# AVIATION FORUM

25–29 JUNE 2018

ATLANTA, GEORGIA

## EXPANDING THE ENVELOPE: PARTNERING FOR TRANSFORMATION

See what's in the HUB on page 23.

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*Shaping the Future of Aerospace*

The American Institute of Aeronautics and Astronautics (AIAA) is the world's largest aerospace technical society. With nearly 30,000 individual members from 88 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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**Mo Sammy**, Ohio State University

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# AVIATION FORUM

WELCOME to Atlanta and the 2018 AIAA AVIATION Forum! We're excited you're here to learn about the latest trends in aviation and aeronautics. This year the theme is "Expanding the Envelope: Partnering for Transformation" and we'll be exploring this concept with industry luminaries through a mix of thought-leader keynotes, expert panel discussions, and technical research presentations.

Aerospace is in a time of transition. While big rockets and sports cars in orbit grab global headlines, the aviation community is quietly establishing new paradigms that will have near-term, broad impacts on the way we interact with flying machines. Through collaboration and innovation, established and emerging aerospace companies are developing breakthrough technologies that will enable new products and services.

Throughout this week we hope you'll discover why industry leaders think we're at the dawn of a new era of aviation where technology convergence is fueling improvements in speed and efficiency, enabling new markets, and building the infrastructure necessary to allow our ecosystem to expand. Some highlights of the program include an update on ATM modernization, the future of general aviation, U.S. and European government investments in aviation, and the latest on the development of supersonic transports. We're particularly excited this year to provide the venue for the first-ever behind-the-scenes look at the design, development, and testing of the world's most advanced fighter aircraft, the F-35 Lightning II.

We know that many of you are here for the cutting-edge research that you expect from AIAA and the year's technical program is as broad and diverse as ever! More than 1,600 presentations on the latest developments in aeronautics science and technology will take place throughout the week, and if you miss something, all of the papers are available through AIAA Aerospace Research Central.

The HUB, located in the heart of the AIAA Exposition Hall, will be the place to meet colleagues, network, and discuss what you've been learning. You'll also have the chance to tour booths and listen to presentations. Take advantage of the lounge to recharge and be sure to check out the contests and raffles.

We hope AIAA AVIATION Forum will power your imagination as you look ahead to what's next in this exciting and meaningful field.

# SPONSORS AND SUPPORTERS

AIAA would like to thank the following organizations for their support of 2018 AIAA AVIATION Forum

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Every great design begins with a great idea. Boeing is proud to stand alongside those who engineer ideas that change the world.

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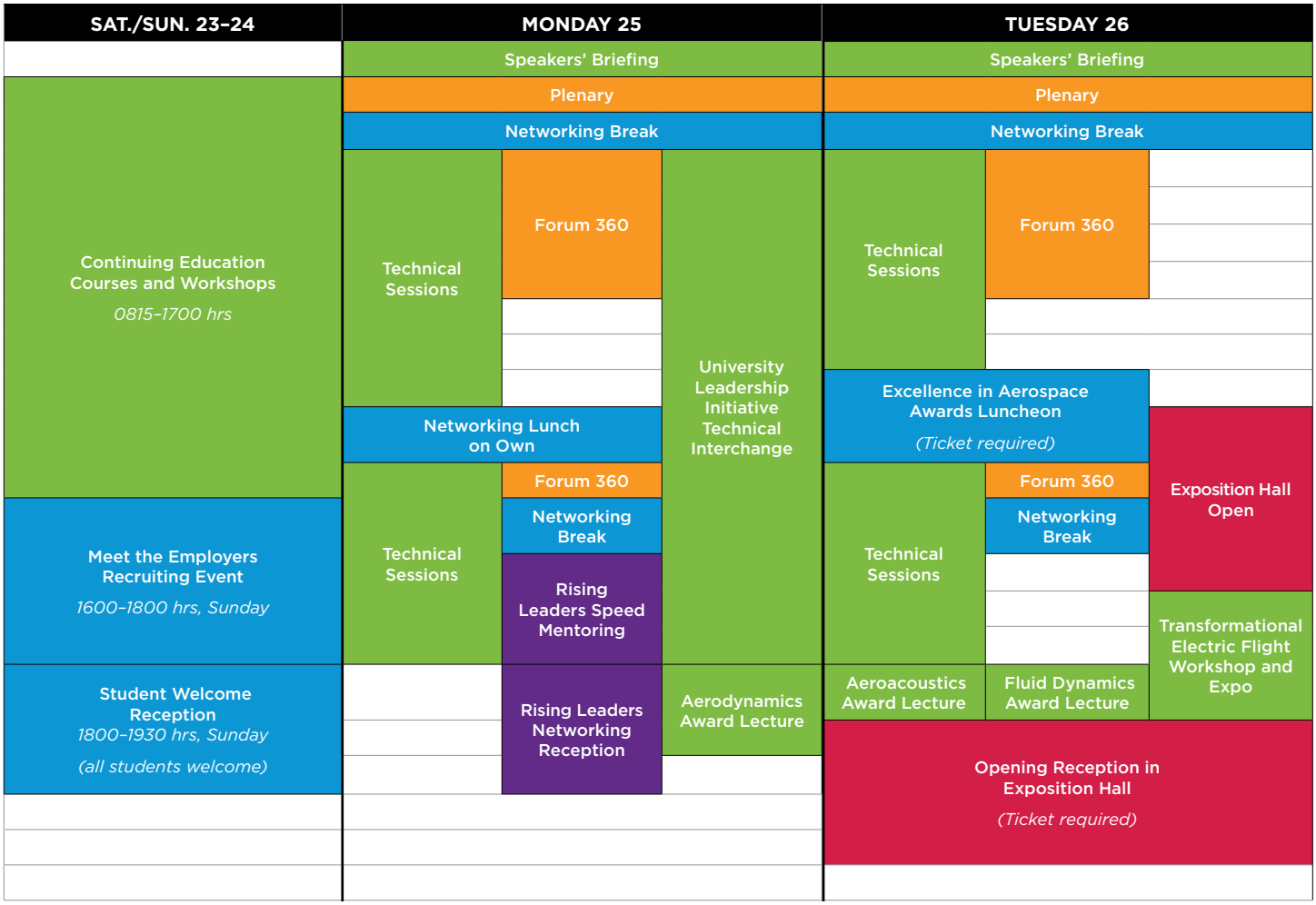
# FORUM OVERVIEW

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Technical Career Development

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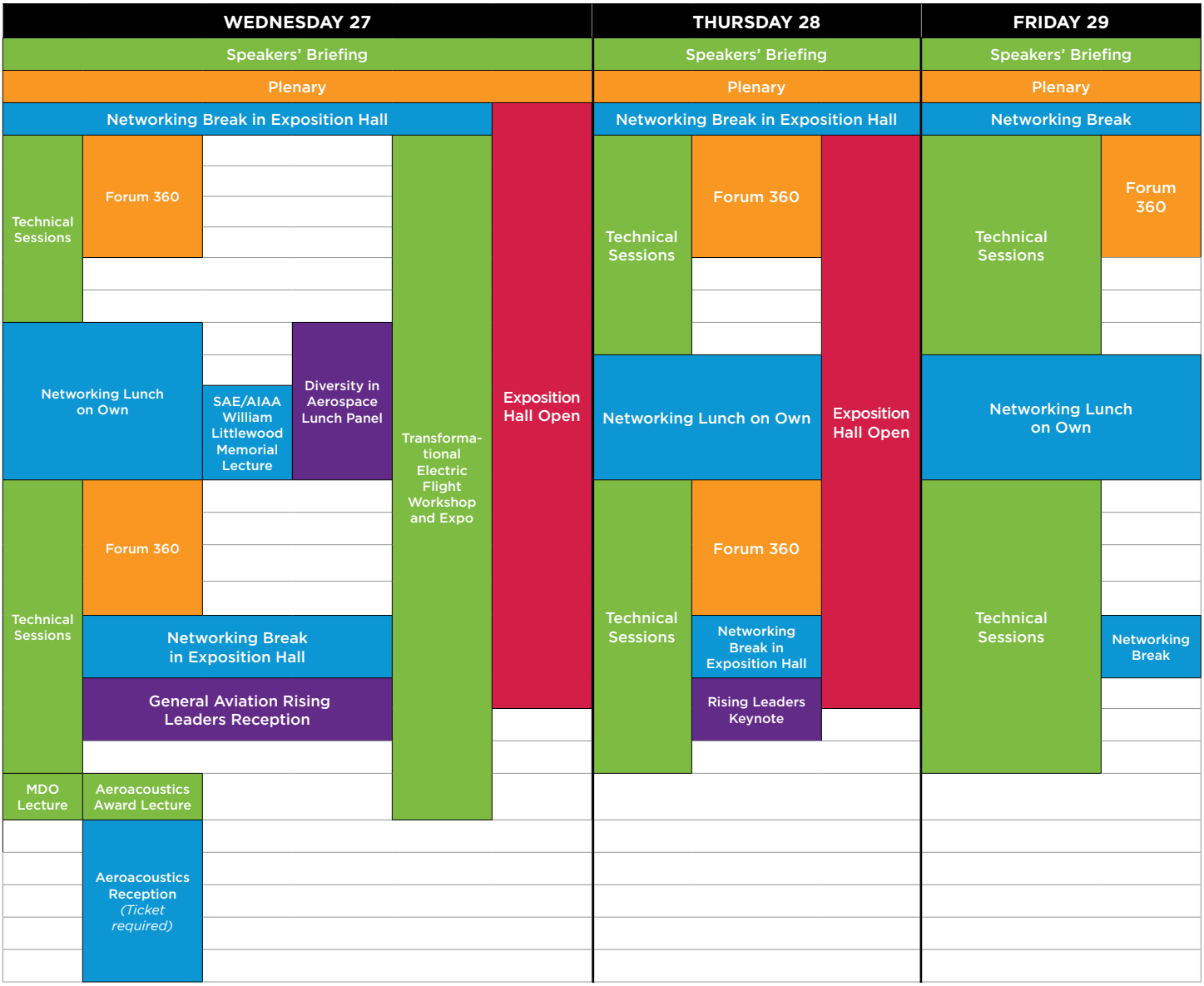
**EXPLORE**
the HUB & Exposition

**DISCOVER**
High Level

**DEVELOPMENT**
Student & Young Professionals

# FORUM OVERVIEW




**GROW**
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the HUB & Exposition

**DISCOVER**
High Level

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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. 23 – SUN. 24 JUNE

0800–1700 HRS HANOVER D-E

### 5th AIAA Workshop on Benchmark Problems for Airframe Noise Computations (BANC-V)

The BANC-V workshop, organized by the AIAA Aeroacoustics Technical Committee, will:

- Provide a forum for a thorough assessment of simulation-based noise-prediction tools in the context of airframe configurations, including both near-field unsteady flow and the acoustic radiation generated via the interaction of this flow with solid surfaces.
- Identify current gaps in physical understanding, experimental databases, and prediction capability for the major sources of airframe noise.
- Help determine best practices and accelerate the development of benchmark quality datasets.
- Promote coordinated studies of common configurations for maximum impact on the current state of the art in the understanding and prediction of airframe noise.

0800–1700 HRS HANOVER C

### Design of Electric and Hybrid-Electric Aircraft

In this course, participants learn about current development in electric and hybrid-electric aircraft. They will learn how to design electric and hybrid-electric aircraft starting from the top-level aircraft requirements. Design examples will include an electric air taxi and a hybrid-electric aircraft with distributed propulsion. Various powertrains will be examined including pure electric, parallel hybrid, serial hybrid, and combinations. It will be demonstrated which design variables are unique to electric and hybrid-electric aircraft and how the sizing process of the powertrain components can be carried out.

0800–1730 HRS HANOVER F

### Practical Design Methods for Aircraft and Rotorcraft Flight Control for Manned and UAV Applications with Hands-on Training using CONDUIT®

The 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. While our design approach is based on multi-objective parametric optimization, we intend that course attendees who use a different design method will still find the course a useful and comprehensive presentation of well-validated flight-control principles and rules of thumb. This course should challenge the practicing engineer to consider where their flight-control processes can be improved or augmented. The many examples from recent manned and UAV aircraft programs illustrate the effectiveness of this technology for rapidly solving difficult integration problems.

0800–1700 HRS HANOVER G

### Missile Aerodynamics

A system-level approach is provided for missile aerodynamic design, development, and system engineering. The methods presented are generally simple closed-form analytical expressions that are physics-based, to provide insight into the primary driving parameters. Sizing examples are presented for rocket-powered missiles, ramjet-powered missiles, turbo-jet powered missiles, and guided bombs. Typical values of missile aerodynamic parameters and the characteristics of current operational missiles are presented. Videos illustrate missile aerodynamic development activities and performance. Each student will design, build, and fly a small air rocket in a design, build, and fly competition.

0800–1700 HRS HANOVER A

### Optimal Design in Multidisciplinary Systems: State-of-the-Art Methods, Practical Applications, and Emerging Trends

When you are designing or evaluating a complicated engineering system such as an aircraft or a launch vehicle, can you effectively reconcile the multitude of conflicting requirements, interactions, and objectives? This course discusses the underlying challenges in such an environment, and introduces you to methods and tools that have been developed over the years.

0800–1700 HRS HANOVER B

### OpenFOAM® Foundations

This course introduces the open source CFD toolbox, OpenFOAM. It provides a foundation for all aspects of OpenFOAM, from running cases to programming, so is useful to both new users and existing users wishing to broaden their basic knowledge of OpenFOAM.

# PRE-FORUM ACTIVITIES

## SUNDAY, 24 JUNE

**1600–1800 HRS** **CENTENNIAL IV**

### Meet the Employers

AIAA's Meet the Employers event offers students and young professional attendees the opportunity to meet AIAA corporate members. 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. Immediately following the event, AIAA will hold its Student Welcome Reception in the same venue and company and organization representatives are encouraged to attend. There is no charge to participate in either the recruiting event or the reception. No RSVP is required.

**1800–1930 HRS** **REGENCY BALLROOM V**

### AIAA Student Welcome Reception

Network with your peers and hear from AIAA Executive Director Dan Dumbacher. This reception provides you with the opportunity to meet your fellow students who you are sure to see again throughout the week, and learn more about the opportunities available to you as an AIAA student member.


