for the steady aerodynamics of porous aerofoils
P. Baddoo, University of Cambridge, Cambridge, United Kingdom; R. Hajian, Harvard University, Cambridge, MA; J. Jaworski, Lehigh University, Bethlehem, PA

1530 hrs
AIAA-2019-2960
Separation delay by optimal streaks
M. Karp, P. Hack, Stanford University, Stanford, CA

Monday, 17 June 2019

50-FD-7 — **Turbulence Model Development** — **Madrid**

Chaired by: B. SMITH, Lockheed Martin Aeronautics and S. DUVVURI, Indian Institute of Science

1400 hrs
AIAA-2019-2961
Length-Scale Correction for Reynolds Stress Modeling
B. Eisfeld, German Aerospace Center (DLR), Braunschweig, Germany; C. Rumsey, NASA Langley Research Center, Hampton, VA

1430 hrs
AIAA-2019-2962
Turbulence Modeling for Free Shear Flows
B. Eisfeld, German Aerospace Center (DLR), Braunschweig, Germany

1500 hrs
AIAA-2019-2963
Turbulent Axial Odometer Model
M. Olsen, NASA Ames Research Center, Moffett Field, CA; R. Lillard, NASA Johnson Space Center, Houston, TX

1530 hrs
AIAA-2019-2964
Near-Wall Subgrid Mixing Model for Film-Cooled Surfaces
N. Behlman, R. Bush, Pratt & Whitney, East Hartford, CT

1600 hrs
AIAA-2019-2965
Turbulence Modeling Effects of Transonic, High Pressure Airfoils near Design Incidence
S. Owen, M. Uddin, University of North Carolina, Charlotte, Charlotte, NC

1630 hrs
AIAA-2019-2966
Assessment of the Elliptic Blending Reynolds Stress Model for a Rotating Turbulent Pipe Flow Using New DNS Data
N. Ashton, University of Oxford, Oxford, United Kingdom; J. Davis, C. Brehm, University of Kentucky, Lexington, Lexington, KY

Monday, 17 June 2019						
51-FD-8	**Stability and Transition II: High-Speed II**					**Miro**
Chaired by: M. CHOUDHARI, NASA-Langley Research Center and T. JULIANO, University of Notre Dame						
1400 hrs AIAA-2019-2967 **Implicit Large-Eddy Simulation of Discrete Roughness Boundary-Layer Transition with Added Perturbations** M. Tufts, N. Bisek, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH	1430 hrs AIAA-2019-2968 **Using Discrete and Distributed Roughness to Generate Stationary Crossflow Waves in a Mach 6 Quiet Tunnel** J. Edelman, S. Schneider, Purdue University, West Lafayette, IN	1500 hrs AIAA-2019-2969 **Effect of Initial Phase Difference on Subharmonic Breakdown of Boundary Layers** D. Park, J. Park, Pusan National University, Busan, South Korea; M. Kim, S. Kim, J. Lim, S. Jee, Gwangju Institute of Science and Technology, Gwangju, South Korea	1530 hrs AIAA-2019-2970 **HIFiRE-5b Boundary-Layer Transition Length and Turbulent Overshoot** T. Juliano, University of Notre Dame, Notre Dame, IN; J. Jewell, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2019-2971 **Towards Modeling and Simulation of Particulate Interactions with High-Speed Transitional Boundary-Layer Flows** O. Browne, S. Hasnine, C. Brehm, University of Kentucky, Lexington, Lexington, KY	1630 hrs AIAA-2019-2972 **Nonlinear Boundary-Layer Stability Analysis of BOLT and HIFiRE-5** A. Moyes, H. Reed, Texas A&M University, College Station, TX	

Monday, 17 June 2019						
52-FT-2 **1400 - 1730 hrs**	**Flight Test Lessons Learned Workshop**					**Desoto B**
Moderator: Starr Ginn, NASA Armstrong Flight Research Center Panelists: **Glenn Graham** NASA Armstrong Flight Research Center	**Garrett Windschitl** JSF Lockheed Martin Corporation	**Robert Roedts** Columbia Helicopters, Inc.	**Andrew Freeborn** U.S. Air Force AFMC TPS	**Derek Spear** Air Force Institute of Technology	Flight Test Safety Committee	

Monday, 17 June 2019						
53-GT-4	**Aerodynamic Research Testing in Ground Test Facilities**					**Emerald**
Chaired by: R. GRIFFITHS and D. CHAN, NASA-Langley Research Center						
1400 hrs AIAA-2019-2973 **Wind Tunnel Testing of Static and Dynamic Aerodynamic Characteristics of a Quadcopter** E. Baris, C. Britcher, Old Dominion University, Norfolk, VA; G. Altamirano, Ohio State University, Columbus, OH	1430 hrs AIAA-2019-2974 **Cascade Thrust Reverser Design, Test and Evaluation work at Spirit AeroSystems, Inc.** E. Irani, J. Locke, P. Paden, Spirit AeroSystems, Inc., Wichita, KS	1500 hrs AIAA-2019-2975 **Low & High Speed Cryogenic Testing of a Wind Tunnel Model With Remote Control Actuation (RCA) Spoiler** F. Calkins, D. Nicholson, The Boeing Company, Seattle, WA; S. VonDeetzen, Deharde Maschinenbau Helmut Hoffmann GmbH, Varel, Germany; M. Wright, European Transonic Windtunnel, Cologne, Germany; C. Cramer, NASA Langley Research Center, Hampton, VA; R. Griffiths, AeroTEC, Inc., Seattle, WA; et al.	1530 hrs AIAA-2019-2976 **RANS Data Assimilation Techniques for Wind-Tunnel Wall Interference Corrections** Z. Belligoli, R. Dwight, G. Eitelberg, Delft University of Technology, Delft, The Netherlands	1600 hrs AIAA-2019-2977 **A Preliminary Investigation of the Check Standard Model in the NASA Ames Unitary Plan Wind Tunnel** M. Amaya, R. Flach, T. Garbeff, NASA Ames Research Center, Moffett Field, CA	1630 hrs Oral Presentation **A Survey of the Application and Impact of Statistical Methods in Aeronautical Ground Testing** P. Parker, NASA Langley Research Center, Hampton, VA	

Monday, 17 June 2019						
54-LTA-2	**Airships and Aerostat Development**					**Edelweiss**
Chaired by: R. VAN TREUREN						
1400 hrs AIAA-2019-2978 **Sizing Methodology of Airship Fins Taking Into Account a Tethered Flight Condition** J. Santos, J. Mendonça Junior, M. Morales, L. Goes, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; S. Stevanovic, Planet IX, Zagreb, Croatia; R. Santana, University of Passo Fundo, Passo Fundo, Brazil	1430 hrs AIAA-2019-2979 **Design, Fabrication and Testing of an Aerostat System for Last Mile Communication** V. Sharma, C. Dusane, R. Verma, R. Pant, Indian Institute of Technology Bombay, Mumbai, India	1500 hrs AIAA-2019-2980 **Lighter than air wind turbine platform** P. Upadhyay, University of Petroleum and Energy Studies, Dehradun, India	1530 hrs AIAA-2019-2981 **Methodology and Analysis of Inflatable Structures for Lighter Than Air Flight Systems** K. McNamara, T. Tsukada, B. Loh, J. Jacob, Oklahoma State University, Stillwater, OK	1600 hrs AIAA-2019-2982 **Airship Aerodynamic Coefficients Estimation Based on Computational Method for Preliminary Design** J. Mendonça Junior, J. Santos, M. Morales, L. Goes, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; S. Stevanovic, Planet IX, Zagreb, Croatia; R. Santana, University of Passo Fundo, Passo Fundo, Brazil		

Monday, 17 June 2019						
55-MDO-2	**Metamodeling and Approximation Methods**					**Milan**
Chaired by: A. NING, BYU and V. TOROPOV, Queen Mary, University of London						
1400 hrs AIAA-2019-2983 **Adaptive Model Refinement with Batch Bayesian Sampling for Optimization of Bio-inspired Flow Tailoring** P. Ghassemi, S. Lulekar, S. Chowdhury, University at Buffalo, Buffalo, NY	1430 hrs AIAA-2019-2984 **Modeling of a Modern Aircraft Through Calibration Techniques** R. Thacker, NASA Glenn Research Center, Cleveland, OH; N. Blaesser, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-2985 **Finding Maximum Expected Improvement for High-Dimensional Design Optimization** Y. Zhang, J. Kristensen, S. Ghosh, T. Vandeputte, J. Tallman, L. Wang, General Electric Company, Niskayuna, NY	1530 hrs AIAA-2019-2986 **On the Use of Upper Trust Bounds in Constrained Bayesian Optimization Infill Criteria** R. Priem, N. Bartoli, ONERA, Toulouse, France; Y. Diouane, Higher Institute of Aeronautics and Space, Toulouse, France	1600 hrs AIAA-2019-2987 **Efficient Robust Design of a Forward Swept Unmanned Aerial Vehicle Using Surrogates** J. Wauters, V. Browaeys, H. Dolfen, J. Degroote, Ghent University, Gent, Belgium	1630 hrs AIAA-2019-2988 **Efficient Infill Criterion of Surrogate Model for Severely-Constrained Optimization Problems** Y. Dwianto, University of Tokyo, Tokyo, Japan; H. Fukumoto, A. Oyama, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	

Monday, 17 June 2019						
56-MDO-3	**Special Session: MDO Frameworks I**					**Ming**
Chaired by: J. HWANG and A. STUECK, German Aerospace Center (DLR)						
1400 hrs AIAA-2019-2989 **Distributed Multidisciplinary Optimization and Collaborative Process Development Using RCE** B. Boden, J. Flink, R. Mischke, K. Schaffert, A. Weinert, A. Wohlan, German Aerospace Center (DLR), Braunschweig, Germany; et al.	1430 hrs AIAA-2019-2990 **WhatsOpt: a web application for multidisciplinary design analysis and optimization** R. Lafage, S. Defoort, T. Lefebvre, ONERA, Toulouse, France	1500 hrs AIAA-2019-2991 **GEMS, a Generic Engine for MDO Scenarios : Key Features in Application** F. Gallard, P. Barjhoux, IRT Antoine de Saint-Exupéry, Toulouse, France; R. Olivanti, Airbus, Toulouse, France; A. Gazaix, IRT Antoine de Saint-Exupéry, Toulouse, France	1530 hrs Oral Presentation **Using OpenMDAO to Solve Design Optimization Problems 10 Times Faster** J. Gray, NASA Glenn Research Center, Cleveland, OH	1600 hrs AIAA-2019-2992 **MSTC Engineering – A Distributed and Adaptive Collaborative Design Computational Environment for Military Aerospace Vehicle Development and Technology Assessment** R. Kolonay, Air Force Research Laboratory, Wright-Patterson AFB, OH		

Monday, 17 June 2019						
57-MST-2	**Human Factors, Cueing, and Perception**					**Travertine**
Chaired by: S. BEARD, NASA/ARC-AFS Aerospace Simulation R&D and R. RUFF, The MathWorks, Inc.						
1400 hrs AIAA-2019-2993 **Validation of Proposed Go-Around Criteria Under Various Environmental Conditions** P. Zaal, San Jose State University, Moffett Field, CA; A. Campbell, Federal Aviation Administration, Atlantic City, NJ; J. Schroeder, Federal Aviation Administration, Moffett Field, CA; S. Shah, Federal Aviation Administration, Atlantic City, NJ	1430 hrs AIAA-2019-2994 **Low-Cost Simulator for Flight Crew Human-Factors Studies** W. Pittorie, D. Wilt, S. Rebensky, M. Carroll, Florida Institute of Technology, Melbourne, FL	1500 hrs AIAA-2019-2995 **Towards a Computer Vision and Augmented Reality Based System for FSTD Validation** M. Roza, A. Van Leeuwen, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands				

Monday, 17 June 2019						
58-PDL-2	**Plasma Flow Control II**					**Ruby**
Chaired by: A. SHASHURIN, Purdue University- Sch of Aero and Astro and C. LIMBACH, Texas A&M University						
1400 hrs AIAA-2019-2996 **Experimental and Numerical Study of a Control Effect of Plasma Array on Flow Structure over Compression Ramp** Y. Watanabe, University of Tokyo, Tokyo, Japan; S. Leonov, University of Notre Dame, Notre Dame, IN	1430 hrs AIAA-2019-2997 **Circuit Studies for Cyclotronic Plasma Actuators** J. Zimmerman, D. Carroll, CU Aerospace, LLC, Champaign, IL; G. Hristov, M. Vahora, P. Ansell, University of Illinois, Urbana-Champaign, Urbana, IL	1500 hrs AIAA-2019-2998 **Fabrication, surface integration and testing of miniaturized dielectric barrier discharge plasma actuators for active flow control applications** M. Lindner, D. Berndt, I. Ehrlich, B. Jungbauer, R. Schreiner, OTH Regensburg, Regensburg, Germany; A. Pipa, INP Greifswald, Greifswald, Germany; et al.	1530 hrs AIAA-2019-2999 **Realization of Multifunctional Surfaces Containing MEMS-based DBD Plasma Actuators and Biomimetic Structures for Flow Manipulation** D. Berndt, M. Lindner, R. Schreiner, OTH Regensburg, Regensburg, Germany; R. Hink, A. Pipa, J. Schaefer, INP Greifswald, Greifswald, Germany; et al.			

Monday, 17 June 2019						
59-TF-3	**Innovative/Transformational Aircraft Concepts**					**Lalique**
Chaired by: S. BRICENO, Georgia Institute of Technology and C. JUSTIN, Georgia Institute of Technology						
1400 hrs AIAA-2019-3000 **Conceptual Design of Electric Helicopters for Urban Air Mobility** S. Salinger, L. Rajauski, J. Cole, Bucknell University, Lewisburg, PA	1430 hrs AIAA-2019-3001 **A Thrust-Elevator Interaction Criterion for Aircraft Optimal Longitudinal Control** C. Varriale, K. Hameeteman, Delft University of Technology, Delft, The Netherlands; M. Voskuijl, Netherlands Defence Academy, Den Helder, The Netherlands; L. Veldhuis, Delft University of Technology, Delft, The Netherlands	1500 hrs AIAA-2019-3002 **Network-Optimized Design of a Notional Hybrid Electric Airplane for Thin-Haul Operations** C. Weit, C. Justin, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1530 hrs AIAA-2019-3003 **Development and Testing of a Coaxial Helicopter Controlled by Shifting the Center of Gravity** M. Miller, T. Khamvilai, Georgia Institute of Technology, Atlanta, GA	1600 hrs AIAA-2019-3004 **A Combined Blade Element and Vortex Panel Method for Stacked Rotor Analysis** B. Pollard, M. Patterson, S. Whiteside, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2019-3005 **Concept of a Logistics, Air Launch, and Recovery (LALAR) eVTOL Platform** Y. Ito, M. Hayashida, H. Yasuda, Yamato Holdings Co., Ltd., Chuo-ku, Japan	1700 hrs Oral Presentation **Baseline Assumptions and Future Research Areas for Urban Air Mobility Vehicles** K. Antcliff, S. Whiteside, NASA Langley Research Center, Hampton, VA; L. Kohlman, C. Silva, NASA Ames Research Center, Moffett Field, CA

Monday, 17 June 2019						
60-TP-2	**Aerothermodynamics and Thermal Protection Systems I**					**Fleur De Lis A**
Chaired by: M. BARNHARDT, NASA Ames Research Center and A. BRUNE, NASA Langley Research Center and S. SHERIF, University of Florida						
1400 hrs AIAA-2019-3006 **Shock Layer Radiation Measurements at a Mars Entry Condition for Infrared Thermography** R. Ramesh, R. Kelly, T. Cullen, R. Morgan, D. Mee, University of Queensland, Brisbane, Australia	1430 hrs AIAA-2019-3007 **Testing of Ultra Fast Response, Durable Co-axial Thermocouples for High Enthalpy Impulse Facilities** C. James, University of Queensland, Brisbane, Australia; B. Birch, University of Southern Queensland, Toowoomba, Australia; D. Smith, T. Cullen, T. Millard, S. Vella, University of Queensland, Brisbane, Australia; et al.	1500 hrs AIAA-2019-3008 **CFD Simulations of the IHF Arc-Jet Flow: 9-Inch Nozzle, Flow Surveys, LEAF Wedge Calibration Data** T. Gokcen, A. Alunni, Analytical Mechanics Associates, Inc., Moffett Field, CA	1530 hrs AIAA-2019-3009 **Rough-Wall Turbulent Heat Transfer Experiments in Hypersonic Free Flight** M. Wilder, NASA Ames Research Center, Moffett Field, CA; D. Prabhu, Analytical Mechanics Associates, Inc., Moffett Field, CA	1600 hrs AIAA-2019-3010 **Features of Afterbody Radiative Heating for Titan Entry** C. Johnston, T. West, NASA Langley Research Center, Hampton, VA; A. Brandis, NASA Ames Research Center, Moffett Field, CA		

Monday, 17 June 2019						
61-TP-3	**Theoretical, Analytical, and Computational Heat Transfer: Conduction, Convection, Radiation, and Phase Change**					**Wyeth**
Chaired by: K. WEED, Ball Aerospace & Technologies Corporation and E. SHORT, Raytheon Company						
1400 hrs AIAA-2019-3011 **Radiative Heat Transfer in Solid Rocket Nozzles** P. Cross, Naval Air Warfare Center, China Lake, CA	1430 hrs AIAA-2019-3012 **Generalized Solution for Three-Dimensional Transient Heat Conduction Problems with Partial Heating** R. McMasters, Virginia Military Institute, Lexington, VA; F. de Monte, University of L'Aquila, L'Aquila, Italy; J. Beck, Michigan State University, East Lansing, MI	1500 hrs AIAA-2019-3013 **A Computational Study of Hydrodynamic Developing Region in Single-Phase Minichannels** A. Sarmiento, G. Maccari, F. Milanese, M. Mantelli, R. Cavalcanti Alvarez, Federal University of Santa Catarina, Florianópolis, Brazil	1530 hrs AIAA-2019-3014 **Effect of Accelerated Vibrational Relaxation on the Flow in a Nonequilibrium Flow Supersonic Wind Tunnel** I. Gulko, Y. Hung, I. Adamovich, Ohio State University, Columbus, OH	1600 hrs AIAA-2019-3015 **Simulations of CO2-CO Infrared Radiation Measurements in Shock and Expansion-Tubes** U. Dubuet, CentraleSupélec, Gif-sur-Yvette, France; A. Lemal, Astro Live Experiences (ALE), Tokyo, Japan; S. Nomura, H. Takayanagi, S. Matsuyama, K. Fujita, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan		

Monday, 17 June 2019		
62-NW-6 **1600 - 1630 hrs**	**Networking Break**	**Technical Session Foyers**

Monday, 17 June 2019		
63-RLA-2 **1630 - 1900 hrs**	**Speed Mentoring & Networking Reception**	**Peacock Terrace**

Monday, 17 June 2019		
64-LEC-1 **1800 - 1900 hrs**	**Wright Brothers Lecture: Turning Flight Control on its Head for the F-35, eVTOL, and Beyond**	**Grand Ballroom**

Tuesday

Tuesday, 18 June 2019

65-SB-2 0730 - 0800 hrs	Tuesday Speaker Briefing	Session Rooms

Tuesday, 18 June 2019

66-PLNRY-2 0800 - 0900 hrs	Tuesday Plenary: NASA Aeronautics	Grand Ballroom

Moderator: Richard Wahls, Strategic Technical Advisor, Advanced Air Vehicles Program, Aeronautics Research Mission Directorate, NASA

Keynote Speaker
Stephen Jurczyk
Associate Administrator
NASA

Tuesday, 18 June 2019

67-NW-7 0900 - 0930 hrs	Networking Break	Technical Session Foyers

Tuesday, 18 June 2019

68-ACD-5 — Propulsion Technologies — Fleur De Lis B

Chaired by: T. TAKAHASHI, Arizona State University and D. CARTER, Air Force Research Laboratory

0930 hrs AIAA-2019-3016 **Comparison of Vaneless Counter-Rotating Power Extraction Engines for UAV Propulsion** L. Burgett, T. Takahashi, Arizona State University, Tempe, AZ	1000 hrs AIAA-2019-3017 **Preliminary Engine Intake Sizing for a Boundary Layer Ingesting Rear Engine** M. Ruetten, J. Díaz Vides, German Aerospace Center (DLR), Göttingen, Germany	1030 hrs AIAA-2019-3018 **Assessment of Mixer-Ejector Nozzle with Thermal Acoustic Shield for Jet Noise Reduction** J. Burt, J. Seidel, S. Leib, NASA Glenn Research Center, Cleveland, OH	1100 hrs AIAA-2019-3019 **Aero-Propulsive Analysis for Contemporary Conceptual Design** V. Ahuja, Research in Flight, Auburn, AL; I. Chakraborty, R. Hartfield, Auburn University, Auburn, AL		

Tuesday, 18 June 2019

69-ADS-4 — CPAS Program Overview and Airdrop Testing — Plum Blossom A

Chaired by: B. ANDERSON, NASA-Johnson Space Center and C. EVANS, NASA Johnson Space Center

0930 hrs AIAA-2019-3020 **CPAS Project Management** C. Johnson, NASA Johnson Space Center, Houston, TX	1000 hrs AIAA-2019-3021 **Orion Capsule Assembly System (CPAS) Test Program Summary** C. Evans, NASA Johnson Space Center, Houston, TX	1030 hrs AIAA-2019-3022 **Spacecraft Requirements Development and Tailoring** J. McMichael, C. McCann, NASA Johnson Space Center, Houston, TX	1100 hrs AIAA-2019-3023 **Orion Capsule Assembly System (CPAS) Airdrop Test Program Challenges and Solutions** C. Evans, NASA Johnson Space Center, Houston, TX	1130 hrs AIAA-2019-3024 **Orion Capsule Assembly System (CPAS) Airdrop Test Program Avionics, Imagery, and Instrumentation Systems** C. Evans, C. Williamson, K. Nornoo, W. Jennings, R. Sweet, NASA Johnson Space Center, Houston, TX	

Tuesday, 18 June 2019

70-APA-9 — Special Session: Aerodynamic-Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology I — Cortez C

Chaired by: N. NGUYEN, NASA-Ames Research Center and B. STANFORD, NASA Langley Research Center

0930 hrs AIAA-2019-3025 **Active Flutter Suppression Using Reduced Order Modeling for Transonic Aeroservoelastic Control Law Development (Invited)** J. Waite, B. Stanford, R. Bartels, W. Silva, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2019-3026 **Investigation of Truss-Braced Wing Aircraft Transonic Wing-Strut Interference Effects Using FUN3D (Invited)** J. Xiong, J. Fugate, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2019-3027 **Computation of Flow Induced by Gust Generator in a Wind-Tunnel (Invited)** J. Xiong, N. Cramer, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2019-3028 **Aero-Structural Modeling of the Truss-Braced Wing Aircraft Using Potential Method with Correction Methods for Transonic Viscous Flow and Wing-Strut Interference Aerodynamics (Invited)** N. Nguyen, NASA Ames Research Center, Moffett Field, CA; J. Fugate, J. Xiong, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA		

Tuesday, 18 June 2019						
71-APA-10	**Ship Air-Wake Characterization and Interaction**					**Cortez D**
Chaired by: M. GHOREYSHI, United States Air Force Academy and L. DAVENPORT, CSSI, Inc.						
0930 hrs AIAA-2019-3029 **Experimental Validation of the Unsteady CFD-generated Airwake of the HMS Queen Elizabeth Aircraft Carrier** N. Watson, M. White, I. Owen, University of Liverpool, Liverpool, United Kingdom	1000 hrs AIAA-2019-3030 **Numerical Wave Simulation and Investigation of Air-wave-aircraft Interactions** J. Chen, T. Xiao, Nanjing University of Aeronautics and Astronautics, Nanjing, China; L. Shen, University of Minnesota, Twin Cities, Minneapolis, MN; Y. Lu, M. Tong, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1030 hrs AIAA-2019-3031 **Adaptive Mesh Refinement for Computing Unsteady Ship Air Wakes** T. Miller, University of Colorado, Colorado Springs, Colorado Springs, CO; P. Aref, M. Ghoreyshi, A. Jirasek, R. Greenwood, U.S. Air Force Academy, Colorado Springs, CO	1100 hrs AIAA-2019-3032 **On the unsteadiness of ship airwakes subject to atmospheric boundary-layer inflow from a helicopter operation perspective** R. Thedin, Pennsylvania State University, State College, PA; S. Murman, NASA Ames Research Center, Moffett Field, CA; S. Schmitz, Pennsylvania State University, State College, PA		

Tuesday, 18 June 2019						
72-APA-11	**Aeropropulsive Interactions I**					**Cortez A**
Chaired by: T. SINNIGE, Delft University of Technology and A. HABERMANN						
0930 hrs AIAA-2019-3033 **Aerodynamic Performance of a Wingtip-Mounted Tractor Propeller Configuration in Windmilling and Energy-Harvesting Conditions** T. Sinnige, T. Stokkermans, N. van Arnhem, L. Veldhuis, Delft University of Technology, Delft, The Netherlands	1000 hrs AIAA-2019-3034 **Experimental Investigation of Rotor-wing Interaction at Low Disk Loading and Low Reynolds Number** M. Chen, D. Cranes, J. Hubner, University of Alabama, Tuscaloosa, Tuscaloosa, AL	1030 hrs AIAA-2019-3035 **Aerodynamic Interaction Between an Over-the-Wing Propeller and the Wing Boundary-Layer in Adverse Pressure Gradients** R. de Vries, N. van Arnhem, F. Avallone, D. Ragni, R. Vos, G. Eitelberg, Delft University of Technology, Delft, The Netherlands; et al.	1100 hrs AIAA-2019-3036 **Aerodynamic Performance of an Aircraft Equipped with Horizontal Tail Mounted Propellers** N. van Arnhem, R. de Vries, R. Vos, L. Veldhuis, Delft University of Technology, Delft, The Netherlands	1130 hrs AIAA-2019-3037 **Experimental and Computational Investigation for In-Line Boundary Layer Ingestion** L. Kob, J. Doherty, D. Birch, University of Surrey, Guildford, United Kingdom	

Tuesday, 18 June 2019						
73-APA-12	**Aerodynamic Design: Analysis and Methodologies II**					**Cortez B**
Chaired by: M. MCMULLEN and T. CHYCZEWSKI, Northrop Grumman Aerospace Systems						
0930 hrs AIAA-2019-3038 **Low-order modeling of wing tip vortices using an augmented vortex lattice method** E. Loewenthal, A. Gopalarathnam, North Carolina State University, Raleigh, NC	1000 hrs AIAA-2019-3039 **Linear Frequency Domain Method for Load Control by Fluidic Actuation** M. Widhalm, T. Knopp, V. Ciobaca, German Aerospace Center (DLR), Braunschweig, Germany	1030 hrs AIAA-2019-3040 **Methodology for a Robust Interactive Boundary Layer Solver** M. McMullen, S. Shah, N. Rajmohan, Aerion Technologies Corporation, Palo Alto, CA	1100 hrs AIAA-2019-3041 **Modeling of Brown-Michael vortices in ground effect** H. Chen, Lehigh University, Bethlehem, PA; P. Baddoo, University of Cambridge, Cambridge, United Kingdom; J. Jaworski, Lehigh University, Bethlehem, PA	1130 hrs AIAA-2019-3042 **Unsteady Aerodynamic Computations Using Overset Field-Panel Method and an Unstructured CFD Code** Z. Yang, J. Li, Northwestern Polytechnical University, Xi'an, China; H. Zhang, Aviation Industry Corporation of China (AVIC), Xi'an, China; B. Ma, Northwestern Polytechnical University, Xi'an, China	

Tuesday, 18 June 2019						
74-ASE-1	**Aircraft Wake Turbulence I (Invited)**					**Governors Lecture Hall**
Chaired by: F. HOLZÄPFEL, DLR e.V. and Z. ZHENG, The University of Kansas						
0930 hrs Oral Presentation **Further development and assessment of fast-time wake vortex models in ground proximity** F. Holzäpfel, S. Koerner, A. Stephan, G. Rotshteyn, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	1000 hrs Oral Presentation **Experimental Investigation of Ground Interaction and Decay of Wake Vortices of a Landing Aircraft** G. Castaneda Fuentes, A. Wolter, S. Grundmann, University of Rostock, Rostock, Germany	1030 hrs Oral Presentation **Crow Instability of Vortex Pair in Ground Effect** Z. Zheng, University of Kansas, Lawrence, Lawrence, KS	1100 hrs Oral Presentation **Wake vortex detection at Vienna airport with a Windcube 200S lidar** A. Stephan, N. Wildmann, F. Holzäpfel, German Aerospace Center (DLR), Wessling, Germany; I. Smalikho, Russian Academy of Sciences, Tomsk, Russia	1130 hrs AIAA-2019-3043 **Wake Vortex Pair Formation as an Analog for Dust Devil and Tornado Genesis** R. Ash, Old Dominion University, Norfolk, VA		

Tuesday, 18 June 2019						
75-ATOMS-5	**ATC - Local and Ground**					**Peridot**
Chaired by: P. ROLING, Delft Technical University of Technology and N. MEIJERS, Massachusetts Institute of Technology						
0930 hrs AIAA-2019-3044 **Enhancements to the Runway Capacity Simulation Model Using the ASDE-X Data for Estimating Airports Throughput Under Various Wake Separation Systems** N. Mirmohammadsadeghi, Virginia Polytechnic Institute and State University, Blacksburg, VA; J. Hu, TransSolution, Dallas, TX; A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA	1000 hrs AIAA-2019-3045 **A Data-Driven Approach to Understanding Runway Occupancy Time** N. Meijers, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA	1030 hrs AIAA-2019-3046 **Runway Occupancy Time Constraint and Runway Throughput Estimation under Reduced Arrival Wake Separation Rules** J. Hu, N. Mirmohammadsadeghi, A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA	1100 hrs AIAA-2019-3047 **Modelling the effects of gate planning on apron congestion** W. Lingen, P. Roling, Delft University of Technology, Delft, The Netherlands	1130 hrs AIAA-2019-3048 **A Non-Parametric Discrete Choice Model for Airport Acceptance Rate Prediction** D. Larsen, M. Robinson, MITRE Corporation, McLean, VA		

Tuesday, 18 June 2019						
76-ATOMS-6	**UAS Traffic Management II**					**Steuben**
Chaired by: E. ANCEL, NASA Langley Research Center and S. KIM, Korea Aerospace Research Institute (KARI)						
0930 hrs AIAA-2019-3049 **Low-SWaP EO sensor-based Robust Aircraft Detection for DAA Technology in UAS Integration** J. Lee, H. Lee, D. Shim, Korea Advanced Institute of Science and Technology, Daejeon, South Korea	1000 hrs AIAA-2019-3050 **Autonomous Small Unmanned Aerial Systems Computer Vision Tracking** J. Ogorzalek, D. Doyle, J. Black, Virginia Polytechnic Institute and State University, Blacksburg, VA	1030 hrs AIAA-2019-3051 **A Mobile Alerting Interface for Drone and Human Contraband Drops** C. Wang, M. Cummings, Duke University, Durham, NC	1100 hrs AIAA-2019-3052 **Third-Party Risk of Mid-Air Collision Between Small Unmanned Aircraft Systems** S. Kim, Korea Aerospace Research Institute, Daejeon, South Korea	1130 hrs AIAA-2019-3053 **In-Time Non-Participant Casualty Risk Assessment to Support Onboard Decision Making for Autonomous Unmanned Aircraft** E. Ancel, F. Capristan, J. Foster, NASA Langley Research Center, Hampton, VA; R. Condotta, Analytical Mechanics Associates, Inc., Hampton, VA		

Tuesday, 18 June 2019						
77-BA-1	**Balloon System Operations**					**Travertine**
Chaired by: H. CATHEY, New Mexico State Universtiy and M. SMITH, Aerostar International, Inc.						
0930 hrs AIAA-2019-3054 **The CNES Balloon Program : 2017 - 2019** A. Vargas, V. Dubourg, P. Raizonville, P. Cocquerez, French Space Agency (CNES), Toulouse, France	1000 hrs AIAA-2019-3055 **Numerical simulation of heat sealing of the strengthen belt on high-altitude balloon** J. Cai, Y. Qin, Y. Yang, Q. Liu, Chinese Academy of Sciences, Beijing, China					

Tuesday, 18 June 2019						
78-CFD-6/MVCE-2	**Adaptive Meshing and Error Analysis II**					**Obelisk A**
Chaired by: S. DEY, US NRL and R. GLASBY, University of Tennessee						
0930 hrs AIAA-2019-3056 **High-Fidelity Coupled Fluid-Structure Interaction Simulations with Adaptive Meshing** V. Ojha, K. Fidkowski, C. Cesnik, University of Michigan, Ann Arbor, Ann Arbor, MI	1000 hrs AIAA-2019-3057 **Output-Based Mesh Adaptation for Variable-Fidelity Multipoint Aerodynamic Optimization** G. Chen, K. Fidkowski, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2019-3058 **Metric Construction for Error Control of Finite Element Solutions** A. Rangarajan, G. May, RWTH Aachen University, Aachen, Germany	1100 hrs AIAA-2019-3059 **Unstructured anisotropic mesh adaptation for 3D RANS turbomachinery applications** L. Frazza, A. Loseille, F. Alauzet, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France			

Tuesday, 18 June 2019						
79-CFD-7	**High-Order Flux Reconstruction**					**Obelisk B**
Chaired by: H. NISHIKAWA, National Institute of Aerospace and Z. WANG, University of Kansas						
0930 hrs AIAA-2019-3060 **High-Order Hyperbolic Navier-Stokes Reconstructed Discontinuous Galerkin Method for Unsteady Flows** L. Li, J. Lou, H. Luo, North Carolina State University, Raleigh, NC; H. Nishikawa, National Institute of Aerospace, Hampton, VA	1000 hrs AIAA-2019-3061 **A p-multigrid flux reconstruction method for the steady Navier-Stokes equations** L. Wang, M. Yu, University of Maryland, Baltimore County, Baltimore, MD	1030 hrs AIAA-2019-3062 **Jacobian-free implicit p-adaptive high-order compact direct flux reconstruction methods for unsteady flow simulation** L. Wang, M. Yu, University of Maryland, Baltimore County, Baltimore, MD	1100 hrs AIAA-2019-3063 **A Novel Flux Reconstruction Method for Diffusion Problems** P. Johnson, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI; H. Huynh, NASA Glenn Research Center, Cleveland, OH	1130 hrs AIAA-2019-3064 **Discontinuous Galerkin via Interpolation: The Direct Flux Reconstruction Method** H. Huynh, NASA Glenn Research Center, Cleveland, OH	1200 hrs AIAA-2019-3065 **Direct Reconstruction Method for Surface Integration of Discontinuous Galerkin Methods on High-order Mixed-Curved Meshes** H. You, C. Kim, Seoul National University, Seoul, South Korea	