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# PLENARY & FORUM 360 SESSIONS

## MONDAY, 25 JUNE

0800–0900 HRS CENTENNIAL BALLROOM I-III

### New Paradigms in Aviation

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

**PANELISTS:**

**Pradeep Fernandes**, Managing Director, Disruptive Horizons, Boeing HorizonX

**Ilan Kroo**, Thomas V. Jones Professor of Engineering, Department of Aeronautics and Astronautics, Stanford University

**Rodin Lyasoff**, Chief Executive Officer, A$^3$ by Airbus

**Jack O'Banion**, Vice President, Strategy and Customer Requirements, Advanced Development Programs, Lockheed Martin Aeronautics Company

FORUM 360°

0930–1130 HRS CENTENNIAL BALLROOM IV

### Rapid Spiral Development from Ground to Flight

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

**PANELISTS:**

**Charles Ashton**, Senior Engineer, AeroVironment

**Scott Drennan**, Director, Innovation, Bell

**Steve Ericson**, Director, Advanced Design, The Spaceship Company

**Robert Morgan**, Director, Research and Development, Scaled Composites

**Michael Swanson**, Chief Engineer, Advanced Development Programs, Lockheed Martin Aeronautics Company

FORUM 360°

1400–1600 HRS CENTENNIAL BALLROOM IV

### Investment Perspectives on the Aviation Market

**MODERATOR: Van Espahbodi**, Co-Founder, Managing Partner, Starburst Aerospace Accelerator

**PANELISTS:**

**Maryanna Saenko**, Principal, Khosla Ventures

**Brian Schettler**, Managing Director, Boeing HorizonX Ventures

**Peter Truwit**, Associate, Seraph Group

## TUESDAY, 26 JUNE

0800–0900 HRS CENTENNIAL BALLROOM I-III

### Evolution of the F-35

**Jeff Babione**, Vice President and General Manager, Advanced Development Programs, Lockheed Martin Aeronautics Company

FORUM 360°

0930–1130 HRS CENTENNIAL BALLROOM IV

### Reflection on Partnerships Within the F-35 Enterprise

**MODERATOR: Graham Warwick**, Technology Managing Editor, *Aviation Week & Space Technology*

**PANELISTS:**

**Eric Branyan**, Vice President, F-35 Supply Chain Management, Lockheed Martin Corporation

**Frank Carus**, Vice President and JSF F-35 Program Manager, Aerospace Systems, Northrop Grumman Corporation

**Declan Holland**, Vice President US Business, BAE Systems, Inc.

**Thomas Johnson**, F135 Program Chief Engineer (ret.), Pratt & Whitney

**John Mazur**, Lead, Foreign Military Sales, F-35 Joint Program Office

**J.D. McFarlan**, Vice President, F-35 Test & Verification, Lockheed Martin Aeronautics Company

FORUM 360°

1400–1600 HRS CENTENNIAL BALLROOM IV

### Inventors and Innovators

**MODERATOR: John Tylko**, Chief Innovation Officer, Aurora Flight Sciences Corporation

**PANELISTS:**

**Andrew Gibson**, President and Co-Founder, ESAero

**Bruce Holmes**, Vice President, Digital Aviation, SmartSky Networks, LLC

**Daniel Morris**, Director, Peninsula Technology Incubator, National Institute of Aerospace

**Kevin Noertker**, Chief Executive Officer and Co-Founder, Ampaire

# PLENARY & FORUM 360 SESSIONS

## WEDNESDAY, 27 JUNE

0800–0900 HRS CENTENNIAL BALLROOM I-III

### Aviation Transformation – The Ultimate Team Sport

**Michael Huerta**, Senior Advisor, Macquarie Holdings

FORUM 360º 0930–1130 HRS CENTENNIAL BALLROOM IV

### Air Traffic Management Modernization

**MODERATOR: Donald W. Richardson**, Chief Operating Officer, Donrich Research Inc.

**PANELISTS:**

**Ravi Chaudhary**, Director, Advanced Programs and Innovation, Office of Commercial Space Transportation, FAA

**Parimal Kopardekar**, Senior Technologist, Air Transportation Systems, NASA Ames Research Center

**John Maffei**, Deputy Director, NextGen Portfolio Management and Technology Development Directorate, FAA

**Robert Pearce**, Deputy Associate Administrator for Strategy, Acting Director for Airspace Operations and Safety Program, Aeronautics Research Mission Directorate, NASA Headquarters

**James Ray**, Senior Advisor for Infrastructure, Office of the Secretary, U.S. Department of Transportation

**Melissa Rudinger**, Vice President of Regulatory Affairs, Aircraft Owners and Pilots Association

**Richard Terry**, Director of Line Operations, Delta Air Lines

**James Ullmann**, Director of Safety and Technology, National Air Traffic Controllers Association

FORUM 360º 1400–1600 HRS CENTENNIAL BALLROOM IV

### Entering a New Era of General Aviation (Part 23)

**MODERATOR: Nicholas Borer**, Advanced Air Vehicle Configurator Technical Lead, NASA Langley Research Center

**PANELISTS:**

**Ella Atkins**, Professor, Aerospace Engineering, University of Michigan

**Anna Dietrich**, Co-Founder, Terrafugia

**Stéphane Fymat**, Vice President, Product Management and Marketing, BendixKing, Honeywell Aerospace

**Zohaib Mian**, Senior Autonomous Systems Architect, Mercedes-Bosch Autonomous Driving Project, Robert Bosch LLC

**Wes Ryan**, Unmanned Systems Certification Lead, Policy & Innovation Division, FAA

**David Sizoo**, FAA

## THURSDAY, 28 JUNE

0800–0900 HRS CENTENNIAL BALLROOM I-III

### New Era in Flight

**Michael Thacker**, Executive Vice President, Technology and Innovation, Bell

FORUM 360º 0930–1130 HRS CENTENNIAL BALLROOM IV

### NASA Aeronautics at the Dawn of a New Era of Aviation

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

**OPENING REMARKS: Robert Pearce**, Deputy Associate Administrator for Strategy, Acting Director for Airspace Operations and Safety Program, Aeronautics Research Mission Directorate, NASA Headquarters

**PANELISTS:**

**Peter Coen**, Manager, Commercial Supersonic Technology Project, Advanced Air Vehicles Program, Aeronautics Research Mission Directorate, NASA

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

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

**Parimal Kopardekar**, Senior Technologist, Air Transportation Systems, NASA Ames Research Center

**Craig Nickol**, Project Manager, Low Boom Flight Demonstration Project, Aeronautics Research Mission Directorate, NASA

FORUM 360º 1400–1600 HRS CENTENNIAL BALLROOM IV

### Europe: Open to the World to Transform Aviation

**MODERATOR: David Hills**, Senior Partnership Manager, Airbus

**PANELISTS:**

**Pier-Davide Ciampa**, Team Lead, Multidisciplinary Design and Optimization, German Aerospace Center (DLR)

**Joeri De Ruytter**, Research and Technology Business Development and Partnerships, Honeywell Aerospace Europe

**Sebastiano Fumero**, Head of Unit - Aeronautics, Research and Innovation Directorate General, European Commission

**Pablo Perez-Illana**, Programme Officer, Research and Innovation Directorate General, European Commission

**Igor Perkon**, Research and Development Program Manager, Pipistrel Vertical Solutions

# PLENARY & FORUM 360 SESSIONS

## FRIDAY, 29 JUNE

0800–0900 HRS CENTENNIAL BALLROOM I-III

### Drone Technology: Leading the Data Revolution

**Anil Nanduri**, Vice President and General Manager, Drone Group, Intel Corporation

FORUM 360°

0930–1130 HRS CENTENNIAL BALLROOM IV

### A Path to Supersonic Commercial Travel

**MODERATOR: Robert "Robbie" Cowart**, Director, Supersonic Technology Development, Gulfstream Aerospace Corporation

**PANELISTS:**

**Mike Hinderberger**, Senior Vice President, Aircraft Development, Aerion Corporation

**Blake Scholl**, Founder and Chief Executive Officer, Boom Supersonic

**Kevin Welsh**, Executive Director, Office of Environment and Energy, FAA

**David Richardson**, Director, Air Vehicle Design and Technology, Advanced Development Programs, Lockheed Martin Aeronautics Company

**Joseph Zelina**, Consulting Engineer, GE Aviation

# RISING LEADERS IN AEROSPACE

This multidimensional program, planned by the Young Professionals Committee, 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.

## MONDAY, 25 JUNE

1630–1800 HRS — REGENCY V

**Speed Mentoring**

1800–1930 HRS — REGENCY V

**Networking Reception**

Accomplished members of corporations and AIAA will be taking time to meet with the Rising Leaders participants and share their experiences. This event is a great way to get insight from top-level officials and make some great new contacts. And, maybe, they will end up being a mentor for more than just the 15 minutes at this event.

Continue your conversations and networking at the reception, which 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, 27 JUNE

1230–1400 HRS — REGENCY V

### Lunch Panel—Moving Us Forward: Growing Diversity in the Aerospace Sector

Despite making major advances in recent years, the aerospace sector still struggles with diversity, as many groups that comprise a large portion of the U.S. labor force only account for a small fraction of the aerospace workforce. This panel will provide perspectives on the role of diversity in STEM fields and how creating a diverse workforce can propel technological innovation. Panelists will also discuss efforts and best practices for closing the gap in STEM fields for minorities and women. They will share their personal commitment, experiences, and activities related to growing diversity in the workforce as well as the efforts of their associated organizations.

**MODERATOR: Cynthia Calhoun**, Deputy Chief, Program and Project Assurance Division, NASA Glenn Research Center

**PANELISTS:**

**Ashlie Flegel**, Aerospace Engineer, Fluid Mechanics Icing Branch, NASA Glenn Research Center

**Birdel Jackson III**, President, Jackson-Davis Foundation

**Rumaasha Maasha**, Aerospace Engineer, Dynamics, Loads, and Strength Branch, NASA Marshall Space Flight Center

**Christine Pastor-Barsi**, Aerospace Engineer, NASA Glenn Research Center

**Amanda Simpson**, Vice President, Research and Technology, Airbus

*Cosponsored by the AIAA Diversity Working Group*

*Boxed lunches will be available for the first 50 young professionals who attend*

## WEDNESDAY, 27 JUNE *CONT.*

1600–1730 HRS — TERRACE FOYER, BALLROOM LEVEL, BY REGENCY BALLROOM

### General Aviation Technical Committee and Rising Leaders Reception

Students and young professionals are invited to join members of the General Aviation Technical Community and the "Entering a New Era of General Aviation (Part 23)" Forum 360 panelists, who are at the forefront of the new face of aviation—including electric flight, simplified vehicle operations, and how general aviation and unmanned aircraft technologies are leading to a common destiny. Network and learn more about their role within AIAA as well as how the committee serves the industry and Institute at large.

## THURSDAY, 28 JUNE

1630–1730 HRS — CENTENNIAL IV

### Partnerships for Transformation and Skills for the Next 100 years in Aerospace

**Starr Ginn**, Deputy Aeronautics Research Director, NASA Armstrong Flight Research Center

# SPECIAL PROGRAMMING

***Open to all AIAA AVIATION Forum attendees***

## F-35 LIGHTNING II – FROM CONCEPT TO COCKPIT

The F-35 is the most advanced fighter aircraft ever built. With stealth technology, advanced sensors, weapons capacity and range, the F-35 is the most lethal, survivable and connected fighter aircraft flying in the skies today. For the first time ever, the F-35 Lightning II – From Concept to Cockpit speaker series, held at AIAA AVAIATION Forum, will provide a comprehensive, behind-the-scenes look at the government and industry effort to deliver the F-35's transformational capabilities to men and women in uniform. With 18 papers, presentations, videos and more, the team will tell the entire story behind what it took to design, develop, demonstrate, test, and deliver the F-35. Don't miss the opportunity to hear how the world's best aerospace engineers teamed up to deliver the world's most advanced fighter jet.

### TUESDAY, 26 JUNE

**0800–0900 HRS** — **CENTENNIAL BALLROOM I-III**

**Plenary: Evolution of the F-35**

**Jeff Babione**, Vice President and General Manager, Advanced Development Programs, Lockheed Martin Aeronautics Company

**0930–1130 HRS** — **CENTENNIAL BALLROOM IV**

FORUM 360°

**Reflection on Partnerships Within the F-35 Enterprise**

**1400–1700 HRS** — **REGENCY BALLROOM VI**

**F-35 Program Overview**

- F-35 Program History - From JAST to IOC
- F-35 Air Vehicle Configuration Development
- F-35 Air Vehicle Technology Overview
- F-35 Digital Thread and Advanced Manufacturing
- F-35 Weapons Design Integration
- F-35 SDD Flight Testing at Edwards AFB and NAS Patuxent River

### WEDNESDAY, 27 JUNE

**0930–1230 HRS** — **REGENCY BALLROOM VI**

**F-35 Air Vehicle Design**

- F-35 Flight Control Law Design, Development & Verification
- F-35 Propulsion System Integration, Development & Verification
- F-35 Subsystems Design, Development & Verification
- F-35 Mission Systems Design, Development & Verification
- F-35 Information Fusion
- F-35 Structural Design, Development & Verification

**1400–1700 HRS** — **REGENCY BALLROOM VI**

**F-35 Test & Verification**

- F-35 Carrier Suitability (CVS) Testing
- F-35 Aerodynamic Performance Verification
- F-35 High Angle of Attack Flight Control Development and Flight Test Results
- F-35 Weapons Separation Test and Verification
- F-35 STOVL Performance Requirements Verification
- F-35 Climatic Chamber Testing & System Verification

# SPECIAL PROGRAMMING

***Open to all AIAA AVIATION Forum attendees***

## UNIVERSITY LEADERSHIP INITIATIVE TECHNICAL INTERCHANGE

### MONDAY, 25 JUNE

**REGENCY BALLROOM VI**

NASA's Aeronautics Research Mission Directorate created the University Leadership Initiative (ULI) for a new type of interaction with the university community, where universities take the lead, build their own teams, and set their own research path. ULI seeks new, innovative ideas that can support the NASA Aeronautics portfolio and the U.S. aviation community.

In the first round of ULI, NASA selected 5 multi-year awards. The ULI Technical Interchange is a peer review of these projects. In addition, an industry expert panel will discuss aviation industry challenges that could serve as future proposal ideas. NASA's second ULI solicitation is open for proposals in NSPIRES. Proposals are due 16 May for this solicitation. The ULI Technical Interchange is the ideal event to discover cutting-edge research and technologies that will advance U.S. aviation and for an inspired idea exchange and networking for both leads and partners looking to participate in future ULI solicitations.

For detailed agenda visit: **aviation.aiaa.org/uli**

## TRANSFORMATIONAL ELECTRIC FLIGHT WORKSHOP AND EXPO

### TUESDAY, 26 JUNE – THURSDAY, 28 JUNE

**REGENCY BALLROOM VII**

The Transformational Electric Flight Workshop and Expo brings together speakers and attendees from industry, government, and academia worldwide to explore the exciting developments in the aeronautics field occurring because of electric propulsion.

From small unmanned aircraft to personal transportation to high-altitude long-endurance unmanned aircraft to commercial transports, electric propulsion technologies are opening up new missions and beginning to revolutionize traditional missions. Engage with many of the pioneers in the field, make new connections, hear the latest from regulators and researchers, and learn how electric propulsion may impact your job and your everyday life.

For detailed agenda visit: **aviation.aiaa.org/ElectricFlight**

# RECOGNITION AND LECTURES

Join us at the 2018 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, 25 JUNE

1730–1830 HRS INTERNATIONAL SOUTH

**Aerodynamics Award Lecture**

## TUESDAY, 26 JUNE

1230–1400 HRS CENTENNIAL BALLROOM I-III

### 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 Aspiring, Innovating, and Inspiring members of our aerospace community.

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

**ASPIRING EXCELLENCE:** We will announce the winners of Student Paper Competitions in the following fields if they have been chosen:

- Aerodynamic Measurement Technology
- Atmospheric Flight Mechanics
- Atmospheric and Space Environments
- Flow Control
- Lempert Award for Fluid Mechanics, Plasma Physics and Energy Transfer
- Multidisciplinary Design Optimization
- Plasmadynamics and Lasers
- Thermophysics

**INNOVATING EXCELLENCE:** Best Papers are voted to be the latest, most significant research by technical peers. We will recognize the following:

**2018 Aerodynamics Measurement Technology (AMT) Best Paper**
"First Results of Lifetime-Based Unsteady PSP Measurement on a Pitching Airfoil in Transonic Flow" (AIAA 2018-1030) by Yosuke Sugioka, Taku Nonomura, and Keisuke Asai, Tohoku University; and Kazuyuki Nakakita and Kenichi Saitoh, Japan Aerospace Exploration Agency (JAXA).

**2018 Aircraft Design Best Paper**
"Conceptual Design and Evaluation of Blended-Wing-Body Aircraft" (AIAA 2018-0522) by Malcom Brown and Roelof Vos, Delft University of Technology.

**2017 Applied Aerodynamics Best Paper**
"Cart3D Simulations for the Second AIAA Sonic Boom Prediction Workshop," (AIAA 2017-3255), by George R. Anderson, Michael J. Aftosmis, and Marian Nemec, NASA Ames Research Center.

**Best 2017 Aviation Technology, Integration, and Operations Paper**
"High-Fidelity Multirotor Unmanned Aircraft System Simulation Development for Trajectory Prediction Under Off-Nominal Flight Dynamics" (AIAA 2017-3271) by John V. Foster, NASA Langley Research Center, and David Hartman, Drexel University.

**2017 Ground Testing Best Paper**
"Correlation of Recent and Historical Rough-Wall Transition Data on Hemispherical Nosetips" (AIAA 2017-3986) by Brian R. Hollis, NASA Langley Research Center.

**2017 Modeling and Simulation Best Paper**
"Effects of Motion Cues on the Training of Multi-Axis Manual Control Skills" (AIAA 2017-3473) by Peter M. T. Zaal, NASA Ames Research Center, and Xander R.I. Mobertz, Delft University of Technology.

**2018 Plasmadynamics and Lasers Best Paper**
"Measurements and Kinetic Modeling of Radical Species in Diluted Fuel-Oxidizer Mixtures Excited by a Repetitive Nanosecond Pulse Discharge" (AIAA 2018-1194) by Caroline Winters, Zakari Eckert, Kraig Frederickson, Igor V. Adamovich, Ohio State University; and Zhiyao Yin, German Aerospace Center (DLR).

**2017 Multidisciplinary Design Optimization (MDO) Best Paper**
"Multi-Level MDO of a Long-Range Transport Aircraft Using a Distributed Analysis Framework" (AIAA 2017-4326) by Stefan Goertz, Caslav Ilic, Jonas Jepsen, Martin Leitner, Matthias Schulze, Andreas Schuster, Julian Scherer, Richard Becker, Sascha Zur, and Michael Petsch, German Aerospace Center (DLR).

**2017 Thermophysics Best Paper**
"Evidence of Standing Waves in Arc Jet Nozzle Flow" (AIAA 2017-4452) by David M. Driver, Frank C. Hui, and Imelda Terrazas-Salinas, NASA Ames Research Center; Joseph Hartman, Sierra Lobo, Inc.; Eric A. Noyes, Jacobs Technology, Inc.; and Daniel Philippidis, Aerospace Computing, Inc.

# RECOGNITION AND LECTURES

**INSPIRING EXCELLENCE:** We celebrate the significant technical achievements of the following individuals who will serve to inspire the next generation of aerospace researchers:

**2018 Aeroacoustics Award**
Tim Colonius, Frank and Ora Lee Marble Professor of Mechanical Engineering, California Institute of Technology

**2018 CEAS Aeroacoustics Award**
Sjoerd W. Rienstra, Associate Professor, Department of Mathematics and Computing Science, Eindhoven University of Technology

**2018 Aerodynamics Award**
Kenneth C. Hall, Professor of Mechanical Engineering and Materials Science, Duke University

**2018 Aircraft Design Award**
Airbus A380 Design Team, represented by Robert Lafontan, Senior Vice President, Engineering, Airbus

**2018 Ground Testing Award**
Norbert Ulbrich, Senior Aerodynamicist, Jacobs Technology, Inc.

**2018 Fluid Dynamics Award**
Helen Reed, Regents Professor, Aerospace Engineering, Texas A&M University

**2018 Hap Arnold Award for Excellence in Aeronautical Program Management**
Jeff Babione, Vice President and General Manager, Advanced Development Programs, Lockheed Martin Aeronautics Company

**Losey Atmospheric Sciences Award**
Roland Bowles, NASA Langley Research Center (ret.)

**2018 Multidisciplinary Design Optimization Award**
Evin J. Cramer, Technical Fellow, The Boeing Company (ret.)

**2018 Piper General Aviation Award**
Normal Crabill, NASA Langley Research Center (ret.)

**2018 Plasmadynamics and Lasers Award**
Martin Gundersen, Lloyd F. Hunt Chair in Electrical Power Engineering and Professor of Electrical Engineering-Electrophysics, Chemical Engineering and Materials Science, and Physics and Astronomy, University of Southern California

**2018 Thermophysics Award**
Iain D. Boyd, James E. Knott Professor of Engineering, University of Michigan

1730–1830 HRS — INTERNATIONAL NORTH

### CEAS Aeroacoustics Award Lecture

1730–1830 HRS — INTERNATIONAL SOUTH

### Fluid Dynamics Award Lecture

## WEDNESDAY, 27 JUNE

1730–1830 HRS — INTERNATIONAL NORTH

### AIAA Aeroacoustics Award Lecture

1730–1830 HRS — INTERNATIONAL SOUTH

### Multidisciplinary Analysis and Optimization Lecture

1830–2030 HRS — CENTENNIAL IV

### Aeroacoustics Reception*

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

1300–1400 HRS — CENTENNIAL I-III

### SAE/AIAA William Littlewood Memorial Lecture

**Highly Efficient Civil Aviation, Now via Operations - AAR & Challenges**
Raj Nangia, Research Fellow, University of Bristol

# 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, 24 JUNE

**1800–1930 HRS** **REGENCY BALLROOM V**

### AIAA Student Welcome Reception

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

### Networking Coffee Breaks

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

**Monday, 25 June**
0900–0930 hrs and 1600–1630 hrs, Meeting Room Foyers

**Tuesday, 26 June**
0900–0930 hrs, Meeting Room Foyers; and
1600–1630 hrs, Exposition Hall
*Sponsored by* BASTION TECHNOLOGIES

**Wednesday, 27 June**
0900–0930 hrs and 1600–1630 hrs, Exposition Hall

**Thursday, 28 June**
0900–0930 hrs and 1600–1630 hrs, Exposition Hall

**Friday, 29 June**
0900–0930 hrs and 1600–1630 hrs, Meeting Room Foyers

## TUESDAY, 26 JUNE

**1830–2000 HRS** **EXPOSITION HALL, GRAND HALL**

### Welcome Reception in the Exposition Hall

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

## THURSDAY, 28 JUNE

**1230–1400 HRS,** **EXPOSITION HALL, GRAND HALL**

### Luncheon in the Exposition Hall

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


Manage your schedule
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GET IT ON Google Play
http://ativ.me/ep2

For all other devices Web Version
http://ativ.me/aviation2018

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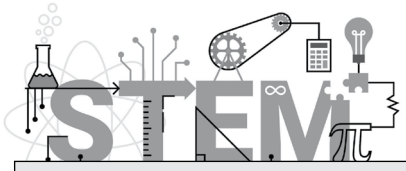


### Donate to Local STEM Programs!

AIAA has teamed up with Hands on Atlanta and their KITES (Kids Interested in Technology, Engineering, and Science) program! We invite you to donate the following items by dropping them off in the box by Registration or at the HUB any time between **Sunday at 1500 hrs and Thursday at 1500 hrs**. Items needed for local STEM programs: cups, bowls, shaving cream, tonic water, contact solution, baking soda, straws, pipe cleaners, playdoh, yarn, popsicle sticks, STEM related reading books, freezer bags, brown paper bags, food coloring, tape, aluminum foil. **Thank you for your help!**

# LET YOUR CAREER SOAR


**There's no limit to how high you can fly when you invest in yourself.**

Gain the skills and knowledge you need to boost your career trajectory with an advanced degree in aerospace engineering. The University of Alabama offers innovative programs and online classes that allow you to earn your degree while continuing to work full time.

Distance learning degree programs include:

- MS in Aerospace Engineering and Mechanics *(online)*
- PhD in Aerospace Engineering and Mechanics *(primarily online)*

**BamaByDistance.ua.edu/aviation**

Bama By Distance

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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:

### Proof of U.S. Citizenship ~

**(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~***

**U.S. Government Attendees***
AIAA forum badge
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.*

*~CAC Cards are not proof of U.S. citizenship.*

## TUESDAY, 26 JUNE

0930–1230 HRS — KENNESAW ROOM
**ITAR-01** **AEDC: Enhanced T&E for Flight Vehicles at the AEDC 1**

1400–1630 HRS — KENNESAW ROOM
**ITAR-02** **Aero-Optics and Directed Energy**

## WEDNESDAY, 27 JUNE

1400–1600 HRS — KENNESAW ROOM
**ITAR-04** **Aerodynamic Systems**

### ITAR Session General Information:

**ITAR Registration Hours:**

| | | |
|---|---|---|
| **Sunday, 24 June** | 1500–1900 hrs | Grand Hall Foyer |
| **Monday, 25 June** | 0900–1730 hrs | Grand Hall Foyer |
| **Tuesday, 26 June** | 0700–1630 hrs | Kennesaw Room Foyer |
| **Wednesday, 27 June** | 1200–1600 hrs | Kennesaw 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, 27 June, between 1500–1630 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!*

# EXPOSITION HALL

## AIAA PUBLICATIONS PAVILION AND AIAA FOUNDATION 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 Publications Pavilion. This show special will only be available during the forum! Take advantage of these super savings and visit the AIAA Publications Pavilion!

### MEET THE AUTHOR

**Leland M. Nicolai**
*Fundamentals of Aircraft and Airship Design* and *Lessons Learned*

**Wednesday, 27 June**
Coffee Break: 0900–0930 hrs
Luncheon: 1230–1400 hrs
Coffee Break: 1600–1630 hrs

AIAA FOUNDATION

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. Come check out our silent auction that has some cool aerospace items up for bid.

### EXPOSITION HALL HOURS

**TUESDAY, 26 JUNE**

**1300–1630 HRS**
**1830–2000 HRS — WELCOME RECEPTION***
Local soft rock/acoustic artist Brandon Crocker will perform.

*Sponsored by* AIRBUS

**WEDNESDAY, 27 JUNE**

**0845–1630 HRS**

**THURSDAY, 28 JUNE**

**0845–1630 HRS**

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


the HUB

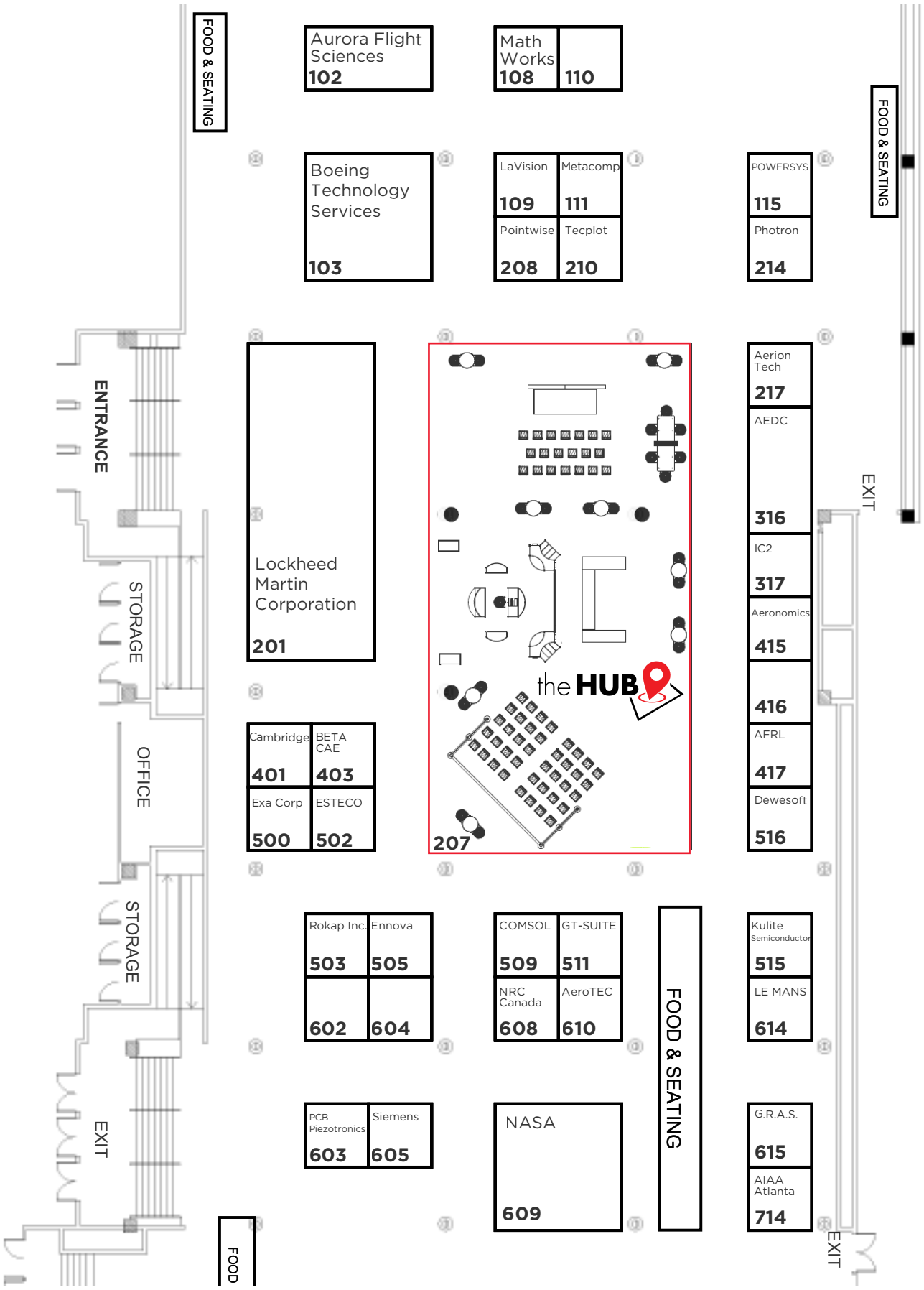
### DAILY PRIZE DRAWINGS – VISIT THE HUB TO ENTER!