Tuesday, 18 June 2019						
80-DE-1	**Design Engineering - Emerging Design Tools and Innovative Approaches**					**Fleur De Lis A**
Chaired by: K. BENSON, Raytheon Missile Systems and N. HINES, The Boeing Company						
0930 hrs AIAA-2019-3066 **Wing Airfoil Pressure Calibration with Deep Learning** X. Bertrand, F. Tost, S. Champagneux, Airbus, Toulouse, France	1000 hrs AIAA-2019-3067 **An Exploratory Design Tool for Lattice Airplane Wing Components** P. Riley, S. Malek, U.S. Naval Academy, Annapolis, MD	1030 hrs AIAA-2019-3068 **Preliminary Design of a Wing Considering Transonic Aerodynamic, Weight and Aeroelastic Behavior** D. Miskin, T. Takahashi, Arizona State University, Tempe, AZ	1100 hrs AIAA-2019-3069 **A Script-Based CAD System for Aerodynamic Design** B. Mukundakrishnan, N. Rajmohan, D. Rajnarayan, S. Fugal, Aerion Supersonic, Reno, NV	1130 hrs AIAA-2019-3070 **Numerical approach to the setting of aircraft in-flight target loads problem** S. Hernandez, A. Baldomir, C. Cid, University of Coruna, A Coruna, Spain	1200 hrs AIAA-2019-3071 **Feasibility Assesment of Using Hydrokinetic Turbine in Golden Gate Strait** S. Mohammadi, M. Hassanalian, S. Bakhtiyarov, New Mexico Institute of Mining and Technology, Socorro, NM	

Tuesday, 18 June 2019		
81-F360-3 **0930 - 1130 hrs**	**Tuesday Morning Forum 360: NASA Aeronautics Shaping the Future of Flight**	**Coronado Ballroom**

Moderator: Richard Wahls, Strategic Technical Advisor, Advanced Air Vehicles Program, Aeronautics Research Mission Directorate, NASA

Opening Remarks:
Jon Montgomery, Deputy Associate Administrator for Policy, Aeronautics Research Mission Directorate, NASA

Panelists:

Bryan Barmore
Deputy Project Manager for Technology, Air Traffic Management – Exploration Project
Airspace Operations and Safety Program
Aeronautics Research Mission Directorate
NASA

Barbara Esker
Acting Director
Advanced Air Vehicles Program
Aeronautics Research Mission Directorate
NASA

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

Davis Hackenberg
Strategy Advisor for Urban Air Mobility
Aeronautics Research Mission Directorate
NASA

David Richwine
Deputy Project Manager for Technology
Low-Boom Flight Demonstrator Project
Integrated Aviation Systems Program
Aeronautics Research Mission Directorate
NASA

Tuesday, 18 June 2019						
82-FD-9	**Special Session: Reduced-Complexity Modeling for Flow Control**					**Madrid**
Chaired by: M. HEMATI, University of Minnesota and K. DURAISAMY						
0930 hrs Oral Presentation **Kalman Filter Dynamic Mode Decomposition and its Off-line Extension** T. Nonomura, Tohoku University, Sendai, Japan	1000 hrs AIAA-2019-3072 **Reduced-order modeling using Dynamic Mode Decomposition and Least Angle Regression** J. Graff, X. Xu, F. Lagor, T. Singh, University at Buffalo, Buffalo, NY	1030 hrs Oral Presentation **Resolvent-based estimation for flow control** A. Towne, University of Michigan, Ann Arbor, Ann Arbor, MI; E. Martini, A. Cavalieri, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil	1100 hrs Oral Presentation **Feedback Control of Transitional Channel Flow via Reduced-Order Modeling** Y. Sun, H. Yao, A. Kalur, M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN	1130 hrs Oral Presentation **Analytic methods for modal decomposition of turbulent shear flows** S. Dawson, Illinois Institute of Technology, Chicago, IL; B. McKeon, California Institute of Technology, Pasadena, CA	1200 hrs Oral Presentation **Optimization of Riblet Geometry Using Low-Order Models** A. Chavarin, M. Luhar, University of Southern California, Los Angeles, CA	

Tuesday, 18 June 2019						
83-FD-10	**Fundamental Fluid Flows I: High Speed Flows**					**Manchester**
Chaired by: K. GRANLUND, North Carolina State University and S. PELTIER, U.S. Air Force Research Laboratory						
0930 hrs AIAA-2019-3073 **Flow Characterisation for a Validation Study in High-speed Aerodynamics** K. Sabnis, University of Cambridge, Cambridge, United Kingdom; D. Galbraith, Air Force Research Laboratory, Wright-Patterson AFB, OH; H. Babinsky, University of Cambridge, Cambridge, United Kingdom; J. Benek, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2019-3074 **Experimental investigation of planar shock wave-grid turbulence interaction using counter driver shock tube** G. Fukushima, Nagoya University, Nagoya, Japan; T. Tamba, Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; S. Ogawa, A. Iwakawa, A. Sasoh, Nagoya University, Nagoya, Japan	1030 hrs AIAA-2019-3075 **Shocks and Shock Interactions in Granular flow Past Circular Cylinder** A. Khan, P. Hankare, S. Kumar, R. Kumar, S. Verma, S. Prakash, Indian Institute of Technology Kanpur, Kanpur, India	1100 hrs AIAA-2019-3076 **Transonic Flow Past a Porous Medium: Effect of Porosity on Slip Velocity and Flow Gradients at the Clear-Fluid/Porous-Medium Interface** A. Sahoo, S. Ghosh, S. Roy, Indian Institute of Technology Madras, Chennai, India	1130 hrs AIAA-2019-3077 **Oscillating Shock Impinging on a Flat Plate at Mach 6** G. Currao, L. McQuellin, A. Neely, University of New South Wales at the Australian Defence Force Academy, Canberra, Australia; J. McNamara, Ohio State University, Columbus, OH; D. Buttsworth, University of Southern Queensland, Toowoomba, Australia	1200 hrs AIAA-2019-3078 **A Semi-analytical Approach for Electric Arc Shock Tube Flow Simulations** D. Chandel, I. Nompelis, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN	

Tuesday, 18 June 2019						
84-FD-11	**Stability and Transition III: High-Speed III**					**Miro**
Chaired by: S. SCHNEIDER, Purdue University and B. WHEATON, JHU Applied Physics Laboratory						
0930 hrs AIAA-2019-3079 **Visualizations of Hypersonic Boundary-Layer Transition on a Variable Bluntness Cone** R. Kennedy, E. Jagde, S. Laurence, University of Maryland, College Park, College Park, MD; J. Jewell, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2019-3080 **Visualizations of Boundary-Layer Transition on a Sharp Cone at Mach 6** E. Jagde, R. Kennedy, S. Laurence, University of Maryland, College Park, College Park, MD; J. Jewell, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH	1030 hrs AIAA-2019-3081 **Heat Transfer and Boundary-Layer Stability Analysis of Subscale BOLT and the Fin Cone** C. Mullen, A. Moyes, T. Kocian, H. Reed, Texas A&M University, College Station, TX	1100 hrs AIAA-2019-3082 **DNS Study of Roughness-Induced Transition at Mach 6** J. Lefieux, E. Garnier, ONERA, Meudon, France; N. Sandham, University of Southampton, Southampton, United Kingdom	1130 hrs AIAA-2019-3083 **How nose bluntness suppresses second-mode growth** J. Sakakeeny, Baylor University, Waco, TX; A. Batista, J. Kuehl, University of Delaware, Newark, Newark, DE	1200 hrs AIAA-2019-3084 **Implications of local wall temperature variations on second-mode instability** A. Batista, J. Kuehl, University of Delaware, Newark, Newark, DE	

Tuesday, 18 June 2019						
85-FD-12	**Special Session: Experiments for Turbulence Model Validation and Evaluation**					**Metropolitan**
Chaired by: B. SMITH, Lockheed Martin Aeronautics and C. RUMSEY, NASA-Langley Research Center						
0930 hrs Oral Presentation **Smooth Wall Separation over Bumps: Benchmark Experiments for CFD Validation** T. Lowe, W. Devenport, C. Roy, A. Borgoltz, V. Vishwanathan, A. Gargiulo, Virginia Polytechnic Institute and State University, Blacksburg, VA; et al.	1000 hrs AIAA-2019-3085 **Smooth Body Flow Separation Experiments and Their Surface Flow Topology Characterization** D. Simmons, F. Thomas, T. Corke, University of Notre Dame, Notre Dame, IN	1030 hrs Oral Presentation **Update on the NASA Junction-Flow Experiment: Methodology and Future Plans** M. Kegerise, D. Neuhart, J. Hannon, C. Rumsey, NASA Langley Research Center, Hampton, VA	1100 hrs Oral Presentation **Update on the NASA Junction-Flow Experiment: Results and Future Plans** D. Neuhart, M. Kegerise, J. Hannon, C. Rumsey, NASA Langley Research Center, Hampton, VA	1130 hrs Oral Presentation **Update on Juncture Flow PIV Results & Future Plans** L. Jenkins, C. Yao, S. Bartram, NASA Langley Research Center, Hampton, VA		

Tuesday, 18 June 2019						
86-FT-3	**System ID and Parameter Estimation Techniques from Flight Test**					**Desoto B**
Chaired by: S. GINN, NASA AFRC and B. COBLEIGH, NASA Armstrong Flight Research Center						
0930 hrs AIAA-2019-3086 **System Identification and Dynamics Modeling of a Distributed Electric Propulsion Aircraft** A. Perry, T. Bretl, P. Ansell, University of Illinois, Urbana-Champaign, Urbana, IL	1000 hrs AIAA-2019-3087 **Collocation-Based Output-Error Method for Aircraft System Identification** D. Dutra, Federal University of Minas Gerais, Belo Horizonte, Brazil	1030 hrs AIAA-2019-3088 **Precision performance measurements of fixed-wing aircraft with wing tip propellers** O. Pfeifle, W. Fichter, D. Bergmann, J. Denzel, A. Strohmayer, M. Schollenberger, University of Stuttgart, Stuttgart, Germany; et al.	1100 hrs AIAA-2019-3089 **Assessment of Sub-scale Designs for Scaled Flight Testing** A. Raju Kulkarni, C. Varriale, Delft University of Technology, Delft, The Netherlands; M. Voskuijl, Netherlands Defence Academy, Den Helder, The Netherlands; G. La Rocca, L. Veldhuis, Delft University of Technology, Delft, The Netherlands			

Tuesday, 18 June 2019						
87-GT-5	**Computational and Experimental Analysis, Predictions, and Assessments of Ground Test Facilities**					**Emerald**
Chaired by: J. PATRICK, Lockheed Martin Aeronautics and C. MORRIS, Arnold Engineering Development Complex						
0930 hrs AIAA-2019-3090 **Computational Assessment of Facility Wall Loads for Large Parachute Testing in the National Full-Scale Aerodynamics Complex 80- by 120-foot Wind Tunnel** C. Nykamp, W. Bartow, P. Goulding, National Full-Scale Aerodynamics Complex (NFAC), Moffett Field, CA; J. Sirbaugh, Arnold Engineering Development Complex (AEDC), Arnold AFB, TN	1000 hrs AIAA-2019-3091 **A 1-D Model for Condensation Onset in Hypersonic Wind Tunnels with Gas-Phase Impurities** P. Lax, S. Leonov, University of Notre Dame, Notre Dame, IN	1030 hrs AIAA-2019-3092 **Overview of Advanced Wind Tunnel Boundary Simulation Research Workshop** A. Krynytzky, The Boeing Company, Seattle, WA; C. Broughton, National Research Council Canada, Ottawa, Canada; J. Morrison, E. Walker, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2019-3093 **Characterization of Test Conditions in the Notre Dame Arc-Heated Wind Tunnel** E. Hoberg, C. Huffman, N. Sanchez-Plesha, C. Running, N. Kato, S. Im, University of Notre Dame, Notre Dame, IN; et al.	1130 hrs AIAA-2019-3094 **Review of Transonic Wall Interference Corrections and Considerations for Development** T. Davis, Calspan Corporation, Cheektowaga, NY	1200 hrs AIAA-2019-3095 **Sensitivity Study of Contraction Flow for Boundary-Layer Validation Wind Tunnel** M. Blanco, J. Battiato, K. Disotell, Youngstown State University, Youngstown, OH	

Tuesday, 18 June 2019						
88-ITAR-1	**ITAR - General Topics**					**Morocco**
Chaired by: N. MARCO, Air Force Research Lab (AFRL/RQVC) and J. REBAND, Air Force Research Laboratory						
0930 hrs AIAA-2019-3096 **Optimal Design of the New Mach 6 Quiet Nozzle at NASA Langley** F. Chen, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2019-3097 **Enhanced ADS-B Flight Tests on F-18 Supersonic Aircraft** R. Arteaga, NASA Armstrong Flight Research Center, Edwards, CA; N. Demidovich, J. Dinofrio, Federal Aviation Administration, Washington, D.C.; N. Voronka, M42 Technologies, LLC, Seattle, WA; C. GreenLow, Federal Aviation Administration, Washington, D.C.; K. Epperson, Vigilant Aerospace, LLC, Oklahoma City, OK; et al.	1030 hrs AIAA-2019-3098 **Store-Separation Analysis of a Two-Stage Orbital Launch Vehicle** C. Acuff, NASA Armstrong Flight Research Center, Edwards, CA; T. Matthews, J. Faber, Jacobs, Edwards, CA; T. Bui, NASA Armstrong Flight Research Center, Edwards, CA; K. Powers, V. Shah, Virgin Orbit, Long Beach, CA; et al.	1100 hrs AIAA-2019-3099 **Statistical Analysis of an AVCOAT Model Using EFT-1 Data and Bayesian Inference** P. Rostkowski, University of Illinois, Urbana-Champaign, Urbana, IL; A. Martin, University of Kentucky, Lexington, Lexington, KY; M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL	1130 hrs AIAA-2019-3100 **Building an Expanded MDAO Process with Subsystem Analysis for Next Generation Air Dominance Platforms** A. Carrere, The Boeing Company, Huntsville, AL; P. Sellers, The Boeing Company, St. Louis, MO; D. Allison, Air Force Research Laboratory, Wright-Patterson AFB, OH	1200 hrs AIAA-2019-3101 **Results, Conclusions and Lessons Learned from the OPTimized Integrated MUltidisciplinary Systems (OPTIMUS) Program** P. Sellers, The Boeing Company, St. Louis, MO; A. Carrere, The Boeing Company, Huntsville, AL; D. Allison, Air Force Research Laboratory, Wright-Patterson AFB, OH	

Tuesday, 18 June 2019						
89-MDO-4	**Aerodynamic Design/Shape Optimization I**					**Milan**
Chaired by: P. PIPERNI, Clarkson University						
0930 hrs AIAA-2019-3102 **Comparison of Generic Multi-Fidelity Approaches for Bound-Constrained Nonlinear Optimization Applied to Adjoint-Based CFD Applications** R. Olivanti, Airbus, Toulouse, France; F. Gallard, IRT Antoine de Saint-Exupéry, Toulouse, France; J. Brézillon, Airbus, Toulouse, France; N. Gourdain, Higher Institute of Aeronautics and Space, Toulouse, France	1000 hrs AIAA-2019-3103 **Towards Real-Time In-Flight Ice Detection Systems via Computational Aeroacoustics and Machine Learning** B. Zhou, N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany; J. Hauth, X. Huan, University of Michigan, Ann Arbor, Ann Arbor, MI; M. Morelli, A. Guardone, Technical University of Milan, Milan, Italy	1030 hrs AIAA-2019-3104 **Achieving Quieter Supersonic Flight Through Outer-Mold Line Modifications: An Optimization Study** S. Reddy, G. Dulikravich, Florida International University, Miami, FL; F. Carpenter, P. Cizmas, Texas A&M University, College Station, TX	1100 hrs AIAA-2019-3105 **Coupled component sizing and aerodynamic shape optimization via geometric constraints** B. Brelje, J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI			

Tuesday, 18 June 2019						
90-MDO-5	**Special Session: MDO Frameworks II**					**Ming**
Chaired by: A. GAZAIX and S. GOERTZ, German Aerospace Center (DLR)						
0930 hrs AIAA-2019-3106 **Large-scale multidisciplinary design optimization — review and recommendations** J. Hwang, A. Jain, T. Ha, University of California, San Diego, La Jolla, CA	1000 hrs AIAA-2019-3107 **Integration of High-Fidelity Analysis Tools in MDO Frameworks for HPC** T. Backhaus, S. Gottfried, C. Ilic, A. Merle, A. Stueck, German Aerospace Center (DLR), Dresden, Germany	1030 hrs AIAA-2019-3108 **Using Graph Coloring To Compute Total Derivatives More Efficiently in OpenMDAO** J. Gray, T. Hearn, NASA Glenn Research Center, Cleveland, OH; B. Naylor, DB Consulting Group, Inc., Cleveland, OH	1100 hrs AIAA-2019-3109 **Industrial Application of an Advanced Bi-level MDO Formulation to Aircraft Engine Pylon Optimization** A. Gazaix, F. Gallard, V. Ambert, D. Guénot, M. Hamadi, S. Grihon, IRT Antoine de Saint-Exupéry, Toulouse, France; et al.	1130 hrs AIAA-2019-3110 **Collaborative Design Optimization with Simulation Process and Data Management** M. Gazzin, G. Cassio, M. Nicolich, ESTECO S.p.A., Trieste, Italy; S. Picinich, Airworks, Gorizia, Italy; C. Poloni, University of Trieste, Trieste, Italy		

Tuesday, 18 June 2019						
91-MST-3	**Modeling and Simulation of New Entrants**					**Inverness**
Chaired by: P. ZAAL, NASA Ames Research Center and D. KEATING, The Charles Stark Draper Laboratory, Inc.						
0930 hrs AIAA-2019-3111 **Stochastic Wind Modeling and Estimation for Unmanned Aircraft Systems** M. Rhudy, Pennsylvania State University, Reading, PA; J. Gross, Y. Gu, West Virginia University, Morgantown, WV	1000 hrs AIAA-2019-3112 **Development of a Modeling, Flight Simulation, and Control Analysis Capability for Novel Vehicle Configurations** I. Chakraborty, Auburn University, Auburn, AL; V. Ahuja, Research in Flight, Auburn, AL; A. Comer, O. Mulekar, Auburn University, Auburn, AL	1030 hrs AIAA-2019-3113 **A Centralized Extended Kalman Filter for Cooperative Localization of Munition Swarms** B. Burchett, Rose-Hulman Institute of Technology, Terre Haute, IN	1100 hrs AIAA-2019-3114 **Design of Multi-Agent UAV Simulator to Support the Development of the MARSNet Communication Protocol** J. Ponniah, San Jose State University, San Jose, CA; O. Dantsker, University of Illinois, Urbana-Champaign, Urbana, IL; R. Mancuso, Boston University, Boston, MA	1130 hrs AIAA-2019-3115 **Modelling and simulation of a bioinspired aquatic micro aerial vehicle** S. Armanini, R. Siddall, M. Kovac, Imperial College London, London, United Kingdom		

Tuesday, 18 June 2019						
92-PDL-3	**Plasma-Assisted Combustion and Ignition**					**Ruby**
Chaired by: S. LEONOV, University of Notre Dame and J. ZIMMERMAN, CU Aerospace						
0930 hrs AIAA-2019-3116 **Investigation of Partially-Coupled Ignition Using Nanosecond Pulsed High Frequency Discharges** N. Tichenor, Texas A&M University, College Station, TX; R. Leiweke, T. Ombrello, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2019-3117 **Dual-Pulse Laser Ignition Using Oxygen REMPI Preionization** C. Butte, Colorado State University, Fort Collins, CO; C. Dumitrache, CentraleSupélec, Châtenay-Malabry, France; A. Yalin, Colorado State University, Fort Collins, CO	1030 hrs AIAA-2019-3118 **Nonequilibrium Nitrogen Excitation in NS Discharge** A. Starikovskiy, Princeton University, Princeton, NJ	1100 hrs AIAA-2019-3119 **Deflagration to detonation transition assisted by equilibrium and non-equilibrium plasma** A. Tropina, R. Mahamud, D. Yorn, R. Miles, Texas A&M University, College Station, TX	1130 hrs AIAA-2019-3120 **Plasma Assisted Combustion Actuators with Arc Breakdown in a Magnetic Field** J. Zimmerman, D. Carroll, CU Aerospace, LLC, Champaign, IL		

Tuesday, 18 June 2019						
93-TF-4	**Operational Aspects of On-Demand Mobility and Transformational Flight**					**Lalique**
Chaired by: B. GERMAN, Georgia Institute of Technology and K. GOODRICH, NASA Langley Research Center						
0930 hrs AIAA-2019-3121 **Wind and Obstacles Impact on Airpark Placement for STOL-based Sub-Urban Air Mobility** L. Somers, C. Justin, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2019-3122 **Effects of eVTOL Approach and Departure Trajectories on UAM Vertiport Sizing** M. Warren, E. Yilmaz, B. German, Georgia Institute of Technology, Atlanta, GA	1030 hrs AIAA-2019-3123 **A Bayesian Safety Assessment Methodology for Novel Aircraft Architectures and Technologies Using Continuous FHA** M. Bendarkar, A. Behere, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1100 hrs AIAA-2019-3124 **Conceptual Design Study on Electrical Vertical Take Off and Landing Aircraft for Urban Air Mobility Applications** M. Kraenzler, M. Schmitt, Bosch, Renningen, Germany; E. Stumpf, RWTH Aachen University, Aachen, Germany	1130 hrs AIAA-2019-3125 **Assessing Integration Between Emerging and Conventional Operations in Urban Airspace** P. Vascik, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA	1200 hrs AIAA-2019-3126 **In-flight deployment of morphing UAVs – a method to analyze dynamic stability, controllability and loads** M. Voskuijl, Netherlands Defence Academy, Den Helder, The Netherlands; M. Said, Delft University of Technology, Delft, The Netherlands; J. Pandher, M. van Tooren, University of South Carolina, Columbia, Columbia, SC; B. Richards, VX Aerospace Holdings, Morganton, NC	

Tuesday, 18 June 2019						
94-TP-4	**Ablation: Modeling, Experiments, and Applications II**					**Wyeth**
Chaired by: A. MARTIN, University of Kentucky and P. YEE, The Aerospace Corporation						
0930 hrs AIAA-2019-3127 **Surface Ablation Regime of a Model of Porous Material** J. Graña-Otero, S. Edward, S. Schmitt, S. Mahmoudi, University of Kentucky, Lexington, Lexington, KY	1000 hrs AIAA-2019-3128 **Kinetics of Oxidation of Carbon Materials** J. Graña-Otero, S. Mahmoudi, S. Schmitt, University of Kentucky, Lexington, Lexington, KY	1030 hrs AIAA-2019-3129 **Molecular-Scale Carbon Oxidation at Hypersonic Speeds** S. Schmitt, J. Graña-Otero, S. Mahmoudi, University of Kentucky, Lexington, Lexington, KY	1100 hrs AIAA-2019-3130 **Modeling thin layers of materials in the Kentucky Aerodynamic Thermal Solver (KATS)** C. Setters, R. Fu, A. Martin, University of Kentucky, Lexington, Lexington, KY	1130 hrs AIAA-2019-3131 **Numerical Investigation of Nonlinear Structural Responses in Ablation Problem** R. Fu, J. Roger, S. McDaniel, J. Wenk, A. Martin, University of Kentucky, Lexington, Lexington, KY		

Tuesday, 18 June 2019						
95-TP-5	**Aerothermodynamics and Thermal Protection Systems II**					**Edelweiss**
Chaired by: D. PYTEL, Lockheed Martin and M. HOWARD, Sandia National Laboratories						
0930 hrs AIAA-2019-3132 **Aerodynamic Heating Coupled with Structural Temperature Response Analysis for Hypersonic Flight Vehicles** F. Rafla, Air Force Research Laboratory, Edwards AFB, CA	1000 hrs AIAA-2019-3133 **Analysis of RCG-Coated Tile Tests in the PTF: Surface Heating Distribution in a Rectangular Cavity** T. Gokcen, K. Skokova, Analytical Mechanics Associates, Inc., Moffett Field, CA	1030 hrs AIAA-2019-3134 **Theoretical and experimental study of helium-neon substitution for Saturn entry radiation** Y. Liu, C. James, R. Morgan, T. McIntyre, University of Queensland, Brisbane, Australia	1100 hrs AIAA-2019-3135 **Hypervelocity boundary-layer flow with high-temperature surface ablation** N. Temme, C. James, T. McIntyre, University of Queensland, Brisbane, Australia; S. Lewis, Australian Department of Defence, Pullenvale, Australia; R. Morgan, University of Queensland, Brisbane, Australia			

Tuesday, 18 June 2019		
96-NW-8 **1230 - 1400 hrs**	**Excellence in Aerospace Awards Luncheon (Proof of Purchase Required)**	**Grand Ballroom**

Tuesday, 18 June 2019						
97-ACD-6	**UAV System Design Studies**					**Inverness**
Chaired by: A. DORSEY, Boeing						
1400 hrs AIAA-2019-3136 **Design and Development of a Tornado Intercept Unmanned Aerial Vehicle** A. Ross, J. Jacob, Oklahoma State University, Stillwater, OK	1430 hrs AIAA-2019-3137 **Conceptual design of a UAV with VTOL characteristics** P. Kaparos, C. Bliamis, K. Yakinthos, Aristotle University of Thessaloniki, Thessaloniki, Greece	1500 hrs AIAA-2019-3138 **Development of UAV for fire detection and for Object Detection and Tracking of Flying Object** S. Srigrarom, University of Glasgow, Glasgow, United Kingdom; P. Ratsamee, Osaka University, Osaka, Japan	1530 hrs AIAA-2019-3139 **Aerodynamic Design and Control of Tandem Wing UAV** T. Kaya, S. Ozgen, Middle East Technical University, Ankara, Turkey	1600 hrs AIAA-2019-3140 **Development of UGS-TUM Vertical Take Off & Landing (VTOL) Drone with Flight Control** S. Srigrarom, University of Glasgow, Glasgow, United Kingdom; F. Holzapfel, Technical University of Munich, Munich, Germany		

Tuesday, 18 June 2019						
98-ADS-5	**CPAS Ground Test and Parachute Load Modeling**					**Plum Blossom A**
Chaired by: E. RAY, Jacobs Technology and R. MACHIN, NASA-Johnson Space Center						
1400 hrs AIAA-2019-3141 **Orion Capsule Parachute Assembly System (CPAS) Riser Twist Load Amplification** L. Cassady, J. Daum, NASA Johnson Space Center, Houston, TX	1430 hrs AIAA-2019-3142 **Orion Capsule Parachute Assembly System (CPAS) Overload Testing Approach and Results** J. Daum, NASA Johnson Space Center, Houston, TX	1500 hrs AIAA-2019-3143 **Updated Reconstruction Methods for Modeling Orion Parachute Loads** E. Ray, MRI Technologies, Houston, TX	1530 hrs AIAA-2019-3144 **CPAS Airdrop Test Joint Recertification by Analysis** C. McCann, NASA Johnson Space Center, Houston, TX; F. Galaviz, S. Reddy, Jacobs Technology, Houston, TX	1600 hrs AIAA-2019-3145 **CPAS Analysis and Simulation Improvements and Lessons Throughout CPAS Testing** S. Manning, P. Glavin, NASA Johnson Space Center, Houston, TX	1630 hrs AIAA-2019-3146 **Textile Strain Measurement System** A. Witkowski, Katabasis Engineering, LLC, Glastonbury, CT; A. Levay, ALD Systems, Inc., Hudson, OH; M. Murbach, NASA Ames Research Center, Moffett Field, CA	

Tuesday, 18 June 2019						
99-ADS-7	**Student Paper Competition**					**Plum Blossom B**
Chaired by: S. ROLAND, Blue Origin LLC						
1400 hrs **No Presentations**				1600 hrs AIAA-2019-3147 **Designing and Development of Aerodynamic Decelerator System with the Use of Non-Newtonian fluid** A. Pandey, O. Prakash, University of Petroleum and Energy Studies, Dehradun, India	1630 hrs AIAA-2019-3148 **Experimental Investigation into the Effects of Geometry on the Glide Performance of Cruciform Parachutes** S. Herrington, T. Sackett, T. Fields, J. Daniel, University of Missouri, Kansas City, Kansas City, MO	1700 hrs AIAA-2019-3149 **A Numerical FSI Investigation of the Impact of Surface Topology on the Vortex-Induced Vibration of Parachute Suspension Lines** C. Barry, B. Olson, University of Massachusetts, Lowell, Lowell, MA; K. Bergeron, Army Research, Development and Engineering Command, Natick, MA; D. Willis, J. Sherwood, University of Massachusetts, Lowell, Lowell, MA

Tuesday, 18 June 2019						
100-AMT-4	**Novel Measurements of Aerodynamic Forces**					**Desoto A**
Chaired by: J. WAGNER, Sandia National Laboratories and J. JEWELL, Air Force Research Laboratory						
1400 hrs AIAA-2019-3150 **Luminescent Measurement Technique for Analysis of Dynamic Pressure and Strain Fields** K. Chism, J. Kawell, J. Hubner, University of Alabama, Tuscaloosa, Tuscaloosa, AL	1430 hrs AIAA-2019-3151 **Novel Ground Test Applications of High-Frequency Pressure Sensitive Paint** K. Casper, S. Spitzer, N. Glenn, R. Schultz, Sandia National Laboratories, Albuquerque, NM	1500 hrs AIAA-2019-3152 **Fundamental Improvement of a Convergence Test for Iterative Strain-Gage Balance Load Predictions** N. Ulbrich, Jacobs, Moffett Field, CA	1530 hrs AIAA-2019-3153 **Calibration and Data Analysis Recommendations for Three-Component Moment Balances** N. Ulbrich, Jacobs, Moffett Field, CA; M. Reed, Aerodyne Industries, LLC, Moffett Field, CA	1600 hrs AIAA-2019-3154 **A Monolithic Internal Strain-Gage Balance Design based on Design for Manufacturability** T. Webb, D. Landman, Old Dominion University, Norfolk, VA; D. Burns, P. Parker, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2019-3155 **Comparison of Electrical Output Format Options for the Analysis of Strain-Gage Balance Calibration Data** N. Ulbrich, Jacobs, Moffett Field, CA	

Tuesday, 18 June 2019						
101-APA-13	**Special Session: Aerodynamic-Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology II**					**Cortez C**
Chaired by: N. NGUYEN, NASA-Ames Research Center and B. STANFORD, NASA Langley Research Center						
1400 hrs AIAA-2019-3156 **Real-Time Adaptive Drag Minimization Wind Tunnel Investigation of a Flexible Wing with Variable Camber Continuous Trailing Edge Flap System (Invited)** N. Nguyen, NASA Ames Research Center, Moffett Field, CA; N. Cramer, K. Hashemi, M. Drew, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA	1430 hrs AIAA-2019-3157 **Extending A Correction Method for Unsteady Transonic Aerodynamics as Applied to Variable Camber Continuous Trailing Edge Flap (Invited)** U. Kaul, N. Nguyen, NASA Ames Research Center, Moffett Field, CA	1500 hrs AIAA-2019-3158 **Aerodynamic analysis of a Flapping Transitional Configuration (Invited)** E. Santarpia, University of California, San Diego, San Diego, CA; L. Demasi, San Diego State University, San Diego, CA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2019-3159 **Modeling of Tunable Elastic Ultralight Aircraft (Invited)** N. Cramer, J. Kim, Stinger Ghaffarian Technologies, Inc., Mountain View, CA; C. Gregg, K. Cheung, S. Swei, NASA Ames Research Center, Moffett Field, CA	1600 hrs AIAA-2019-3160 **Performance Enhancement of the Flexible Transonic Truss-Braced Wing Aircraft Using Variable-Camber Continuous Trailing-Edge Flaps (Invited)** R. Bartels, B. Stanford, J. Waite, NASA Langley Research Center, Hampton, VA		

Tuesday, 18 June 2019						
102-APA-14	**Guided Munitions and Finned Projectiles**					**Cortez D**
Chaired by: I. CELMINS and J. DESPIRITO, US Army Research Laboratory						
1400 hrs AIAA-2019-3161 **Guided Munition Canard Enhancement Using Gurney Flaps** I. Celmins, Army Research Laboratory, Aberdeen Proving Ground, MD	1430 hrs AIAA-2019-3162 **Unscented Filtering for Munition Parameter Estimation Using Onboard Sensor Telemetry** B. Burchett, Rose-Hulman Institute of Technology, Terre Haute, IN	1500 hrs AIAA-2019-3163 **Fast Generation of Aerodynamics Data for a Canard-Controlled Body with Thrust-Vector Control** J. Sahu, Oak Ridge Associated Universities, Belcamp, MD; F. Fresconi, Army Research Laboratory, Aberdeen Proving Ground, MD	1530 hrs AIAA-2019-3164 **Magnus Effect for Finned Bodies in Supersonic Flow** A. Mielke, D. Klatt, French-German Research Institute of Saint-Louis (ISL), Saint-Louis, France; C. Mundt, University of the German Federal Armed Forces, Neubiberg, Germany	1600 hrs AIAA-2019-3165 **Investigation of Nose Cone Enhancement to Improve the Effectiveness of an Articulating Nose Cone on a Subsonic Missile** E. Stephen, T. McLaughlin, B. Bixler, U.S. Air Force Academy, Colorado Springs, CO; B. Dickinson, Air Force Research Laboratory, Eglin AFB, FL; J. Turner, U.S. Air Force Academy, Colorado Springs, CO	1630 hrs AIAA-2019-3166 **Investigation of Mach Number Effects on the Aerodynamic Loading of an Articulating Nose Cone Missile** E. Stephen, G. Abate, T. McLaughlin, M. Figueroa, S. Ringenbach, U.S. Air Force Academy, Colorado Springs, CO; J. Olivry, French Air Force Academy, Salon de Provence, France; et al.	