**New in 2018:** Visit the HUB in the Exposition Hall each day to drop your business card for a chance at **winning one of three gift cards!**

- 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.

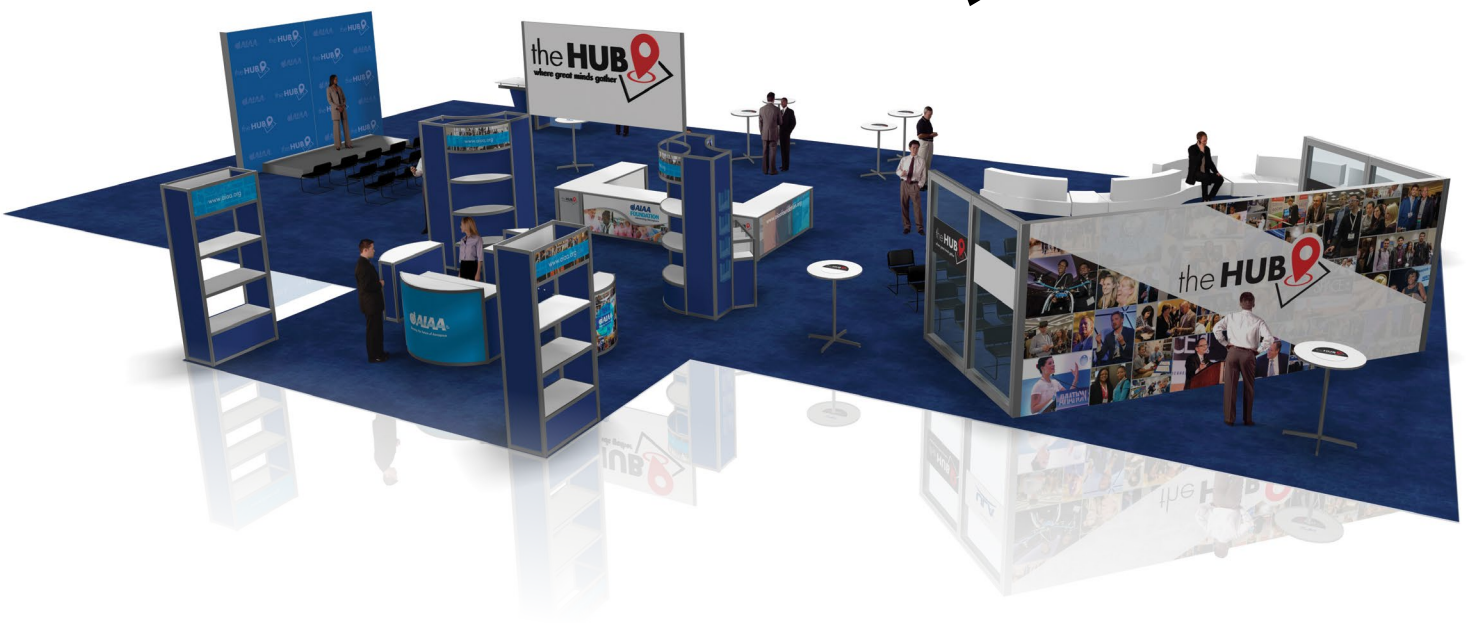
Please drop **only one** entry (business card) per day! Multiple entries will be removed. You do not need to be present to win, but you may claim your prize in the HUB while at 2018 AIAA AVIATION Forum.

# EXPOSITION HALL FLOOR PLAN



# the HUB

## where great minds gather




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

The Exposition Hall is getting an exciting addition at the 2018 AIAA AVIATION Forum: the HUB! This new multi-use area built into the heart of AIAA expositions will feature many attendee-favorite activities like Q&A with keynote speakers and AIAA leadership, PLUS two presentation areas and innovative programming and features such as design challenges, charging stations, a lounge area, and more.

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

Check out the complete schedule of activities:

**aviation.aiaa.org/thehubschedule**

### HIGHLIGHTED SESSIONS

- *Aerospace America* Interview: Rodin Lyasoff
- Career Tips
- Paper Airplane Contest
- Meet the AIAA President and Executive Director
- Q&A with Michael Huerta
- Design Challenge: Balloon Rocket Car

# EXHIBITORS BY BOOTH NUMBER

**217** **Aerion Technologies ★**

**415** **Aeronomics, Inc.**

**610** **AeroTEC ★**

**714** **AIAA Atlanta Section**

**417** **Air Force Research Laboratory**

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

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

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

**103** **Boeing Technology Services ★**

**401** **Cambridge University Press**

**509** **COMSOL, Inc.**

**516** **Dewesoft LLC**

**505** **Ennova Technologies**

**502** **ESTECO**

**500** **Exa Corporation, a Dassault Systèmes Company**

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

**511** **GT-SUITE System Simulation**

**317** **IC2 (Interdiscipilnary Consulting Corp)**

**515** **Kulite Semiconductor Products, Inc.**

**109** **LaVision, Inc.**

**614** **Le Mans Acoustique**

**201** **Lockheed Martin Corporation ★**

**108** **MathWorks**

**111** **Metacomp Technologies ★**

**609** **NASA**

**608** **National Research Council of Canada**

**603** **PCB Piezotronics, Inc.**

**214** **Photron**

**208** **Pointwise, Inc. ★**

**115** **POWERSYS**

**503** **Rokop Inc.**

**605** **Siemens PLM Software**

**210** **Tecplot ★**

★ *AIAA Corporate Member Company*

# EXHIBITORS

## Aerion Technologies 217

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Aerion Technologies (ATC) creates tools for aerodynamic design and analysis of aerospace vehicles. At Aviation 2018 ATC is launching 2 new products: Cart3D+, an intuitive aerial vehicle design tool built around NASA's renowned Cartesian Euler CFD solver, and SAGE, a scriptable CAD tool that enables the construction of sophisticated parametric models for engineering design optimization.

## Aeronomics, Inc. 415

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aeronomicsinc.com/index.htm

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 610

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AeroTEC is a one-stop turnkey flight testing, engineering, data analysis, and certification business designed to bring aerospace products to market quickly, efficiently, and on budget. With locations in Seattle and Moses Lake, Washington, the company employs over 350 engineers, technicians, and support staff, including 23 DERs specializing in a variety engineering disciplines.

## AIAA Atlanta Section 714

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AIAA Atlanta Section goals include advancing the science and technology of aeronautics, and astronautics, to encouraging original research, furthering the professional advancement of our members and improving public perception of our profession, contributions and accomplishments. Our diverse membership includes engineers from Delta Air Lines, Lockheed Martin, Georgia Tech, Kennesaw State, Spaceworks and Area-1. We work with two student chapters and support a variety of STEM related programs.

## Air Force Research Laboratory 417

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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. AFRL Aerospace Systems Directorate brings together world-class facilities including a fuels research facility, structural testing labs, compressor research facility, rocket testing facilities, supersonic and subsonic wind tunnels, flight simulation lab and many other cutting-edge research labs. https://afresearchlab.com/

## Arnold Engineering Development Complex (AEDC) 316

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www.arnold.af.mil

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.

# EXHIBITORS

## Aurora Flight Sciences, A Boeing Company 102

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Email: pwoodside@aurora.aero

Aurora Flight Sciences has over 25 years developing innovative, highly capable unmanned aircraft for national security requirements. From our Optionally Piloted Centaur, to our 5-day endurance Orion RPA, and our new DARPA VTOL X-Plane Technology Demonstrator, Aurora delivers! Contact us for an in-depth discussion of our solutions. Aurora is currently hiring – "Come Build The Future With Us"

## BETA CAE Systems USA, Inc. 403

John Skarakis
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Phone: 248-737-9760
Email: jskar@ansa-usa.com
www.ansa-usa.com

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 103

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7755 E. Marginal Way S
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Phone: 253-241-6310
Email: suzzane.m.hammond@boeing.com
www.boeing.com/bts

Boeing Technology Services provides access to the Boeing testing facilities, equipment, and technical expertise that have produced some of today's most innovative products, including commercial airplanes, rotorcraft, unmanned aircraft, tankers, fighters, airlifters, space systems, network-centric systems and more. With a passion for collaborative listening, planning, contracting, execution and delivery, Boeing creates a tailored partnership with you to achieve your product testing goals.

## Cambridge University Press 401

Kamini Ramphal
1 Liberty Plaza
New York, NY 10006
Phone: 212-337-5000
Email: kramphal@cambridge.org
www.cambridge.org/academic

Cambridge University Press' publishing in books and journals combines state-of-the-art content with the highest standards of scholarship, writing and production. Visit our stand to browse new titles, available at 20% discount, and to pick up sample copies of our journals. Visit our website to find out more about what we do: www.cambridge.org/academic

## COMSOL, Inc. 509

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Email: frida@comsol.com

COMSOL Multiphysics is an industry-leading scientific-software package for the modeling and simulation of any physics-based system. A particular strength is its ability to account for interdependent, coupled physics, known as multiphysics phenomena. Modules for specific disciplines including AC/DC, Acoustics, Plasma, Heat Transfer, MEMS, RF and Structural Mechanics are available.

## Dewesoft LLC 516

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Email: christie.nowicki@dewesoft.com
www.dewesoft.com

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## Ennova Technologies 505

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www.ennova-cfd.com

Ennova Technologies delivers today's most scalable simulation platform combining the power of cloud based computing, advanced geometry repair tools, and mixed mode meshing to create an extremely efficient pre and post processing simulation environment.

# EXHIBITORS

## ESTECO 502

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www.esteco.com

ESTECO is a pioneer in numerical optimization solutions, specializing in the research and development of engineering software for all stages of the simulation-driven design process. ESTECO's top-class products, modeFRONTIER and VOLTA, are used worldwide, helping companies increase efficiency in design simulation and accelerate product innovation.

## Exa Corporation, a Dassault Systemes Company 500

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Exa Corporation, develops, markets, sells, and supports (CAE/CFD) software products, and provides professional services for simulation-driven design. Leading manufacturers choose our fluid flow, heat transfer, and acoustic simulation solutions to optimize the performance of their products, reduce product development costs, and improve the efficiency of their design and engineering processes.

## G.R.A.S. Sound & Vibration 615

Mark Schmelzer
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Email: mark@gras.us
www.gras.us

At G.R.A.S. we know that to trust your measurement results; signal quality, stability and robustness are essentials. And because we also know how you handle and use the microphones in your daily work, we design and build our microphones to perform under real life conditions – and way beyond. We use a series of "Highly Accelerated Life Tests" to ensure reliable data and that our microphones live up to the high quality and precision that our customers have come to expect and trust.

## GT-SUITE System Simulation 511

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601 Oakmont Lane, Suite 220
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Phone: 630-325-5848
Email: d.pellegrini@gtisoft.com
www.gtisoft.com

Gamma Technologies develops GT-SUITE, the industry-leading Model-Based Systems Engineering (MBSE) CAE system simulation software. GT-SUITE provides a comprehensive set of validated 0D/1D/3D multi-physics component libraries, which simulate the physics of fluid flow, thermal, mechanical, multi-body, structural, electrical, magnetic, chemistry, and controls. Using combinations of these libraries, models simulate any aircraft system, including the complete Virtual Integrated Aircraft (VIA).

## IC2 (Interdisciplinary Consulting Corp) 317

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## Kulite Semiconductor Products, Inc. 515

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# EXHIBITORS

## LaVision, Inc. 109

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

## Le Mans Acoustique 614

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"Le Mans Acoustique" unites major contributors to R&D and Innovation, Basic Research and Training who share a common goal: To develop an international-reaching acoustics hub in Le Mans city, France. The expertise developed in aeroacoustics is applied to aircraft engine liners through basic research and cutting edge test benches currently under construction. "Le Mans Acoustique" is also focusing on Acoustic Materials, Electroacoustics, Vibroacoustics, US Non Destructive Testing, Psychoacoustics.

## Lockheed Martin Corporation 201

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Headquartered in Bethesda, Maryland, Lockheed Martin is a global security and aerospace company that employs approximately 97,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. Lockheed Martin is the largest dedicated U.S. defense company, with a legacy of technological innovation addressing the most challenging needs of the United States and our allies.

## MathWorks 108

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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 111

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## NASA 609

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## National Research Council of Canada 608

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# EXHIBITORS

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www.pcb.com

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.

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## Pointwise, Inc. 208

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## POWERSYS 115

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## Rokap Inc. 503

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## Tecplot 210

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# 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, 25 June–Friday, 29 June: 0730 hrs.**

## Speakers' Practice Room

Speakers who wish to practice their presentations may do so in the **Meeting Planner Office 1** (by the Learning Center on the Ballroom Level). 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 mobile device, enter your report at the session chair report 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, 29 June 2018**.