Tuesday, 18 June 2019						
103-APA-15	**Aeropropulsive Interactions II**					**Cortez A**
Chaired by: N. HALL, Lockheed Martin Corporation and R. AGARWAL, Washington University in St Louis						
1400 hrs AIAA-2019-3167 **Numerical Study on Lift Enhancement for Upper Surface Blowing System with Powered Turbofan Engine** Z. Zhu, T. Xiao, C. Zhai, H. Zhi, Y. Lu, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1430 hrs AIAA-2019-3168 **High Control Authority 3D Aircraft Control Surfaces Using Co-Flow Jet** K. Xu, G. Zha, University of Miami, Coral Gables, FL	1500 hrs AIAA-2019-3169 **Study of Mach Number Effect for 2D Co-flow Jet Airfoil at Cruise Conditions** Y. Wang, G. Zha, University of Miami, Coral Gables, FL	1530 hrs AIAA-2019-3170 **Wind Tunnel Testing of a Blown Flap Wing** D. Agrawal, F. Asad, B. Berk, T. Long, J. Lubin, C. Courtin, Massachusetts Institute of Technology, Cambridge, MA; et al.	1600 hrs AIAA-2019-3171 **Comparison of Pitching Moment Generation via Flap Deflection and Thrust Vectoring on A Generic Blown-Wing Model** M. Bronz, French Civil Aviation University, Toulouse, France		

Tuesday, 18 June 2019						
104-APA-16	**Aerodynamic Design: Optimization**					**Cortez B**
Chaired by: J. CODER, University of Tennessee and S. SAXENA, ANSYS						
1400 hrs AIAA-2019-3172 **Aerodynamic Design Trade Study and Optimization of a Blended Wing Body Airliner** F. Staub, N. Morita, J. Entzinger, T. Tsuchiya, University of Tokyo, Tokyo, Japan	1430 hrs AIAA-2019-3173 **Airfoil Optimization via the Class-Shape Transformation and Orthogonal Deformation Modes** M. Karman, M. McNamara, J. Coder, University of Tennessee, Knoxville, Knoxville, TN	1500 hrs AIAA-2019-3174 **Effect of Turbulence Models on Robust Aerodynamic Optimization of 3-D Wing Geometries** A. Vuruskan, S. Hosder, Missouri University of Science and Technology, Rolla, MO	1530 hrs AIAA-2019-3175 **Regularisation of High Fidelity Aerodynamic Shape Optimisation Problems Using Gradient Limits** L. Kedward, C. Allen, T. Rendall, University of Bristol, Bristol, United Kingdom	1600 hrs AIAA-2019-3176 **Application of Subdivision Surfaces to Aerodynamic Wing Shape Optimisation** L. Kedward, C. Allen, T. Rendall, University of Bristol, Bristol, United Kingdom	1630 hrs AIAA-2019-3177 **Optimization of Hybrid Chevron Lobe Nozzle Inserts for Supersonic Jet Noise Reduction** M. O`Gara, J. Bin, N. Sinha, Combustion Research and Flow Technology, Inc., Pipersville, PA	

Tuesday, 18 June 2019						
105-ASE-2	**Aircraft Wake Turbulence II (Invited)**					**Governors Lecture Hall**
Chaired by: A. BROWN, National Research Council Canada and L. DAVENPORT, CSSI, Inc.						
1400 hrs AIAA-2019-3178 **Assessment of Dynamic Pairwise Wake Vortex Separations for Approach and Landing at Vienna Airport** F. Holzäpfel, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; L. Strauss, Austro Control, Vienna, Austria; C. Schwarz, German Aerospace Center (DLR), Oberpfaffenhofen, Germany	1430 hrs AIAA-2019-3179 **Assessment of dynamic pairwise separation benefits using an Airport-in-a-Lab concept** F. Knabe, German Aerospace Center (DLR), Braunschweig, Germany; F. Holzäpfel, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; C. Schwarz, German Aerospace Center (DLR), Braunschweig, Germany	1500 hrs Oral Presentation **Hybrid numerical simulations of wake vortex encounters** A. Stephan, S. Zholtovski, F. Holzäpfel, German Aerospace Center (DLR), Wessling, Germany	1530 hrs Oral Presentation **Wake Turbulence Separation Buffers for High Altitude Airspace** L. Davenport, R. Frej Vitalle, CSSI, Inc., Washington, D.C.	1600 hrs AIAA-2019-3180 **Aircraft close formation control using Finite-Time Sliding Mode control Law** K. Raj, V. Muthukumar, S. Singh, University of Nevada, Las Vegas, Las Vegas, NV	1630 hrs AIAA-2019-3181 **Unsteady Aerodynamic Loading from Parallel-vortex interaction with a lifting wing** A. Brown, M. Ovenden, M. Bastian, National Research Council Canada, Gloucester, Canada	

Tuesday, 18 June 2019						
106-ATOMS-7	**ATC - Terminal**					**Steuben**
Chaired by: R. RORIE, San Jose State University						
1400 hrs AIAA-2019-3182 **A Comparison of Two Terminal Area Detect and Avoid Well Clear Definitions** R. Rorie, K. Monk, S. Brandt, NASA Ames Research Center, Moffett Field, CA; Z. Roberts, Flight Research Associates, Moffett Field, CA; L. Fern, Honeywell International, Inc., Seattle, WA	1430 hrs AIAA-2019-3183 **Remotely Operated Aerodrome Control at Changi Airport: A Human-in-the-Loop Simulation Assessment** T. Chee Hong, A. Mendolia, MITRE Corporation, McLean, VA	1500 hrs AIAA-2019-3184 **Proximity versus dynamicity - an analysis of traffic patterns at major European airports** K. Zeghal, P. Pasutto, E. Hoffman, EUROCONTROL, Brétigny, France	1530 hrs AIAA-2019-3185 **Collision Risk Assessment between UAS and Landing Aircraft in Restricted Airspace Surrounding an Airport using 3D Monte-Carlo Simulation** C. Wang, S. Tan, K. Low, Nanyang Technological University, Singapore, Singapore	1600 hrs AIAA-2019-3186 **Approach for Representing the Aircraft Noise Impacts of Concentrated Flight Tracks** A. Yu, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA		

Tuesday, 18 June 2019						
107-ATOMS-8	**Machine Learning**					**Metropolitan**
Chaired by: A. EVANS, Crown Consulting and X. ZHENG, Iowa State University						
1400 hrs AIAA-2019-3187 **Air Transportation Direct Share Time Series Analysis and Forecast** X. Zheng, P. Wei, Iowa State University, Ames, IA	1430 hrs AIAA-2019-3188 **Predicting The Occurrence of Weather And Volume Related Ground Delay Programs** E. Mangortey, O. Pinon-Fischer, T. Puranik, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1500 hrs AIAA-2019-3189 **Application Of Data Fusion And Machine Learning To The Analysis Of The Relevance Of Recommended Flight Reroutes** G. Dard, E. Mangortey, O. Pinon-Fischer, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1530 hrs AIAA-2019-3190 **Kinematic Prediction for Autonomous Aircraft Using Deep Learning Based Optical Detection** R. Ravishankar, S. Chakravarthy, Indian Institute of Technology Madras, Chennai, India	1600 hrs AIAA-2019-3191 **Data-Driven Approach for Understanding the Impact of Weather on Commercial Flight Path** J. Kim, K. Song, S. Kim, D. Mavris, Georgia Institute of Technology, Atlanta, GA		

Tuesday, 18 June 2019						
108-ATOMS-9	**Special Session: Securing the National Airspace System: A Cyber-Physical-Systems Perspective**					**Peridot**
Chaired by: S. ROY, Washington State Univ and K. DATTA, NASA						
1400 hrs AIAA-2019-3192 **A Slow Autonomy for Threat Resolution in the Cyber-Physical-Human Air Transportation System** S. Roy, Washington State University, Pullman, WA	1430 hrs AIAA-2019-3193 **Modeling Frameworks for Cyber Threat Impact Analysis in the National Airspace System** A. Hahn, Washington State University, Pullman, WA	1500 hrs Oral Presentation **Aviation Cyber-Physical Systems** K. Sampigethaya, Embry-Riddle Aeronautical University, Prescott, AZ	1530 hrs Oral Presentation **Cyber Physical Security Extension to Air Traffic Management (ATM) Testbed** K. Datta, NASA Ames Research Center, Moffett Field, CA; G. Chatterji, Crown Consulting, Inc., Moffett Field, CA	1600 hrs Oral Presentation **Automated route redesign and conflict resolution to manage unpredictable failures** S. Devasia, University of Washington, Seattle, Seattle, WA		

Tuesday, 18 June 2019						
109-BA-2	**Balloon System Design and Analysis**					**Travertine**
Chaired by: H. CATHEY, New Mexico State Universtiy and M. SMITH, Aerostar International, Inc.						
1400 hrs AIAA-2019-3194 **Altitude-Controlled Light Gas Balloons for Venus and Titan Exploration** J. Hall, J. Cameron, M. Pauken, J. Izraelevitz, M. Dominguez, K. Wehage, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1430 hrs AIAA-2019-3195 **Uncertainty Quantification for High Altitude Balloon Trajectory Optimization** E. Chaffee, P. Ellis, J. Reguero-Inserni, Southwest Research Institute, San Antonio, TX	1500 hrs AIAA-2019-3196 **Thermal-dynamic performance of a super-pressure balloon in ascending and floating process** Q. Liu, Q. Wang, Z. Rongchen, Y. Yang, X. Zhang, J. Cai, Chinese Academy of Sciences, Beijing, China				

Tuesday, 18 June 2019						
110-CFD-8/MDO-6	**Multidisciplinary Sensitivity Analysis and Optimization**					**Obelisk B**
Chaired by: D. NICHOLS, Auburn University Aerospace Engineering Department and K. SREENIVAS, University of Tennessee at Chattanooga and SimCenter						
1400 hrs AIAA-2019-3197 **Aerodynamic Shape Optimization for the NURBS-Enhanced Discontinuous Galerkin Method** M. Bhabra, S. Nadarajah, McGill University, Montréal, Canada	1430 hrs AIAA-2019-3198 **Gust Encounter Simulations of a Generic Transport Aircraft and Analysis of Load Alleviation Potentials by Control Surface Deflections Using a RANS-CFD-based Multidisciplinary Simulation Environment** A. Huebner, L. Reimer, German Aerospace Center (DLR), Braunschweig, Germany	1500 hrs AIAA-2019-3199 **A Multidisciplinary Design Framework for Mechanisms of HLDs** Y. Shi, University of California, Davis, Davis, CA; W. Song, Y. Qi, Shanghai Jiao Tong University, Shanghai, China	1530 hrs AIAA-2019-3200 **Field Inversion and Machine Learning With Embedded Neural Networks: Physics-Consistent Neural Network Training** J. Holland, J. Baeder, University of Maryland, College Park, College Park, MD; K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI	1600 hrs AIAA-2019-3201 **Aerodynamic Shape Optimization Framework Based on a Novel Fully-Automated Adjoint Differentiation Toolbox** R. Djeddi, K. Ekici, University of Tennessee, Knoxville, Knoxville, TN	1630 hrs AIAA-2019-3202 **An Adjoint-based Sensitivity Formulation Using the Discontinuous Galerkin Method** M. Ugolotti, M. Turner, P. Orkwis, University of Cincinnati, Cincinnati, OH	

Tuesday, 18 June 2019						
111-CFD-9	**Novel CFD Discretizations**					**Obelisk A**
Chaired by: J. MAENG, Sandia National Laboratories and J. HICKEN, Rensselaer Polytechnic Institute						
1400 hrs AIAA-2019-3203 **Pade Summation-by-parts operators for spectral resolvability on bounded domains: The first derivative** A. Edoh, ERC, Inc., Edwards AFB, CA; D. Del Rey Fernández, National Institute of Aerospace, Hampton, VA	1430 hrs AIAA-2019-3204 **Energy- and Entropy-Stable Multidimensional Summation-by-Parts Discretizations on Non-Conforming Grids** S. Shadpey, D. Zingg, University of Toronto, Toronto, Canada	1500 hrs AIAA-2019-3205 **Generalized Entropy Stable Weighted Essentially Non-Oscillatory Finite Difference Scheme in Curvilinear Multi-Block Domains** J. Maeng, T. Fisher, Sandia National Laboratories, Albuquerque, NM; M. Carpenter, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2019-3206 **Entropy-Stable, High-Order Discretizations Using Continuous Summation-By-Parts Operators** J. Hicken, Rensselaer Polytechnic Institute, Troy, NY			

Tuesday, 18 June 2019						
112-CFD-10	**Shock-Capturing for High-Order Methods**					**Lalique**
Chaired by: D. ZINGG, University of Toronto and S. WOOD						
1400 hrs AIAA-2019-3207 **Convergence of the Moving Discontinuous Galerkin Method with Interface Condition Enforcement in the Presence of an Attached Curved Shock** A. Corrigan, A. Kercher, D. Kessler, Naval Research Laboratory, Washington, D.C.; D. Wood-Thomas, Princeton University, Princeton, NJ	1430 hrs AIAA-2019-3208 **Assessment of low-dissipative shock-capturing schemes for transitional and turbulent shock interactions** D. Lusher, N. Sandham, University of Southampton, Southampton, United Kingdom	1500 hrs AIAA-2019-3209 **Artificial Viscosity Smoothing Operations for an Implicit Discontinuous Galerkin Method** E. Wolf, Ohio Aerospace Institute, Dayton, OH; C. Schrock, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Wukie, University of Cincinnati, Cincinnati, OH	1530 hrs AIAA-2019-3210 **A Parameter-Free Gradient-Based Limiter for the FR/CPR method on Mixed Unstructured Meshes** Q. Lu, G. Liu, P. Ming, Harbin Engineering University, Harbin, China; Z. Wang, University of Kansas, Lawrence, Lawrence, KS	1600 hrs AIAA-2019-3211 **Higher Order Line-Based Discontinuous Galerkin method for compressible flows** R. Vuppala, P. Subbareddy, North Carolina State University, Raleigh, NC		

Tuesday, 18 June 2019		
114-F360-4 **1400 - 1600 hrs**	**Tuesday Afternoon Forum 360: Why Wait? Point-to-Point Mobility Today!**	**Coronado Ballroom**

Moderator: Steven C. Udvar-Hazy, Senior Vice President, OEM Relations & Market Development, Aviation Capital Group

Panelists:

James A. Haas
Regional Director-Product Marketing
Boeing Commercial Airplanes

Clément Monnet
Chief Executive Officer
Voom, an Airbus Company

Trey Urbahn
Chief Commercial Officer and Executive Board Member
TAP Air Portugal

Tuesday, 18 June 2019						
115-FD-13	**Active and Passive Flow Control**					**Madrid**
Chaired by: R. RHEW, NASA Langley Research Center and S. HELLAND, NASA Glenn Research Center						
1400 hrs AIAA-2019-3212 **Design and Characterization of an Experimental Setup for Active Control of Dynamic Stall over a NACA 0012 Airfoil** D. Castaneda, N. Whiting, N. Webb, M. Samimy, Ohio State University, Columbus, OH	1430 hrs AIAA-2019-3213 **Control of Reversed Flow in Static and Dynamic Conditions Using Camber Morphing Airfoils** T. Rice, D. Ko, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY	1500 hrs AIAA-2019-3214 **Interactions of a Jet Assisted Surface Mounted Actuator with a Turbulent Boundary Layer** S. Gildersleeve, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY				

Tuesday, 18 June 2019						
116-FD-14	**Stability and Transition IV: High-Speed IV**					**Miro**
Chaired by: F. LI, NASA-Langley Research Center and H. FASEL, University of Arizona						
1400 hrs AIAA-2019-3215 **Laminar-Turbulent Transition Upstream of the Entropy-Layer Swallowing Location in Hypersonic Boundary Layers** P. Paredes, National Institute of Aerospace, Hampton, VA; M. Choudhari, F. Li, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2019-3216 **Nonlinear Görtler Vortices and Their Secondary Instability in a Hypersonic Boundary Layer** F. Li, M. Choudhari, NASA Langley Research Center, Hampton, VA; P. Paredes, National Institute of Aerospace, Hampton, VA	1500 hrs AIAA-2019-3217 **Transition on a Cone with a Highly-Swept Fin at Mach 6** F. Turbeville, S. Schneider, Purdue University, West Lafayette, IN	1530 hrs AIAA-2019-3218 **Application of Stability Analysis Tools for Compressible Turbulent Flows** R. Bhagwat, P. Subbareddy, North Carolina State University, Raleigh, NC	1600 hrs AIAA-2019-3219 **Görtler instability analysis of Mach 6 flow on a flared axisymmetric cone with and without suction** C. Hollender, A. Dwivedi, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN	1630 hrs AIAA-2019-3220 **Initial Flow Quality of the Mach 4 Quiet Ludwieg Tube** J. Flood, L. Taubert, S. Craig, University of Arizona, Tucson, Tucson, AZ	

Tuesday, 18 June 2019						
117-FD-15	**Scramjets and High-Speed Chemical Kinetics**					**Manchester**
Chaired by: M. BELISLE, Northrop Grumman Corporation and D. CUPPOLETTI, Air Force Research Laboratory						
1400 hrs AIAA-2019-3221 **Numerical Simulation of Supersonic Flow through Inlet-Isolator Dual Mode Scramjet Model with Concavity in Ramp** R. Verma, A. Shukla, R. Karuppa Raj, S. Paramasivam, Vellore Institute of Technology, Vellore, India	1430 hrs AIAA-2019-3222 **Unstart in an Axisymmetric Scramjet Isolator** N. Kato, S. Im, University of Notre Dame, Notre Dame, IN	1500 hrs AIAA-2019-3223 **Hypervelocity Noble Gas Sampling in the Upper Atmosphere of Venus** J. Rabinovitch, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; A. Borner, Science and Technology Corporation, Moffett Field, CA; M. Gallis, Sandia National Laboratories, Albuquerque, NM; C. Sotin, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1530 hrs AIAA-2019-3224 **Roll torque modeling of a hypersonic reentry vehicle : Numerical analysis of cross-hatching phenomenon** O. Frayssinet, French Alternative Energies and Atomic Energy Commission, Le Barp, France	1600 hrs AIAA-2019-3225 **Flight Control Using Off-Axis Laser Discharge** N. Kianvashrad, A. Pournadali Khamseh, E. DeMauro, D. Knight, Rutgers University, Piscataway, NJ		

Tuesday, 18 June 2019						
118-FT-4	**Flight Test Evaluation of Rotary-Wing, Fixed Wing and Unmanned**					**Desoto B**
Chaired by: R. ROEDTS, Columbia Helicopters, Inc and S. GINN, NASA AFRC						
1400 hrs AIAA-2019-3226 **Helicopter Air Data Systems Calibration Using DGPS** F. Corrêa, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1430 hrs AIAA-2019-3227 **F-35 High Angle of Attack Flight Control Development and Flight Test Results** D. Canin, Lockheed Martin Corporation, Fort Worth, TX	1500 hrs AIAA-2019-3228 **A Next-Generation Modular Boundary Layer Data System** R. Westphal, I. Jellen, Z. Wilson, California Polytechnic State University, San Luis Obispo, CA	1530 hrs AIAA-2019-3229 **Flight Tests of Crosswind on the EMB-314 Aircraft** J. Zanette, M. Zampier Bussmann, F. Corrêa, Brazilian Air Force, São José dos Campos, Brazil	1600 hrs AIAA-2019-3230 **Flight Testing Automation to Parameterize Unmanned Aircraft Dynamics** O. Dantsker, S. Yu, M. Vahora, University of Illinois, Urbana-Champaign, Urbana, IL; M. Caccamo, Technical University of Munich, Garching, Germany		

Tuesday, 18 June 2019		
119-GT-6 **1400 - 1700 hrs**	**Special Session: Future Aerosciences R&D Workforce**	**Emerald**
This session will consist of discussion on workforce development needs and considerations for the future of the ground testing industry. Open discussion on the types of skills, personalities, and aptitudes that are critical to the success of the industry.		

Tuesday, 18 June 2019		
120-HUB-1 **1400 - 1430 hrs**	**Launch into AIAA Membership**	**the HUB**
Do you feel your professional life is on autopilot? Come see how AIAA membership can propel you to new heights. Learn how to get in touch with other members using AIAA's Engage platform, reach out to your Region and Section, involve yourself in Student Branch activities, join a Technical Committee, or get a jump start on your job search with our Career Center. With this live question-and-answer session, AIAA's membership team will demonstrate how an AIAA Professional and Student Membership can benefit you!		

Tuesday, 18 June 2019						
121-ITAR-2	**ITAR - Directed Energy**					**Morocco**
Chaired by: D. WESTON, AFRL-RQVA and S. SANETTI						
1400 hrs AIAA-2019-3231 **Characterization of Supersonic Flow Over Tapered Blunt Body** A. Carney, Case Western Reserve University, Cleveland, OH; C. Thomas, North Carolina State University, Raleigh, NC; J. Tam, Air Force Research Laboratory, Kirtland AFB, NM	1430 hrs AIAA-2019-3232 **Machine Learning to Improve Flight Test Instrumentation** C. Smith, Ball Corporation, Albuquerque, NM; I. Zilberter, D. Wittich, Air Force Research Laboratory, Kirtland AFB, NM	1500 hrs AIAA-2019-3233 **Impact of Engagement Scenarios on an Airborne Laser System** J. Tam, E. Ahn, Air Force Research Laboratory, Kirtland AFB, NM; J. Johnson, Teknicare, Albuquerque, NM	1530 hrs AIAA-2019-3234 **Impact of Boundary Layer Thicknesses on a Hemispherical Turret** S. Sanetti, Air Force Research Laboratory, Kirtland AFB, NM; C. Thomas, North Carolina State University, Raleigh, NC; A. Carney, Case Western Reserve University, Cleveland, OH; J. Tam, Air Force Research Laboratory, Kirtland AFB, NM	1600 hrs Oral Presentation **Preliminary modeling of ultra-short laser generated plasmas** M. White, Air Force Research Laboratory, Kirtland AFB, NM	1630 hrs Oral Presentation **Further Progress in Aperture Integration for Flight Vehicles** S. Sherer, Air Force Research Laboratory, Wright-Patterson AFB, OH; D. Weston, Ohio Aerospace Institute, Wright-Patterson AFB, OH; M. Frede, University of Dayton, Wright-Patterson AFB, OH; B. Hagen, R. Johnson, M. Stanek, Air Force Research Laboratory, Wright-Patterson AFB, OH; et al.	1700 hrs AIAA-2019-3235 **Flow Control Methodology in the Transonic Regime** M. Frede, University of Dayton, Dayton, OH; D. Weston, Ohio Aerospace Institute, Dayton, OH; S. Sherer, M. Stanek, Air Force Research Laboratory, Wright-Patterson AFB, OH

Tuesday, 18 June 2019						
122-MDO-7	**Aerodynamic Design/Shape Optimization II**					**Milan**
Chaired by: R. GRANDHI, Air Force Institute of Technology and B. ZHOU, Technical University of Kaiserslautern						
1400 hrs AIAA-2019-3236 **Multi-fidelity efficient global optimization: Methodology and application to airfoil shape design** N. Bartoli, ONERA, Toulouse, France; M. Meliani, J. Morlier, Higher Institute of Aeronautics and Space, Toulouse, France; T. Lefebvre, ONERA, Toulouse, France; M. Bouhlel, J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI	1430 hrs AIAA-2019-3237 **A Multi-Fidelity Optimization Study Investigating Distributed Adaptivity for Robust Low-Boom Performance** F. Carpenter, P. Cizmas, Texas A&M University, College Station, TX; C. Bolander, T. Giblette, D. Hunsaker, Utah State University, Logan, UT	1500 hrs AIAA-2019-3238 **New Family of Airfoils for the Conceptual Design of Aircraft with Variable-Camber Wings** P. Piperni, M. Huq, Clarkson University, Potsdam, NY	1530 hrs AIAA-2019-3239 **Sizing process and manufacturing of an optimal flapping wing micro air vehicle** P. Lane, I. Fernandez, G. Throneberry, A. Abdelkefi, New Mexico State University, Las Cruces, NM	1600 hrs AIAA-2019-3240 **Error-Based Adaptive Coupling Process Between Multipoint High-Fidelity Aerodynamics and Mission Performance for Shape Optimization in the MDA-MDO Project** B. Dabas, IRT Antoine de Saint-Exupéry, Toulouse, France; N. Bartoli, T. Lefebvre, ONERA, Châtillon, France; F. Gallard, A. Gazaix, IRT Antoine de Saint-Exupéry, Toulouse, France; T. Druot, French Civil Aviation University, Toulouse, France; et al.	1630 hrs AIAA-2019-3241 **Optimisation framework for distinctive vertical axis wind turbine blade generation using hybrid multi-objective genetic algorithms & deep neural networks** J. Joseph, P. Pant, Self, Bengaluru, India	

Tuesday, 18 June 2019						
123-MDO-8	**Special Session: MDO Frameworks III**					**Ming**
Chaired by: J. GRAY, NASA Glenn Research Center and J. HWANG						
1400 hrs AIAA-2019-3242 **How Certain Physical Considerations Impact Aerostructural Wing Optimization** J. Jasa, S. Chauhan, University of Michigan, Ann Arbor, Ann Arbor, MI; J. Gray, NASA Glenn Research Center, Cleveland, OH; J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI	1430 hrs Oral Presentation **Gradient-Based Propeller Optimization with Acoustic Constraints** D. Ingraham, J. Gray, NASA Glenn Research Center, Cleveland, OH; L. Lopes, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-3243 **A Multidisciplinary Airplane Research Integrated Library With Applications To Partial Turboelectric Propulsion** T. Druot, French Civil Aviation University, Toulouse, France; M. Belleville, Airbus, Toulouse, France; P. Roches, French Civil Aviation University, Toulouse, France; F. Gallard, IRT Antoine de Saint-Exupéry, Toulouse, France; N. Peteilh, French Civil Aviation University, Toulouse, France; A. Gazaix, IRT Antoine de Saint-Exupéry, Toulouse, France	1530 hrs Oral Presentation **MDO Frameworks Special Session Discussion 1** J. Hwang, University of California, San Diego, La Jolla, CA	1600 hrs Oral Presentation **MDO Frameworks Special Session Discussion 2** J. Hwang, University of California, San Diego, La Jolla, CA		

Tuesday, 18 June 2019						
124-MST-4	**Modeling and Simulation of Air and Space Vehicles**					**Fleur De Lis B**
Chaired by: A. ELMILIGUI, NASA Langley Research Center and G. CHATTERJI, NASA Ames Research Center						
1400 hrs AIAA-2019-3244 **Modelling the Effect of Unsteady Turbulent Wakes on a Short Take-off and Vertical Landing (STOVL) Aircraft** N. Watson, M. White, I. Owen, University of Liverpool, Liverpool, United Kingdom	1430 hrs AIAA-2019-3245 **Free-Wake Based Nonlinear Aeroelastic Modeling of Cycloidal Rotor** A. Halder, M. Benedict, Texas A&M University, College Station, TX; A. Sridharan, Airbus, Mountain View, CA	1500 hrs AIAA-2019-3246 **A Parametric Case Study of the Apollo Program: Comparison of Program Alternatives Leading up to Apollo** M. Coley, I. Maynard, B. Chudoba, University of Texas, Arlington, Arlington, TX				

Tuesday, 18 June 2019						
125-PDL-4	**Diagnostics and Experimental Techniques I**					**Ruby**
Chaired by: A. STARIKOVSKIY, Princeton University and S. LEONOV, University of Notre Dame						
1400 hrs AIAA-2019-3247 **Characterization of Mineral Aerosol Dusts by Laser-Induced Breakdown Spectroscopy** B. Leonov, Y. Wu, C. Limbach, Texas A&M University, College Station, TX	1430 hrs AIAA-2019-3248 **Spectroscopy of High Speed Expanding Argon Flows** R. Kelly, D. Gildfind, T. McIntyre, University of Queensland, Brisbane, Australia	1500 hrs AIAA-2019-3249 **Electric Field Measurements in Atmospheric Pressure Ns Pulse Plasma Jets by Ps Second Harmonic Generation** K. Orr, Y. Tang, Ohio State University, Columbus, OH; M. Simeni Simeni, University of Minnesota, Twin Cities, Minneapolis, MN; I. Adamovich, Ohio State University, Columbus, OH	1530 hrs AIAA-2019-3250 **Thomson microwave scattering for electron number density diagnostics of miniature plasmas at low pressure** X. Wang, A. Ranjan, Purdue University, West Lafayette, IN; M. Shneider, Princeton University, Princeton, NJ; A. Shashurin, Purdue University, West Lafayette, IN	1600 hrs AIAA-2019-3251 **Laser-Induced Plasma Formation in Ar, N_2, and CH_4 at Low Pressure: Energy Deposition and Flow Dynamics** Y. Wu, C. Limbach, Texas A&M University, College Station, TX	1630 hrs AIAA-2019-3252 **Preliminary Schlieren and Optical Emission Diagnostics of a High-Voltage Laser Triggered Switch** C. Rose, Colorado State University, Fort Collins, CO; S. Patel, S. Simpson, Sandia National Laboratories, Albuquerque, NM; A. Yalin, Colorado State University, Fort Collins, CO	1700 hrs AIAA-2019-3253 **In-Flight Studies of Aero-Optical Distortions Around AAOL-BC** M. Kalensky, S. Gordeyev, E. Jumper, University of Notre Dame, Notre Dame, IN

Tuesday, 18 June 2019		
126-SP-1 **1400 - 1600 hrs**	**CFD Flow Visualization Showcase**	**Chantilly Ballroom Foyer**

Tuesday, 18 June 2019						
127-TF-5	**Autonomous Systems Development and Testing**					**Edelweiss**
Chaired by: O. ARIFF, University of Salford and S. BRICENO, Georgia Institute of Technology						
1400 hrs AIAA-2019-3254 **Cooperative Trajectory Generation Framework for Cluttered Environments** J. Puig - Navarro, University of Illinois, Urbana-Champaign, Urbana, IL	1430 hrs AIAA-2019-3255 **Paths to Autonomous Vehicle Operations for Urban Air Mobility** A. Mathur, K. Panesar, E. Atkins, N. Sarter, University of Michigan, Ann Arbor, Ann Arbor, MI; M. Ballin, K. Goodrich, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-3256 **Behavioral Competency Model for Safety Assurance of Automated Aviation Systems** B. Lascara, A. Lacher, M. DeGarmo, L. Vempati, R. Zimmerman, MITRE Corporation, McLean, VA	1530 hrs AIAA-2019-3257 **Landing a Fixed-Wing UAV on a Moving Platform: A Pseudospectral Optimal Control Approach** J. Pravitra, J. Clarke, Georgia Institute of Technology, Atlanta, GA; E. Johnson, Pennsylvania State University, State College, PA	1600 hrs AIAA-2019-3258 **Multi-Quadcopter Team Leader Path Planning Using Particle Swarm Optimization** Z. Liang, H. Rastgoftar, E. Atkins, University of Michigan, Ann Arbor, Ann Arbor, MI		

Tuesday, 18 June 2019						
128-TP-6	**Aerothermodynamics and Thermal Protection Systems III**					**Wyeth**
Chaired by: X. WANG, The University of Alabama and E. GOLLIHER, NASA Goddard Space Flight Center and S. SHERIF, University of Florida						
1400 hrs AIAA-2019-3259 **Evaluating Shock-Tube Informed Biases for Shock-Layer Radiative Heating Simulations** C. Johnston, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2019-3260 **Simulation of the Schiaparelli Entry and Comparison to Aerothermal Flight Data** A. Brandis, Analytical Mechanics Associates, Inc., Moffett Field, CA; T. White, NASA Ames Research Center, Moffett Field, CA; D. Saunders, J. Hill, Analytical Mechanics Associates, Inc., Moffett Field, CA; C. Johnston, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-3261 **Analysis of the Silicon Carbide Boundary Layer under Passive and Active Oxidation** S. Chen, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1530 hrs AIAA-2019-3262 **Simulation of HyMETS Flowfield around Baby-SPRITE Entry Probe** P. Ventura Diaz, S. Yoon, F. Panerai, N. Mansour, NASA Ames Research Center, Moffett Field, CA	1600 hrs AIAA-2019-3263 **Nonequilibrium Effects in Precursor Electron ahead of Shock Waves** T. Kawakami, Shizuoka University, Hamamatsu, Japan; S. Nomura, K. Fujita, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1630 hrs AIAA-2019-3264 **Aerodynamic Force and Heat Analysis of a Tumbling CubeSat Experiencing Orbital Decay** C. Kaplan, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	

Tuesday, 18 June 2019						
129-VSTOL-1	**V/STOL and VTOL Controls Design and Applications**					**Fleur De Lis A**
Chaired by: R. MANGE, Lockheed Martin Aeronautics and W. ELBERS, Lockheed Martin Aeronautics Co.						
1400 hrs AIAA-2019-3265 **Control Allocation Framework with SVD-based Protection for a Tilt-rotor VTOL Transition Air Vehicle** J. Zhang, P. Bhardwaj, S. Raab, F. Holzapfel, Technical University of Munich, Munich, Germany	1430 hrs AIAA-2019-3266 **Thrust command based Integrated Reference Model with Envelope Protections for Tilt-rotor VTOL Transition UAV** P. Bhardwaj, S. Raab, J. Zhang, F. Holzapfel, Technical University of Munich, Munich, Germany	1500 hrs AIAA-2019-3267 **Consideration of Control Effector Dynamics and Saturations in an Extended INDI Approach** S. Raab, J. Zhang, P. Bhardwaj, F. Holzapfel, Technical University of Munich, Munich, Germany	1530 hrs AIAA-2019-3268 **Control Inceptor Design for Remote Control of a Transition UAV** D. Dollinger, T. Fricke, F. Holzapfel, Technical University of Munich, Garching, Germany	1600 hrs AIAA-2019-3269 **Control Optimization of a Novel eVTOL/Pusher Transport Aircraft with Known Faults** C. Carithers, K. Tucker, M. Cobar, C. Montalvo, University of South Alabama, Mobile, AL	1630 hrs AIAA-2019-3270 **Control of a Quadrotor Formation Carrying a Slung Load Using Flexible Bars** S. Ariyibi, O. Tekinalp, Middle East Technical University, Ankara, Turkey	

Tuesday, 18 June 2019		
130-HUB-2 **1430 - 1530 hrs**	**Design Challenge: Marshmallow Lander**	**the HUB**
Contestants will design a shock absorbing method to protect their rover and other hardware from the impact of landing. Come join the fun as a contestant or a spectator!		

Tuesday, 18 June 2019		
131-HUB-3 **1530 - 1630 hrs**	**Paper Airplane Contest**	**the HUB**
Create your paper airplane and aim for the bullseye for a chance to win a ticket to the Opening Reception! All attendees welcome and templates will be provided.		

Tuesday, 18 June 2019		
132-HUB-4 **1600 - 1630 hrs**	**Meet the Author with Leland Nicolai**	**the HUB**
Meet, and have your books signed by, Leland M. Nicolai, author of Lessons Learned and Fundamentals of Aircraft and Airship Design, Volumes 1 & 2. Books available for purchase at a forum discount.		

Tuesday, 18 June 2019		
133-NW-9 **1600 - 1630 hrs**	**Networking Break**	**Exposition Hall**

Tuesday, 18 June 2019		
134-FD-36 **1730 - 1830 hrs**	**Fluid Dynamics Award Lecture**	**Coronado Ballroom**
Hermann F. Fasel University of Arizona		

Tuesday, 18 June 2019		
135-FT-8 **1730 - 1830 hrs**	**Chanute Flight Test Award Lecture**	**Peridot**
The Flight Test Technical Committee recognizes the winner of the 2019 AIAA Chanute Flight Test Award. **David W. Minto** retired Technical Director 96th Test Group Air Force Test Center Holloman Air Force Base		

Tuesday, 18 June 2019		
136-SP-2 **1730 - 1830 hrs**	**Addressing Aviation and Education Challenges with NASA University Leadership Initiative: A Dialog with Helen Reed**	**Peacock Terrace**

Tuesday, 18 June 2019		
137-NW-10 **1830 - 2000 hrs**	**Opening Reception in the Exposition Hall (Proof of Purchase Required)**	**Exposition Hall**

Wednesday

Wednesday, 19 June 2019		
138-SB-3 0730 - 0800 hrs	**Wednesday Speaker Briefing**	Session Rooms

Wednesday, 19 June 2019		
139-PLNRY-3 0800 - 0900 hrs	**Wednesday Plenary: The Reality of a Vertical Dream**	Grand Ballroom

Moderator: Amanda Simpson, Vice President, Research and Technology, Airbus Americas Inc.

Keynote Speaker
Christopher Emerson
President and Head
North America Region
Airbus Helicopters

Wednesday, 19 June 2019		
140-HUB-5 0900 - 1000 hrs	**Meet the Employers**	the HUB

This fun, dynamic event offers students and young professionals the opportunity to meet AIAA corporate members and government agencies and discuss employment opportunities. Participating companies/organizations will present a brief organizational overview and opportunities available, then have follow-on discussions with the attendees. This event is in addition to the Sunday evening Meet the Employers event and allows students and attendees to meet with any of the employers that they didn't have a chance to talk with on Sunday evening, and for any employers that could not participate in Sunday's session to meet with prospective employees.

Wednesday, 19 June 2019		
141-HUB-6 0900 - 0930 hrs	**Meet the Author with Leland Nicolai**	the HUB

Meet, and have your books signed by, Leland M. Nicolai, author of Lessons Learned and Fundamentals of Aircraft and Airship Design, Volumes 1 & 2. Books available for purchase at a forum discount.

Wednesday, 19 June 2019		
142-NW-11 0900 - 0930 hrs	**Networking Break**	Exposition Hall

Wednesday, 19 June 2019						
143-ACD-7	**Aircraft Performance Methods II**					Inverness
Chaired by: J. MERRET, University of Illinois at Urbana-Champaign and B. STEELE, Textron Aviation						
0930 hrs AIAA-2019-3271 **Climb Performance Anomalies in 'Real' Atmospheric Conditions** T. Takahashi, Arizona State University, Tempe, AZ; A. Sobester, University of Southampton, Southampton, United Kingdom	1000 hrs AIAA-2019-3272 **The Effect of Maneuver Load Alleviation Strategies on Aircraft Performance Indicators** A. Mancini, R. Vos, Delft University of Technology, Delft, The Netherlands	1030 hrs AIAA-2019-3273 **WAT's Up with Using the Small Angle Approximation to Estimate Climb Gradient Limited Departure Weights** T. Takahashi, P. Thomas, Arizona State University, Tempe, AZ	1100 hrs AIAA-2019-3274 **An Introduction to Inertial-Coupling-Moment-Induced Aircraft Pitch Instability** S. Tang, Faiteve, Inc., Sugar Land, TX			

Wednesday, 19 June 2019						
144-ADS-8	**Fluid Structure Interaction**					**Plum Blossom A**
Chaired by: K. BERGERON, US Army NSRDEC and J. UNDERWOOD, Vorticity						
0930 hrs AIAA-2019-3275 **Towards a Validated FSI Computational Framework for Supersonic Parachute Deployments** J. Rabinovitch, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; D. Huang, R. Borker, P. Avery, C. Farhat, Stanford University, Stanford, CA; A. Derkevorkian, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; et al.	1000 hrs AIAA-2019-3276 **Effects of Structural Parameters on the FSI Simulation of Supersonic Parachute Deployments** A. Derkevorkian, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; P. Avery, C. Farhat, Stanford University, Stanford, CA; J. Rabinovitch, L. Peterson, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1030 hrs AIAA-2019-3277 **Afterbody Vortices of Axisymmetric Cylinders with a slanted base got by Numerical Simulation with LS-DYNA®** B. Perin, French Defense Procurement Agency (DGA), Toulouse, France	1100 hrs AIAA-2019-3278 **Fluid-Structure Interaction Analysis of an Isolated Ram-Air Parafoil Cell** H. Altmann, Airbus, Manching, Germany	1130 hrs AIAA-2019-3279 **Fully-Coupled Fluid-Structure Interaction Simulations of a Supersonic Parachute** J. Boustani, University of Kentucky, Lexington, Lexington, KY; M. Barad, C. Kiris, NASA Ames Research Center, Moffett Field, CA; C. Brehm, University of Kentucky, Lexington, Lexington, KY		

Wednesday, 19 June 2019						
145-ADS-9	**Instrumentation**					**Plum Blossom B**
Chaired by: J. WATKINS, Pioneer Aerospace Corporation and M. WARD, Earthly Dynamics						
0930 hrs AIAA-2019-3280 **Orion Capsule Parachute Assembly System (CPAS) Main and Drogue Canopy Instrumentation** J. Daum, NASA Johnson Space Center, Houston, TX	1000 hrs AIAA-2019-3281 **Stereoscopic Tracking and Modeling of Braided Textile Cords Experiencing Flow-Induced Vibrations** K. Bergeron, Army Research, Development and Engineering Command, Natick, MA; T. Siefers, U.S. Air Force Academy, Colorado Springs, CO	1030 hrs AIAA-2019-3282 **A Complete In-Canopy System for Autonomous Aerial Delivery** B. Leon, J. Wachlin, M. Ward, M. Costello, Earthly Dynamics Corporation, Atlanta, GA	1100 hrs AIAA-2019-3283 **Combining Distributed Measurements of Air Data, IMU and GPS for Gliding Parachute Applications** T. Jann, German Aerospace Center (DLR), Braunschweig, Germany; M. Ward, Earthly Dynamics Corporation, Atlanta, GA	1130 hrs AIAA-2019-3284 **Improving Wind Estimation Accuracy Using Model Based Techniques** S. Herrington, J. Renzelman, J. Harp, T. Fields, University of Missouri, Kansas City, Kansas City, MO		

Wednesday, 19 June 2019						
146-AMT-5	**Development and Implementation of Non-Intrusive Diagnostics**					**Desoto A**
Chaired by: Z. ZHANG, University of Tennessee						
0930 hrs AIAA-2019-3285 **Sensitivity of Blended Baseline Fitting Method for Direct Absorption Spectroscopy** J. Weisberger, P. DesJardin, University at Buffalo, Buffalo, NY	1000 hrs AIAA-2019-3286 **Temperature Profiling of the Atmosphere from an Airborne Lidar by Dispersed Filtered Rayleigh Scattering in Atomic and Molecular Vapors** A. Rekhy, A. Gerakis, Texas A&M University, College Station, TX; D. Feng, M. Shneider, A. Dogariu, Princeton University, Princeton, NJ; R. Miles, Texas A&M University, College Station, TX	1030 hrs AIAA-2019-3287 **The Demonstration of a Light Extinction Tomography System at the NASA Glenn Research Center's Icing Research Tunnel** M. Woike, J. Ponder, J. Van Zante, T. Bencic, L. King-Steen, E. Timko, NASA Glenn Research Center, Cleveland, OH; et al.	1100 hrs AIAA-2019-3288 **Development of Tomographic Background-Oriented Schlieren Capability at NASA Langley Research Center** B. Bathel, J. Weisberger, S. Jones, NASA Langley Research Center, Hampton, VA; J. Klemkowsky, C. Clifford, B. Thurow, Auburn University, Auburn, AL	1130 hrs AIAA-2019-3289 **Instantaneous Temperature Field Measurement in a Sooting Flame using 2-line Kr PLIF Thermometry Technique** A. Sahoo, D. Zelenak, V. Narayanaswamy, North Carolina State University, Raleigh, NC	1200 hrs AIAA-2019-3290 **Networked Array Recorder (NeAR) Microphones for Field-Deployed Phased Arrays** W. Culliton, W. Humphreys, NASA Langley Research Center, Hampton, VA	

Wednesday, 19 June 2019						
147-APA-17	**Special Session: Application of Natural Laminar Flow**					**Cortez D**
Chaired by: S. VIKEN, NASA Langley Research Center and M. CHOUDHARI, NASA-Langley Research Center						
0930 hrs AIAA-2019-3291 **On the Flow Mechanism of Forward Swept Natural-Laminar-Flow Wing for Crossflow Instability Suppression (Invited)** Z. Xu, Z. Han, Z. Zhu, W. Song, Northwestern Polytechnical University, Xi'an, China	1000 hrs AIAA-2019-3292 **Additional Findings from the Common Research Model Natural Laminar Flow Wind Tunnel Test (Invited)** M. Lynde, R. Campbell, S. Viken, NASA Langley Research Center, Hampton, VA	1030 hrs Oral Presentation **DEKAF boundary-layer solutions for swept-wing stability calculations** K. Groot, E. Beyak, H. Reed, Texas A&M University, College Station, TX	1100 hrs Oral Presentation **Development of Slotted, Natural-Laminar-Flow Airfoils for Commercial Aircraft: Challenges and Accomplishments** J. Coder, University of Tennessee, Knoxville, Knoxville, TN			

Wednesday, 19 June 2019						
148-APA-18	**Special Session: Commercial Supersonic Technologies I**					**Cortez C**
Chaired by: D. RICHWINE, NASA-Langley Research Center and L. OZOROSKI, NASA LARC						
0930 hrs Oral Presentation **NASA's Vision and Plans for Commercial Supersonic Flight (Invited)** P. Coen, D. Richwine, NASA Langley Research Center, Hampton, VA	1000 hrs Oral Presentation **NASA's Low-Boom Flight Demonstration Mission – Concept of Operations and Research Plans (Invited)** D. Richwine, NASA Langley Research Center, Hampton, VA	1030 hrs Oral Presentation **X-59 QueSST Aircraft Requirements and Design Status (Invited)** P. Iosifidis, Lockheed Martin Corporation, Palmdale, CA	1100 hrs Oral Presentation **Status of Certification Procedures for Quiet Supersonic Flight (Invited)** R. Cowart, Gulfstream Aerospace Corporation, Savannah, GA	1130 hrs Oral Presentation **Conceptual Design of a Low-Boom Commercial Supersonic Aircraft (Invited)** M. Buonanno, P. Iosifidis, Lockheed Martin Corporation, Palmdale, CO	1200 hrs Oral Presentation **Overview of AS2 Mission and Aircraft - Technical Challenges and Future Plans (Invited)** G. Holloway, M. Hinderberger, T. Vice, Aerion Technologies Corporation, Reno, NV	

Wednesday, 19 June 2019						
149-APA-19	**Passive Flow Control**					**Cortez A**
Chaired by: B. MARINUS, The Royal Military Academy (RMA) and J. ESTEVADEORDAL, Innovative Scientific Solutions Incorporated						
0930 hrs AIAA-2019-3293 **3D Flow Features in the Boundary Layer of a Rotating Propeller Blade** B. Marinus, Royal Military Academy, Brussels, Belgium; C. Irimia, Military Technology Academy, Bucharest, Romania; H. Akila, National Polytechnic School, Algiers, Algeria; A. Pire, Royal Military Academy, Brussels, Belgium	1000 hrs AIAA-2019-3294 **Characterization of Tubercle Effects on Finite Span Wings** S. Reid, R. Perez, A. Asghar, Royal Military College of Canada, Kingston, Canada	1030 hrs AIAA-2019-3295 **Aerodynamic Characteristics of Tubercled Slotted Flaps** R. Mehta, R. Perez, P. Jansen, Royal Military College of Canada, Kingston, Canada	1100 hrs AIAA-2019-3296 **Drag Reduction with Diamond-shaped Dimples** J. Tay, T. Lim, B. Khoo, National University of Singapore, Singapore, Singapore	1130 hrs AIAA-2019-3297 **PIV Study of the Flow Interaction between a Three-Cylinder Rotating System and a downstream Dimpled Airfoil** A. Ullah, B. Rostad, J. Estevadeordal, North Dakota State University, Fargo, ND		

Wednesday, 19 June 2019						
150-APA-20	**Special Session: Space Launch System Aerosciences I**					**Cortez B**
Chaired by: J. PINIER, NASA LaRC and N. ROOZEBOOM, NASA Ames Research Center						
0930 hrs AIAA-2019-3298 **Ascent Aerodynamic Force and Moment Database Development for the Space Launch System (Invited)** P. Shea, J. Pinier, NASA Langley Research Center, Hampton, VA; H. Houlden, A. Favaregh, M. Hemsch, ViGYAN, Inc., Hampton, VA; D. Dalle, NASA Ames Research Center, Moffett Field, CA; et al.	1000 hrs AIAA-2019-3299 **Wind Tunnel Flow Field Visualizations of the Space Launch System Vehicle Ascent (Invited)** T. Garbeff, J. Baerny, J. Ross, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2019-3300 **Effect of Sting Geometry on Axial Force Calculation for the Space Launch System (Invited)** C. Eggert, P. Shea, N. Ratnayake, S. Krist, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2019-3301 **Comparison of Space Launch System Aerodynamic Surface Pressure Measurements from Experimental Testing and CFD (Invited)** S. McMillin, P. Shea, NASA Langley Research Center, Hampton, VA; D. Dalle, S. Rogers, N. Roozeboom, NASA Ames Research Center, Moffett Field, CA; J. Meeroff, Science and Technology Corporation, Moffett Field, CA; et al.	1130 hrs AIAA-2019-3302 **Measurement and Analysis of Terminal Shock Oscillation and Buffet Forcing Functions on a Launch Vehicle Payload Fairing (Invited)** D. Piatak, M. Sekula, NASA Langley Research Center, Hampton, VA	1200 hrs AIAA-2019-3303 **Space Launch System Aeroacoustic Wind Tunnel Test Results (Invited)** T. Steva, V. Pollard, A. Herron, W. Crosby, NASA Marshall Space Flight Center, Huntsville, AL	

Wednesday, 19 June 2019						
151-ASE-3	**Aircraft Icing**					**Governors Lecture Hall**
Chaired by: Z. ZHENG, The University of Kansas and A. AVERY, Oklahoma State University						
0930 hrs AIAA-2019-3304 **High Ice Water Content in Tropical Cyclones during NASA/FAA Radar Flight Campaigns with Comparison to Numerical Simulations** F. Proctor, S. Harrah, NASA Langley Research Center, Hampton, VA; G. Switzer, J. Strickland, P. Hunt, Analytical Mechanics Associates, Inc., Hampton, VA	1000 hrs AIAA-2019-3305 **Low Altitude Icing for Small Unmanned Aircraft** A. Avery, L. Bunting, J. Jacob, Oklahoma State University, Stillwater, OK	1030 hrs AIAA-2019-3306 **Droplet in the Shoulder Region of an Incoming Airfoil. Part I: Droplet Deformation and Trajectory** A. Garcia-Magariño, S. Sor, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain; A. Velazquez, Technical University of Madrid, Madrid, Spain	1100 hrs AIAA-2019-3307 **Droplet in the Shoulder Region of an Incoming Airfoil. Part II: Droplet Breakup** S. Sor, A. Garcia-Magariño, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain; A. Velazquez, Technical University of Madrid, Madrid, Spain	1130 hrs AIAA-2019-3308 **Shear-Layer Adapted DDES Analysis of 3D Stalled Flow Over an Iced Airfoil** G. Tagawa, V. Huck, F. Morency, University of Québec, Montréal, Canada; H. Beaugendre, University of Bordeaux, Talence, France	1200 hrs AIAA-2019-3309 **Supercooled Water Droplet Impingement and Icing Region Prediction on a Rotating Fan Blade** T. Wu, Q. Yang, Z. Guo, W. Dong, Shanghai Jiao Tong University, Shanghai, China	

Wednesday, 19 June 2019						
152-ATOMS-10	**IDM and CTOP**					**Peridot**
Chaired by: H. YOO						
0930 hrs AIAA-2019-3310 **User Preference and Trajectory Options Sets (TOS) to Benefit Traffic Flow Management** M. Robinson, S. Kamine, MITRE Corporation, McLean, VA	1000 hrs AIAA-2019-3311 **Aircraft Mission Analysis Enhancement by Using Data Science and Machine Learning Techniques** J. Kim, K. Song, S. Kim, Y. Yi, D. Mavris, Georgia Institute of Technology, Atlanta, GA					

Wednesday, 19 June 2019						
153-ATOMS-11	**UAS Traffic Management III**					**Steuben**
Chaired by: K. MONK and D. SEIFERTH, Technical University of Munich						
0930 hrs AIAA-2019-3312 **Training Detection-Range-Frugal Cooperative Collision Avoidance Models for Quadcopters via Neuroevolution** A. Behjat, K. Gabani, S. Chowdhury, University at Buffalo, Buffalo, NY	1000 hrs AIAA-2019-3313 **Detect-and-Avoid Alerting Performance for High-Speed UAS and Non-Cooperative Aircraft** A. Cone, M. Wu, NASA Ames Research Center, Moffett Field, CA; S. Lee, Crown Consulting, Inc., Arlington, VA	1030 hrs AIAA-2019-3314 **Automatic Safe Area Detection In Three-Dimensional Airspace** D. Seiferth, M. Landkammer, M. Heller, F. Holzapfel, Technical University of Munich, Garching, Germany	1100 hrs AIAA-2019-3315 **A Detect and Avoid System in the Context of Multiple-Unmanned Aircraft Systems Operations** K. Monk, R. Rorie, NASA Ames Research Center, Moffett Field, CA; G. Sadler, San Jose State University, Moffett Field, CA; S. Brandt, NASA Ames Research Center, Moffett Field, CA; Z. Roberts, Flight Research Associates, Moffett Field, CA	1130 hrs AIAA-2019-3316 **Drone Stations in Airports for Runway and Airplane Inspection Using Image Processing Techniques** R. Sappington, G. Acosta, M. Hassanalian, K. Lee, R. Morelli, New Mexico Institute of Mining and Technology, Socorro, NM		

Wednesday, 19 June 2019						
154-CFD-11	**High-Order Methods and Mesh Mechanics**					**Obelisk A**
Chaired by: A. CORRIGAN, Naval Research Laboratory and C. KIM, Seoul National University						
0930 hrs AIAA-2019-3317 **Mixed-Order Curving for Viscous Meshes** S. Karman, Pointwise, Inc., Fort Worth, TX	1000 hrs AIAA-2019-3318 **A no-slip, moving-wall boundary condition for the Navier-Stokes equations** N. Wukie, University of Cincinnati, Cincinnati, OH	1030 hrs AIAA-2019-3319 **A robust Lagrangian discontinuous Galerkin method on quadratic triangular meshes using sub-cell mesh stabilization** X. Liu, N. Morgan, D. Burton, Los Alamos National Laboratory, Los Alamos, NM	1100 hrs AIAA-2019-3320 **A Dynamic High-order Variational Multiscale Method on Unstructured Meshes for Advection-diffusion Problems** Z. Xu, O. Sahni, Rensselaer Polytechnic Institute, Troy, NY			

Wednesday, 19 June 2019						
155-CFD-12	**RANS and Transition Modeling**					**Obelisk B**
Chaired by: M. FRANCIOLINI, NASA Ames Research Center						
0930 hrs AIAA-2019-3321 **Anisotropic Turbulent Heat Flux Modelling through Shock Waves** S. Roy, K. Sinha, Indian Institute of Technology Bombay, Mumbai, India; F. Lacombe, J. Hickey, University of Waterloo, Waterloo, Canada	1000 hrs AIAA-2019-3322 **Three-dimensional simulation of rocket nozzles with multi-jet interaction using shock-unsteadiness model** P. Raje, K. Sinha, Indian Institute of Technology Bombay, Mumbai, India	1030 hrs AIAA-2019-3323 **Implementation of stability-based transition models by means of transport equations** L. Pascal, G. Delattre, H. Deniau, G. Bégou, ONERA, Toulouse, France; J. Cliquet, Airbus, Toulouse, France	1100 hrs AIAA-2019-3324 **Development of a Transition Model Based on One-Equation k-? Closure** C. Peng, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1130 hrs AIAA-2019-3325 **Development of a One-Equation Algebraic Reynolds Stress Model based on k-kL Closure** T. Wen, R. Agarwal, Washington University in St. Louis, St. Louis, MO		

Wednesday, 19 June 2019						
156-CFD-13	**Recent Advancements in Modeling Particle-Laden Flows in Extreme Environments**					**Lalique**
Chaired by: J. CAPECELATRO, University of Michigan, Ann Arbor and E. JOHNSEN, University of Michigan						
0930 hrs Oral Presentation **Volume-filtered framework for compressible particle-laden flows** J. Capecelatro, G. Shallcross, University of Michigan, Ann Arbor, Ann Arbor, MI	1000 hrs Oral Presentation **A multiscale approach to modeling explosive dispersal of particles** S. Balachandar, University of Florida, Gainesville, Gainesville, FL	1030 hrs Oral Presentation **Modeling Highly Compacted Granular Media in Intensely Shocked Flows** R. Houim, University of Florida, Gainesville, Gainesville, FL	1100 hrs Oral Presentation **Modeling of dusty flow environments at atmospheric reentry with high-order discontinuous Galerkin schemes** M. Ihme, E. Ching, Stanford University, Stanford, CA	1130 hrs Oral Presentation **Simulations and Experiments on Shock-Driven Multiphase Flows with Droplets** J. McFarland, University of Missouri, Columbia, Columbia, MO		

Wednesday, 19 June 2019						
157-DE-2	**Design Engineering - Model Based Design and Design Education**					**Fleur De Lis A**
Chaired by: J. QUINLAN, NASA Langley Research Center and C. DAVIES, Lockheed Martin Aeronautics						
0930 hrs AIAA-2019-3326 **A Web-enabled MBSE Analysis Integration Framework** A. Ko, W. Keel, A. Baines, Phoenix Integration, Blacksburg, VA	1000 hrs AIAA-2019-3327 **Application of an integrated and distributed multidisciplinary product development framework to a multi-tier aircraft design case** T. van den Berg, GKN Aerospace, Papendrecht, The Netherlands; B. Beijer, KE-Works, Delft, The Netherlands; E. Moerland, German Aerospace Center (DLR), Hamburg, Germany	1030 hrs AIAA-2019-3328 **Application of designette practice in solving the challenges of design education in aerospace engineering** A. Altybayeva, K. Wood, Singapore University of Technology and Design, Singapore, Singapore				

Wednesday, 19 June 2019		
158-F360-5 **0930 - 1130 hrs**	**Wednesday Morning Forum 360: Innovation in Vertical Lift**	**Coronado Ballroom**

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

Panelists:

Adam Besachio
Guidance, Navigation, and Control, Manager
Northrop Grumman Corporation

Ryan Ehinger
V-280 Valor Program Manager
Bell

Nick Lappos
Senior Technical Fellow
Advanced Technology
Sikorsky, A Lockheed Martin Company

Jeff Trang
Vice President
Technology and Flight Operations
Airbus Helicopters

Wednesday, 19 June 2019						
159-FD-16	**Reduced-Order and Data-Driven Modeling of Fluid Flows I**					**Manchester**
Chaired by: J. WEISS, TU Berlin and A. MEDINA, Air Force Research Laboratory						
0930 hrs AIAA-2019-3329 **Wake Vortex Detection and Tracking for Aircraft Formation Flight** D. Caprace, G. Winckelmans, P. Chatelain, Catholic University of Louvain, Louvain-la-Neuve, Belgium; J. Eldredge, University of California, Los Angeles, Los Angeles, CA	1000 hrs AIAA-2019-3330 **Dynamic Mode Decomposition of Stratified Wakes** S. Nidhan, J. Ortiz-Tarin, K. Chongsiripinyo, S. Sarkar, University of California, San Diego, La Jolla, CA; P. Schmid, Imperial College London, London, United Kingdom	1030 hrs AIAA-2019-3331 **Spectral Proper Orthogonal Decomposition Analysis of Shock-Wave/Boundary-Layer Interactions** S. Cottier, C. Combs, University of Texas, San Antonio, San Antonio, TX; L. Vanstone, University of Texas, Austin, Austin, TX	1100 hrs AIAA-2019-3332 **Model-based Adaptive Reduced Basis Methods for Unsteady Aerodynamics Studies** G. Pascarella, M. Fossati, G. Barrenechea, University of Strathclyde, Glasgow, United Kingdom	1130 hrs AIAA-2019-3333 **A Tutorial on the Proper Orthogonal Decomposition** J. Weiss, Technical University of Berlin, Berlin, Germany		

Wednesday, 19 June 2019						
160-FD-17	**Unsteady Flows: Pitching, Plunging, and Surging**					**Fleur De Lis B**
Chaired by: S. BENTON, Air Force Research Laboratory and D. GARMANN, Air Force Research Laboratory						
0930 hrs AIAA-2019-3334 **Comparison of Pitch versus Plunge Maneuvers of a Finite Wing** M. Visbal, D. Garmann, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2019-3335 **Dynamic Stall of a Swept Finite Wing for a Range of Reduced Frequencies** M. Rockwood, A. Medina, D. Garmann, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1030 hrs AIAA-2019-3336 **Effects of Yaw Angle on a Pitching Wing** R. Wahidi, University of Texas, Permian Basin, Odessa, TX; D. Troolin, TSI, Inc., Shoreview, MN	1100 hrs AIAA-2019-3337 **Investigations of Lift-Based Equivalence of a NACA 0018 Airfoil for Surge-Pitch-Plunge Oscillations** K. Elfering, K. Granlund, North Carolina State University, Raleigh, NC	1130 hrs AIAA-2019-3338 **High-Order Numerical Simulation of Flapping Wing for Energy Harvesting** B. Zhang, C. Liang, George Washington University, Washington, D.C.	1200 hrs AIAA-2019-3339 **Comparison of Geometric Parameterization Methods for Optimal Shape Design in Efficient Flapping Propulsion** P. Han, A. Bode-Oke, H. Dong, University of Virginia, Charlottesville, Charlottesville, VA; T. Van Buren, D. Floryan, A. Smits, Princeton University, Princeton, NJ	

Wednesday, 19 June 2019						
161-FD-19	**High-Speed Boundary Layers**					**Madrid**
Chaired by: S. CRAIG, University of Arizona and N. TICHENOR, Texas A&M University						
0930 hrs AIAA-2019-3340 **Direct simulation of a Mach-5 turbulent spatially-developing boundary layer** G. Araya, University of Puerto Rico, Mayaguez, ; K. Jansen, University of Colorado, Boulder, Boulder, CO	1000 hrs AIAA-2019-3341 **Turbulent / Non-Turbulent Interface and Uniform Momentum Zones of High-Speed Turbulent Boundary Layers Subjected to Streamline Pressure Gradient** N. Tichenor, Texas A&M University, College Station, TX	1030 hrs AIAA-2019-3342 **Reynolds Number Effects on Secondary Motion in Corner Flow Boundary Layers** C. McKenna, University of Tennessee, Tullahoma, Tullahoma, TN; B. Rice, Air Force Research Laboratory, Arnold AFB, TN; N. Bisek, Air Force Research Laboratory, Wright-Patterson AFB, OH; S. Peltier, J. Hofferth, Air Force Research Laboratory, Arnold AFB, TN	1100 hrs AIAA-2019-3343 **Unsteadiness in a Supersonic Backward-Facing Step Flow** L. Riley, R. Ranjan, D. Gaitonde, Ohio State University, Columbus, OH			

Wednesday, 19 June 2019		
162-FT-5 **0930 - 1230 hrs**	**UAV Firefighting Panel**	**Desoto B**

Since the 1940s, aircraft have been utilize to fight wildfires across the world in various capacities. Over the last several years, wildfire activity has been steadily increasing and starting to destroy entire communities as seen in California. In parallel, UAV technology has been evolving and has been having both a positive and negative impact on firefighting activities. In order to increase overall effectiveness, both the existing firefighting community and new UAV providers need to align their efforts.

Panel members will each give a brief presentation on their respective areas giving an overview of what's been accomplished to date and what are the opportunities/obstacles moving forward. Following these presentations, there will be an open discussion amongst the panel members with prompting questions to guide the conversation. Finally, we will have an open Q&A with the audience.

Panelists:

Vince Ambrosia	**Keith Saylor**	**Martin Gomez**	**Brad Koeckeritz**
NASA	Columbia Helicopters	Aurora	Department of the Interior

Wednesday, 19 June 2019						
163-GA-1	**Aircraft Certification and Emissions**					**Travertine**
Chaired by: N. BORER, NASA Langley Research Center and K. KNOPP, FAA						
0930 hrs AIAA-2019-3344 **A Model-Based System Engineering Approach to Normal Category Airplane Airworthiness Certification** M. Bleu-Laine, M. Bendarkar, J. Xie, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2019-3345 **Analysis of Exhaust Emissions of an Aircraft Diesel Engine Using Jet-A** S. Underwood, R. Taghavi, University of Kansas, Lawrence, Lawrence, KS; T. Miller, Friends University, Wichita, KS	1030 hrs AIAA-2019-3346 **How Do We Know an Alternative Aviation Gasoline Meets the Needed Form, Fit, and Functions** M. Kimble-Thom, Baere Aerospace Consulting, Inc., West Lafayette, IN; D. Atwood, Federal Aviation Administration, Atlantic City, NJ; J. Thom, Purdue University, West Lafayette, IN				

Wednesday, 19 June 2019						
164-ITAR-4	**Special Session: Recent Capability Improvements and Expansions at the Arnold Engineering Development Complex**					**Morocco**
Chaired by: P. GOULDING, National Full-Scale Aerodynamics Complex - AEDC and C. NYKAMP, National Full-Scale Aerodynamics Complex - AEDC						
0930 hrs Oral Presentation **An Introduction to Test Capabilities at the Arnold Engineering Development Complex** P. Goulding, National Full-Scale Aerodynamics Complex, Moffett Field, CA	1000 hrs Oral Presentation **Return to Service Efforts and Current Capabilities at the National Full-Scale Aerodynamics Complex** P. Goulding, National Full-Scale Aerodynamic Complex, Moffett Field, CA		1100 hrs Oral Presentation **Reactivation Efforts and Performance Improvements at AEDC's Aerodynamic and Propulsion Test Unit APTU** G. Garrard, Arnold Engineering Development Complex (AEDC), Arnold AFB, TN	1130 hrs Oral Presentation **Reactivation Efforts for Mach 7 Capability at AEDC's Tunnel 9 Facility in Support of Critical Missile Defense** N. Fredrick, Hypervelocity Tunnel 9, AEDC, White Oak, MD	1200 hrs Oral Presentation **Reactivation Efforts for Mach 18 Capability at AEDC's Tunnel 9 Facility** P. Kathrotiya, Hypervelocity Tunnel 9, AEDC, White Oak, MD	

Wednesday, 19 June 2019						
165-MDO-9	**Aeroelastic and Aero-Structures Optimization**					**Milan**
Chaired by: G. KENNEDY, Georgia Institute of Technology						
0930 hrs AIAA-2019-3347 **Aero-Structural Design Study of Extreme-Scale Segmented Ultralight Morphing Rotor Blades** M. Chetan, M. Sakib, D. Griffith, S. Yao, University of Texas, Dallas, Richardson, TX	1000 hrs AIAA-2019-3348 **Flexibility Distribution Tuning by Wing Frame Inner Structure Morphing for Fixed-Wing Unmanned Aerial Vehicle** H. Yu, W. Yang, H. Duan, A. Malik, University of Texas, Dallas, Richardson, TX	1030 hrs AIAA-2019-3349 **Minimizing Induced Drag with Weight Distribution, Lift Distribution, Wingspan, and Wing-Structure Weight** W. Phillips, D. Hunsaker, J. Taylor, Utah State University, Logan, UT				

Wednesday, 19 June 2019						
166-MDO-10	**Design Optimization of Complex Engineered Systems I**					**Ming**
Chaired by: L. MAININI, United Technologies Research Center and M. STELMACK, Lockheed Martin Aeronautics						
0930 hrs AIAA-2019-3350 **A Data-Driven Decision Making Framework for Value-Based Engineering Design of Complex Network Systems** S. Shihab, P. Wei, Iowa State University, Ames, IA; C. Bloebaum, Kent State University, Kent, OH	1000 hrs AIAA-2019-3351 **Optimal Aircraft Design Deicions under Uncertainty via Robust Signomial Programming** B. Ozturk, A. Saab, Massachusetts Institute of Technology, Cambridge, MA	1030 hrs AIAA-2019-3352 **Wind Farm Layout Optimization Using Analytical Derivatives** T. Ashuri, Arkansas Technical University, Russellville, AR	1100 hrs AIAA-2019-3353 **Cellular Phone Loaded Network Field Test Using Swarming Drones: Replacing Drive Test and Particle Swarm Optimization** A. Mirzaeinia, M. Hassanalian, New Mexico Institute of Mining and Technology, Socorro, NM; M. Mirzaeinia, Amirkabir University of Technology, Tehran, Iran			

Wednesday, 19 June 2019						
167-MDO-11	**Special Session: NASA University Leadership Initiative Challenge 1**					**Metropolitan**
Chaired by: P. CIZMAS						

Wednesday, 19 June 2019						
168-PDL-5	**Computational Methods and Plasma Modeling**					**Ruby**
Chaired by: A. TROPINA, Texas A&M University and A. STARIKOVSKIY, Princeton University						
0930 hrs AIAA-2019-3354 **Numerical Modeling of Hypersonic Weakly Ionized External Flowfields with Poisson's Equation** A. Blanco, E. Josyula, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2019-3355 **Dual-pulse laser energy deposition for the flow control in a supersonic flow** D. Hartman, A. Tropina, Texas A&M University, College Station, TX	1030 hrs AIAA-2019-3356 **Effect of Local Field Approximation in Simulations of Gas Discharges** T. Piskin, S. Macheret, J. Poggie, Purdue University, West Lafayette, IN	1100 hrs AIAA-2019-3357 **Validation of a SUPG finite element solver for the two-fluid plasma model using the Brio-Wu MHD shock tube problem** K. Croft, T. Moeller, University of Tennessee, Tullahoma, Tullahoma, TN			

Wednesday, 19 June 2019

169-TP-8 — **Aerothermodynamics and Thermal Protection Systems IV** — **Edelweiss**

Chaired by: J. BURT, NASA Glenn Research Center and P. YEE, The Aerospace Corporation

0930 hrs
AIAA-2019-3358
Effects of Ab-Initio Potential Energy Surfaces on O2-O Non-Equilibrium Kinetics
S. Venturi, M. Sharma Priyadarshini, University of Illinois, Urbana-Champaign, Urbana, IL; A. Racca, University of Pisa, Pisa, Italy; M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL

1000 hrs
AIAA-2019-3359
Analysis of Shockwave Radiation Data in Nitrogen
B. Cruden, A. Brandis, Analytical Mechanics Associates, Inc., Moffett Field, CA

1030 hrs
AIAA-2019-3360
Investigation of Galileo Probe Entry Heating with Coupled Radiation and Ablation
A. Erb, T. West, C. Johnston, NASA Langley Research Center, Hampton, VA

1100 hrs
AIAA-2019-3361
Comparison between traditional and competitive reaction models for the pyrolysis of high temperature aerospace materials
F. Torres Herrador, J. Coheur, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; J. Blondeau, Vrije Universiteit Brussel, Brussels, Belgium; J. Meurisse, F. Panerai, NASA Ames Research Center, Moffett Field, CA; J. Lachaud, University of Bordeaux, Talence, France; et al.