## Audiovisual

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

## "No Paper, No Podium" and "No Podium, No Paper" Policies

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

## Journal Publication

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


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# COMMITTEE MEETINGS

| TIME | COMMITTEE AND ANCILLARY MEETINGS/EVENTS | ROOM |
|---|---|---|
| | **Sunday, 24 June** | |
| 1330-1430 | **GTTC Steering Subcommittee** | Embassy A/B/C |
| 1400-1500 | **APATC New Member Orientation** | Roswell |
| 1430-1530 | **GTTC New Members Meeting** | Embassy A/B/C |
| 1430-1500 | **APATC Liaison Subcommittee Meeting** | Heritage |
| 1500-1600 | **APATC Publicity and Publications Subcommittee** | Chicago A |
| 1500-1600 | **APATC Honors & Awards Subcommittee** | Chicago B |
| 1500-1600 | **APATC Education Subcommittee** | Chicago C |
| 1500-1600 | **APATC Planning Subcommittee** | Chicago D |
| 1500-1600 | **APATC Membership Subcommittee** | Williams |
| 1530-1600 | **GTTC Introduction/ Overview** | Embassy A/B/C |
| 1600-1700 | **GTTC Program Meeting** | Embassy A/B/C |
| 1600-1700 | **APATC Technical Activities** | Heritage |
| 1700-1730 | **GTTC Conferences Subcommittee** | Embassy A/B/C |
| 1730-1800 | **GTTC Publications Subcommittee** | Embassy A/B/C |
| 1700-1800 | **APATC - Steering Committee** | Marietta |
| 1800-1830 | **GTTC Education and Student Activities Subcommittee** | Embassy A/B/C |
| 1800-2200 | **Applied Aerodynamics Technical Committee** | Fairlie |
| 1830-1900 | **GTTC Standards Subcommittee** | Embassy A/B/C |
| 1900-2000 | **GTTC Awards Subcommittee** | Embassy A/B/C |
| 1900-2030 | **Fluid Dynamics Transition DG** | Courtland |
| 1900-2200 | **Aviation Technology, Integration, and Operations Group Meeting (ATIOG)** | Inman |
| | **Monday, 25 June** | |
| 0900-1600 | **GTTC Internal Balance Working Group** | Chicago C/D |
| 1200-1400 | **General Aviation Technical Committee** | Heritage |
| 1200-1500 | **Aerospace Sciences Group** | Regency Ballroom VII |
| 1245-1345 | **FDTC New Members Orientation** | Chicago B |
| 1300-1500 | **GTTC Model Deformation Measurement Working Group** | Regency Ballroom V |
| 1300-1700 | **GTTC High Speed Wind Tunnel Calibration Working Group** | Embassy A |
| 1700-1800 | **APATC  Aerodynamic/Propulsive DG** | Heritage |
| 1730-1830 | **FDTC Solver Technology DG** | Embassy A |
| 1730-1830 | **FDTC LES DG** | Chicago B |
| 1730-1830 | **FDTC Flow Control Best Practices Document** | Chicago D |
| 1730-1830 | **APATC Stability and Control Prediction DG** | Harris |
| 1730-1930 | **APATC Low Boom and Commercial Supersonics DG** | Chicago C |
| 1830-1930 | **FDTC Non-Equilibrium DG** | Courtland |
| 1830-1930 | **FDTC Modal Decomposition DG** | Dunwoody |
| 1830-1930 | **FDTC Turbulence Modeling DG** | Kennesaw |
| 1830-2200 | **Aircraft Design Technical Committee** | Hanover C |
| 1900-2030 | **APATC Collaborative Experiments and Computations DG** | Inman |
| 1900-2030 | **AMT Conferences Subcommittee** | Heritage |
| 1900-2100 | **Meshing Visualization and Computational Environments Technical Committee** | Embassy A |

# COMMITTEE MEETINGS

| TIME | COMMITTEE AND ANCILLARY MEETINGS/EVENTS | ROOM |
|---|---|---|
| 1900-2100 | **Aircraft Operations Technical Committee** | Chicago A |
| 1900-2100 | **FDTC Massively-Separated Flows DG** | Greenbriar |
| 1900-2200 | **Air Transportation Systems Technical Committee** | Embassy F |
| 1930-2030 | **FDTC High-Order CFD Methods DG** | Fairlie |
| 1930-2100 | **APATC Sailplane Aerodynamics and Design DG** | Chicago B |
| 1930-2100 | **APATC/FDTC Flow Control Applications and Impacts DG** | Embassy D |
| 1930-2130 | **FDTC High-speed FSI DG** | Embassy C |
| 2030-2200 | **AMT Awards & Nominations Subcommittees** | Heritage |
| 2100-2200 | **Joint Meeting between AOTC and ATSTC** | Chicago A |
| 2100-2200 | **Joint Meeting between AOTC and ATSTC** | Chicago A |
| | **Tuesday, 26 June** | |
| 0800-1600 | **GTTC Measurement Uncertainty Working Group** | Chicago C |
| 0900-1000 | **Certification/Qualification by Analysis CoI Steering Committee** | Chicago B |
| 1300-1700 | **GTTC Model Attitude Measurement Working Group** | Regency Ballroom V |
| 1600-1700 | **Thermophysics TC Nominations Subcommittee** | Williams |
| 1600-1700 | **Emerging Technologies Committee** | Auburn |
| 1600-1700 | **Thermophysics TC Best Paper Subcommittee** | Chicago D |
| 1600-1700 | **Thermophysics TC Awards Subcommittee** | Heritage |
| 1700-1800 | **Thermophysics TC Publications Subcommittee** | Williams |
| 1700-1800 | **Thermophysics Conferences Subcommittee** | Embassy B |
| 1700-1800 | **Computational Fluid Dynamics (CFD) CoS** | Chicago B |
| 1700-1800 | **Thermophysics TC Education Subcommittee** | Chicago C |
| 1700-1800 | **Thermophysics TC Publicity Subcommittee** | Chicago D |
| 1800-2000 | **Atmospheric and Space Environments Technical Committee** | Auburn |
| 1800-2100 | **Design Engineering Technical Committee** | Heritage |
| 1830-2030 | **APATC Simulation of Rotor in Hover DG** | Embassy B |
| 1830-2130 | **Flight Test Technical Committee** | Williams |
| 1900-2100 | **Aeroacoustics Technical Committee Meeting** | Regency Ballroom VI |
| 1900-2100 | **Plasmadynamics and Lasers Technical Committee** | Courtland |
| 1900-2100 | **FDTC Flow Control and Fluid Applications SC** | Fairlie |
| 1900-2100 | **FDTC CFD Methods SC** | Kennesaw |
| 1900-2100 | **FDTC Fundamentals of Flow Phenomena SC** | Chicago A |
| 1900-2100 | **Meshing Subcommittee** | Chicago C |
| 1930-2200 | **Thermophysics Technical Committee** | Regency Ballroom V |
| 1930-2200 | **AMT Technical Committee** | Inman |
| | **Wednesday, 27 June** | |
| 0800-1200 | **GTTC Dual Flow Reference Nozzle Working Group** | Chicago B |
| 0830-1130 | **Certification/Qualification by Analysis Community of Interest Open Meeting** | Chicago C/D |
| 1100-1200 | **Aviation 2019 Technical Program Committee Planning Meeting** | Courtland |
| 1200-1400 | **NASA Swept-Wing Icing Research** | Hanover E |
| 1230-1400 | **FDTC Steering Committee** | Heritage |
| 1300-1500 | **AIAA Standards Executive Council (SEC)** | Williams |

# COMMITTEE MEETINGS

| TIME | COMMITTEE AND ANCILLARY MEETINGS/EVENTS | ROOM |
|---|---|---|
| 1300-1700 | **GTTC Future of Ground Testing IC&E Development** | Chicago B |
| 1400-1630 | **Corporate Member Group** | Chicago C/D |
| 1600-1700 | **AVIATION Executive Steering Committee** | Williams |
| 1600-1800 | **Green Engineering Integration and Outreach Committee** | Auburn |
| 1730-1900 | **APATC CFD Transition Modeling DG** | Regency Ballroom V |
| 1730-1900 | **APATC Missile & Projectile Aeroprediction DG** | Chicago C/D |
| 1800-1930 | **APATC High Lift Common Research Model Applications DG** | Marietta |
| 1830-2000 | **CASE 2019 at AVIATION - Planning** | Williams |
| 1830-2130 | **Multidisciplinary Design Optimization Technical Committee Meeting** | Courtland |
| 1900-2100 | **V/STOL Technical Committee** | Chicago A |
| 1900-2100 | **Geometry Modeling Working Group** | Heritage |
| 1900-2200 | **Aerospace Traffic Management Integration Committee** | Chicago B |
| 1900-2200 | **FDTC Plenary** | Centennial I |
| | **Thursday, 28 June** | |
| 0800-1200 | **GTTC Future of Ground Testing Working Group** | Chicago B |
| 0900-1200 | **GTTC Statistically Defensible Test Methods FG** | Chicago C/D |
| 0900-1500 | **Atmospheric Flight Mechanics (AFM) Technical Committee** | Williams |
| 1300-1700 | **GTTC Wind Tunnel Flow Quality Working Group** | Chicago C/D |
| 1730-2030 | **GTTC Conference Summary Meeting** | International South |
| 1800-2100 | **Transformational Flight IOC Meeting** | Chicago C/D |
| 1900-2200 | **Modeling and Simulation Technical Committee Meeting** | Courtland |

## Monday

### Monday, 25 June 2018

| 1-SB-1<br>0730 - 0800 hrs | Speakers' Briefing | Session Rooms |
|---|---|---|

### Monday, 25 June 2018

| 2-PLNRY-1<br>0800 - 0900 hrs | Monday Plenary: New Paradigms in Aviation | Centennial I, II, III |
|---|---|---|

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

Panelists:

**Rodin Lyasoff**
Chief Executive Officer
A$^3$ by Airbus

**Pradeep Fernandes**
Managing Director, Disruptive Horizons
Boeing HorizonX

**Ilan Kroo**
Thomas V. Jones Professor of Engineering
Department of Aeronautics and Astronautics
Stanford University

**Jack O'Banion**
Vice President, Strategy and Customer Requirements
Advanced Development Programs
Lockheed Martin Aeronautics Company

### Monday, 25 June 2018

| 3-NW-1<br>0900 - 0930 hrs | Networking Coffee Break | Centennial Foyer |
|---|---|---|

### Monday, 25 June 2018

**4-AA-1** — Acoustic/Fluid Dynamics Interactions I — Marietta

Chaired by: D. NARK, NASA Langley Research Center

0930 hrs
AIAA-2018-2800
**Experimental Characterization of Vortex Generators Induced Noise of Wind Turbines**
D. Kolkman, L. de Santana, C. Venner, A. Garrel, University of Twente, Enschede, The Netherlands; C. Arce León, LM Wind Power, Heerhugowaard, The Netherlands; M. Sanders, University of Twente, Enschede, The Netherlands

1000 hrs
AIAA-2018-2801
**Turbulent Flow Interaction with Porous Surfaces**
S. Showkat Ali, M. Szoke , M. Azarpeyvand, University of Bristol, Bristol, United Kingdom; C. Ilario da Silva, Embraer, São José dos Campos, Brazil

1030 hrs
AIAA-2018-2802
**An experimental investigation of trailing-edge noise reduction due to elasticity**
M. Nilton, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; Y. Malik, University of Twente, Enschede, The Netherlands; A. Cavalieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; L. de Santana, University of Twente, Enschede, The Netherlands; M. Donadon, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; W. Wolf, University of Campinas, Campinas, Brazil; et al.

1100 hrs
AIAA-2018-2803
**On The Spatial–Temporal Developments Of Turbulent Spots On a Serrated Trailing Edge**
A. Juknevicius, T. Chong, Brunel University London, London, United Kingdom

1130 hrs
AIAA-2018-2804
**Sound extrapolation methods for turbulent flows based on indirect acoustic variables**
S. Zhong, X. Zhang, Hong Kong University of Science and Technology, Hong Kong, Hong Kong; C. Morfey, University of Leicester, Leicester, United Kingdom; R. Sandberg, University of Melbourne, Melbourne, Australia; R. Fattah, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

| Monday, 25 June 2018 | | | | | | |
|---|---|---|---|---|---|---|
| **5-AA-2** | **Advanced Testing Techniques I** | | | | | **University** |
| Chaired by: P. JOSEPH, ISVR/University of Southampton and N. MURRAY, The University of Mississippi | | | | | | |
| 0930 hrs<br>AIAA-2018-2805<br>**Two-dimensional Modal Beamforming in Wavenumber Space for Duct Acoustics**<br>R. Dougherty, OptiNav, Inc., Bellevue, WA; R. Bozak, NASA Glenn Research Center, Cleveland, OH | 1000 hrs<br>AIAA-2018-2806<br>**Direct Spectral Estimation Method for Continuous Scan Beamforming**<br>D. Papamoschou, D. Morata, University of California, Irvine, Irvine, CA; P. Shah, ATA Engineering, Inc., San Diego, CA | 1030 hrs<br>AIAA-2018-2807<br>**Beamforming array design via iterative microphone removal**<br>E. Arcondoulis, Y. Liu, Southern University of Science and Technology, Shenzhen, China | 1100 hrs<br>AIAA-2018-2808<br>**A Tomographic Directivity Approach to Frequency Domain Beamforming**<br>T. Ahlefeldt, C. Spehr, T. Berkefeld, German Aerospace Center (DLR), Göttingen, Germany; A. Di Marco, L. Burghignoli, Roma Tre University, Rome, Italy | 1130 hrs<br>AIAA-2018-2809<br>**Comparison between analog and digital phased microphone arrays for aeroacoustic measurements**<br>R. Merino-Martinez, Delft University of Technology, Delft, The Netherlands; M. Sanders, L. Caldas, University of Twente, Twente, The Netherlands; F. Avallone, D. Ragni, Delft University of Technology, Delft, The Netherlands; L. de Santana, University of Twente, Twente, The Netherlands; et al. | | |

| Monday, 25 June 2018 | | | | | | |
|---|---|---|---|---|---|---|
| **6-AA-3** | **Airframe/High-Lift Noise I** | | | | | **Roswell** |
| Chaired by: M. KHORRAMI, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-2810<br>**Trailing-edge noise in slowly-varying, sheared flow**<br>D. Baker, N. Peake, University of Cambridge, Cambridge, United Kingdom | 1000 hrs<br>AIAA-2018-2811<br>**Investigation on the Accuracy of the TNO Model Using RANS CFD and XFOIL Inputs for Airfoil Trailing Edge Noise Predictions**<br>D. Nguyen, S. Lee, University of California, Davis, Davis, CA | 1030 hrs<br>AIAA-2018-2812<br>**Numerical Study of 2-D Finlets Using RANS CFD for Trailing Edge Noise Reduction**<br>Y. Shi, S. Lee, University of California, Davis, Davis, CA | 1100 hrs<br>AIAA-2018-2813<br>**Toward a Semi-Empirical Noise Prediction for Airfoils with Serrated Trailing Edges**<br>Y. Mayer, University of Bristol, Bristol, United Kingdom; B. Lyu, University of Cambridge, Cambridge, United Kingdom; H. Kamliya Jawahar, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | 1130 hrs<br>AIAA-2018-2814<br>**Airfoil Trailing-edge Noise Reduction using Flow Suction**<br>L. Cesar, H. Kamliya Jawahar, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | 1200 hrs<br>AIAA-2018-2815<br>**Aerodynamic and Aeroacoustic Performance of Airfoils Fitted with Morphing Trailing-edges**<br>H. Kamliya Jawahar, Q. Ai, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | |

| Monday, 25 June 2018 | | | | | | |
|---|---|---|---|---|---|---|
| **7-AA-4** | **Community Noise and Metrics** | | | | | **Spring** |
| Chaired by: J. ALONSO-MIRALLES, UTC Aerospace Systems | | | | | | |
| 0930 hrs<br>AIAA-2018-2816<br>**Noise and Sonic Boom Analysis from Rocket Launches**<br>K. Tran, D. Lim, S. Min, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-2817<br>**Preliminary Noise Assessment of Aircraft with Distributed Electric Propulsion**<br>A. Synodinos, R. Self, A. Torija, University of Southampton, Southampton, United Kingdom | 1030 hrs<br>AIAA-2018-2818<br>**Assessment of the Noise Immission along Approach and Departure Flightpaths for Different SFB 880 Vehicle Concepts**<br>J. Blinstrub, L. Bertsch, German Aerospace Center (DLR), Göttingen, Germany; W. Heinze, Technical University of Braunschweig, Braunschweig, Germany | 1100 hrs<br>AIAA-2018-2819<br>**Community noise assessment for aircrafts with contra-rotating open rotor power plants**<br>L. Sanders, ONERA, Châtillon, France | | | |

| Monday, 25 June 2018 | | | | | | |
|---|---|---|---|---|---|---|
| **8-AA-5** | **Integration Effects and Flight Acoustics I** | | | | | **Techwood** |
| Chaired by: I. CLARK, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-2820<br>**Experimental Investigations on Noise Shielding: Dependency on Reference Noise Source and Testing Environment**<br>K. Rossignol, J. Delfs, German Aerospace Center (DLR), Braunschweig, Germany; D. Gély, J. Bulté, ONERA, Châtillon, France | 1000 hrs<br>AIAA-2018-2821<br>**Experimental Study of Noise Shielding by a NACA 0012 Airfoil**<br>F. Hutcheson, C. Bahr, R. Thomas, NASA Langley Research Center, Hampton, VA; D. Stead, Science and Technology Corporation, Hampton, VA | 1030 hrs<br>AIAA-2018-2822<br>**Numerical Assessment of CROR Noise Shielding with a Coupled Möhring Analogy and BEM Approach**<br>L. Dürrwächter, M. Kessler, E. Kraemer, University of Stuttgart, Stuttgart, Germany | 1100 hrs<br>AIAA-2018-2823<br>**Computation and Validation of Acoustic Shielding at Realistic Aircraft Configurations**<br>M. Lummer, M. Mössner, J. Delfs, German Aerospace Center (DLR), Braunschweig, Germany | 1130 hrs<br>AIAA-2018-2824<br>**Evaluation of Wing Shielding for Supersonic Civil Transport Community Noise Reduction**<br>K. Ramakrishnan, U. Paliath, N. Pastouchenko, General Electric Company, Niskayuna, NY | | |

**Monday, 25 June 2018**

| 9-AA-6 | Jet Aeroacoustics I | | | | | Piedmont |
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| Chaired by: T. COLONIUS, California Institute of Technology | | | | | | |
| 0930 hrs<br>AIAA-2018-2825<br>**Simulations and experiments of dual high-speed impinging jets**<br>M. Houston, J. Nichols, University of Minnesota, Twin Cities, Minneapolis, MN; F. Zigunov, P. Sellappan, F. Alvi, Florida State University, Tallahassee, FL | 1000 hrs<br>AIAA-2018-2826<br>**Dependence of High-performance Military Aircraft Noise on Frequency and Engine Power**<br>K. Leete, Brigham Young University, Provo, UT; A. Wall, Air Force Research Laboratory, Wright-Patterson AFB, OH; K. Gee, T. Neilsen, Brigham Young University, Provo, UT; M. James, J. Downing, Blue Ridge Research and Consulting, LLC, Asheville, NC | 1030 hrs<br>AIAA-2018-2827<br>**Temperature effect on the apparent position of effective noise sources in a hot jet**<br>V. Gryazev, Queen Mary University of London, London, United Kingdom; A. Markesteijn, GPU-prime, Ltd., Cambridge, United Kingdom; S. Karabasov, Queen Mary University of London, London, United Kingdom | 1100 hrs<br>AIAA-2018-2828<br>**Comparison of two Goldstein acoustic analogy implementations with the Tam&Auriault model for heated and unheated jet noise prediction**<br>V. Gryazev, S. Karabasov, Queen Mary University of London, London, United Kingdom | | |

**Monday, 25 June 2018**

| 10-AFM-1 | Small Unmanned Aircraft Systems I | | | | | Embassy C |
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| Chaired by: M. PHILLIPS, NASA and S. D'SOUZA, NASA-ARC | | | | | | |
| 0930 hrs<br>AIAA-2018-2829<br>**Impact of albatross's wing colors on their skin friction drag: thermal analysis and blasius boundary layer solution**<br>M. Hassanalian, S. Ben Ayed, New Mexico State University, Las Cruces, NM; M. Ali, Research and Technology Center of Energy, Hammam-Lif, Tunisia; P. Houde, New Mexico State University, Las Cruces, NM; C. Hocut, Army Research Laboratory, Las Cruces, NM; A. Abdelkefi, New Mexico State University, Las Cruces, NM | 1000 hrs<br>AIAA-2018-2830<br>**Time-Averaged Dynamic Modeling of a Flapping-Wing Micro Air Vehicle with Passive Rotation Mechanisms**<br>L. Chang, N. Pérez-Arancibia, University of Southern California, Los Angeles, CA | 1030 hrs<br>AIAA-2018-2831<br>**An Investigation of Wing Elasticity Effects on Store Separation Based on Computational Fluid Dynamics**<br>I. Mizrahi, D. Raveh, Technion–Israel Institute of Technology, Haifa, Israel | 1100 hrs<br>AIAA-2018-2832<br>**On The Stability of Dynamic Soaring Orbits of UAVs**<br>B. Swaminathan, Indian Institute of Technology Madras, Chennai, India | 1130 hrs<br>AIAA-2018-2833<br>**Robust Higher-Order Sliding Mode Control Systems for Roll-Coupled Maneuvers of Aircraft Using Output Feedback**<br>K. Raj, V. Muthukumar, S. Singh, University of Nevada, Las Vegas, Las Vegas, NV | 1200 hrs<br>AIAA-2018-2834<br>**Design of an Active Gust Load Alleviation System for Small UAS Using a Flush Airdata Sensing System**<br>T. Islam, I. Martin, D. Moormann, RWTH Aachen University, Aachen, Germany | |

**Monday, 25 June 2018**

| 11-AMT-1/GT-1<br>0930 - 1230 hrs | Special Session: Optical Diagnostics in Plasma Facilities (Invited) | The Learning Center |
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**Aerothermal Modeling Challenges for Entry, Descent and Landing Missions**
Mike Wright, NASA Ames Research Center, Brian Hollis, NASA Langley Research Center, Michael Barnhardt, NASA Ames Research Center, Chris Jonhston, NASA Langley Research Center, Aaron Brandis, NASA Ames Research Center, Karl Edquist, NASA Langley Research Center, Brett Cruden, NASA Ames Research Center

**Quantitative Flow Measurements Using Planar Laser-Induced Fluorescence in the Hypersonic Materials Environmental Test System (HYMETS)**
Craig Johansen and Connor McDougall, University of Calgary, Roland Stanzel, University of Vermont, Daniel Resse, National Institute of Aerospace, Jennifer Inman, Brett Bathel, Paul Danehy, and Scott Splinter, NASA Langley Research Center

**Laser Spectroscopic Measurements of Gas-Surface Reaction Rates for Atmospheric Entry Applications**
Douglas G. Fletcher, Jason M. Meyers, Andrew J. Lutz, Luke D. Allen and Roland Herrmann-Stanzel, University of Vermont

**Characterization of Gas/Surface Interaction Phenomena on Ablation Testing in the VKI Plasmatron Facility**
B. Helber and O. Chazot, von Kármán Institute for Fluid Dynamics

**High Enthalpy Flow Diagnostics with Lightfield Imaging and Tomographic Emission Spectroscopy**
S. Loehle, F. Zander, M. Eberhart, A. Meindl, D. Leiser, and F. Hufgard, University of Stuttgart

**Remote Recession Measurements of Ablators with Emission Spectroscopy**
Michael Winter, University of Kentucky

| Monday, 25 June 2018 | | | | | | |
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| **12-APA-1** | **Special Session: Aerodynamic-Structural Modeling, Optimization, and Test Techniques for Flexible Wing Technology (Invited)** | | | | | **Greenbriar** |
| Chaired by: N. RAJMOHAN, Aerion Technologies Inc. | | | | | | |
| 0930 hrs<br>AIAA-2018-2835<br>**Lift Characterization Study of a Two-Element Three-Segment Variable Camber Airfoil (Invited)**<br>U. Kaul, N. Nguyen, NASA Ames Research Center, Moffett Field, CA | 1000 hrs<br>AIAA-2018-2836<br>**Active Flutter Suppression Controllers Derived from Linear and Nonlinear Aerodynamics: Application to a Transport Aircraft Model (Invited)**<br>J. Waite, B. Stanford, R. Bartels, W. Silva, S. Massey, NASA Langley Research Center, Hampton, VA | 1030 hrs<br>AIAA-2018-2837<br>**Aeroservoelastic Optimization under Stochastic Gust Constraints (Invited)**<br>B. Stanford, NASA Langley Research Center, Hampton, VA | | | | |

| Monday, 25 June 2018 | | | | | | |
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| **13-APA-2/ATIO.ACD-1** | **Special Session: UCAV Systems Design I - Overviews, Aerodynamic Shaping (Invited)** | | | | | **Hanover F** |
| Chaired by: R. CUMMINGS, US Air Force Academy and B. CYBYK, The Johns Hopkins University Applied Physics Laboratory | | | | | | |
| 0930 hrs<br>AIAA-2018-2838<br>**Multi-Disciplinary Design and Performance Assessment of Effective, Agile NATO Air Vehicles (Invited)**<br>R. Cummings, U.S. Air Force Academy, Colorado Springs, CO; C. Liersch, A. Schuette, German Aerospace Center (DLR), Braunschweig, Germany | 1000 hrs<br>AIAA-2018-2839<br>**Conceptual Design of a 53deg Swept Flying Wing UCAV Configuration (Invited)**<br>C. Liersch, German Aerospace Center (DLR), Braunschweig, Germany; G. Bishop, Ministry of Defence, Fareham, United Kingdom | 1030 hrs<br>AIAA-2018-2840<br>**Aerodynamic design of an Unmanned Combat Air Vehicle in a collaborative framework (Invited)**<br>M. van Rooij, Netherlands Aerospace Centre (NLR), Amsterdam, The Netherlands; R. Cummings, U.S. Air Force Academy, Colorado Springs, CO | 1100 hrs<br>AIAA-2018-2841<br>**Aerodynamic shaping design and vortical flow design aspects of a 53deg swept flying wing configuration (Invited)**<br>A. Schuette, J. Vormweg, German Aerospace Center (DLR), Braunschweig, Germany; R. Maye, T. Jeans, University of New Brunswick, Fredericton, Canada | 1130 hrs<br>AIAA-2018-2842<br>**A UCAV Wing Design, Assessment and Comparisons. (Invited)**<br>R. Nangia, Nangia Aero Research Associates, Bristol, United Kingdom; J. Coppin, Defence Science and Technology Laboratory, Fareham, United Kingdom; M. Ghoreyshi, U.S. Air Force Academy, Colorado Springs, CO | | |

| Monday, 25 June 2018 | | | | | | |
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| **14-APA-3** | **Special Session: High Lift Prediction Using CFD** | | | | | **Fairlie** |
| Chaired by: C. RUMSEY, NASA-Langley Research Center and J. SLOTNICK, The Boeing Company | | | | | | |
| 0930 hrs<br>AIAA-2018-2843<br>**Gulfstream's Contributions to the Third AIAA High Lift Prediction Workshop**<br>N. Powell, A. Clemens, A. Velez-Valencia, J. Welter, Gulfstream Aerospace Corporation, Savannah, GA | 1000 hrs<br>AIAA-2018-2844<br>**ANSYS CFD Study for High Lift Aircraft Configurations**<br>K. Zore, S. Shah, J. Stokes, B. Sasanapuri, P. Sharkey, ANSYS, Inc., Pune, India | 1030 hrs<br>AIAA-2018-2845<br>**DPW-6 and HiLiftPW-3 using the Stanford University Unstructured (SU2)**<br>G. Becker, R. Granzoto, Embraer, São José dos Campos, Brazil | 1100 hrs<br>AIAA-2018-2846<br>**Transitional Delayed Detached Eddy Simulation of Multielement, High-Lift Airfoils**<br>J. Coder, H. Ortiz-Melendez, University of Tennessee, Knoxville, Knoxville, TN | 1130 hrs<br>AIAA-2018-2847<br>**XFlow Contribution to the Third High-Lift Prediction Workshop**<br>G. Trapani, R. Brionnaud, D. Holman, Dassault Group, Madrid, Spain | 1200 hrs<br>**High Lift Prediction Workshop Discussion**<br>(Open Discussion) | |

| Monday, 25 June 2018 | | | | | | |
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| **15-APA-4** | **Special Session: Low Boom Activities** | | | | | **Courtland** |
| Chaired by: S. RALLABHANDI, NASA Langley Research Center and O. SAN, Oklahoma State University | | | | | | |
| 0930 hrs<br>AIAA-2018-2848<br>**Sonic Boom Prediction and Mitigation using Three-Dimensional Earth Effects**<br>S. Rallabhandi, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-2849<br>**Surrogate Based Shape Optimization of a Low Boom Axisymmetric Body**<br>J. Kirz, German Aerospace Center (DLR), Braunschweig, Germany | 1030 hrs<br>AIAA-2018-2850<br>**Supersonic Inlet Test for a Quiet Supersonic Transport Technology Demonstrator in the NASA Glenn 8-foot by 6-foot Supersonic Wind Tunnel**<br>R. Castner, S. Simerly, NASA Glenn Research Center, Cleveland, OH; M. Rankin, Lockheed Martin Corporation, Palmdale, CA | 1100 hrs<br>AIAA-2018-2851<br>**Multifidelity Uncertainty Quantification of a Commercial Supersonic Transport**<br>T. West, B. Phillips, NASA Langley Research Center, Hampton, VA | 1130 hrs<br>Oral Presentation<br>**Aeroservoelastic Uncertainty Quantification for a Low-Boom Aircraft Configuration**<br>B. Phillips, T. West, NASA Langley Research Center, Hampton, VA | 1200 hrs<br>Oral Presentation<br>**Sonic Booms in Atmospheric Turbulence (SonicBAT) Program Overview**<br>K. Bradley, KBR, Inc., Arlington, VA | |