1130 hrs
AIAA-2019-3362
Artificial Neural Network Potential Energy Surface for Direct Molecular Simulation of Nonequilibrium Gas Flows
P. Valentini, University of Dayton, Dayton, OH; M. Grover, E. Josyula, Air Force Research Laboratory, Wright-Patterson AFB, OH

Wednesday, 19 June 2019

170-HUB-7 — **The Reality of a Vertical Dream - Conversation Continued** — **the HUB**
1100 - 1130 hrs

Continue the discussion with Wednesday's Plenary keynote speaker Christopher Emerson, President and Head, North America Region, Airbus Helicopters, Inc., as he provides his perspective on next-generation vertical lift.

Wednesday, 19 June 2019

171-HUB-8 — **Focus on Automation: Automation Q&A** — **the HUB**
1230 - 1500 hrs

Speakers:

Ella Atkins
Professor
Aerospace Engineering
University of Michigan

David Cox
Senior Research Engineer
NASA

Maxine Gariel
Chief Technical Officer
XWing

Peter Kostiuk
President
Robust Analytics

David Sizoo
Flight Test Pilot
FAA

Arne Stoschek
Project Executive
A^3 by Airbus

Virginia Stouffer
President
Transformational Technologies

Wednesday, 19 June 2019

172-RLA-3 — **RLA Lunch & Learn: Shaping the Workforce of Tomorrow** — **Peacock Terrace**
1230 - 1400 hrs

Wednesday, 19 June 2019

173-ACD-8 — **Aircraft Structures and Subsystems** — **Fleur De Lis B**

Chaired by: M. DRAKE, Boeing Commercial Airplanes

1400 hrs
AIAA-2019-3363
Design and Development of an Android Application for Voice Control of Micro Unmanned Aerial Vehicles
C. Thomas, University of Petroleum and Energy Studies, Dehradun, India; J. Joseph Thomas, Mar Baselios Christian College of Engineering and Technology (MBC CET), Kuttikkanam, India; R. Bharadwaj, A. Mondal, V. Devalla, University of Petroleum and Energy Studies, Dehradun, India; S. Omkar, Indian Institute of Science, Bengaluru, India

1430 hrs
AIAA-2019-3364
Flight Loads Spectra of a Fleet of Heavy Air Tankers
K. Rokhsaz, L. Kliment, Wichita State University, Wichita, KS; B. Terning, J. Nelson, Forest Service, Boise, ID

1500 hrs
AIAA-2019-3365
A Thermal Risk Assessment Approach for the Conceptual Design of Aircraft System Architectures
F. Sanchez, S. Liscouet-Hanke, Concordia University, Montréal, Canada; Y. Boutin, S. Beaulac, Bombardier Aerospace, Saint-Laurent, Canada

1530 hrs
AIAA-2019-3366
Analytical Modelling of Baffled Inflatable Wing for Failure Prediction
K. Rakshith, C. Dusane, S. Mistri, R. Pant, Indian Institute of Technology Bombay, Mumbai, India

1600 hrs
AIAA-2019-3367
Effect of Data Filtering on Flight Loads Spectra
K. Rokhsaz, L. Kliment, Wichita State University, Wichita, KS

1630 hrs
AIAA-2019-3368
Aeroservoelastic Wing Sizing Using a Physics-Based Approach in Conceptual Aircraft Design
M. Krengel, M. Hepperle, A. Huebner, German Aerospace Center (DLR), Braunschweig, Germany

1700 hrs
AIAA-2019-3369
Automated Wing Internal Structure Placement Guided by Finite Element Analysis
J. Clough, A. Oberai, University of Southern California, Los Angeles, CA; A. Zakrajsek, Air Force Research Laboratory, Wright-Patterson AFB, OH

Wednesday, 19 June 2019						
174-ADS-10	**Ram-Air Parafoil Delivery**					**Plum Blossom A**
Chaired by: S. HERRINGTON and S. ROLAND, Blue Origin LLC						
1400 hrs AIAA-2019-3370 **Effect of Spoilers on Ram Air Parachute Aerodynamic Force and Moment Coefficients** E. Berexa, R. Warner, J. Seidel, U.S. Air Force Academy, Colorado Springs, CO; K. Bergeron, Army Research, Development and Engineering Command, Natick, MA	1430 hrs AIAA-2019-3371 **Modeling and Experimental Efforts towards Robust Low-Cost Cruciform Canopy Control** G. Noetscher, T. Rose, K. Bergeron, Army Research, Development and Engineering Command, Natick, MA	1500 hrs AIAA-2019-3372 **Simulation of the Landing Dynamics of a Guided Airdrop System** J. Wachlin, M. Costello, Earthly Dynamics Corporation, Atlanta, GA	1530 hrs AIAA-2019-3373 **Jumper-Inspired Guidance Logic for Precision Guided Airdrop Systems** M. Ward, M. Costello, J. Wachlin, B. Leon, Earthly Dynamics Corporation, Atlanta, GA; K. Bergeron, G. Noetscher, Army Research, Development and Engineering Command, Natick, MA			

Wednesday, 19 June 2019						
175-ADS-11	**Parachute Modeling and Analysis**					**Plum Blossom B**
Chaired by: S. MANNING and J. PEI, NASA Langley Research Center						
1400 hrs AIAA-2019-3374 **Post-Flight Performance Analysis and Data Reconstruction of a New Parachute Design for the High Speed Container Delivery System (HSCDS)** U. Fraire, M. Henry, M. Sonnen, Army Research, Development and Engineering Command, Natick, MA	1430 hrs AIAA-2019-3375 **Extraction-Separation Performance and Dynamic Modeling of Orion Test Vehicles with Adams Simulation: 4th Edition** J. Davidson, GeoControl Systems, Inc., Houston, TX	1500 hrs AIAA-2019-3376 **ASPIRE Aerodynamic Models and Flight Performance** S. Muppidi, NASA Ames Research Center, Moffett Field, CA; C. O'Farrell, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; J. Van Norman, NASA Langley Research Center, Hampton, VA; I. Clark, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1530 hrs AIAA-2019-3377 **Modal Analysis of a Two-Parachute System** J. Pei, C. Roithmayr, NASA Langley Research Center, Hampton, VA; R. Barton, D. Matz, NASA Johnson Space Center, Houston, TX	1600 hrs AIAA-2019-3378 **Linear Analysis of a Two-Parachute System Undergoing Pendulum Motion** C. Roithmayr, J. Beaty, J. Pei, NASA Langley Research Center, Hampton, VA; R. Barton, D. Matz, NASA Johnson Space Center, Houston, TX	1630 hrs AIAA-2019-3379 **Nonlinear Analysis of a Two-Parachute System Undergoing Pendulum Motion** J. Pei, NASA Langley Research Center, Hampton, VA	

Wednesday, 19 June 2019						
176-AMT-6/GT-8/PDL-6	**Diagnostics and Experimental Techniques II**					**Desoto A**
Chaired by: P. DANEHY, NASA Langley Research Center and J. ZIMMERMAN, CU Aerospace						
1400 hrs AIAA-2019-3380 **Implementation of a Pulsed-laser Measurement System in the National Transonic Facility** D. Reese, R. Burns, National Institute of Aerospace, Hampton, VA; P. Danehy, E. Walker, NASA Langley Research Center, Hampton, VA; W. Goad, Jacobs, Hampton, VA	1430 hrs AIAA-2019-3381 **Hypersonic wake measurements behind a slender cone using FLEET velocimetry** Y. Zhang, D. Richardson, S. Beresh, K. Casper, M. Soehnel, J. Henfling, Sandia National Laboratories, Albuquerque, NM; et al.	1500 hrs AIAA-2019-3382 **Feasibility Analysis of Optically Pumped Barium Vapor for Filtered Rayleigh Scattering at the Nd:YAG Third Harmonic** M. Hetlage, Y. Wu, C. Limbach, Texas A&M University, College Station, TX	1530 hrs AIAA-2019-3383 **Focused and Cylindrical-Focused Laser Differential Interferometer Characterization of SBR-50 at Mach 2** A. Houpt, S. Leonov, University of Notre Dame, Notre Dame, IN	1600 hrs AIAA-2019-3384 **Pulse-burst cross-correlation Doppler global Velocimetry** T. Fahringer, R. Burns, National Institute of Aerospace, Hampton, VA; P. Danehy, NASA Langley Research Center, Hampton, VA; P. Bardet, George Washington University, Washington, D.C.; J. Felver, Spectral Energies, LLC, Dayton, OH	1630 hrs AIAA-2019-3385 **Effect of Varying Beam Diameter on Global Jitter of Laser Beam Passing Through Turbulent Flows** L. Butler, M. Lozier, S. Gordeyev, University of Notre Dame, Notre Dame, IN	

Wednesday, 19 June 2019						
177-APA-21	**Special Session: Commercial Supersonic Technologies II**					**Cortez C**
Chaired by: L. OZOROSKI, NASA LARC and D. RICHWINE, NASA-Langley Research Center						
1400 hrs Oral Presentation **QSF18 Community Response Flight Test Planning, Field Operations and Test Execution (Invited)** L. Cliatt, E. Haering, P. Dees, NASA Armstrong Flight Research Center, Edwards, CA	1430 hrs Oral Presentation **QSF18 Community Response Preliminary Results and Lessons Learned (Invited)** J. Rathsam, NASA Langley Research Center, Hampton, VA; J. Page, Department of Transportation, Cambridge, MA; K. Hodgdon, Pennsylvania State University, State College, PA; T. Gaugler, Lafayette College, Easton, PA	1500 hrs Oral Presentation **Investigation of the Potential Impact of Real Atmospheres on Predicted X-59 QueSST Aircraft Sonic Boom Ground Signatures (Invited)** L. Ozoroski, NASA Langley Research Center, Hampton, VA; M. RIchwine, Tabb High School, Yorktown, VA; N. Dunn, University of Virginia, Charlottesville, Charlottesville, VA	1530 hrs Oral Presentation **Adjoint Error Estimation of Sonic Boom Loudness (Invited)** S. Rallabhandi, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2019-3386 **Recent Enhancements to NASA's PCBoom Sonic Boom Propagation Code (Invited)** J. Lonzaga, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2019-3387 **Sonic Boom Carpet Computation as a Basis for Supersonic Flight Routing (Invited)** B. Liebhardt, German Aerospace Center (DLR), Hamburg, Germany	

Wednesday, 19 June 2019						
178-APA-22	**Aeroelastic and Aerodynamic-Structure Interactions**					**Cortez D**
Chaired by: S. PENG, FOI - Swedish Defence Research Agency and P. ANSELL, University of Illinois at Urbana-Champaign						
1400 hrs AIAA-2019-3388 **Aeroelastic Indicial Response Reduced-Order Modeling for Flexible Flight Vehicles** B. Hiller, N. Frink, W. Silva, NASA Langley Research Center, Hampton, VA; D. Mavris, Georgia Institute of Technology, Atlanta, GA	1430 hrs AIAA-2019-3389 **Investigation of the role of higher order torsion & bending modes in flutter stability for flexible slender wings** A. Bottai, M. Jonson, R. Campbell, Pennsylvania State University, State College, PA	1500 hrs AIAA-2019-3390 **Transonic Flutter Prediction Using Subspace Identification Based Reduced Order Method with Parametric Variation and Flowfield Reconstruction** R. Halder, National University of Singapore, Singapore, Singapore; M. Damodaran, B. Khoo, Temasek Laboratories, Singapore, Singapore	1530 hrs AIAA-2019-3391 **Computational Analysis of Aerodynamic Vibration and Mitigation for MLG Doors of an Aircraft Model** S. Peng, M. Dalenbring, A. Jirasek, Swedish Defense Research Agency (FOI), Stockholm, Sweden	1600 hrs AIAA-2019-3392 **Experimental Examination of Body-Freedom Flutter on Forward Swept Wings** E. Kocsis, M. Turner, Clarkson University, Potsdam, NY		

Wednesday, 19 June 2019						
179-APA-23	**Active Flow Control I**					**Cortez A**
Chaired by: S. ARAM, Naval Surface Warfare Center - Carderock Division and E. PHILLIPS, The University of Arizona						
1400 hrs AIAA-2019-3393 **Passive and Active Leading Edge devices on a simple swept back wing** E. Phillips, I. Wygnanski, University of Arizona, Tucson, Tucson, AZ; P. Menge, University of the German Federal Armed Forces, Neubiberg, Germany; L. Taubert, University of Arizona, Tucson, Tucson, AZ	1430 hrs AIAA-2019-3394 **Experimental and numerical studies of physical mechanisms in fluidic oscillators** C. Nicholls, B. Tang, J. Turner, M. Bacic, University of Oxford, Oxford, United Kingdom	1500 hrs AIAA-2019-3395 **An Experimental Study of the Characteristics of a Supersonic Fluidic Oscillator Utilizing the Design of Experiment** S. Park, H. Ko, Korea Aerospace University, Goyang, South Korea; M. Kang, Agency for Defense Development, Daejon, South Korea; Y. Lee, Korea Aerospace University, Goyang, South Korea	1530 hrs AIAA-2019-3396 **Synchronization Effect of an Array of Sweeping Jets on a Separated Flow over a Wall-Mounted Hump** S. Aram, H. Shan, Naval Surface Warfare Center, Bethesda, MD			

Wednesday, 19 June 2019						
180-APA-24	**Special Session: Space Launch System Aerosciences II**					**Cortez B**
Chaired by: A. HERRON, NASA Marshall and D. PIATAK, NASA-Langley Research Center						
1400 hrs AIAA-2019-3397 **Advances in the Characterization of NASA's Space Launch System Aerodynamic Environments (Invited)** J. Pinier, NASA Langley Research Center, Hampton, VA; A. Herron, NASA Marshall Space Flight Center, Huntsville, AL; R. Gomez, NASA Johnson Space Center, Houston, TX	1430 hrs AIAA-2019-3398 **Aerodynamic Characterization and Improved Testing Methods for the Space Launch System Liftoff and Transition Environment (Invited)** D. Chan, NASA Langley Research Center, Hampton, VA; J. Paulson, Analytical Mechanics Associates, Inc., Hampton, VA; P. Shea, K. Toro, P. Parker, S. Commo, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-3399 **Computational Fluid Dynamics Methods Used in the Development of the Space Launch System Liftoff and Transition Lineloads Databases (Invited)** N. Ratnayake, S. Krist, F. Ghaffari, K. Deere, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2019-3400 **Kestrel Results at Liftoff Conditions for a Space Launch System Configuration in Proximity to the Launch Tower (Invited)** S. Krist, N. Ratnayake, F. Ghaffari, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2019-3401 **Liftoff and Transition Database Generation for Launch Vehicles Using Data-Fusion-Based Modeling (Invited)** T. Wignall, NASA Langley Research Center, Hampton, VA		

Wednesday, 19 June 2019						
181-ASE-4	**Atmospheric Environments**					**Governors Lecture Hall**
Chaired by: R. FREJ VITALLE and A. BROWN, National Research Council Canada						
1400 hrs AIAA-2019-3402 **Estimation of Aircraft Derived Winds in Turbulent Conditions** R. Frej Vitalle, L. Davenport, CSSI, Inc., Washington, D.C.	1430 hrs AIAA-2019-3403 **Experimental Investigation of Downburst Physics to Derive Scaling Laws** J. Jandreau, J. Jacob, Oklahoma State University, Stillwater, OK	1500 hrs AIAA-2019-3404 **Experimental Observations of the Boundary Layer in Varying Topography with Unmanned Aircraft** V. Natalie, J. Jacob, Oklahoma State University, Stillwater, OK	1530 hrs AIAA-2019-3405 **Comparison between RANS and hybrid RANS/LES simulations of jet/vortex interaction** V. Chmielarski, W. Ghedhaifi, E. Montreuil, ONERA, Palaiseau, France; A. Loseille, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France			

Wednesday, 19 June 2019						
182-ATOMS-12	**Air Traffic Flow Management**					**Steuben**
Chaired by: S. ROY, Washington State Univ						
1400 hrs AIAA-2019-3406 **Interaction between arrival management and network management when extending the arrival horizon** C. Raphael, E. Hoffman, K. Zeghal, EUROCONTROL, Le Plessis-Pâté, France	1430 hrs AIAA-2019-3407 **Preliminary Study of Multi-Objective Air Traffic Optimization by Using Step Back Cellular Automaton** K. Sekine, T. Tatsukawa, S. Nagaoka, K. Fujii, Tokyo University of Science, Katsushika, Japan	1500 hrs AIAA-2019-3408 **Hidden Disruptions in the Air Traffic System: Modeling, Identification, and Monitoring** S. Roy, Washington State University, Pullman, WA	1530 hrs AIAA-2019-3409 **A Target-Controllability Approach for Designing Coordinated Air Traffic Flow Management Strategies** M. Xue, Washington State University, Pullman, WA	1600 hrs AIAA-2019-3410 **Clustering Stochastic Weather Scenarios Using Influence Model-based Distance Measures** C. He, Y. Wan, University of Texas, Arlington, Arlington, TX		

Wednesday, 19 June 2019						
183-ATOMS-13	**Special Session: Prognostics and Safety Assessment for ATM - NASA ULI Project II**					**Travertine**
Chaired by: Y. LIU, Arizona State University						
1400 hrs AIAA-2019-3411 **Monitoring Human Performance in Real-Time for NAS Safety Prognostics** S. Ligda, M. Seeds, M. Harris, C. Lieber, M. Demir, N. Cooke, Arizona State University, Mesa, AZ	1430 hrs AIAA-2019-3412 **Real-time Facial Expression and Head Pose Analysis for Monitoring the Workloads of Air Traffic Controllers** J. Chen, Y. Liu, N. Cooke, P. Tang, Arizona State University, Tempe, AZ	1500 hrs AIAA-2019-3413 **A Recurrent Neural Network Approach for Aircraft Trajectory Prediction with Weather Features From Sherlock** Y. Pang, H. Yao, J. Hu, Y. Liu, Arizona State University, Tempe, AZ	1530 hrs AIAA-2019-3414 **Predicting Collisions between Aircraft through Spatiotemporal Data-Driven Simulation of Airport Ground Operations** Y. Wang, S. Zhe, Y. Liu, P. Tang, Arizona State University, Tempe, AZ	1600 hrs AIAA-2019-3415 **Aviation Safety Assessment Using Historical Flight Trajectory Data** X. Zhang, S. Mahadevan, Vanderbilt University, Nashville, TN	1630 hrs AIAA-2019-3416 **Developing a Toolset to Compute Probabilistic Measures of Airport Surface Safety** E. DeCarlo, M. Hartnett, B. Bichon, Southwest Research Institute, San Antonio, TX	1700 hrs AIAA-2019-3417 **Multiple Aircraft Collision Avoidance Method Based on ADS-B System** P. Zhao, Y. Liu, L. Ying, W. Wang, Arizona State University, Tempe, AZ

Wednesday, 19 June 2019						
184-CFD-14	**LES Methods I**					**Obelisk A**
Chaired by: C. BREHM, University of Kentucky and B. ZHANG, The George Washington University						
1400 hrs AIAA-2019-3418 **An entropy-adjoint *p*-adaptive discontinuous Galerkin method for the under-resolved simulation of turbulent flows** F. Bassi, A. Colombo, University of Bergamo, Bergamo, Italy; A. Crivellini, Marche Polytechnic University, Ancona, Italy; K. Fidkowski, M. Franciolini, University of Michigan, Ann Arbor, Ann Arbor, MI; A. Ghidoni, University of Brescia, Brescia, Italy; et al.	1430 hrs AIAA-2019-3419 **4D Variational Data Assimilation with Large Eddy Simulation** P. Chandramouli, E. Memin, National Institute for Research in Computer Science and Control (INRIA), Rennes, France; D. Heitz, National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA), Rennes, France	1500 hrs AIAA-2019-3420 **A new recycling method to generate turbulent inflow profiles** A. Garai, Science and Technology Corporation, Moffett Field, CA; S. Murman, D. Ekelschot, NASA Ames Research Center, Moffett Field, CA	1530 hrs AIAA-2019-3421 **Numerical method for Large Eddy Simulation of compressible isotropic turbulence** B. Modi, S. Ghosh, Indian Institute of Technology Madras, Chennai, India	1600 hrs AIAA-2019-3422 **Grid-size requirements for Large Eddy simulations: estimates for different orders of accuracy based on local reconstruction type schemes** Y. Lu, Dimaxer Technology, Ltd., Cambridge, United Kingdom; T. Cao, University of Cambridge, Cambridge, United Kingdom; K. Liu, Dimaxer Technology, Ltd., Cambridge, United Kingdom		

Wednesday, 19 June 2019						
185-CFD-15	**Progress in CFD Algorithms**					**Obelisk B**
Chaired by: D. FRENCH, Wright-Patterson AFB and Y. SUZUKI, Altair Engineering, Inc.						
1400 hrs AIAA-2019-3423 **A nonlinear SUPG method for hyperbolic conservation laws** Y. Suzuki, Altair Engineering, Inc., Sunnyvale, CA	1430 hrs AIAA-2019-3424 **Overset Methods and Robin Boundary Conditions** D. French, University of Cincinnati, Cincinnati, OH; J. Benek, C. Schrock, Air Force Research Laboratory, Wright-Patterson AFB, OH; M. Galbraith, Massachusetts Institute of Technology, Cambridge, MA	1500 hrs AIAA-2019-3425 **Transonic flow analysis with discontinuous Galerkin method in SU2 DG-FEM solver** J. Choi, J. Alonso, Stanford University, Stanford, CA; E. van der Weide, University of Twente, Enschede, The Netherlands	1530 hrs AIAA-2019-3426 **Sensitivity computation of statistically stationary quantities in turbulent flows** N. Chandramoorthy, Q. Wang, Massachusetts Institute of Technology, Cambridge, MA			

Wednesday, 19 June 2019		
186-F360-6 1400 - 1600 hrs	Wednesday Afternoon Forum 360: Enabling the Engineering Transformation	Coronado Ballroom

Moderator: John Cavolowsky, Director, Transformative Aeronautics Concepts Program, Aeronautics Research Mission Directorate, NASA

Panelists:

Gene Holloway
Vice President of Boomless Cruise™ & Environmental Responsibility
Aerion Supersonic

Lesa Roe
Chancellor
University of North Texas System

Tom Shih
J. William Uhrig and Anastasia Vournas Head
Professor, Aeronautics and Astronautics
Purdue University

Kristi Shryock
Associate Department Head
Department of Aerospace Engineering
Texas A&M University

Wednesday, 19 June 2019		
187-FD-20 1400 - 1730 hrs	Transition Open Forum	Metropolitan

Wednesday, 19 June 2019						
188-FD-21	Fundamental Fluid Flows II: Instability and Vortex Flows					Manchester
Chaired by: D. SMITH, Air Force Office of Scientific Research and A. MEDINA, Air Force Research Laboratory						
1400 hrs AIAA-2019-3427 **Lock-in Of Vortex Shedding From A Cylinder In Forced Oscillations** M. Aleman Chona, K. Granlund, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2019-3428 **Experimental study on the appearance of Kelvin-Helmholtz-like instabilities in the wakes produced by bio-inspired pitching panels** J. King, M. Green, Syracuse University, Syracuse, NY	1500 hrs AIAA-2019-3429 **Effects of Upstream Body on Pitching Trapezoidal Panel** S. Brooks, M. Green, Syracuse University, Syracuse, NY	1530 hrs AIAA-2019-3430 **High-Order Numerical Simulation of Flows over Rotating Cylinders of Various Cross-Sectional Shapes** B. Zhang, C. Liang, George Washington University, Washington, D.C.	1600 hrs AIAA-2019-3431 **Effect of Slotted Winglet on the Wingtip Vortex** J. Deslich, S. Gunasekaran, University of Dayton, Dayton, OH	1630 hrs AIAA-2019-3432 **Simulation of Viscous Fingering Instability by the Lattice Boltzmann Method** L. Vienne, S. Marie, F. Grasso, National Conservatory of Arts and Crafts, Paris, France	

Wednesday, 19 June 2019						
189-FD-22	Low Re and Bio-Inspired Flows					Madrid
Chaired by: C. KANG, University of Alabama in Huntsville and S. BHATTACHARYA, University of Central Florida						
1400 hrs AIAA-2019-3433 **Insight into the Thermal Effects of Aquatic Animal Colors on their Skin Friction Drag** M. Hassanalian, H. Abdelmoula, S. Mohammadi, S. Bakhtiyarov, New Mexico Institute of Mining and Technology, Socorro, NM; J. Goerlich, Forum Energy Technologies, Houston, TX; U. Javed, University of Lahore , Lahore, Pakistan	1430 hrs AIAA-2019-3434 **Numerical Investigation on Hydrodynamic Performance of Flapping Plates with Non-Uniform Spanwise Flexibility Using Fluid Structure Interaction** J. Wang, X. Deng, University of Virginia, Charlottesville, Charlottesville, VA; G. Lauder, Harvard University, Cambridge, MA; H. Dong, University of Virginia, Charlottesville, Charlottesville, VA	1500 hrs AIAA-2019-3435 **Study on the passive pitching mechanism of different forms of flapping motion in turning flight** Y. Pan, J. Wang, H. Dong, University of Virginia, Charlottesville, Charlottesville, VA	1530 hrs AIAA-2019-3436 **Effect of Joint Stiffness on Propulsive Performance of Fish-Shaped Panel** R. Zhu, J. Wang, H. Dong, H. Bart-Smith, University of Virginia, Charlottesville, Charlottesville, VA	1600 hrs AIAA-2019-3437 **Compressibility, Reynolds Number and Thermal Effects in Pressure-Decay Based Leak Detection Systems** M. Kandula, Stinger Ghaffarian Technologies, Inc., Cape Canaveral, FL; B. Nufer, A. Felt, NASA Kennedy Space Center, Cape Canaveral, FL; N. Hicks, Stinger Ghaffarian Technologies, Inc., Cape Canaveral, FL; T. Aranyos, NASA Kennedy Space Center, Cape Canaveral, FL; G. Webster, NASA Goddard Space Flight Center, Greenbelt, MD; et al.		

Wednesday, 19 June 2019						
190-FD-23	Shock-Wave/Boundary-Layer Interactions					Miro
Chaired by: A. GROSS, New Mexico State University and T. EYMANN, Air Force Research Laboratory						
1400 hrs AIAA-2019-3438 **Transient Aspects of a Shock-Wave Boundary Layer Interaction** A. Wills, M. Awasthi, C. Doolan, D. Moreau, University of New South Wales, Sydney, Australia	1430 hrs AIAA-2019-3439 **Statistical Analysis of Unsteadiness in a Compressible Reattaching Flow** A. Deshpande, J. Poggie, Purdue University, West Lafayette, IN	1500 hrs AIAA-2019-3440 **Heat transfer amplifications in transitional shock-wave/boundary-layer interactions** J. Lunte, E. Schuelein, German Aerospace Center (DLR), Göttingen, Germany	1530 hrs AIAA-2019-3441 **Numerical Investigation of Super- and Hypersonic Laminar Shockwave Boundary Layer Interactions** S. Lee, A. Gross, New Mexico State University, Las Cruces, NM	1600 hrs AIAA-2019-3442 **Modal Analysis of 3-D Hypersonic Shock-Boundary Layer Interactions on a Double Wedge** S. Sawant, O. Tumuklu, D. Levin, University of Illinois, Urbana-Champaign, Urbana, IL; V. Theofilis, University of Liverpool, Liverpool, United Kingdom		

Wednesday, 19 June 2019						
191-GA-2	**General Aviation Safety**					**Inverness**
Chaired by: A. LINN, A. B. Linn PE						
1400 hrs AIAA-2019-3443 **Assessing Potential Biases in Risk Perception for General Aviation Pilots** N. Fala, K. Marais, Purdue University, West Lafayette, IN	1430 hrs AIAA-2019-3444 **Investigation of Feasibility of Using Low-Cost AHRS Devices to Detect General Aviation Hazardous States** A. Chakraborty, N. Fala, K. Marais, Purdue University, West Lafayette, IN	1500 hrs AIAA-2019-3445 **Efficiency Improvement of Instrument Reading Identification from Recording Images** B. Kuo, P. Chen, Aviation Safety Council, New Taipei City, Taiwan; F. Hsiao, F. Chang, Tamkang University, New Taipei City, Taiwan				

Wednesday, 19 June 2019		
192-GT-7 **1400 - 1700 hrs**	**Special Session: National Partnership for Aeronautical Testing (NPAT) Mini Facility Users Meeting (FUM)**	**Emerald**
This session is the semi-annual meeting of tunnel operators and customers to discuss topics of interest in an open-forum session.		