| Monday, 25 June 2018 | | | | | | |
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| **16-APA-5** | **Aerodynamic Testing: Ground, Wind-Tunnel and Flight Testing I** | | | | | **Baker** |
| Chaired by: T. CHYCZEWSKI, Northrop Grumman Aerospace Systems and G. GATLIN, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-2852<br>**A Test Fixture to Measure the Skin Friction of Anisotropic Surfaces**<br>B. Rafferty, B. Dowgwillo, The Boeing Company, Berkeley, MO | 1000 hrs<br>AIAA-2018-2853<br>**Integrating Model-Based Systems Engineering and Uncertainty Quantification to Design Optimum Aircraft Test Campaigns**<br>E. Kraft, University of Tennessee, Tullahoma, Tullahoma, TN | 1030 hrs<br>AIAA-2018-2854<br>**Increasing the Effectiveness of a Vertical Stabilizer by Combining Pulsed Jet Actuation at the Leading Edge and the Rudder Hinge Line**<br>S. Löffler, M. Staats, T. Grund, J. Weiss, Technical University of Berlin, Berlin, Germany | 1100 hrs<br>AIAA-2018-2855<br>**Wind tunnel testing of a generic regional turboprop aircraft modular model and development of improved design guidelines**<br>F. Nicolosi, D. Ciliberti, P. Della Vecchia, S. Corcione, University of Naples "Federico II", Naples, Italy | 1130 hrs<br>AIAA-2018-2856<br>**LDA characterization of the Mars 2020 rover influence on the wind measurements at low Reynolds**<br>R. Bardera-Mora, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain; A. Garcia-Magariño, Engineering Systems for Spanish Defense (ISDEFE), Madrid, Spain; S. Sor , M. Urdiales, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain | | |

| Monday, 25 June 2018 | | | | | | |
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| **17-ASE-1** | **Icing CFD and Modeling** | | | | | **Hanover C** |
| Chaired by: M. POTAPCZUK, NASA Glenn Research Center and P. PELLICANO, Federal Aviation Administration | | | | | | |
| 0930 hrs<br>AIAA-2018-2857<br>**Direct Numerical Simulation of a Thin Film Over a NACA 0012 Airfoil**<br>J. Sakakeeny, S. McClain, Y. Ling, Baylor University, Waco, TX | 1000 hrs<br>AIAA-2018-2858<br>**An extended rough-wall model for an integral boundary layer model intended for ice accretion calculations**<br>E. Radenac, A. Kontogiannis, C. Bayeux, P. Villedieu, ONERA, Toulouse, France | 1030 hrs<br>AIAA-2018-2859<br>**Computational Icing Risk Analysis of the D8 "Double Bubble" Aircraft**<br>C. Porter, M. Potapczuk, NASA Glenn Research Center, Cleveland, OH | 1100 hrs<br>AIAA-2018-2860<br>**Ice accretion on a NACA 23012 airfoil**<br>E. Oztekin, Diakon Solutions, LLC, Cape May Court House, NJ; J. Riley, Federal Aviation Administration, Atlantic City, NJ | 1130 hrs<br>AIAA-2018-2861<br>**UAV Icing: Comparison of LEWICE and FENSAP-ICE for Ice Accretion and Performance Degradation**<br>R. Hann, Norwegian University of Science and Technology (NTNU), Trondheim, Norway | 1200 hrs<br>AIAA-2018-2862<br>**IDDES simulation of flow separation on an 3-D NACA23012 airfoil with spanwise ridge ice**<br>S. Hu, C. Zhang, H. Liu, F. Wang, Shanghai Jiao Tong University, Shanghai, China; Y. Li, Civil Aviation Administration of China, Shanghai, China | |

| Monday, 25 June 2018 | | | | | | |
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| **18-ASE-2** | **Managing Vortex Encounter I (Invited)** | | | | | **Hanover D** |
| Chaired by: A. BROWN, National Research Council Canada and N. AHMAD, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-2863<br>**Recent advances in wind lidar technologies for characterization of wake vortices (Invited)**<br>N. Prasad, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-2864<br>**Large Eddy Simulation of Wake Vortices under Influences of Hanger Wake and the Ground (Invited)**<br>T. Misaka, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan; R. Yoshimura, S. Obayashi, Tohoku University, Sendai, Japan; N. Matayoshi, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan | 1030 hrs<br>AIAA-2018-2865<br>**Hybrid numerical simulation of the jet-wake-vortex interaction of a cruising aircraft (Invited)**<br>A. Stephan, D. Rohlmann, F. Holzäpfel, R. Rudnik, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1100 hrs<br>AIAA-2018-2866<br>**Examination of the Applicability of NOAA MADIS Aircraft Based Observation Dataset for Wake Turbulence Research (Invited)**<br>S. Mackey, Department of Transportation, Cambridge, MA; B. Robins, Engility Corporation, Andover, MA; F. Wang, Y. Zhang, Department of Transportation, Cambridge, MA | 1130 hrs<br>AIAA-2018-2867<br>**Flight Measurement of Medium Category Wake Vortex Characteristics (Invited)**<br>A. Brown, National Research Council Canada, Gloucester, Canada | 1200 hrs<br>Oral Presentation<br>**Analysis of a Wake Vortex Encounter over the Arabian Sea—Meteorological Situation, Wake Vortex Behavior and Impact on Aircraft (Invited)**<br>F. Holzäpfel, U. Schumann, S. Koerner, German Aerospace Center (DLR), Oberpfaffenhofen, Germany; C. Schwarz, German Aerospace Center (DLR), Braunschweig, Germany | |

| Monday, 25 June 2018 | | | | | | |
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| **19-ATIO.ACD-2** | **Systems Engineering** | | | | | **Hanover A** |
| Chaired by: W. ANEMAAT, DARcorporation | | | | | | |
| 0930 hrs<br>AIAA-2018-2868<br>**Technology Impact Forecasting as a Framework for Assessment of Multi-functional Composites**<br>Y. Huang, D. Soban, Queen's University Belfast, Belfast, United Kingdom | 1000 hrs<br>AIAA-2018-2869<br>**Stochastic Aircraft Optimization and Decision Making using a Competitive Value-Driven Design Framework**<br>A. Desai, P. Hollingsworth, University of Manchester, Manchester, United Kingdom; S. Jinks, Rolls Royce, Derby, United Kingdom | 1030 hrs<br>AIAA-2018-2870<br>**Impact of Aircraft Technologies on US Fleet $CO_2$ Emissions**<br>M. Hassan, H. Pfaender, D. Mavris, Georgia Institute of Technology, Atlanta, GA | | | | |

| Monday, 25 June 2018 | | | | | | |
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| **20-ATIO.ATM-1** | **UAS Detect and Avoid** | | | | | **Embassy D** |
| Chaired by: V. SCHULTZ, NASA Langley Research Center and K. ARTHUR | | | | | | |
| 0930 hrs<br>AIAA-2018-2871<br>**UAS Detect and Avoid: Efforts from NASA's UAS Integration into the NAS Project**<br>W. Johnson, NASA Langley Research Center, Hampton, VA; R. Shively, NASA Ames Research Center, Moffett Field, CA | 1000 hrs<br>AIAA-2018-2872<br>**En Route Detect and Avoid Well Clear in Terminal Area Landing Pattern**<br>A. Trujillo, NASA Langley Research Center, Hampton, VA; D. Jack, Adaptive Aerospace Group, Inc., Hampton, VA; D. Tsakpinis, SAIC, Hampton, VA | 1030 hrs<br>AIAA-2018-2873<br>**A Recommended DAA Well-Clear Definition for the Terminal Environment**<br>M. Vincent, A. Trujillo, NASA Langley Research Center, Hampton, VA; D. Jack, K. Hoffler, Adaptive Aerospace Group, Inc., Hampton, VA; D. Tsakpinis, SAIC, Hampton, VA | 1100 hrs<br>AIAA-2018-2874<br>**An Exploratory Evaluation of UAS Detect and Avoid Operations in the Terminal Environment**<br>L. Fern, R. Rorie, NASA Ames Research Center, Moffett Field, CA; Z. Roberts, San Jose State University, San Jose, CA; K. Monk, NASA Ames Research Center, Moffett Field, CA | 1130 hrs<br>AIAA-2018-2875<br>**An Interoperability Concept for Detect and Avoid and Collision Avoidance Systems: Results from a Human-in-the-Loop Simulation**<br>R. Rorie, L. Fern, NASA Ames Research Center, Moffett Field, CA | 1200 hrs<br>AIAA-2018-2876<br>**Well Clear Trade Study for Unmanned Aircraft System Detect And Avoid with Non-Cooperative Aircraft**<br>M. Wu, A. Cone, S. Lee, NASA Ames Research Center, Moffett Field, CA; C. Chen, M. Edwards, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; D. Jack, Adaptive Aerospace Group, Inc., Hampton, VA | |

| Monday, 25 June 2018 | | | | | | |
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| **21-ATIO.ATM-2** | **Weather Impacts** | | | | | **Embassy G** |
| Chaired by: G. ENEA, MIT Lincoln Laboratory | | | | | | |
| 0930 hrs<br>AIAA-2018-2877<br>**Human-in-the-Loop Evaluation of Dynamic Multi-Flight Common Route Advisories**<br>K. Bilimoria, M. Hayashi, K. Sheth, NASA Ames Research Center, Moffett Field, CA | 1000 hrs<br>AIAA-2018-2878<br>**Evaluating NAS Performance in Context**<br>S. Heitin, W. Cooper, C. Chou, MITRE Corporation, McLean, VA | 1030 hrs<br>AIAA-2018-2879<br>**Ground-based Wake Vortex Prediction in the En-route European Airspace**<br>A. Lau, J. Berling, A. Koloschin, F. Holzäpfel, F. Linke, K. Wicke, German Aerospace Center (DLR), Hamburg, Germany | 1100 hrs<br>AIAA-2018-2880<br>**Optimal Trajectory Planning based on Wind-Optimal Cost Index**<br>A. Alizadeh, M. Uzun, E. Koyuncu, Istanbul Technical University, Istanbul, Turkey | 1130 hrs<br>AIAA-2018-2881<br>**Learning Airspace Flow Rates through Fast-time Simulation**<br>J. Jones, R. DeLaura, Y. Glina, E. Hassey, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA | | |

| Monday, 25 June 2018 | | | | | | |
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| **22-ATIO.TF-1** | **On-Demand Mobility Markets and Demand** | | | | | **Hanover B** |
| Chaired by: B. GERMAN, Georgia Institute of Technology | | | | | | |
| 0930 hrs<br>AIAA-2018-2882<br>**If You Fly It, Will Commuters Come? A Survey to Model Demand for eVTOL Urban Air Trips**<br>L. Garrow, B. German, P. Mokhtarian, M. Daskilewicz, T. Douthat, R. Binder, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-2883<br>**Opportunities to Enhance Air Emergency Medical Service Scale through New Vehicles and Operations**<br>C. Chappelle, C. Li, P. Vascik, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA | 1030 hrs<br>AIAA-2018-2884<br>**Network Geography and Fleet Sizing for eVTOL Urban Air Mobility**<br>M. Daskilewicz, B. German, L. Garrow, T. Douthat, R. Binder, Georgia Institute of Technology, Atlanta, GA | 1100 hrs<br>AIAA-2018-2885<br>**A global gravity model for air passenger demand between city pairs and future interurban air mobility markets identification.**<br>K. Becker, Technical University of Hamburg, Hamburg, Germany; I. Terekhov, German Aerospace Center (DLR), Hamburg, Germany; V. Gollnick, Technical University of Hamburg, Hamburg, Germany | 1130 hrs<br>AIAA-2018-2886<br>**Initial Analysis of Urban Air Mobility's Transport Performance in Sioux Falls**<br>R. Rothfeld, Bauhaus Luftfahrt e.V., Taufkirchen, Germany; M. Balac, ETH Zurich, Zurich, Switzerland; K. Ploetner, Bauhaus Luftfahrt e.V., Taufkirchen, Germany; C. Antoniou, Technical University of Munich, Munich, Germany | | |

| Monday, 25 June 2018 | | | | | | |
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| **23-CPS-1** | **Advances in Computer Systems for Aviation** | | | | | **Dunwoody** |
| Chaired by: M. VELEV, Aries Design Automation, LLC and R. TUGGLE, PeopleTec | | | | | | |
| 0930 hrs<br>AIAA-2018-2887<br>**Parallel Data Refinement Layer of a Telescopic Approach for Extreme-scale Parallel Mesh Generation for CFD Applications**<br>N. Chrisochoides, A. Chernikov, T. Kennedy, C. Tsolakis, K. Garner, Old Dominion University, Norfolk, VA | 1000 hrs<br>AIAA-2018-2888<br>**Parallel Software Framework for Large-Scale Parallel Mesh Generation and Adaptation for CFD Solvers**<br>P. Thomadakis, C. Tsolakis, Old Dominion University, Norfolk, VA; K. Vogiatzis, Engility Corporation, Chantilly, VA; A. Kot, University of Illinois, Urbana-Champaign, Urbana, IL; N. Chrisochoides, Old Dominion University, Norfolk, VA | 1030 hrs<br>AIAA-2018-2889<br>**Fine-grained Speculative Topological Transformation Scheme for Local Reconnection Methods**<br>F. Drakopoulos, C. Tsolakis, N. Chrisochoides, Old Dominion University, Norfolk, VA | 1100 hrs<br>AIAA-2018-2890<br>**Performance Portability of a Multiphysics Finite Element Code**<br>C. Tanis, K. Sreenivas, J. Newman, R. Webster, University of Tennessee, Chattanooga, Chattanooga, TN | | | |

**Monday, 25 June 2018**

| 24-F360-1<br>0930 - 1130 hrs | Monday Forum 360: Rapid Spiral Development from Ground to Flight | Centennial IV |
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Moderator: Starr Ginn, Deputy Aeronautics Research Director, NASA Armstrong Flight Research Center