Wednesday, 19 June 2019						
193-ITAR-3	**ITAR - Kinetic Weapon Integration**					**Morocco**
Chaired by: R. GRAVES, Air Force Research Laboratory and R. SCHMIT, USAF/AFRL and B. JOLLY, USAF						
1400 hrs Oral Presentation **Design and Characterization of a Captive Trajectory System and a Free Drop Mechanism for Generic Stores** G. Robertson, R. Kumar, Florida A&M University-Florida State University, Tallahassee, FL; K. Roughen, S. Doyle, M4 Engineering, Inc., Long Beach, CA; I. Maatz, Air Force Research Laboratory, Wright-Patterson AFB, OH	1430 hrs Oral Presentation **Simulation of High Speed Store Separation with Data Comparisons** N. Sinha, M. O`Gara, J. Shipman, P. Cavallo, CRAFT Tech, Pipersville, PA	1500 hrs AIAA-2019-3446 **Parametric Investigation of Store Separation Including Unsteady Effects** K. Roughen, S. Doyle, M4 Engineering, Inc., Long Beach, CA; R. Kumar, G. Robertson, Florida State University, Tallahassee, FL; I. Maatz, R. Johnson, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2019-3447 **Computational Investigation of Separation-Trajectory Dynamics Using a Generic Store** R. Graves, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2019-3448 **Techniques for Removal of Structural Modes from an Unsteady Two-Strut Store Balance** I. Maatz, R. Schmit, Air Force Research Laboratory, Wright-Patterson AFB, OH; J. Draper, Arnold Engineering Development Complex (AEDC), Silver Spring, MD; R. Johnson, Air Force Research Laboratory, Wright-Patterson AFB, OH	1630 hrs Oral Presentation **Model Scale Assessment of Store Separation from a Complex Bay** N. Murray, University of Mississippi, University, MS	1700 hrs AIAA-2019-3449 **Kestrel Simulations on a Store Separating from JSF Weapons Bay** J. Lee, E. Lynch, D. Prosser, B. Headley, Naval Air Systems Command, Patuxent River, MD

Wednesday, 19 June 2019						
194-MDO-12	**Design Optimization of Complex Engineered Systems II**					**Ming**
Chaired by: S. CHOI, Virginia Tech and A. NAJAFI, ANSYS, Inc.						
1400 hrs AIAA-2019-3450 **Optimal control and design of an underactuated ball-pitching robotic arm using large-scale multidisciplinary optimization** J. Yan, N. Li, T. Luo, M. Tolley, J. Hwang, University of California, San Diego, San Diego, CA	1430 hrs AIAA-2019-3451 **Power Management Optimization for Off-Design Performance Assessment of Ducted Electric Fan with Boundary Layer Ingestion** J. Brucculeri, L. Salas Nunez, J. Gladin, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1500 hrs AIAA-2019-3452 **Cleaning Mechanisms for Solar Panels of Rovers and Other Extraterrestrial Unmanned Vehicles** A. Maxwell, G. Acosta, M. Ward, A. Hamm, M. Hassanalian, New Mexico Institute of Mining and Technology, Socorro, NM	1530 hrs AIAA-2019-3453 **Development of a Stabilized Sensor Platform for a Dynamic Targeting Technology Demonstrator** J. Sturm, M. Hornung, Technical University of Munich, Garching, Germany; A. Lindner, Wittenstein Aerospace and Simulations GmbH, Igersheim, Germany			

Wednesday, 19 June 2019						
195-MDO-13	**Aircraft Design Optimization I**					**Milan**
Chaired by: B. STANFORD, NASA Langley Research Center and J. CORMAN, Georgia Institute of Technology						
1400 hrs AIAA-2019-3454 **Streamlining Cross-Organizational Aircraft Development: Results from the AGILE Project** P. Ciampa, P. Prakasha, F. Torrigiani, J. Walther, German Aerospace Center (DLR), Hamburg, Germany; T. Lefebvre, N. Bartoli, ONERA, Toulouse, France; et al.	1430 hrs AIAA-2019-3455 **Aeropropulsive Design Optimization of a Boundary Layer Ingestion System** A. Yildirim, University of Michigan, Ann Arbor, Ann Arbor, MI; J. Gray, NASA Glenn Research Center, Cleveland, OH; C. Mader, J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI	1500 hrs AIAA-2019-3456 **An Examination into the Defining Characteristics of Flexible Solar Aircraft Configurations through Optimization** T. McDonnell, A. Ning, Brigham Young University, Provo, UT	1530 hrs AIAA-2019-3457 **Artificial Life-inspired Morphology/ Learning CoDesign Framework: Towards Conceptual Design of Intelligent Hybrid Quadcopters** C. Zeng, A. Behjat, K. Gabani, S. Chowdhury, University at Buffalo, Buffalo, NY			

Wednesday, 19 June 2019						
196-MVCE-3	**Second Geometry and Mesh Generation Workshop: Lessons Learned**					**Wyeth**
Chaired by: J. MASTERS, National Aerospace Solutions and D. MCDANIEL, DoD HPCMP/CREATE						
1400 hrs AIAA-2019-3458 **Summary of Exascale and Remeshing Efforts for the Second Geometry and Mesh Generation Workshop** C. Woeber, Pointwise, Inc., Fort Worth, TX; J. Masters, National Aerospace Solutions, Arnold AFB, TN; D. McDaniel, University of Alabama, Birmingham, Birmingham, AL	1430 hrs AIAA-2019-3459 **Analysis of GMGW2 Case 3: Design Variations** J. Dannenhoffer, Syracuse University, Syracuse, NY	1500 hrs AIAA-2019-3460 **The Wind Tunnel Model of the NASA High Lift Common Research Model: A Geometry-Handling Perspective** N. Taylor, MBDA, Filton, United Kingdom; M. Gammon, International TechneGroup, Inc., Cambridge, United Kingdom	1530 hrs AIAA-2019-3461 **Summary of Discussions of Mesh Impact on CFD Simulations at GMGW2** C. Ollivier Gooch, University of British Columbia, Vancouver, Canada	1600 hrs **Panel: Discussion of GMGW2 Lessons Learned** Panelists: Carolyn Woeber, Pointwise, Inc. Jim Masters, National Aerospace Solutions John Dannenhoffer, Syracuse University Carl Ollivier-Gooch, University of British Columbia		

Wednesday, 19 June 2019						
197-NIA-1	**Graduate Student Research Papers**					**Ruby**
Chaired by: C. BRITCHER, Old Dominon University and D. STANLEY, National Institute of Aerospace						
1400 hrs AIAA-2019-3462 **Computational Efficiency Enhancements for Optimal Control Allocation** M. Acheson, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2019-3463 **Performance Enhancement and Load Balancing of Swarming Drones through Position Reconfiguration** A. Mirzaeinia, M. Hassanalian, K. Lee, New Mexico Institute of Mining and Technology, Socorro, NM; M. Mirzaeinia, Amirkabir University of Technology, Tehran, Iran	1500 hrs AIAA-2019-3464 **On Real-time Management of On-board Ice Protection Systems by means of Machine Learning** B. Arizmendi, T. Bellosta, Technical University of Milan, Milan, Italy; A. del Val, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; G. Gori, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France; M. Prazeres, McGill University, Montréal, Canada; J. Reis, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France	1530 hrs AIAA-2019-3465 **Design and Analysis of a High Pressure and High Temperature Fixed Wing Space Drone for Venus Exploration** G. Acosta, D. Grow, M. Hassanalian, New Mexico Institute of Mining and Technology, Socorro, NM	1600 hrs AIAA-2019-3466 **A Multi-University Small Satellite Design Course : Systems Engineering Approach** M. Weinmann, S. Mann, A. Stark, Old Dominion University, Norfolk, VA; E. Edmonson, A. Anzagira, N. Kibret, North Carolina A&T State University, Greensboro, NC; et al.		

Wednesday, 19 June 2019					
198-TF-6 **1400 - 1630 hrs**	**Current State of the X-57 Design, Integration and Testing: Briefing to Industry II**				**Lalique**
Panelists:					
Nicholas Borer NASA	**Jeffrey Viken** NASA	**Sean Clarke** NASA	**Lowell Foster** FAA	**Andy Gibson** ESAero	

Wednesday, 19 June 2019						
199-TP-9	**Heat Transfer Enhancement, Energy Harvesting, Thermal Management, Thermal Control, and Thermophysical and Transport Properties**					**Edelweiss**
Chaired by: E. SHORT, Raytheon Company and K. WEED, Ball Aerospace & Technologies Corporation						
1400 hrs AIAA-2019-3467 **Entropy Generation Analysis Applied to Diffusion-Bonded Compact Heat Exchangers** R. Cavalcanti Alvarez, A. Sarmiento, J. Victor Colin Batista, M. Mantelli, Federal University of Santa Catarina, Florianópolis, Brazil	1430 hrs AIAA-2019-3468 **Enhancement of Gas Pumping and Heat Transfer Using a Two-Stage Electrohydrodynamic Pump Operated at Uneven Applied Voltage** F. Lai, University of Oklahoma, Norman, OK; M. Mazumder, Saginaw Valley State University, University Center, MI	1500 hrs AIAA-2019-3469 **Cowl Optimization for Effective Cooling of Hybrid Gasoline - Battery Propulsion System** H. Gwon, W. Kim, D. Kim, K. Lee, Y. Jung, J. Kang, Korean Air, Daejeong, South Korea; et al.	1530 hrs AIAA-2019-3470 **Aircraft Weight Reduction and Onboard Combined Power Cycle Efficiency Improvement—An Integrative Approach** S. Yang, J. Ordonez, Florida State University, Tallahassee, FL	1600 hrs AIAA-2019-3471 **Topology optimization of a fuel thermal management system** G. Huang, Wright State University, Dayton, OH; D. Doman, M. Oppenheimer, Air Force Research Laboratory, Wright-Patterson AFB, OH; A. Tipton, Wright State University, Dayton, OH; D. Sigthorsson, Infoscitex Corporation, Beavercreek, OH	1630 hrs AIAA-2019-3472 **Semi-Empirical Method for Measuring Thermal Conductivity of Fibrous Insulation Materials** C. Barrow, J. Maddox, A. Martin, University of Kentucky, Lexington, Lexington, KY	

Wednesday, 19 June 2019						
200-VSTOL-2	**V/STOL and VTOL Design Methodologies, Issues, and Assessments**					**Fleur De Lis A**
Chaired by: G. GATLIN, NASA Langley Research Center and E. CHARLTON, Lockheed Martin Aeronautics						
1400 hrs AIAA-2019-3473 **Robust Environmental Life Cycle Assessment of Electric VTOL Concepts for Urban Air Mobility** N. André, M. Hajek, Technical University of Munich, Munich, Germany	1430 hrs AIAA-2019-3474 **Hybrid Lagrangian-Eulerian Approach for Modeling Aerodynamic Interactions** E. Bae, P. Rand, C. He, Advanced Rotorcraft Technology, Inc., Sunnyvale, CA	1500 hrs AIAA-2019-3475 **Development of a Safe, Quiet, Certifiable Personal VTOL System** L. Schumacher, P. McNamee, J. Haug, R. Barrett, University of Kansas, Lawrence, Lawrence, KS	1530 hrs AIAA-2019-3476 **Sensitivity Analysis and Uncertainty Quantification of a Coaxial Rotor System** P. Anusonti-Inthra, E. Cole, Army Research Laboratory, Aberdeen Proving Ground, MD; B. Smith, Rensselaer Polytechnic Institute, Troy, NY; Z. Nieto, University of Texas, El Paso, El Paso, TX	1600 hrs AIAA-2019-3477 **Model Development for a Comparison of VTOL and STOL Electric Aircraft Using Geometric Programming** C. Courtin, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA	1630 hrs AIAA-2019-3478 **Lift Fan Assessment for Conceptual Design of Aircraft Forebody** L. Myers, R. Czerwiec, Z. Napolillo, Naval Air Systems Command, Patuxent River, MD	

Wednesday, 19 June 2019		
201-HUB-9 **1500 - 1630 hrs**	**Introduction to Drones (I2D)**	**the HUB**
Speakers: **Jesse Rheingold** Airworthiness and Subsystem Engineer Lockheed Martin Corporation **Wendell Chun** Research Professor University of Colorado Denver **Sanjiv Gupta** Chief Engineer Global Hawk Program Northrop Grumman		

Wednesday, 19 June 2019		
202-HUB-10 **1600 - 1630 hrs**	**Meet the Author with Leland Nicolai**	**the HUB**
Meet, and have your books signed by, Leland M. Nicolai, author of Lessons Learned and Fundamentals of Aircraft and Airship Design, Volumes 1 & 2. Books available for purchase at a forum discount.		

Wednesday, 19 June 2019		
203-NW-12 **1600 - 1630 hrs**	**Networking Break**	**Exposition Hall**

Wednesday, 19 June 2019		
204-MDO-14 **1730 - 1830 hrs**	**MDO Lecture**	**Coronado Ballroom**
Raymond Kolonay Air Force Research Laboratory Student paper awards presentations will follow the lecture.		

Wednesday, 19 June 2019		
205-NW-13 **1830 - 2000 hrs**	**AIAA Backyard BBQ (Proof of Purchase Required)**	**Anatole Sculpture Park**

Thursday

Thursday, 20 June 2019

206-SB-4 0730 - 0800 hrs	Thursday Speaker Briefing	Session Rooms

Thursday, 20 June 2019

207-PLNRY-4 0800 - 0900 hrs	Thursday Plenary: The Future of Mobility – Aviation is Changing the World	Grand Ballroom

Moderator: Benjamin C. Linder, Director of Flight Sciences, Boeing Commercial Airplanes

Keynote Speaker
Greg Hyslop
Chief Technology Officer
The Boeing Company

Thursday, 20 June 2019

208-NW-14 0900 - 0930 hrs	Networking Break	Exposition Hall

Thursday, 20 June 2019

209-HUB-11 0915 - 0945 hrs	Calculating Shape From OFDR-Based Distributed Strain Measurement	the HUB

This presentation describes how engineers are utilizing Optical Frequency Domain Reflectometry (OFDR) based fiber optic strain measurements to derive distributed shape. OFDR offers the ability to acquire strain measurements continuously along the length of an optical fiber. Coupled with fiber's flexible routing options, this allows one to capture various components of strain continuously or quasi-continuously along the length of the substrate to which the fiber is bonded. Through any number of mechanics models or computational techniques, this information may then be used to determine distributed displacements and deflections along the length of structural components. This has been particularly useful in the aerospace industry for monitoring wing deflection in real-time during flight.

Thursday, 20 June 2019

210-ACD-9 0930 - 1230 hrs	CADWG 21 - Bill Mason: Aircraft Conceptual Designer, Scholar and Educator (a Memorial)	Fleur De Lis B

Thursday, 20 June 2019

211-ADS-12 — **Mars Parachute Applications** — **Plum Blossom A**

Chaired by: B. TUTT, Airborne Systems

0930 hrs AIAA-2019-3479 **Design Overview of the Strengthened Mars 2020 Parachute Assembly** B. Tutt, C. Lowry, Airborne Systems, Santa Ana, CA; I. Clark, C. Tanner, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1000 hrs AIAA-2019-3480 **Comparison of Mars and Earth High Altitude Supersonic Disk-Gap-Band Parachute System Performance** M. Kandis, Pioneer Aerospace Corporation, South Windsor, CT; A. Witkowski, Katabasis Engineering, LLC, Glastonbury, CT	1030 hrs AIAA-2019-3481 **Mars InSight Parachute System Performance** A. Witkowski, Katabasis Engineering, LLC, Glastonbury, CT; M. Kandis, Pioneer Aerospace Corporation, South Windsor, CT; D. Kipp, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; D. Buecher, Lockheed Martin Corporation, Littleton, CO	1100 hrs AIAA-2019-3482 **Summary of the Advanced Supersonic Parachute Inflation Research Experiments (ASPIRE) Sounding Rocket Tests with a Disk-Gap-Band Parachute** B. Sonneveldt, I. Clark, C. O'Farrell, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA			

Thursday, 20 June 2019

212-ADS-13 — **Parachute Simulation** — **Plum Blossom B**

Chaired by: J. POTVIN, Saint Louis University and J. DAVIDSON

0930 hrs AIAA-2019-3483 **Fine Reconstitution of Trajectories of Airdropped Systems to Complete CARP Approach and Trajectory Analysis** D. Bergotti, B. Perin, French Defense Procurement Agency (DGA), Toulouse, France	1000 hrs AIAA-2019-3484 **Towed Paratrooper Simulation and Estimation of Maximum Experienced Force During Impact** P. Furlani Vidal, M. Arbelo, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; P. Caruy Povoa, Embraer, São José dos Campos, Brazil	1030 hrs AIAA-2019-3485 **Airdrop Technology Multi-Operational Simulation (ATMOS)** U. Fraire, Army Research, Development and Engineering Command, Natick, MA	1100 hrs AIAA-2019-3486 **Opening Shock Factor Calculation for Orion Main Parachute Disreefing** J. Potvin, Saint Louis University, St. Louis, MO; E. Ray, MRI Technologies, Houston, TX			

Thursday, 20 June 2019						
213-APA-25	**Special Session: Commercial Supersonic Technologies III**					**Cortez C**
Chaired by: D. RICHWINE, NASA-Langley Research Center and L. OZOROSKI, NASA LARC						
0930 hrs Oral Presentation **Investigating Impacts of Propulsive Uncertainties on Low-Boom Concepts (Invited)** B. Phillips, NASA Langley Research Center, Hampton, VA	1000 hrs AIAA-2019-3487 **Efficient Near-Field to Mid-Field Sonic Boom Propagation Using a High-Order Space Marching Method (Invited)** J. Housman, G. Kenway, J. Jensen, C. Kiris, NASA Ames Research Center, Moffett Field, CA	1030 hrs AIAA-2019-3488 **Adjoint-Based Mesh Adaptation and Shape Optimization for Simulations with Propulsion (Invited)** M. Nemec, NASA Ames Research Center, Moffett Field, CA; D. Rodriguez, Science and Technology Corporation, Moffett Field, CA; M. Aftosmis, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2019-3489 **Surrogate Based Shape Optimization of a Low Boom Fuselage Wing Configuration (Invited)** J. Kirz, German Aerospace Center (DLR), Braunschweig, Germany			

Thursday, 20 June 2019						
214-APA-26	**Airfoil, Wing, and Configuration Design**					**Cortez D**
Chaired by: B. POMEROY, Boeing Commercial Airplanes and M. O`GARA, CRAFT Tech						
0930 hrs AIAA-2019-3490 **Box wing longitudinal flight quality evaluation** A. Sousa, A. de Paula, F. Ribeiro, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1000 hrs AIAA-2019-3491 **Adaptation of General Aviation Techniques for the Design of a Supersonic Leading-Edge Business Jet** M. Gilfert, S. Gudmundsson, Embry-Riddle Aeronautical University, Daytona Beach, FL	1030 hrs AIAA-2019-3492 **Lift Enhancement by a Stationary Leading-Edge Vortex Over a High Aspect Ratio Wing** H. Ben-Gida, Technion–Israel Institute of Technology, Haifa, Israel; R. Gurka, Coastal Carolina University, Conway, SC; D. Weihs, Technion–Israel Institute of Technology, Haifa, Israel	1100 hrs AIAA-2019-3493 **An Aerodynamic Design Method of Propeller Airfoils with Geometric Compatibility as Constraints** J. Xu, H. Li, W. Song, Z. Han, Northwestern Polytechnical University, Xi'an, China			

Thursday, 20 June 2019						
215-APA-27	**Analysis of Internal Flows**					**Morocco**
Chaired by: S. BERGER, ISAE-SUPAERO and B. HINSON, Textron Aviation						
0930 hrs AIAA-2019-3494 **Experimental Investigations on Active Flow Control Applied to an Asymmetric Compressor Cascade** M. Staats, C. Ebert, J. Weiss, Technical University of Berlin, Berlin, Germany	1000 hrs AIAA-2019-3495 **Improving Efficiency of Co-Flow Jet Micro-Compressor Actuator Outlet Guide Vanes and Nozzle** K. Xu, G. Zha, University of Miami, Coral Gables, FL	1030 hrs AIAA-2019-3496 **CFD Analysis of Cyclone Separator Flow Field in Advance of Experiment** N. Lucarelli, E. Eckman, K. Disotell, Youngstown State University, Youngstown, OH	1100 hrs AIAA-2019-3497 **Discharge coefficient of an orifice jet in cross flow: influence of inlet conditions and optimum velocity ratio** S. Berger, N. Gourdain, M. Bauerheim, ISAE-SUPAERO, Université de Toulouse, Toulouse, France; S. Devillez, LATECOERE, Toulouse, France			

Thursday, 20 June 2019						
216-APA-28	**Active Flow Control II**					**Cortez A**
Chaired by: T. WONG, U. S. Army AMRDEC and K. BERGERON, US Army NSRDEC						
0930 hrs AIAA-2019-3498 **Microjets for Lift Enhancement and Separation Mitigation in High-Lift Systems** S. Hosseini, NASA Ames Research Center, Moffett Field, CA; A. Cooperman, C. van Dam, University of California, Davis, Davis, CA; S. Pandya, NASA Ames Research Center, Moffett Field, CA	1000 hrs AIAA-2019-3499 **Flow Field Investigation on a Vertical Stabilizer with Pulsed Jet Actuation by means of PIV Measurements** S. Löffler, L. Rohlfs, M. Staats, J. Weiss, Technical University of Berlin, Berlin, Germany	1030 hrs AIAA-2019-3500 **Steady and Unsteady compressible Reduced-Order Models of a Zero-Net Mass-Flux Synthetic Jet Actuator** R. Messahel, Y. Bury, J. Bodart, N. Doué, Higher Institute of Aeronautics and Space, Toulouse, France	1100 hrs AIAA-2019-3501 **Interaction between a jet and a turbulent boundary layer** C. Ott, Q. Gallas, J. Delva, ONERA, Lille, France; M. Lippert, L. Keirsbulck, Polytechnic University of Hauts-de-France, Valenciennes, France			

Thursday, 20 June 2019						
217-APA-29	**Special Session: Space Launch System Aerosciences III**					**Cortez B**
Chaired by: D. CHAN, NASA-Langley Research Center and P. SHEA, NASA Langley Research Center						
0930 hrs AIAA-2019-3502 **Development of Unsteady Pressure-Sensitive Paint Application on NASA Space Launch System (Invited)** N. Roozeboom, NASA Ames Research Center, Moffett Field, CA; J. Powell, NASA Johnson Space Center, Houston, TX; J. Baerny, D. Murakami, C. Ngo, T. Garbeff, NASA Ames Research Center, Moffett Field, CA; et al.	1000 hrs AIAA-2019-3503 **Assessment of Buffet Forcing Function Development Process Using Unsteady Pressure Sensitive Paint (Invited)** M. Sekula, D. Piatak, R. Rausch, NASA Langley Research Center, Hampton, VA; J. Ross, NASA Ames Research Center, Moffett Field, CA; M. Sellers, QuantiTech, Arnold AFB, TN	1030 hrs AIAA-2019-3504 **Verification of Calculation Procedure for Unsteady Aerodynamic Forces on a Launch Vehicle (Invited)** J. Panda, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2019-3505 **Space Launch System Booster Separation Supersonic Powered Testing with Surface and Off-body Measurements (Invited)** C. Winski, P. Danehy, A. Watkins, P. Shea, NASA Langley Research Center, Hampton, VA; J. Meeroff, Science and Technology Corporation, Moffett Field, CA; K. Lowe, Virginia Polytechnic Institute and State University, Blacksburg, VA; et al.	1130 hrs AIAA-2019-3506 **Three-Velocity-Component Cross-Correlation Doppler Global Velocimetry for the Space Launch System Booster Separation Test in the NASA Langley Unitary Plan Wind Tunnel (Invited)** K. Lowe, G. Byun, S. Shea, M. Boyda, Virginia Polytechnic Institute and State University, Blacksburg, VA; C. Winski, NASA Langley Research Center, Hampton, VA	1200 hrs AIAA-2019-3507 **Laser Light Sheet Flow Visualization of the Space Launch System Booster Separation Test (Invited)** P. Danehy, B. Wisser, NASA Langley Research Center, Hampton, VA; T. Fahringer, National Institute of Aerospace, Hampton, VA; C. Winski, NASA Langley Research Center, Hampton, VA; B. Falman, Jacobs, Hampton, VA; S. Shea, Virginia Polytechnic Institute and State University, Blacksburg, VA; et al.	

Thursday, 20 June 2019						
218-ATOMS-14	**Airline and Passengers**					**Inverness**
Chaired by: M. URBAN and K. OGUNSINA, Purdue University						
0930 hrs AIAA-2019-3508 **Hidden Markov Models for Pattern Learning and Recognition in a Data-Driven Model for Airline Disruption Management** K. Ogunsina, M. Papamichalis, I. Bilionis, D. DeLaurentis, Purdue University, West Lafayette, IN	1000 hrs AIAA-2019-3509 **Aircraft Reserve Fuel Study with High-fidelity Fuel Approximation Model** Y. Lyu, J. Yanto, R. Liem, Hong Kong University of Science and Technology, Hong Kong, Hong Kong	1030 hrs AIAA-2019-3510 **Uniform Terminal Area: How to Abolish the Physical Separation of International and Domestic Passengers at Airports Using the European Example** M. Schulze Schwienhorst, RWTH Aachen University, Aachen, Germany	1100 hrs AIAA-2019-3511 **Estimating Cancellation Costs for Real-Time Decision Support** Q. Diao, C. Taylor, A. Tien, C. Wanke, MITRE Corporation, McLean, VA			

Thursday, 20 June 2019						
219-ATOMS-15	**UAS Traffic Management IV**					**Steuben**
Chaired by: M. XUE, NASA Ames Research Center and E. MAKI						
0930 hrs AIAA-2019-3512 **Defining Well Clear Separation for Unmanned Aircraft Systems Operating with Noncooperative Aircraft** C. Chen, M. Edwards, B. Gill, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; S. Smearcheck, T. Adami, S. Calhoun, CAL Analytics, Dayton, OH; et al.	1000 hrs AIAA-2019-3513 **Scenario Complexity for Unmanned Aircraft System Traffic** M. Xue, NASA Ames Research Center, Moffett Field, CA; M. Do, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA	1030 hrs AIAA-2019-3514 **Real-time UAV Trajectory Prediction for Safety Monitoring in Low-Altitude Airspace** M. Corbetta, P. Banerjee, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; W. Okolo, NASA Ames Research Center, Moffett Field, CA; G. Gorospe, D. Luchinsky, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA	1100 hrs AIAA-2019-3515 **Cooperative Navigation for Small UAVs in GPS-Intermittent Environments** B. Yang, P. Dutta, Optimal Synthesis, Inc., Los Altos, CA	1130 hrs AIAA-2019-3516 **Impact of Detect and Avoid Maneuvering on Wake Hazard** E. Maki, C. Engholm, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA	1200 hrs AIAA-2019-3517 **Advancing Aircraft Operations in a Net-Centric Environment with the Incorporation of Increasingly Autonomous Systems and Human Teaming** V. Houston, NASA Langley Research Center, Hampton, VA; W. Manuel, Purdue University, West Lafayette, IN; E. Gizzi, Tufts University, Medford, MA; B. Barrows, NASA Langley Research Center, Hampton, VA	

Thursday, 20 June 2019

220-ATOMS-16 — **Urban Air Mobility I** — **Topaz**

Chaired by: C. BOSSON, University Space Research Association and S. ROY, Purdue University

0930 hrs
AIAA-2019-3518
A study to investigate total mobility using both CTOL and VTOL-capable aircraft
S. Roy, A. Maheshwari, W. Crossley, D. DeLaurentis, Purdue University, West Lafayette, IN

1000 hrs
AIAA-2019-3519
Pre-Departure Planning for Urban Air Mobility Flights with Dynamic Airspace Reservation
G. Zhu, P. Wei, Iowa State University, Ames, IA

1030 hrs
AIAA-2019-3520
Multi-Agent Autonomous On-Demand Free Flight Operations in Urban Air Mobility
X. Yang, L. Deng, P. Wei, Iowa State University, Ames, IA

1100 hrs
AIAA-2019-3521
Analysis of interactions between Urban Air Mobility (UAM) operations and current air traffic in urban areas: Traffic alert and Collision Avoidance System (TCAS) study for UAM Operations
V. Bulusu, B. Sridhar, A. Cone, D. Thipphavong, NASA Ames Research Center, Moffett Field, CA

1130 hrs
AIAA-2019-3522
By Schedule or On Demand? - A Hybrid Operation Concept for Urban Air Mobility
S. Shihab, P. Wei, Iowa State University, Ames, IA; D. Ramirez, National University of Colombia, Medellin, Colombia; R. Mesa-Arango, Florida Institute of Technology, Melbourne, FL; C. Bloebaum, Kent State University, Kent, OH

Thursday, 20 June 2019

221-CFD-16 — **LES Methods II** — **Obelisk A**

Chaired by: D. WESTON, AFRL-RQVA

0930 hrs
AIAA-2019-3523
CFD Based Reduced Order Modeling for Hypersonic Vehicles Using CREATE(TM)-AV Kestrel
D. Potter, University of Michigan, Ann Arbor, Ann Arbor, MI; T. Eymann, Air Force Research Laboratory, Wright-Patterson AFB, OH

1000 hrs
AIAA-2019-3524
Hybrid RANS/LES Simulation of Vortex Breakdown Over a Delta Wing
B. Zhou, Technical University of Kaiserslautern, Kaiserslautern, Germany; B. Diskin, National Institute of Aerospace, Hampton, VA; N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany; J. Pardue, A. Chernikov, C. Tsolakis, Old Dominion University, Hampton, VA; et al.

1030 hrs
AIAA-2019-3525
Ultra-fast high order unsteady simulations on GPUs based on a new computational model
K. Liu, Y. Lu, Dimaxer Technology, Ltd., Cambridge, United Kingdom

1100 hrs
AIAA-2019-3526
Implicit Large-Eddy Simulation of rotating and non-rotating machinery with Cumulant Lattice Boltzmann method aiming for industrial applications
S. Nishimura, K. Hayashi, S. Nakaye, M. Yoshimoto, Mitsubishi Corporation, Nagoya, Japan; K. Suga, Osaka Prefecture University, Sakai, Japan; T. Inamuro, Kyoto University, Kyoto, Japan

1130 hrs
AIAA-2019-3527
Scale Adaptive Simulation of stalled NACA 0012 airfoil using high order schemes
P. Patel, Y. Yang, G. Zha, University of Miami, Coral Gables, FL

Thursday, 20 June 2019

222-F360-7
0930 - 1130 hrs
Thursday Morning Forum 360: Autonomous Operation in an Evolving Ecosystem
Coronado Ballroom

Moderator: Parker Vascik, Aerospace Engineering, Technology and Policy, Massachusetts Institute of Technology

Panelists:

Ella Atkins
Professor
Aerospace Engineering
University of Michigan

Thomas Edwards
Chief Technical Officer
Crown Consulting

Brock Lascara
Lead Aviation Systems Engineer
The MITRE Corporation

Chad Stecker
NEXUS Program Manager
Bell

Thursday, 20 June 2019

223-FD-24 — **Reduced-Order and Data-Driven Modeling of Fluid Flows II** — **Manchester**

Chaired by: M. HEMATI, University of Minnesota

0930 hrs
AIAA-2019-3528
Output Error Estimation for Projection-Based Reduced Models
G. Collins, K. Fidkowski, C. Cesnik, University of Michigan, Ann Arbor, Ann Arbor, MI

1000 hrs
AIAA-2019-3529
An input-independent method for solving weakly nonlinear partial differential equations in the frequency domain: application to the Euler equations
D. Quero, German Aerospace Center (DLR), Göttingen, Germany

1030 hrs
AIAA-2019-3530
Near-Wall Modeling Using Coordinate Frame Invariant Representations and Neural Networks
N. Miller, M. Barone, W. Davis, J. Fike, Sandia National Laboratories, Albuquerque, NM

1100 hrs
AIAA-2019-3531
Closure of Reacting Flow Reduced-Order Models via the Adjoint Petrov-Galerkin Method
C. Wentland, C. Huang, K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI

Thursday, 20 June 2019						
224-FD-25	**Stability and Transition V: Roughness**					**Miro**
Chaired by: L. DUAN, Missouri University of Science and Technology and D. RIZZETTA, AFRL/RQVA						
0930 hrs AIAA-2019-3532 **Effects of Forward-Facing Step Shape on Stationary Crossflow Instability Growth and Breakdown** J. Eppink, NASA Langley Research Center, Hampton, VA; C. Casper, University of Wisconsin, Milwaukee, Milwaukee, WI	1000 hrs AIAA-2019-3533 **Destabilisation of Stationary and Travelling Crossflow Disturbances Due to Steps over a Swept Wing** E. Cooke, M. Mughal, S. Sherwin, Imperial College London, London, United Kingdom; R. Ashworth, S. Rolston, Airbus, Bristol, United Kingdom	1030 hrs AIAA-2019-3534 **Scale-resolving simulations of laminar-to-turbulent transition in swept-wing flow** M. Denison, NASA Ames Research Center, Moffett Field, CA; A. Garai, Science and Technology Corporation, Moffett Field, CA; S. Murman, NASA Ames Research Center, Moffett Field, CA	1100 hrs AIAA-2019-3535 **Global instability analysis of a boundary layer flow over a small cavity** M. Mathias, M. Medeiros, University of São Paulo, São Carlos, Brazil	1130 hrs AIAA-2019-3536 **Numerical Simulations of Asymptotic Theory for Distributed Roughness** M. McMillan, E. White, Texas A&M University, College Station, TX	1200 hrs AIAA-2019-3537 **Global Stability Analysis of a Boundary Layer with Surface Indentations** T. Appel, Airbus, Bristol, United Kingdom; M. Mughal, Imperial College London, London, United Kingdom; R. Ashworth, Airbus, Bristol, United Kingdom	

Thursday, 20 June 2019						
225-FD-26	**Unsteady Flows: Wakes**					**Madrid**
Chaired by: C. BARNES, AFRL/RQVA and J. SEIDEL, USAF Academy						
0930 hrs AIAA-2019-3538 **Further Investigation on the Effect of Sweep on Parallel Vortical-Gust/ Wing Interactions on a Finite Aspect-Ratio Wing** C. Barnes, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH	1000 hrs AIAA-2019-3539 **Wake Characteristics of a Circular Cylinder with a Short Flat Plate in One of the Separated Shear Layers** B. Bhasme, Sardar Patel College of Engineering, Mumbai, India	1030 hrs AIAA-2019-3540 **Flow Characteristics of a Wing in a Cylinder Wake** J. Lefebvre, A. Jones, University of Maryland, College Park, College Park, MD				

Thursday, 20 June 2019						
226-FD-27	**Multiphysics and Cross-Disciplinary Flows, Supersonic Applications**					**Fleur De Lis A**
Chaired by: F. HOLZÄPFEL, DLR e.V.						
0930 hrs AIAA-2019-3541 **Aerodynamic Response to a Compliant Panel in Mach 4 Flow** S. Peltier, B. Rice, J. Szmodis, D. Ogg, J. Hofferth, Air Force Research Laboratory, Arnold AFB, TN; M. Sellers, Quantitech, Arnold AFB, TN; et al.	1000 hrs AIAA-2019-3542 **Shock-induced Reestablishment of Rotating Detonation Waves** Y. Wang, Beijing University of Chemical Technology, Beijing, China; J. Le, China Aerodynamics Research and Development Center, Mianyang, China	1030 hrs AIAA-2019-3543 **Investigation of Shock Wave Oscillations over a Flexible Panel in Supersonic Flows** S. Varigonda, V. Narayanaswamy, North Carolina State University, Raleigh, NC	1100 hrs AIAA-2019-3544 **Hybrid RANS/LES and kHz-Rate PIV of a Reacting Cavity Flameholder at Mach 3** S. Peltier, Air Force Research Laboratory, Arnold AFB, TN; D. Peterson, E. Hassan, C. Carter, Air Force Research Laboratory, Wright-Patterson AFB, OH	1130 hrs AIAA-2019-3545 **Direct Simulation of Fluid-Structure Interaction in Compression Ramp with Embedded Compliant Panel** B. Sullivan, D. Bodony, University of Illinois, Urbana-Champaign, Urbana, IL		

Thursday, 20 June 2019						
227-FT-6	**Flight Testing in the Educational Environment I**					**Desoto A**
Chaired by: A. FREEBORN, USAF Test Pilot School and D. SPEAR						
0930 hrs AIAA-2019-3546 **Iterative Prototyping of Aircraft Tire Wear Measurement Using Laser Profilometer** M. Schuurman, R. Groves, Delft University of Technology, Delft, The Netherlands	1000 hrs AIAA-2019-3547 **Flight Testing at the Air Force Institute of Technology** D. Kunz, M. Reeder, R. Cobb, D. Crowe, Air Force Institute of Technology, Wright-Patterson AFB, OH	1030 hrs AIAA-2019-3548 **Evaluation of Unmanned Aircraft Flying Qualities Using a Stitched Learjet Model** P. Callaghan, D. Kunz, Air Force Institute of Technology, Wright-Patterson AFB, OH				

Thursday, 20 June 2019		
228-GT-10 **0930 - 1230 hrs**	**Special Session: Discussion of Wall Interference Correction Methods for Wind Tunnel Testing**	**Emerald**
The goal of this session is to engage individuals across the greater aerospace community who have interest in wind tunnel wall corrections and identify and prioritize topics and concepts of interest to be covered in a series of future special invited sessions and/or short courses.		

Thursday, 20 June 2019						
229-MDO-15	**Aircraft Design Optimization II**					**Milan**
Chaired by: V. BALABANOV, Boeing Commercial Airplanes and K. KNIGHT						
0930 hrs AIAA-2019-3549 **A Coupled Newton-Krylov Time Spectral Solver for Wing Flutter and LCO Prediction** S. He, E. Jonsson, C. Mader, J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI	1000 hrs AIAA-2019-3550 **Investigation of Controllability Gramian as Control Objective in MDAO Framework** R. Gupta, W. Zhao, R. Kapania, Virginia Polytechnic Institute and State University, Blacksburg, VA	1030 hrs AIAA-2019-3551 **Multidisciplinary Optimization of a Turboelectric Tiltwing Urban Air Mobility Aircraft** E. Hendricks, R. Falck, J. Gray, E. Aretskin-Hariton, D. Ingraham, J. Chapman, NASA Glenn Research Center, Cleveland, OH; et al.	1100 hrs AIAA-2019-3552 **Hydrofoil Conceptual Design and Optimization Framework for Amphibious Aircraft** A. Seth, R. Liem, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong			

Thursday, 20 June 2019						
230-MDO-16	**Non-Deterministic Design Methods and Applications**					**Ming**
Chaired by: S. CHOWDHURY, University at Buffalo and G. CATALDO, NASA Goddard Space Flight Center						
0930 hrs AIAA-2019-3553 **Stochastic Progressive Failure Analysis of Fiber-Reinforced Composite Laminate** M. Thapa, A. Paudel, S. Mulani, University of Alabama, Tuscaloosa, Tuscaloosa, AL; R. Walters, Virginia Polytechnic Institute and State University, Blacksburg, VA	1000 hrs AIAA-2019-3554 **Margin as Model: Some Answers to "How Many Tests Should I Perform?"** Z. del Rosario, Stanford University, Stanford, CA; R. Fenrich, Arevo, Milpitas, CA; G. Iaccarino, Stanford University, Stanford, CA	1030 hrs AIAA-2019-3555 **Benchmarking Uncertainty Quantification Methods Using the NACA 2412 Airfoil with Geometrical and Operational Uncertainties** D. Quagliarella, Italian Aerospace Research Center (CIRA), Capua, Italy; A. Serani, M. Diez, National Research Council (CNR), Rome, Italy; M. Pisaroni, P. Leyland, Swiss Federal Institute of Technology, Lausanne, Switzerland; L. Montagliani, Roma Tre University, Rome, Italy; et al.	1100 hrs AIAA-2019-3556 **Multifidelity Data Fusion via Bayesian Inference** A. Renganathan, K. Harada, D. Mavris, Georgia Institute of Technology, Atlanta, GA			

Thursday, 20 June 2019						
231-MDO-17	**Shape and Topology Optimization I**					**Peridot**
Chaired by: H. KIM, University of California, San Diego and J. DEATON, Adjoint Technologies						
0930 hrs AIAA-2019-3557 **Thermomechanical Design of Electric Vehicle Components with Mission Performance Requirements using Topology Optimization** M. Leader, T. Chin, G. Kennedy, Georgia Institute of Technology, Atlanta, GA	1000 hrs AIAA-2019-3558 **Level Set Topology Optimization of Load Carrying Heat Dissipation Devices** S. Kambampati, H. Kim, University of California, San Diego, San Diego, CA	1030 hrs AIAA-2019-3559 **Level Set Topology Optimization for Design Dependent Pressure Loads: A Comparison Between FEM and RKPM** A. Neofytou, R. Picelli, Cardiff University, Cardiff, United Kingdom; J. Chen, H. Kim, University of California, San Diego, San Diego, CA				

Thursday, 20 June 2019						
232-MVCE-4	**Geometry and Visualization**					**Wyeth**
Chaired by: N. TAYLOR, MBDA UK Limited and G. ARAYA, University of Puerto Rico Mayaguez						
0930 hrs AIAA-2019-3560 **AArDVARK: Aerospace Analysis and Design in Virtual and Augmented Reality toolKit** R. Durscher, A. Pankonien, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Bhagat, University of Dayton, Dayton, OH	1000 hrs AIAA-2019-3561 **Effects of Lossy Compression on the Analysis of Unsteady CFD Data** T. Leger, N. Bisek, Air Force Research Laboratory, Wright-Patterson AFB, OH	1030 hrs AIAA-2019-3562 **A Method for Topology Optimization for High Reynolds Number Flows** J. Rossetti, J. Dannenhoffer, M. Green, Syracuse University, Syracuse, NY	1100 hrs AIAA-2019-3563 **In-Situ Visualization of 10-Billion Cell Transient Data via Subzone Writing** S. Imlay, C. Mackey, D. Taflin, Tecplot, Inc., Bellevue, WA			

Thursday, 20 June 2019						
233-TF-8	**NASA Convergent Aeronautical Solutions Project**					**Lalique**
Chaired by: P. CORNELL, NASA Glenn Research Center and I. LOPEZ, NASA Glenn Research Center						
0930 hrs Oral Presentation **NASA Convergent Aeronautics Solutions (CAS) Overview** I. Lopez, NASA Glenn Research Center, Cleveland, OH	1000 hrs Oral Presentation **Quantum Technologies for UAS (QTech)** E. Rieffel, NASA Ames Research Center, Moffett Field, CA; A. Wroblewski, NASA Glenn Research Center, Cleveland, OH; S. Grabbe, NASA Ames Research Center, Moffett Field, CA	1030 hrs Oral Presentation **Fit2Fly – Addressing the Technical, Social, and Legal Barriers for Commercial UAS Fleets** G. Qualls, NASA Langley Research Center, Hampton, VA	1100 hrs Oral Presentation **Ownship Self-Assessment of Success for Autonomous Search and Rescue Operations** B. Allen, NASA Langley Research Center, Hampton, VA	1130 hrs Oral Presentation **ATTRACTOR: Building Trustworthiness and Trust in Autonomous Systems** N. Alexandrov, B. Allen, NASA Langley Research Center, Hampton, VA	1200 hrs AIAA-2019-3564 **A Study on the Use of Solid-Oxide Fuel Cells for Increased Power Generation on Small Aircraft** B. Litherland, N. Borer, S. Geuther, NASA Langley Research Center, Hampton, VA	

Thursday, 20 June 2019						
234-TP-10/PDL-7	**Ablation and Aerothermodynamics**					**Ruby**
Chaired by: M. WHITE, Air Force Research Laboratory and A. SHASHURIN, Purdue University- Sch of Aero and Astro						
0930 hrs AIAA-2019-3565 **Experimental Microsecond Laser Ablation Study on Simulated Aluminum Space Debris Targets** J. Sinko, C. Negen, St. Cloud State University, St. Cloud, MN	1000 hrs AIAA-2019-3566 **NonEquilibrium Processes in Plasma Torches of Inductively Coupled Plasma Facilities** S. Poovathingal, J. Kruszelnicki, I. Boyd, M. Kushner, University of Michigan, Ann Arbor, Ann Arbor, MI	1030 hrs AIAA-2019-3567 **Modeling of Electronically Excited Oxygen in O_2-Ar Shock Tube Studies** K. Hanquist, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI	1100 hrs AIAA-2019-3568 **Extension of non-equilibrium modeling of metal ablation to the thermal effect inside the target material using a two temperature model** A. Ait Oumeziane, Aix-Marseille University, Marseille, France; J. Parisse, French Air Force Academy, Salon de Provence, France			

Thursday, 20 June 2019		
235-HUB-12 **1000 - 1030 hrs**	**Career Tips**	**the HUB**

Thursday, 20 June 2019		
236-HUB-13 **1100 - 1130 hrs**	**GoFly**	**the HUB**
GoFly is a $2,000,000 competition to create personal flyers. GoFly's CEO Gwen Lighter will provide new details on joining GoFly as a new Team, new Sponsor, and attending the grand Final Fly Off event.		

Thursday, 20 June 2019		
237-HUB-14 **1230 - 1300 hrs**	**F-35 Lightning II Discussion**	**the HUB**
An integrated story of the technical development of the F-35 Lightning II has heretofore never been presented in a single work. Visit the HUB as Lockheed Martin representatives debut The F-35 Lightning II: From Concept to Cockpit, the newly released book that chronicles a full-spectrum history of the design, development, and verification of the F-35 Lightning II as described by the engineers, scientists and managers intimately involved throughout the development program. Come listen as one of the book's authors discusses the history and recent developments on the F-35 program.		

Thursday, 20 June 2019		
238-LUNCH-1 **1230 - 1400 hrs**	**Networking Boxed Luncheon (Proof of Purchase Required)**	**Exposition Hall**

Thursday, 20 June 2019		
239-HUB-15 **1300 - 1330 hrs**	**Frontiers of Flight**	**the HUB**
Future 7 - 10th grade aerospace engineers have been working hard doing 3D modeling and experimentation this summer! Students from the Frontiers of Flight Museum Aero Lab camp will showcase their custom rubber-band powered balsas plane that they have designed using computer-aided drafting software and a 3D printer. This is a hands-on demonstration and they're looking to you, AVIATION attendees, to provide best practices, feedback and tips! This is your chance to help future aerospace engineers!		

Thursday, 20 June 2019		
240-HUB-16 **1330 - 1400 hrs**	**First Man Screening Party and Book Signing with James Hansen**	**the HUB**
Come meet the author of First Man: The Life of Neil A. Armstrong! James Hansen will be hosting a Q&A with the audience prior to introducing the movie.		

Thursday, 20 June 2019						
241-ACD-10	**High Speed Aircraft Design**					**Inverness**
Chaired by: D. LEVY, Sierra Nevada Corporation and W. CRISLER, Embry-Riddle Aeronautical University						
1400 hrs AIAA-2019-3569 **Comparison of Methods to Predict Aerodynamic Center Shift due to Bodies** D. van Dommelen, A. D'Silva, W. Anemaat, DARcorporation, Lawrence, KS	1430 hrs AIAA-2019-3570 **Nozzle Jet Effects for a Generic Fighter Conceptual Design Tool** V. Guevara, M. Moening, B. Smith, D. Finley, P. Yagle, Lockheed Martin Corporation, Fort Worth, TX	1500 hrs AIAA-2019-3571 **Development of Sonic Boom Prediction Code for Supersonic Transports Based on Augmented Burgers Equation** J. Qiao, Z. Han, W. Song, B. Song, Northwestern Polytechnical University, Xi'an, China; G. Zha, University of Miami, Miami, FL				

Thursday, 20 June 2019						
242-ACD-11	**Aircraft Requirements Studies II**					**Fleur De Lis B**
Chaired by: C. BIL, RMIT University and S. SWAINE, Gulfstream Aerospace Corporation						
1400 hrs AIAA-2019-3572 **Urban Air Transportation for Melbourne Metropolitan Area** L. Swadesir, C. Bil, RMIT University, Bundoora, Australia	1430 hrs AIAA-2019-3573 **Statistical Usage of BAe-146 and RJ-85 Airtankers in Forest Service Operation** L. Kliment, K. Rokhsaz, Wichita State University, Wichita, KS; J. Nelson, B. Terning, Forest Service, Boise, ID	1500 hrs AIAA-2019-3574 **An Optimization Tool for Preliminary Concept Design of Guided Air to Ground Munitions** D. Varol, M. Akgul, G. Aydin, ROKETSAN Missile Industries, Inc., Ankara, Turkey	1530 hrs AIAA-2019-3575 **System of Systems Model Building and Acausal Simulation Environment** P. Menegay, C. Doepp, J. Salyers, D. Notestein, SynaptiCAD, Blacksburg, VA; D. Burnham, J. Luu, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2019-3576 **Development of Certification Module for Aircraft Early Design** J. Xie, Georgia Institute of Technology, Atlanta, GA; I. Chakraborty, Auburn University, Auburn, AL; S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1630 hrs AIAA-2019-3577 **Multi-mission Multi-objective Optimization in Commercial Aircraft Conceptual Design** Y. Cai, D. Rajaram, D. Mavris, Georgia Institute of Technology, Atlanta, GA	

Thursday, 20 June 2019		
243-ADS-14/APA-30/FD-28 **1400 - 1730 hrs**	**Open Forum on Fluid Membrane Interactions**	**Plum Blossom A**

Thursday, 20 June 2019						
244-APA-31	**Bio-Inspired Flows**					**Cortez C**
Chaired by: H. HOEIJMAKERS, University of Twente and C. PASILIAO, AFRL/RWPI						
1400 hrs AIAA-2019-3578 **Interferences in the Wind Velocities Measurements in the Mars 2020 Rover at High Reynolds number** A. Garcia-Magariño, S. Sor, R. Bardera-Mora, J. Muñoz, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain	1430 hrs AIAA-2019-3579 **Effect of wing deformation by camber angle on aerodynamic performance of flapping micro air vehicles** S. Yoon, H. Cho, J. Lee, C. Kim, S. Shin, Seoul National University, Seoul, South Korea	1500 hrs AIAA-2019-3580 **Experimental Determination of Profile and Induced Drag Components in a Biomimetic Design MAV with Grids** R. Bardera-Mora, A. Garcia-Magariño, E. Barroso, National Institute of Aerospace Technology (INTA), Madrid, Spain; A. Rodriguez-Sevillano, Technical University of Madrid, Madrid, Spain	1530 hrs AIAA-2019-3581 **Study of Aerodynamic Performances of a Biologically Inspired Micro-UAV by Wind Tunnel Testing** R. Bardera-Mora, A. Garcia-Magariño, E. Barroso, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain; A. Rodriguez-Sevillano, Technical University of Madrid, Madrid, Spain	1600 hrs AIAA-2019-3582 **Investigation into Wake of Flapping Wing of Robotic Bird** L. Groot Koerkamp, L. de Santana, H. Hoeijmakers, K. Venner, University of Twente, Enschede, The Netherlands	1630 hrs AIAA-2019-3583 **A CFD-Based Assessment of Undulating Propulsion** G. Loubimov, M. Kinzel, University of Central Florida, Orlando, FL	1700 hrs AIAA-2019-3584 **Aerodynamic Performance Improvements Due to Porosity in Wings at Moderate Re** Y. Hanna, G. Spedding, University of Southern California, Los Angeles, CA

Thursday, 20 June 2019						
245-APA-32	**Unsteady Flow Separation and Dynamic Stall**					**Cortez D**
Chaired by: A. GOPALARATHNAM, North Carolina State University and C. TILMANN, AFRL/RQV						
1400 hrs AIAA-2019-3585 **Low-order modeling of dynamic stall in vertical-axis wind turbines** A. Suresh Babu, A. Gopalarathnam, North Carolina State University, Raleigh, NC	1430 hrs AIAA-2019-3586 **Numerical investigation of dynamic stall suppression with steady-blowing jet** J. Kim, T. Kim, J. Lee, S. Jee, Gwangju Institute of Science and Technology, Gwangju, South Korea	1500 hrs AIAA-2019-3587 **Dynamic Stall Control with Impulsive Jet** T. Kim, J. Kim, M. Kim, J. Lee, S. Jee, Gwangju Institute of Science and Technology, Gwangju, South Korea	1530 hrs AIAA-2019-3588 **Dynamics of a Separation Bubble Subject to Compliant Surface Motion** R. Richardson, T. Wang, L. Cattafesta, K. Shoele, Florida State University, Tallahassee, FL	1600 hrs AIAA-2019-3589 **A numerical study on controlling flow separation via surface morphing in the form of backward traveling waves** A. Akbarzadeh, I. Borazjani, Texas A&M University, College Station, TX	1630 hrs AIAA-2019-3590 **Boundary-Layer Characteristics at the Onset of Leading-Edge Vortex Formation on Unsteady Airfoils** H. Ramanathan, S. Narsipur, A. Gopalarathnam, North Carolina State University, Raleigh, NC	1700 hrs AIAA-2019-3591 **Study on Wing Rock Phenomenon of a Fighter Aircraft Using Free-To-Roll Wind Tunnel Test and Dynamic CFD Method** H. Chung, D. Cho, J. Kim, Y. Jang, Korea Air Force Academy, Cheongju, South Korea

Thursday, 20 June 2019						
246-APA-33	**High-Speed Aerodynamics**					**Cortez A**
Chaired by: J. MAXWELL, Naval Research Laboratory and N. HALL, Lockheed Martin Corporation						
1400 hrs AIAA-2019-3592 **Limitations of Two-Shock Mixed Compression Intakes at Hypersonic Mach Numbers** A. Vedam, Embry-Riddle Aeronautical University, Daytona Beach, FL; M. Devaraj, G. Jagadeesh, Indian Institute of Science, Bengaluru, India	1430 hrs AIAA-2019-3593 **Experimental and Computational Results of a Cone-Slice-Ramp Geometry at Mach 6** E. Vogel, University of Tennessee, Knoxville, Knoxville, TN; B. Chynoweth, Purdue University, West Lafayette, IN; J. Coder, University of Tennessee, Knoxville, Knoxville, TN; S. Schneider, Purdue University, West Lafayette, IN	1500 hrs AIAA-2019-3594 **Viscous Corrections for Hypersonic Air Intake Using CFD Simulations** N. Sinha, R. G, B. Modi, Indian Institute of Technology Madras, Chennai, India	1530 hrs AIAA-2019-3595 **Passive Flow Control on Crossing Shock-Wave/Boundary-Layer Interactions** M. Schwartz, K. Stamper, R. Bond, J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN	1600 hrs AIAA-2019-3596 **Scaling of Distortion Caused by Crossing Shock-Wave/Boundary-Layer Interactions** M. Schwartz, R. Bond, J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN	1630 hrs AIAA-2019-3597 **Transient Matching of Conditions in a Blow-Down Hypersonic Wind Tunnel** J. Maxwell, Naval Research Laboratory, Washington, D.C.	

Thursday, 20 June 2019						
247-APA-34	**Active Flow Control III**					**Cortez B**
Chaired by: A. CIARELLA, Aircraft Research Association and M. DESALVO						
1400 hrs AIAA-2019-3598 **Aerodynamic and Transition Analysis of the Hybrid Laminar Flow ControlWing at ARA Wind Tunnel** A. Ciarella, S. Lawson, P. Wong, Aircraft Research Association, Ltd., Bedford, United Kingdom; M. Mughal, Imperial College London, London, United Kingdom	1430 hrs AIAA-2019-3599 **Lift-to-Drag Ratio Enhancement for a Wing Using Thermal Forcing** M. Varshney, A. Varshney, M. Baig, Aligarh Muslim University, Aligarh, India	1500 hrs AIAA-2019-3600 **Turbulent Drag Reduction on an Aircraft Wing Using Wall Jets** M. Varshney, M. Baig, N. Hasan, Aligarh Muslim University, Aligarh, India	1530 hrs AIAA-2019-3601 **Open- and closed loop control on a D-shaped bluff body equipped with Coanda actuation** P. Oswald, R. Semaan, Technical University of Braunschweig, Braunschweig, Germany; B. Noack, National Center for Scientific Research (CNRS), Orsay, France			

Thursday, 20 June 2019						
248-APA-35	**Experimental Design and Measurement Techniques**					**Plum Blossom B**
Chaired by: R. SPETH, Air Force Research Laboratory and C. BRITCHER, Old Dominon University						
1400 hrs AIAA-2019-3602 **Design of a Modular Boundary Layer Bleed System for a Supersonic Wind Tunnel** C. Thomas, North Carolina State University, Raleigh, NC; A. Carney, Case Western Reserve University, Cleveland, OH; J. Tam, Air Force Research Laboratory, Kirtland AFB, NM	1430 hrs AIAA-2019-3603 **Support Interference on the Subsonic Aerodynamics of a Planetary Entry Capsule** C. Neill, C. Britcher, Old Dominion University, Norfolk, VA; M. Schoenenberger, D. Cox, NASA Langley Research Center, Hampton, VA	1500 hrs AIAA-2019-3604 **Multi-rotor wake propagation investigation for atmospheric sampling** G. Throneberry, New Mexico State University, Las Cruces, NM; C. Hocut, Army Research Laboratory, White Sands Missile Range, NM; F. Shu, A. Abdelkefi, New Mexico State University, Las Cruces, NM	1530 hrs AIAA-2019-3605 **Forced Oscillation WindTunnel Tests for Dynamic Characteristic of Aircraft** S. Lee, Y. Choi, H. Chung, Republic of Korea Air Force Academy, Cheongju, South Korea			

Thursday, 20 June 2019						
249-APA-36	**System Characterization Using Applied CFD**					**Morocco**
Chaired by: P. SUNDARAM and S. PENG, FOI - Swedish Defence Research Agency						
1400 hrs AIAA-2019-3606 **Coupled Flight Mechanics based on Reduced Order Models for use in Tiltrotor Stability Analysis** J. Wakefield, D. Jones, A. Gaitonde, S. Medina, University of Bristol, Bristol, United Kingdom	1430 hrs AIAA-2019-3607 **Implementation and Verification of Computational Aerodynamics for Manoeuvring Air Vehicles** S. Peng, O. Grundestam, L. Tysell, Swedish Defense Research Agency (FOI), Stockholm, Sweden	1500 hrs AIAA-2019-3608 **CFD Assisted QLPV Representation of a 2-DOF Flat Plate** W. Farrell, M. Kinzel, University of Central Florida, Orlando, FL	1530 hrs AIAA-2019-3609 **Fast and Accurate Aerodynamic Predictions Using Unsteady CFD** P. Sundaram, S. Agrawal, Northrop Grumman Corporation, Redondo Beach, CA			

Thursday, 20 June 2019						
250-ATOMS-17	**Pilot Ops and Decision Support**					**Steuben**
Chaired by: D. WING, NASA Langley Research Center and A. CAMPBELL						
1400 hrs AIAA-2019-3610 **Pilot Evaluation of Proposed Go-Around Criteria for Transport Aircraft** A. Campbell, Federal Aviation Administration, Atlantic City, NJ; P. Zaal, San Jose State University, Moffett Field, CA; S. Shah, Federal Aviation Administration, Atlantic City, NJ; J. Schroeder, Federal Aviation Administration, Moffett Field, CA	1430 hrs AIAA-2019-3611 **Passive Sidesticks and Hard Landings - Is there a Link?** F. Wolfert, M. Bromfield, S. Scott, A. Stedmon, Coventry University, Coventry, United Kingdom	1500 hrs AIAA-2019-3612 **Loss of Control In Flight – time to re-define?** M. Bromfield, Coventry University, Coventry, United Kingdom; S. Landry, Purdue University, West Lafayette, IN	1530 hrs AIAA-2019-3613 **Initial TASAR Operations Onboard Alaska Airlines** D. Wing, K. Burke, K. Ballard, NASA Langley Research Center, Hampton, VA; J. Henderson, Engility Corporation, Andover, MA; J. Woodward, Alaska Airlines, Seattle, WA	1600 hrs AIAA-2019-3614 **Simulation and Flight Test Environments for the TASAR Traffic Aware Planner** T. Barney, M. Underwood, B. Buck, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2019-3615 **In-Flight Evaluation of the Traffic Aware Planner on the NASA HU-25A Guardian Aircraft** M. Underwood, T. Lewis, T. Barney, NASA Langley Research Center, Hampton, VA	1700 hrs AIAA-2019-3616 **Weather Design Considerations for the TASAR Traffic Aware Planner** T. Lewis, K. Burke, M. Underwood, D. Wing, NASA Langley Research Center, Hampton, VA

Thursday, 20 June 2019						
251-ATOMS-18	**Trajectory and Profile Optimization**					**Travertine**
Chaired by: D. LAX, GE Aviation and R. ANDREU ALTAVA, Airbus Operations SAS - Jets						
1400 hrs AIAA-2019-3617 **Optimal Variable-Speed Climb for a Fixed-Wing Aircraft** R. Ghaemi, General Electric Company, Niskayuna, NY; D. Lax, General Electric Company, Grand Rapids, MI; E. Westervelt, General Electric Company, Niskayuna, NY; M. Darnell, N. Visser, General Electric Company, Grand Rapids, MI	1430 hrs AIAA-2019-3618 **Graph-Search Descent and Approach Trajectory Optimization Based on Enhanced Aircraft Energy Management** R. Andreu Altava, J. Mere, Airbus, Toulouse, France; D. Delahaye, T. Miquel, French Civil Aviation University, Toulouse, France	1500 hrs AIAA-2019-3619 **Optimal Rendezvous of Unmanned Aerial and Ground Vehicles via Sequential Convex Programming** Z. Wang, S. McDonald, University of Tennessee, Knoxville, Knoxville, TN	1530 hrs AIAA-2019-3620 **Real-Time Optimal Trajectory Generation for UAV to Rendezvous with an Aerial Orbit** S. McDonald, Z. Wang, University of Tennessee, Knoxville, Knoxville, TN	1600 hrs AIAA-2019-3621 **A Study on a Flexible Track System based on Long-term Weather Data** Y. Nakamura, K. Kageyama, Electronic Navigation Research Institute, Tokyo, Japan	1630 hrs AIAA-2019-3622 **Two Dimensional Mission Profile Optimization Algorithm for Noise Abatement and Fuel Efficiency during Departure and Arrival** D. Kim, Y. Lyu, R. Liem, Hong Kong University of Science and Technology, New Territories, Hong Kong	1700 hrs AIAA-2019-3623 **Adherence to best descent profiles - An analysis of the relative vertical (in)efficiency at four major European airports** P. Pasutto, E. Hoffman, K. Zeghal, EUROCONTROL, Brétigny, France

Thursday, 20 June 2019						
252-ATOMS-19	**Urban Air Mobility II**					**Topaz**
Chaired by: S. VERMA, NASA-Ames and J. BERTRAM, Rockwell Collins						
1400 hrs AIAA-2019-3624 **Exploration of Near term Potential Routes and Procedures for Urban Air Mobility** S. Verma, J. Keeler, T. Edwards, V. Dulchinos, NASA Ames Research Center, Moffett Field, CA	1430 hrs AIAA-2019-3625 **Online Flight Planner with Dynamic Obstacles for Urban Air Mobility** J. Bertram, X. Yang, M. Brittain, P. Wei, Iowa State University, Ames, IA	1500 hrs AIAA-2019-3626 **Mission Planner Algorithm for Urban Air Mobility – Initial Performance Characterization** N. Guerreiro, R. Butler, J. Maddalon, G. Hagen, NASA Langley Research Center, Hampton, VA	1530 hrs AIAA-2019-3627 **Investigation of Traffic Flow for ODM Vehicles in Dynamic ICAO Addressing Process** S. Ghayouraneh, S. El-Ghazaly, University of Arkansas, Fayetteville, AR; J. Rankin, South Dakota School of Mines and Technology, Rapid City, SD	1600 hrs AIAA-2019-3628 **Urban air mobility (UAM) vehicle design considerations to facilitate future accident investigation** M. Schuurman, B. Rattanagraikanakorn, C. Kassapoglou, R. De Breuker, Delft University of Technology, Delft, The Netherlands	1630 hrs AIAA-2019-3629 **Exploring human factors issues for urban air mobility operations** T. Edwards, San Jose State University, Moffett Field, CA; S. Verma, J. Keeler, NASA Ames Research Center, Moffett Field, CA	

Thursday, 20 June 2019		
253-ATOMS-20 **1400 - 1700 hrs**	**Realizing Large-Scale UAS operations in High-Density Urban Airspace**	**Edelweiss**

Rapid growth in UAS development is opening the door for various commercial applications in urban areas. Panelists will discuss the challenges (and potential solutions) to realizing secure and safe high-density commercial operations of UAS in urban airspace. Some of these challenges include, but are not limited to, the ability to safely manage large collections of UAVs operated by different operators while ensuring secure communication channels. The aim of this session is to provide a common platform for industry, rule-making bodies, and academia to further explore these issues.

Panelists:

Apoorv Maheshwari
Purdue University

Dennis Shomko
DronSystems Limited

Tracy Lamb
AUVSI

Thursday, 20 June 2019

254-CFD-18 — **LES Applications to Complex Flows** — **Obelisk A**

Chaired by: J. KOMIVES, Air Force Institute of Technology and P. SUBBAREDDY

1400 hrs
AIAA-2019-3630
Comparison of Computational and Experimental Results in the Wake Region Behind a Wall-Mounted Hemisphere in Supersonic Flow
D. Weston, Ohio Aerospace Institute, Dayton, OH; S. Sherer, Air Force Research Laboratory, Wright-Patterson AFB, OH

1430 hrs
AIAA-2019-3631
Computational Study of Wing Tip Effect for the Flow Control Authority of DBD Plasma Actuator
T. Abe, K. Asada, S. Sekimoto, K. Fukudome, Tokyo University of Science, Katsushika, Japan; H. Mamori, University of Electro-Communications, Chofu, Japan; T. Tatsukawa, Tokyo University of Science, Katsushika, Japan; et al.

1500 hrs
AIAA-2019-3632
Reacting Dynamic Hybrid Reynolds-Averaged Navier-Stokes/Large-Eddy-Simulation of a Round Dual Mode Scramjet Combustor
B. Bornhoft, E. Hassan, D. Peterson, Air Force Research Laboratory, Wright-Patterson AFB, OH; E. Luke, Mississippi State University, Mississippi State, MS

1530 hrs
AIAA-2019-3633
Understanding the dependence of turbulent flow modulation on the spacing between adjacent cubes on a backward-facing ramp
S. Tandon, K. Maki, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI

Thursday, 20 June 2019

255-CFD-19 — **Advances in Finite-Volume Methods** — **Obelisk B**

Chaired by: H. NISHIKAWA, National Institute of Aerospace

1400 hrs
AIAA-2019-3634
A Framework for Analyzing the Temporal Accuracy of Pressure Projection Methods
M. Karam, J. Sutherland, University of Utah, Salt Lake City, Salt Lake City, UT; M. Hansen, Sandia National Laboratories, Albuquerque, NM; T. Saad, University of Utah, Salt Lake City, Salt Lake City, UT

1430 hrs
AIAA-2019-3635
A Comparative Study of Two Finite Volume Algorithms for Incompressible Flows on Unstructured Grids
J. Yin, Iowa State University, Ames, IA; M. Fischels, Jacobs ESSCA Group, Huntsville, AL; R. Rajagopalan, Iowa State University, Ames, IA

1500 hrs
AIAA-2019-3636
Face-Averaged Nodal-Gradient Approach to Cell-Centered Finite-Volume Method on Triangular Grids
H. Nishikawa, National Institute of Aerospace, Hampton, VA; J. White, NASA Langley Research Center, Hampton, VA

1530 hrs
AIAA-2019-3637
Development of Low Diffusive MLP Limiter for Meshless Method
J. Huh, K. Kim, Seoul National University, Seoul, South Korea

1600 hrs
AIAA-2019-3638
A novel numerical scheme based on Active flux method for Hyperbolic heat equations in multidimensional space
F. He, P. Roe, University of Michigan, Ann Arbor, Ann Arbor, MI

Thursday, 20 June 2019

256-F360-8
1400 - 1600 hrs
Thursday Afternoon Forum 360: Building on Today's Safety Foundation for Tomorrow's Mobility
Coronado Ballroom

Moderator: Brian Yutko, Senior Vice President, Programs, Aurora Flight Sciences

Thursday, 20 June 2019

257-FD-29 — **Fundamental Fluid Flows III: General** — **Madrid**

Chaired by: A. AHMED, Auburn University and K. KANISTRAS, University of Alabama in Huntsville

1400 hrs
AIAA-2019-3639
A DNS Study to Investigate Turbulence Suppression in Rotating Pipe Flows
J. Davis, S. Ganju, S. Bailey, C. Brehm, University of Kentucky, Lexington, Lexington, KY

1430 hrs
AIAA-2019-3640
Large Eddy Simulation of a Turbulent Wake behind a Body of Revolution at ReD = 5000
F. Zhang, Y. Peet, Arizona State University, Tempe, AZ

1500 hrs
AIAA-2019-3641
Direct Numerical Simulations of Turbulent Channel Flows with Two- and Three-Dimensional Superimposed Sinusoidal Roughness
S. Ganju, J. Davis, S. Bailey, C. Brehm, University of Kentucky, Lexington, Lexington, KY

1530 hrs
AIAA-2019-3642
Numerical Simulation of Three Dimensional Tank Impacting on Wavy Water
Y. Jin, T. Xiao, Nanjing University of Aeronautics and Astronautics, Nanjing, China; B. Wu, Aviation Industry Corporation of China (AVIC), Jingmen, China; H. Zhi, Y. Lu, M. Tong, Nanjing University of Aeronautics and Astronautics, Nanjing, China

1600 hrs
AIAA-2019-3643
Numerical Simulation of Fountain formation due to Twin-Jet impingement on Ground
X. Zhang, R. Agarwal, L. Zhou, Washington University in St. Louis, St. Louis, MO

1630 hrs
AIAA-2019-3644
PIV Measurement of Separation Bubble on an Airfoil at Low Reynolds Numbers
D. Park, Pusan National University, Busan, South Korea; H. Shim, Kyungwoon University, Gumi, South Korea; Y. Lee, Korea Aerospace Research Institute, Daejeon, South Korea

1700 hrs
AIAA-2019-3645
Electrowetting-on-Dielectric Induced Bubble Dynamics and Surface Waves
R. Yan, C. Chen, University of Missouri, Columbia, Columbia, MO

Thursday, 20 June 2019						
258-FD-31	**High-Speed Boundary-Layer Separation and Wakes**					**Manchester**
Chaired by: M. VYAS, NASA Glenn Research Center and S. LAURENCE, University of Maryland, College Park						
1400 hrs AIAA-2019-3646 **Separation dynamics of a spherical particle detaching from a two-dimensional ramp in hypersonic flow** S. Laurence, C. Sousa, C. Butler, University of Maryland, College Park, College Park, MD; R. Deiterding, University of Southampton, Highfield, United Kingdom	1430 hrs AIAA-2019-3647 **Separated Flow Unsteadiness in a Mach 2 Swept Compression-Ramp Interaction Using High-Speed PSP** L. Vanstone, T. Goller, University of Texas, Austin, Austin, TX; L. Mears, Florida State University, Tallahassee, FL; N. Clemens, University of Texas, Austin, Austin, TX	1500 hrs AIAA-2019-3648 **On the Three-Dimensional Separation in Shock/Boundary-Layer Interactions at Swept Corners** R. Pulimidi, F. Lu, University of Texas, Arlington, Arlington, TX	1530 hrs AIAA-2019-3649 **Planar and Volumetric Turbulent Mode Dynamics of a Supersonic Separated/Reattaching Flow** B. Kirchner, G. Elliott, J. Dutton, University of Illinois, Urbana-Champaign, Urbana, IL	1600 hrs AIAA-2019-3650 **Investigation of Wall-Pressure Fluctuations in Three Pressure-Induced Turbulent Separation Bubbles** A. Le Floc'h, A. Mohammed-Taifour, L. Dufresne, J. Weiss, University of Québec, Montréal, Canada		

Thursday, 20 June 2019						
259-FD-32	**Multiphysics and Cross-Disciplinary Flows, Applied Aerodynamics**					**Fleur De Lis A**
Chaired by: S. DUNN, Jacobs and F. HOLZÄPFEL, DLR e.V.						
1400 hrs AIAA-2019-3651 **Compressibility Effects on the Discharge Coefficient of Small Diameter Ratio Sharp-Edged Orifices With and Without Downstream Chamfer** G. Webster, NASA Goddard Space Flight Center, Greenbelt, MD; G. Coll, SAIC, Greenbelt, MD; M. Kandula, Stinger Ghaffarian Technologies, Inc., Cape Canaveral, FL; B. Nufer, T. Aranyos, NASA Kennedy Space Center, Cape Canaveral, FL	1430 hrs AIAA-2019-3652 **Study of Super-Lift Coefficient of Co-Flow Jet Airfoil and Its Power Consumption** Y. Wang, G. Zha, University of Miami, Coral Gables, FL	1500 hrs AIAA-2019-3653 **Numerical Simulation of Helicopter Ditching on Wavy Water** Y. Lu, T. Xiao, J. Chen, M. Tong, F. Liu, Z. Zhu, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1530 hrs AIAA-2019-3654 **Response of Jointed-Structures in a Shock Tube: Simultaneous PSP and DIC with Comparison to Modeling** K. Lynch, E. Jones, A. Brink, D. Roettgen, R. Kuether, J. Wagner, Sandia National Laboratories, Albuquerque, NM; et al.	1600 hrs AIAA-2019-3655 **Flow cavitation in a centrifugal pump; numerical studies using LES** M. Ilie, G. Sullivan, Georgia Southern University, Statesboro, GA		

Thursday, 20 June 2019						
260-FT-7	**Flight Testing in the Educational Environment II**					**Desoto A**
Chaired by: A. FREEBORN, USAF Test Pilot School and D. SPEAR						
1400 hrs AIAA-2019-3656 **A Statistical Approach to Modeling Cavity Acoustics Using Natural Variation of Flight Test** T. Soileau, C. Schubert-Kabban, D. Crowe, Air Force Institute of Technology, Wright-Patterson AFB, OH	1430 hrs AIAA-2019-3657 **Automatic-Ground Collision Avoidance System (Auto-GCAS) for Performance Limited Aircraft** J. Carpenter, K. Gahan, R. Cobb, Air Force Institute of Technology, Wright-Patterson AFB, OH	1500 hrs AIAA-2019-3658 **Design of a Low-Cost RPAS Data Acquisition System for Education** S. Koeberle, M. Rumpf, B. Scheufele, M. Hornung, Technical University of Munich, Munich, Germany	1530 hrs AIAA-2019-3659 **Flight Tests of Cavity-Store Interaction, Including Supersonic Conditions** D. Prudhomme, M. Reeder, Air Force Institute of Technology, Wright-Patterson AFB, OH; R. Schmit, I. Maatz, R. Johnson, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2019-3660 **Cavity Flow Control in a Low-Speed Tunnel in Preparation for Flight Test** M. Wood, U.S. Naval Academy, Annapolis, MD; M. Reeder, Air Force Institute of Technology, Wright-Patterson AFB, OH; K. Granlund, North Carolina State University, Raleigh, NC		

Thursday, 20 June 2019						
261-GT-11	**Special Session: Recent Advancements in Wind Tunnel Force and Angle Measurement Technology**					**Emerald**
Chaired by: R. RHEW, NASA Langley Research Center and D. BURNS						
1400 hrs Oral Presentation **Design and Development of Additively Manufactured Force Balances** P. Parker, D. Burns, NASA Langley Research Center, Hampton, VA	1430 hrs Oral Presentation **Advancements in Rotating Balance Technology Design and Data Acquisition** M. Woike, J. Ponder, NASA Glenn Research Center, Cleveland, OH; P. Parker, S. Commo, NASA Langley Research Center, Hampton, VA	1500 hrs Oral Presentation **Technology Review and Road-Mapping of Wind Tunnel Angle Measurement** K. Toro, NASA Langley Research Center, Hampton, VA	1530 hrs Oral Presentation **Experimental Design of a Unique Force Measurement System Calibration for Booster Loads** K. Toro, NASA Langley Research Center, Hampton, VA	1600 hrs AIAA-2019-3661 **Balance Calibration and Use in the Era of Stress-Based Loads Monitoring** M. Kammeyer, The Boeing Company, St. Louis, MO	1630 hrs **Panel - Future Force and Angle Measurement Needs/AIAA Working Group Topics** Moderators: Ray Rhew, NASA, and Devin Burns, NASA	

Thursday, 20 June 2019		
262-HUB-17 **1400 - 1630 hrs**	**First Man Screening**	**the HUB**
To help celebrate the momentous 50th anniversary of the Apollo, we will be playing, First Man, the riveting story of NASA's mission to land a man on the moon, focusing on Neil Armstrong and the years 1961-1969. Popcorn will be provided!		

Thursday, 20 June 2019						
263-MDO-19	**Emerging Methods, Algorithms, and Software Development**					**Ming**
Chaired by: L. LEIFSSON, Iowa State University and M. HENSON, Lockheed Martin Aeronautics						
1400 hrs AIAA-2019-3662 **A CAD-interoperable geometry parameterization for large-scale design optimization** T. Nascenzi, T. Ha, J. Hwang, University of California, San Diego, La Jolla, CA	1430 hrs AIAA-2019-3663 **Analysis of Uncertainty Quantification Techniques for Vehicle Capability in Damaged Composite Aircraft** B. Burrows, D. Allaire, Texas A&M University, College Station, TX	1500 hrs AIAA-2019-3664 **Low-thrust Trajectory Optimization Using a Large-Scale MDO Framework** V. Gandarillas, J. Hwang, University of California, San Diego, La Jolla, CA	1530 hrs AIAA-2019-3665 **Visualizing Engineering Design Data Using a Modified Two- Level Self-Organizing Map Clustering Approach** A. Kohl, E. Winer, Iowa State University, Ames, IA	1600 hrs AIAA-2019-3666 **Numerical Algorithms for Solving Boundary-Value Problems on Reduced Dimensional Manifolds** M. Sparapany, M. Grant, Purdue University, West Lafayette, IN	1630 hrs AIAA-2019-3667 **Mode Pursuing Sampling Method Using Coordinate Perturbation for High-dimensional Expensive Black-box Optimization** Y. Wu, T. Long, Beijing Institute of Technology, Beijing, China; R. Shi, Tsinghua University, Beijing, China; G. Wang, Simon Fraser University, Surrey, Canada	

Thursday, 20 June 2019						
264-MDO-20	**Shape and Topology Optimization II**					**Peridot**
Chaired by: K. JAMES, University of Illinois at Urbana-Champaign						
1400 hrs AIAA-2019-3668 **Coupled Adjoints for Conjugate Heat Transfer in Variable Density Incompressible Flows** O. Burghardt, N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany; T. Economon, Bosch, Sunnyvale, CA	1430 hrs AIAA-2019-3669 **Discrete Adjoint for Unsteady Incompressible Flows Using a Density-based Formulation** C. Venkatesan-Crome, R. Palacios, Imperial College London, London, United Kingdom; T. Kattmann, Bosch, Renningen, Germany; R. Sanchez, N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany; T. Economon, Bosch, Sunnyvale, CA	1500 hrs AIAA-2019-3670 **Flutter Control Using Shape and Topology Optimization** P. Ranjan, K. James, University of Illinois, Urbana-Champaign, Urbana, IL	1530 hrs Oral Presentation **Effects of Atmospheric Variation on In-Flight Sonic Boom Prediction with LIDAR** C. Limbach, Texas A&M University, College Station, TX	1600 hrs Oral Presentation **Structural analysis of reconfiguration methods to mitigate weather-related sonic boom perturbations** P. Leal, D. Hartl, Texas A&M University, College Station, TX		

Thursday, 20 June 2019						
265-MVCE-5/CFD-20	**Structured and Hybrid Meshing**					**Wyeth**
Chaired by: S. KARMAN, Pointwise, Inc. and J. DANNENHOFFER, Syracuse University						
1400 hrs AIAA-2019-3671 **Automation of Overset Structured Surface Mesh Generation on Complex Geometries** W. Chan, S. Pandya, NASA Ames Research Center, Moffett Field, CA; R. Haimes, Massachusetts Institute of Technology, Cambridge, MA	1430 hrs AIAA-2019-3672 **Automatic Generation of Near-Body Structured Grids** J. Dannenhoffer, Y. Hao, Syracuse University, Syracuse, NY	1500 hrs AIAA-2019-3673 **High Quality CFD Meshing Using Automatic Partitioning and a Unified Sizing Field** P. Beben, N. Bergemann, J. Bucklow, S. Whyman, International TechneGroup, Inc., Cambridge, United Kingdom	1530 hrs AIAA-2019-3674 **Study of the Interaction between Vortex and a Squire Cylinder with a part of Structure made by Flexible Material** H. Matsubara, W. Nakayama, Y. Inoue, H. Maekawa, University of Electro-Communications, Chofu, Japan	1600 hrs AIAA-2019-3675 **A closed advancing-layer method for generating curved boundary layer mesh** R. Feuillet, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France; D. Marcum, Mississippi State University, Mississippi State, MS; F. Alauzet, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France		

Thursday, 20 June 2019						
266-TF-9	**Electric Propulsion Integration and Contributory Technologies**					**Lalique**
Chaired by: M. PATTERSON, NASA Langley Research Center and B. GERMAN, Georgia Institute of Technology						
1400 hrs AIAA-2019-3676 **A Performance Analysis of Folding Conformal Propeller Blade Designs** B. Litherland, J. Derlaga, NASA Langley Research Center, Hampton, VA	1430 hrs AIAA-2019-3677 **A Study on "Through-the-Road"-Parallel-Hybrid Powertrains for Small Aircraft with Distributed Electric Propulsion** P. Strathoff, M. Nuño Spiewak, K. Schröder, E. Stumpf, RWTH Aachen University, Aachen, Germany	1500 hrs AIAA-2019-3678 **A comprehensive Approach to the Assessment of a Hybrid Electric Powertrain for Commuter Aircraft** J. Hofmann, E. Stumpf, D. Weintraub, J. Koehler, D. Pham, RWTH Aachen University, Aachen, Germany; M. Schneider, BuB Agema, Aachen, Germany; et al.				

Thursday, 20 June 2019		
267-NW-15 **1600 - 1630 hrs**	**Networking Break**	**Exposition Hall**

Thursday, 20 June 2019		
268-APA-41 **1730 - 1830 hrs**	**Aerodynamics Award Lecture**	**Coronado Ballroom**
"CFD's New Frontier: High Lift Prediction and Validation" **Robert D. Gregg III** The Boeing Company		

Thursday, 20 June 2019		
269-NW-16 **1830 - 2100 hrs**	**ADS Banquet (Proof of Purchase Required)**	**Peacock Terrace**

Friday

Friday, 21 June 2019		
270-SB-5 **0730 - 0800 hrs**	**Friday Speaker Briefing**	**Session Rooms**

Friday, 21 June 2019		
271-PLNRY-5 **0800 - 0900 hrs**	**Friday Plenary: Apollo's Legacy and Impact on Modern Flight**	**Grand Ballroom**
Speakers: **Bill Barry** Chief Historian NASA **James R. Hansen** Author, *First Man: The Life of Neil A. Armstrong* Professor Emeritus, History, Auburn University		

Friday, 21 June 2019		
272-NW-17 **0900 - 0930 hrs**	**Networking Break**	**Technical Session Foyers**

Friday, 21 June 2019						
273-ACD-12	**Electric Aircraft Propulsion and Design**					**Morocco**
Chaired by: P. RAJ, Virginia Tech and D. WELLS, Lockheed Martin Aeronautics						
0930 hrs AIAA-2019-3679 **Primary Weight Estimation for eVTOLs via Explicit Analysis and Surrogate Regression** J. Smart, J. Alonso, Stanford University, Stanford, CA	1000 hrs AIAA-2019-3680 **Conceptual Design Studies of Short Range Aircraft Configurations with Hybrid Electric Propulsion** M. Iwanizki, German Aerospace Center (DLR), Braunschweig, Germany; M. Arzberger, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; M. Plohr, German Aerospace Center (DLR), Cologne, Germany; D. Silberhorn, German Aerospace Center (DLR), Hamburg, Germany; T. Hecken, German Aerospace Center (DLR), Göttingen, Germany	1030 hrs AIAA-2019-3681 **Adjoint-Based Design of a Distributed Propulsion Concept with a Power Objective** I. Ordaz, S. Rallabhandi, E. Nielsen, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2019-3682 **Exergy and Exergoeconomic Comparative Analysis Between Conventional and Hybrid Electric Propulsion Systems for a Regional Aircraft** W. Affonso, R. Gandolfi, Embraer, São José dos Campos, Brazil; R. da Silva, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; S. Junior, University of São Paulo, São Paulo, Brazil		

Friday, 21 June 2019						
274-APA-37	**Active Flow Control IV**					**Cortez C**
Chaired by: A. GLEZER, Georgia Institute of Technology and M. CALVERT, U. S. Army Combat Capabilities Development Command – Aviation and Missile Center						
0930 hrs AIAA-2019-3683 **Active Fluidic Switching at High Mach Numbers** M. Mair, M. Bacic, University of Oxford, Oxford, United Kingdom	1000 hrs AIAA-2019-3684 **The Effect of Active Boundary Layer Fence Spanwise Location on Swept Wing Performance** A. Hussain, J. Bons, Ohio State University, Columbus, OH	1030 hrs AIAA-2019-3685 **Characterization and Control of Nacelle Inlet Flow in Crosswind** D. Nichols, B. Vukasinovic, A. Glezer, Georgia Institute of Technology, Atlanta, GA; M. DeFore, B. Rafferty, F. Palacios, The Boeing Company, Chicago, IL	1100 hrs AIAA-2019-3686 **Directional Control of Finless Flying Wing Vehicles - An Assessment of Opportunities for Fluidic Actuation** T. Shearwood, M. Nabawy, W. Crowther, University of Manchester , Manchester, United Kingdom; C. Warsop, BAE Systems, Bristol, United Kingdom	1130 hrs AIAA-2019-3687 **Control of a Transonic Shock in a Serpentine Diffuser using Surface Fluidic Actuation** T. Burrows, B. Vukasinovic, A. Glezer, Georgia Institute of Technology, Atlanta, GA		

Friday, 21 June 2019						
275-APA-38	**Unmanned and Solar-Powered Vehicles**					**Cortez D**
Chaired by: J. SAGAGA and J. DOYLE, US Army CCDC AvMC						
0930 hrs AIAA-2019-3688 **Propulsion System Testing for a Long-Endurance Solar-Powered Unmanned Aircraft** O. Dantsker, University of Illinois, Urbana-Champaign, Urbana, IL; R. Deters, Embry-Riddle Aeronautical University, Daytona Beach, FL; M. Caccamo, Technical University of Munich, Garching, Germany	1000 hrs AIAA-2019-3689 **Surface Temperature Effects of Solar Panels of Fixed Wing Unmanned Aerial Vehicles on Flight Performance** N. Guido, S. Mohammadi, M. Hassanalian, S. Bakhtiyarov, New Mexico Institute of Mining and Technology, Socorro, NM	1030 hrs AIAA-2019-3690 **A Comparison of Lift-Drag Predictions for the US Army's Raven RQ-11 Using Helios and STAR-CCM+** J. Sagaga, Science and Technology Corporation, Moffett Field, CA; R. Comstock, California Polytechnic State University, San Luis Obispo, CA; S. Lam, University of Washington, Seattle, Seattle, WA; R. Strawn, Army Aviation and Missile Research, Development and Engineering Command, Moffett Field, CA; M. Fladeland, NASA Ames Research Center, Moffett Field, CA; R. Dahlgren, California State University, Moffett Field, CA				

Friday, 21 June 2019						
276-APA-39	**Distributed Propulsion Systems**					**Cortez A**
Chaired by: G. ZHA, University of Miami and L. VELDHUIS, Delft Technical University of Technology						
0930 hrs AIAA-2019-3691 **Numerical Analysis of Propeller-Wing Interaction in Aircraft with Distributed Electric Propulsion** P. Sharpe, R. Agarwal, Washington University in St. Louis, St. Louis, MO	1000 hrs AIAA-2019-3692 **Analysis and Design of a Wing Trailing Edge Mounted Over-The-Wing Distributed Propeller Propulsion system** L. Veldhuis, A. Khajehzadeh, Delft University of Technology, Delft, The Netherlands	1030 hrs AIAA-2019-3693 **Analysis and Design of a Small-Scale Wingtip-Mounted Pusher Propeller** T. Stokkermans, S. Nootebos, L. Veldhuis, Delft University of Technology, Delft, The Netherlands				

Friday, 21 June 2019						
277-APA-40	**Aerodynamics of Complex Geometries**					**Cortez B**
Chaired by: K. ROKHSAZ, Wichita State Univ and S. YOO						
0930 hrs AIAA-2019-3694 **Numerical Analysis of Aerodynamics of a NACA4412 Airfoil above Wavy Water Surface** H. Zhi, T. Xiao, J. Chen, Nanjing University of Aeronautics and Astronautics, Nanjing, China; B. Wu, Aviation Industry Corporation of China (AVIC), Jingmen, China; M. Tong, Z. Zhu, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1000 hrs AIAA-2019-3695 **Recirculating Coherent Structures inside the Cove of a Bulb Sealed Slat** F. Himeno, F. Amaral, University of São Paulo, São Carlos, Brazil; D. Souza, Federal University of São João del-Rei, São João del-Rei, Brazil; D. Rodríguez, Federal Fluminense University, Niterói, Brazil; M. Medeiros, University of São Paulo, São Carlos, Brazil	1030 hrs AIAA-2019-3696 **Aerodynamic Characterization of a Non-Lethal Finned Projectile at Low Subsonic Velocity** V. de Briey, B. Marinus, M. Pirlot, Royal Military Academy, Brussels, Belgium	1100 hrs AIAA-2019-3697 **The Aerodynamics of a Civil Transport in Aerial Firefighting** D. Varner, L. Kliment, K. Rokhsaz, Wichita State University, Wichita, KS	1130 hrs AIAA-2019-3698 **Computational Analysis of the External Aerodynamics of the Unpowered X-57 Mod-III Aircraft** S. Yoo, NASA Armstrong Flight Research Center, Edwards, CA; J. Duensing, NASA Ames Research Center, Moffett Field, CA		

Friday, 21 June 2019						
278-CFD-21	**LES with Near-Wall Modeling**					**Obelisk B**
Chaired by: Z. ZHENG, The University of Kansas and J. KOMIVES, Air Force Institute of Technology						
0930 hrs AIAA-2019-3699 **Modeling non-equilibrium effects in wall modeled LES of high-speed flows** B. Mettu, P. Subbareddy, North Carolina State University, Raleigh, NC	1000 hrs AIAA-2019-3700 **Towards the Prediction of Fluctuating Wall Quantities Using Immersed Boundary Conditions** L. Manueco, P. Weiss, S. Deck, ONERA, Meudon, France	1030 hrs AIAA-2019-3701 **Wall Modeled Large-Eddy Simulation Used with an Immersed-Boundary Method** M. Zhang, Z. Zheng, University of Kansas, Lawrence, Lawrence, KS	1100 hrs AIAA-2019-3702 **Compressible Flow Through a Diffusing Serpentine Inlet Duct Assessed with Wall-Modeled Large Eddy Simulation** R. Thompson, J. Komives, Air Force Institute of Technology, Wright-Patterson AFB, OH	1130 hrs AIAA-2019-3703 **Toward Improved Turbulence-Modeling Techniques for Internal-Flow Applications** M. Lakebrink, M. Mani, The Boeing Company, St. Louis, MO; E. Rolfe, J. Spyropoulos, Naval Air Systems Command, Patuxent River, MD; D. Philips, S. Bose, Cascade Technologies, Inc., Palo Alto, CA; et al.	1200 hrs AIAA-2019-3704 **Adaptive Wavelet-based Delayed Detached Eddy Simulation of Shock Wave-Turbulent Boundary Layer Interaction in a Compression Ramp Flow** X. Ge, Florida State University, Tallahassee, FL; O. Vasilyev, Russian Academy of Sciences, Moscow, Russia; M. Hussaini, Florida State University, Tallahassee, FL	

Friday, 21 June 2019						
279-CFD-22	**Verification, Validation, and Uncertainty Quantification**					**Obelisk A**
Chaired by: H. NISHIKAWA, National Institute of Aerospace						
0930 hrs AIAA-2019-3705 **Code-Verification Techniques for Hypersonic Reacting Flow in Thermochemical Nonequilibrium** B. Freno, B. Carnes, V. Weirs, Sandia National Laboratories, Albuquerque, NM	1000 hrs AIAA-2019-3706 **Validation of calibrated k-ε model parameters for jet-in-crossflow** N. Miller, S. Beresh, Sandia National Laboratories, Albuquerque, NM; J. Ray, Sandia National Laboratories, Livermore, CA	1030 hrs AIAA-2019-3707 **Transform & Learn: A data-driven approach to nonlinear model reduction** E. Qian, B. Kramer, A. Marques, Massachusetts Institute of Technology, Cambridge, MA; K. Willcox, University of Texas, Austin, Austin, TX				

Friday, 21 June 2019

280-CFD-23	Solution Acceleration Techniques				Peridot
Chaired by: J. CONTRERAS, ITP Aero and K. THOMPSON, NASA Langley Research Center					
0930 hrs AIAA-2019-3708 **GCRO with Dynamic Deflated Restarting for Solving Adjoint Systems of Equations for Aerodynamic Shape Optimization** C. Chen, S. Nadarajah, McGill University, Montréal, Canada	1000 hrs AIAA-2019-3709 **Streamlined Convergence Acceleration for CFD Codes** K. Thompson, M. O'Connell, NASA Langley Research Center, Hampton, VA	1030 hrs AIAA-2019-3710 **A review and optimization of the double passage methodology** J. Contreras, ITP, Alcobendas, Spain	1100 hrs AIAA-2019-3711 **A Study of p-multigrid Approach for the High Order FR/CPR Method** E. Jourdan de Araujo Jorge Filho, Z. Wang, University of Kansas, Lawrence, Lawrence, KS	1130 hrs AIAA-2019-3712 **Additive Multigrid with Scaled Correction for Implicit Compressible Flow Solvers** S. Vangara, A. Kashi, S. Nadarajah, McGill University, Montréal, Canada		

Friday, 21 June 2019

281-F360-9 0930 - 1130 hrs	Friday Forum 360: Accelerating Through the TRL Scale	Coronado Ballroom

Moderator: Starr Ginn, Deputy Aeronautics Research Director, NASA Armstrong Flight Research Center

Panelists:

Mark Cousin
Chief Executive Officer
A^3 by Airbus

Steve Ericson
Director
Advanced Design
The Spaceship Company

Jonathan Hartman
Disruptive Technologies Lead
Sikorsky, A Lockheed Martin Company

Brian Hershberger
Conceptual Design
Senior Manager, Advanced Development Programs,
Lockheed Martin Aeronautics Company

Jim Scooler
Director
Aerodynamics
Gulfstream Aerospace

Friday, 21 June 2019

282-FD-33	Transition and Turbulence Interaction				Manchester
Chaired by: Y. SUN, University of Minnesota and S. DUNN, Jacobs					
0930 hrs AIAA-2019-3713 **Suppressing subcritical transition in plane Poiseuille flow** Y. Sun, M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN	1000 hrs AIAA-2019-3714 **Numerical Simulation of Turbulent Junction Flows with Upstream Disturbances** Z. Robison, J. Mosele, A. Gross, New Mexico State University, Las Cruces, NM	1030 hrs AIAA-2019-3715 **Particle-Turbulence Interaction In Homogeneous Isotropic Turbulence** M. Cheikh, J. Chen, University at Buffalo, Buffalo, NY	1100 hrs AIAA-2019-3716 **Effect of Structural Parameters on Shock Wave Boundary Layer Induced Panel Flutter** V. Shinde, J. McNamara, D. Gaitonde, Ohio State University, Columbus, OH	1130 hrs AIAA-2019-3717 **Turbulent mixing of reacting flows; numerical studies using LES** M. Ilie, G. Sullivan, Georgia Southern University, Statesboro, GA		

Friday, 21 June 2019

283-FD-35	Multiphysics and Cross-Disciplinary Flows, Particles and Sprays				Fleur De Lis A
Chaired by: S. BHATTACHARYA, University of Central Florida					
0930 hrs AIAA-2019-3718 **A Mathematic Model Based on Unstructured Mesh for Simulating Ice Accretion on Aircraft** N. Chen, Southwest Petroleum University, Chengdu, China; Y. Hu, H. Ji, Nanjing University of Aeronautics and Astronautics, Nanjing, China; Y. Yuan, Aero Engine Corporation of China (AECC), Chengdu, China; G. Cao, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1000 hrs AIAA-2019-3719 **Droplet Breakup Onset Modeling in Combination with Droplet Ratio Deformation Model** A. Garcia-Magariño, S. Sor, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain; A. Velazquez, Technical University of Madrid, Madrid, Spain	1030 hrs AIAA-2019-3720 **Numerical Simulation of Spatially Resolved Particle Deposition in Accelerating flows** N. Vadgama, P. Forsyth, M. McGilvray, D. Gillespie, University of Oxford, Oxford, United Kingdom	1100 hrs AIAA-2019-3721 **Impact of Inlet Gas Turbulent Intensity on the Characteristics of Droplets Generated in Airblast Atomization** D. Jiang, Y. Ling, Baylor University, Waco, TX; G. Tryggvason, Johns Hopkins University, Baltimore, MD; S. Zaleski, Sorbonne, Paris, France	1130 hrs AIAA-2019-3722 **A Lagrangian-Eulerian Method for Simulating Electrospray Deposition** D. Kessler, M. Merrill, Naval Research Laboratory, Washington, D.C.		

Friday, 21 June 2019						
284-GT-12	**Special Session High Lift CRM Testing at the Langley 14x22 Wind Tunnel**					**Emerald**
Chaired by: M. RIVERS, NASA Langley Research Center and R. PARYZ, NASA Langley Research Center						
0930 hrs AIAA-2019-3723 **Wind Tunnel Testing of Active Flow Control on the High Lift Common Research Model** J. Lin, L. Pack Melton, J. Hannon, M. Andino, M. Koklu, K. Paschal, NASA Langley Research Center, Hampton, VA; et al.	1000 hrs AIAA-2019-3724 **Comparative Study of Active Flow Control Strategies for Lift Enhancement of a Simplified High-Lift Configuration** V. Vatsa, NASA Langley Research Center, Hampton, VA; B. Duda, Dassault Systemes, Munich, Germany; J. Lin, L. Pack Melton, D. Lockard, M. O'Connell, NASA Langley Research Center, Hampton, VA; et al.	1030 hrs AIAA-2019-3725 **NASA Common Research Model: A History and Future Plans** M. Rivers, NASA Langley Research Center, Hampton, VA	1100 hrs AIAA-2019-3726 **Sweeping Jet Flow Control on the Simplified High-Lift Version of the Common Research Model** L. Pack Melton, J. Lin, J. Hannon, M. Koklu, M. Andino, K. Paschal, NASA Langley Research Center, Hampton, VA	1130 hrs AIAA-2019-3727 **Surface Flow Visualization of the High Lift Common Research Model** M. Koklu, L. Pack Melton, J. Lin, J. Hannon, M. Andino, K. Paschal, NASA Langley Research Center, Hampton, VA; et al.		

Friday, 21 June 2019		
285-TF-10 **0930 - 1200 hrs**	**Transformational Flight - SciTech Rolling Recap**	**Coral**

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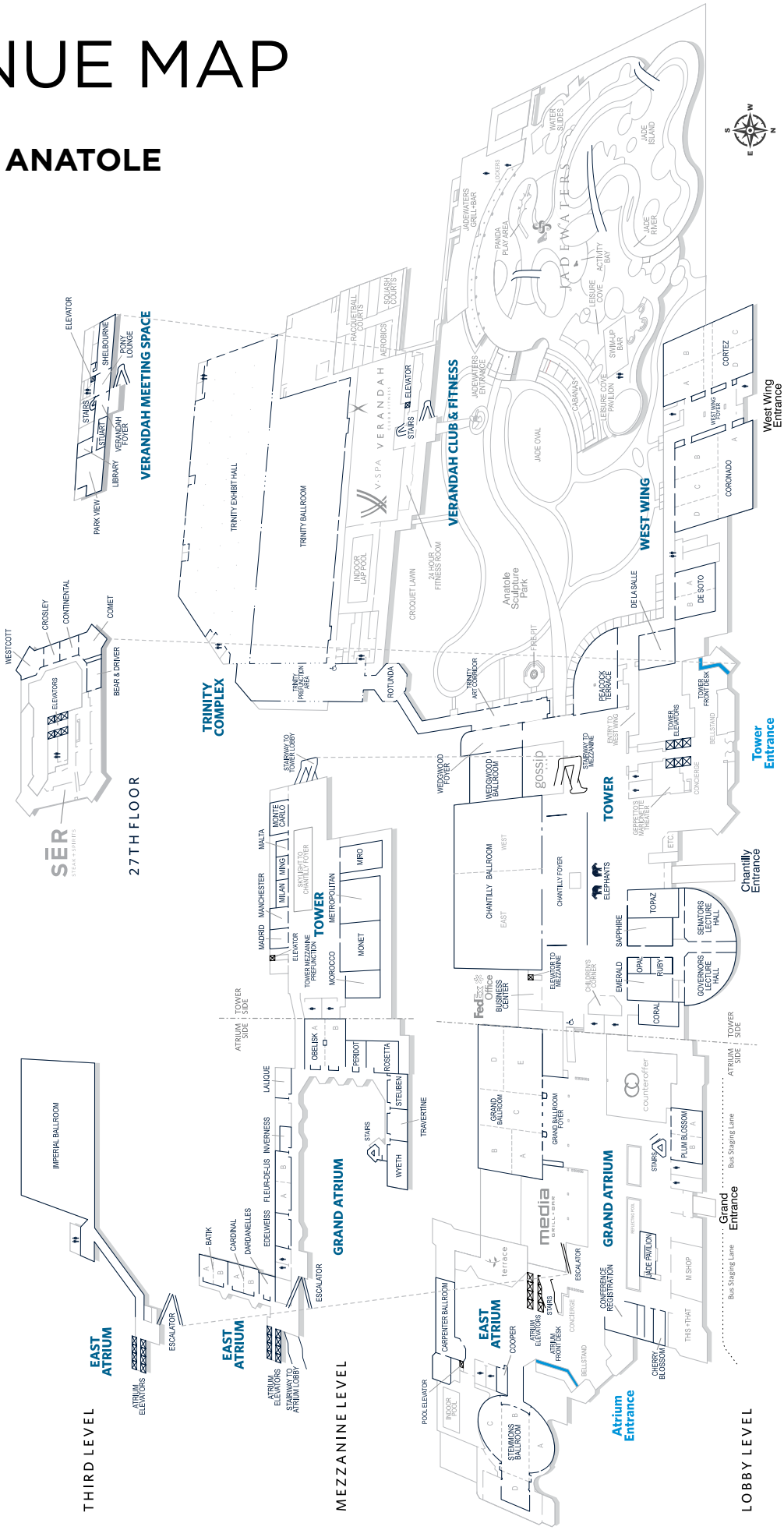
VENUE MAP

HILTON ANATOLE



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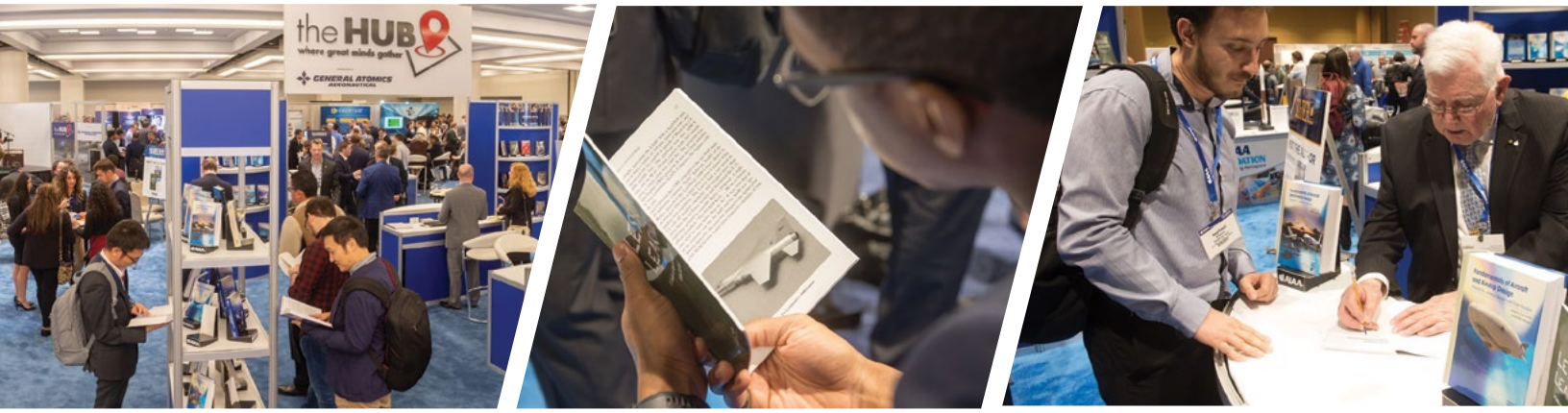

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