Panelists:

| Charles Ashton | Scott Drennan | Steve Ericson | Bob Morgan | Michael Swanson |
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| Senior Engineer | Director, Innovation | Director of Advanced Design | Director of Research and Development | Chief Engineer, Advanced Development Programs |
| AeroVironment | Bell | The Spaceship Company | Scaled Composites | Lockheed Martin Aeronautics Company |

**Monday, 25 June 2018**

| 25-FC-1/FD-1 | Flow Control for Flow Physics (Invited) | | | | | Vinings |
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Chaired by: M. SAMIMY, The Ohio State University and J. LITTLE, The University of Arizona

| 0930 hrs<br>Oral Presentation<br>**Excitation of Instabilities for a Better Undersetting of Flow Physics in High-Speed Free Shear Layers (Invited)**<br>M. Samimy, Ohio State University, Columbus, OH | 1000 hrs<br>Oral Presentation<br>**Exploration of the role of laminar separation bubble bursting on dynamic stall using high-frequency actuation (Invited)**<br>M. Visbal, S. Benton, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1030 hrs<br>Oral Presentation<br>**Simulation-based Analysis of Free and Wall-Bounded Shear Layer Response to Small Perturbations (Invited)**<br>D. Gaitonde, S. Unnikrishnan, S. Chakrabarti, Ohio State University, Columbus, OH | 1100 hrs<br>Oral Presentation<br>**Turbulent Boundary Layer Inner/ Outer Scale Control for Insight on Turbulence Production and Drag (Invited)**<br>T. Corke, F. Thomas, University of Notre Dame, Notre Dame, IN | 1130 hrs<br>Oral Presentation<br>**Numerical investigation of boundary-layer transition and separation using controlled disturbance input (Invited)**<br>H. Fasel, C. Hader, S. Hosseinverdi, University of Arizona, Tucson, Tucson, AZ | | |
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**Monday, 25 June 2018**

| 26-FD-2 | Stability and Transition I: BOLT and HiFire | | | | | International South |
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Chaired by: T. JULIANO, University of Notre Dame and B. WHEATON, JHU Applied Physics Laboratory

| 0930 hrs<br>AIAA-2018-2891<br>**HIFiRE-5b Boundary-Layer Transition --- With Attitude**<br>T. Juliano, University of Notre Dame, Notre Dame, IN; J. Jewell, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-2892<br>**Boundary Layer Transition (BOLT) Flight Experiment Overview**<br>B. Wheaton, D. Berridge, T. Wolf, R. Stevens, B. McGrath, Johns Hopkins University Applied Physics Laboratory, Laurel, MD | 1030 hrs<br>AIAA-2018-2893<br>**Hypersonic Ground Tests In Support of the Boundary Layer Transition (BOLT) Flight Experiment**<br>D. Berridge, Johns Hopkins University Applied Physics Laboratory, Laurel, MD; G. McKiernan, Purdue University, West Lafayette, IN; T. Wadhams, M. Holden, CUBRC, Buffalo, NY; B. Wheaton, T. Wolf, Johns Hopkins University Applied Physics Laboratory, Laurel, MD; et al. | 1100 hrs<br>AIAA-2018-2894<br>**Direct numerical simulation of BOLT hypersonic flight vehicle**<br>J. Thome, A. Dwivedi, J. Nichols, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | 1130 hrs<br>AIAA-2018-2895<br>**Pre-Flight Boundary-Layer Stability Analysis of BOLT Geometry**<br>A. Moyes, T. Kocian, C. Mullen, H. Reed, Texas A&M University, College Station, TX | | |
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**Monday, 25 June 2018**

| 27-FD-3/FC-2 | Modal Analysis of Fluid Flows | | | | | Kennesaw |
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Chaired by: K. DURAISAMY and M. HEMATI, University of Minnesota

| 0930 hrs<br>AIAA-2018-2896<br>**Application of POD to Pulse Burst PIV Data of Flow Over an Open Cavity**<br>S. Singh, J. Keeler, L. Ukeiley, University of Florida, Gainesville, Gainesville, FL | 1000 hrs<br>Oral Presentation<br>**Resolvent Analysis for Turbulent Flow over Patterned Walls**<br>A. Chavarin, M. Luhar, University of Southern California, Los Angeles, CA | 1030 hrs<br>Oral Presentation<br>**Spectral proper orthogonal decomposition of numerical and experimental data**<br>O. Schmidt, T. Colonius, California Institute of Technology, Pasadena, CA | 1100 hrs<br>Oral Presentation<br>**Low-dimensional and Data Fusion Techniques Applied to Turbulent Flows**<br>M. Glauser, M. Berry, M. Ali, Syracuse University, Syracuse, NY; C. Stack, D. Gaitonde, Ohio State University, Columbus, OH | 1130 hrs<br>Oral Presentation<br>**Comparison of Low Order Galerkin Models Using Different Base Functions**<br>M. Wei, Kansas State University, Manhattan, KS | 1200 hrs<br>Oral Presentation<br>**Global stability and sensitivity of shock wave/boundary layer interaction**<br>J. Nichols, University of Minnesota, Twin Cities, Minneapolis, MN | |
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| Monday, 25 June 2018 | | | | | | |
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| **28-FD-4** | **CFD Modeling and Applications (Applications of CFD, CFD Optimization, Error and Uncertainty, Validation, etc.) I** | | | | | **Harris** |
| Chaired by: W. DZIEDZIC and J. RABINOVITCH | | | | | | |
| 0930 hrs<br>AIAA-2018-2897<br>**Three-dimensional, Multi-Phase Modeling of a Water Nozzle Injection System Using Adaptive Re-Meshing**<br>W. Dziedzic, B. Vu, M. Shah, NASA Kennedy Space Center, Cape Canaveral, FL | 1000 hrs<br>AIAA-2018-2898<br>**Aerothermal Impingement Jet Flow Simulations using Anisotropic Multiscale Mesh Adaptation**<br>A. Bazile, Y. Mesri, Paris Institute of Technology, Sophia-Antipolis, France; J. Larroya-Huguet, Safran Group, Moissy-Cramayel, France; E. Hachem, Paris Institute of Technology, Sophia-Antipolis, France | 1030 hrs<br>AIAA-2018-2899<br>**Surface Deposition of Molecular Contaminants in the Mars 2020 Rover Wake**<br>J. Rabinovitch, I. Katz, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1100 hrs<br>AIAA-2018-2900<br>**Data-Driven Deterministic Symbolic Regression of Nonlinear Stress-Strain Relation for RANS Turbulence Modelling**<br>M. Schmelzer, R. Dwight, Delft University of Technology, Delft, The Netherlands; P. Cinnella, Paris Institute of Technology, Paris, France | 1130 hrs<br>AIAA-2018-2901<br>**Modeling Shed Vorticity from Coaxial Blade Interactions**<br>N. Schatzman, E. Romander, NASA Ames Research Center, Moffett Field, CA; N. Komerath, Georgia Institute of Technology, Atlanta, GA | 1200 hrs<br>AIAA-2018-2902<br>**Multi Block and Parallel Computations of Rotor Fan Using Three Dimensional Euler Equations**<br>E. Ozmen, S. Eyi, Middle East Technical University, Ankara, Turkey | |

| Monday, 25 June 2018 | | | | | | |
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| **29-FD-5** | **Fundamental Fluid Flows I: Airfoils** | | | | | **Lenox** |
| Chaired by: C. KIRIS, NASA Ames Research Center and S. SCHMITZ, Pennsylvania State University | | | | | | |
| 0930 hrs<br>AIAA-2018-2903<br>**Vortex Equilibria in Ground Effect**<br>P. Baddoo, L. Ayton, University of Cambridge, Cambridge, United Kingdom | 1000 hrs<br>AIAA-2018-2904<br>**Analysis of Wakes downstream of a Heaving Airfoil by Decomposition Methods**<br>M. Zhang, Z. Zheng, University of Kansas, Lawrence, Lawrence, KS | 1030 hrs<br>AIAA-2018-2905<br>**Leading and Trailing Edge Vortex Shedding of Airfoil in Longitudinal Gust at High Incidence**<br>A. Barrier, K. Granlund, North Carolina State University, Raleigh, NC | 1100 hrs<br>AIAA-2018-2906<br>**Numerical Investigation of Aeroelastic Forces and Pressures on Joukowski Foils of Variable Thickness due to Pitching Motion**<br>M. Catlett, J. Anderson, Naval Surface Warfare Center, West Bethesda, MD; C. Badrya, B. Govindarajan, J. Baeder, University of Maryland, College Park, College Park, MD | 1130 hrs<br>AIAA-2018-2907<br>**Vortex interactions with Joukowski airfoil on elastic supports**<br>H. Chen, J. Jaworski, Lehigh University, Bethlehem, PA | 1200 hrs<br>AIAA-2018-2908<br>**Drag Decomposition Using Partial Pressure Fields in the Compressible Navier-Stokes Equations**<br>S. Schmitz, Pennsylvania State University, University Park, PA | |

| Monday, 25 June 2018 | | | | | | |
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| **30-FD-6** | **Unsteady and Separated Flows I: Airfoils and Transonic Flows** | | | | | **Edgewood** |
| Chaired by: J. GREGORY, The Ohio State University and D. RAVEH | | | | | | |
| 0930 hrs<br>AIAA-2018-2909<br>**Prediction of Unsteady Characteristics of Shock-Separated Turbulent Flow Using DDES Methodology**<br>Z. Wu, Z. Gao, C. Jiang, C. Lee, Beihang University, Beijing, China | 1000 hrs<br>AIAA-2018-2910<br>**Modal Analysis of Transonic Shock Buffet on 2D Airfoil**<br>L. Poplingher, D. Raveh, Technion-Israel Institute of Technology, Haifa, Israel | 1030 hrs<br>AIAA-2018-2911<br>**Unsteady behaviour in direct numerical solutions of transonic flow around an airfoil.**<br>M. Zauner, N. De Tullio, N. Sandham, University of Southampton, Southampton, United Kingdom | 1100 hrs<br>AIAA-2018-2912<br>**Nonlinear Aerodynamic Model Using the Leading Edge Stagnation and Flow Separation Point**<br>A. Mangalam, Tao of Systems Integration, Inc., Hampton, VA | 1130 hrs<br>AIAA-2018-2913<br>**Forces and flow structure around swept wings**<br>H. Tu, M. Green, Syracuse University, Syracuse, NY | | |

| Monday, 25 June 2018 | | | | | | |
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| **31-FD-9** | **Low Re and Bio-Inspired I: Bio-Inspired Fluid Dynamics** | | | | | **International North** |
| Chaired by: Y. PEET, Arizona State University and R. MITTAL, Johns Hopkins University | | | | | | |
| 0930 hrs<br>AIAA-2018-2914<br>**Disentangling the Relation Between the Planform Shape and Swimming Gait in Cetacean Propulsion**<br>F. Ayancik, K. Moored, Lehigh University, Bethlehem, PA; F. Fish, West Chester University, West Chester, PA | 1000 hrs<br>AIAA-2018-2915<br>**Optimum performance of soft-robot fish: gaits of thunniform locomotion and patterns for collective swimming**<br>Y. Xu, Y. Peet, Arizona State University, Tempe, AZ | 1030 hrs<br>AIAA-2018-2916<br>**Flapping Flight of Tiny Insects: Role of Bristled Wings**<br>V. Kasoju, M. Ford, A. Santhanakrishnan, Oklahoma State University, Stillwater, OK | 1100 hrs<br>AIAA-2018-2917<br>**Modification of Drag on the Ear of Brazilian Free-Tailed Bats (Tadarida brasiliensis) via Leading-Edge Tubercles**<br>C. Petrin, Oklahoma State University, Stillwater, OK; W. Caire, University of Central Oklahoma, Edmond, OK; M. Thies, Sam Houston State University, Huntsville, TX; B. Elbing, Oklahoma State University, Stillwater, OK; T. Martin, XTO Energy, Fort Worth, TX | 1130 hrs<br>AIAA-2018-2918<br>**The effect of pulsatile flow on the fluid dynamics of aorta; numerical studies using LES and IDDES**<br>M. Ilie, C. Dao, Georgia Southern University, Statesboro, GA | | |

| Monday, 25 June 2018 | | | | | | |
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| **32-FT-1** | **Flight Testing Education and Training** | | | | | **Embassy F** |
| Chaired by: P. VITSAS, International Test Pilot School and A. FREEBORN | | | | | | |
| 0930 hrs<br>AIAA-2018-2919<br>**The Evolution of the USAF Test Pilot School Education Paradigm toward a Systems-Engineering Foundation**<br>D. Montes, T. Hill, J. Cookson, G. Cannon, U.S. Air Force Test Pilot School, Edwards AFB, CA | 1000 hrs<br>AIAA-2018-2920<br>**Best Practices for Training the Structures Flight Test Engineer**<br>W. Hashii, Air Force Test Center, Edwards AFB, CA; R. Thompson, NASA Armstrong Flight Research Center, Edwards, CA | 1030 hrs<br>AIAA-2018-2921<br>**Software Used to Aid in Flight Sciences Education at the USAF Test Pilot School**<br>M. Cotting, D. Mitchell, U.S. Air Force Test Pilot School, Edwards AFB, CA; R. Ruff, S. Dagen, Mathworks, Natick, MA | 1100 hrs<br>AIAA-2018-2922<br>**Stall Characteristics and Trim Changes of Six General Aviation Aircraft**<br>B. Kish, M. Wilde, R. Kimberlin, I. Silver, Florida Institute of Technology, Melbourne, FL; E. Kolano, R. Schaller, Federal Aviation Administration, Washington, D.C.; et al. | | |

| Monday, 25 June 2018 | | | | | | |
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| **33-GT-2** | **AEDC: Reinventing the Arnold Engineering Development Complex** | | | | | **Embassy E** |
| Chaired by: C. MORRIS, Arnold Engineering Development Complex and J. HOPF | | | | | | |
| 0930 hrs<br>AIAA-2018-2923<br>**Reinventing the Arnold Engineering Development Complex: Reflections on a Decade of Progress Towards Restoring Technical Excellence at the World's Largest and Most Advanced Complex of Flight Simulation (Invited)**<br>T. West, Arnold Engineering Development Complex, Arnold AFB, TN | 1000 hrs<br>Oral Presentation<br>**Hypersonic Investment and Infrastructure Plans at AEDC (Invited)**<br>L. Baxter, Arnold Engineering Development Complex, Tullahoma, TN | 1030 hrs<br>Oral Presentation<br>**Recent Developments in Wind Tunnel Capabilities at AEDC (Invited)**<br>M. Mills, R. Rought, Arnold Engineering Development Complex, Arnold AFB, TN | 1100 hrs<br>Oral Presentation<br>**A Unique Facility for Test Technology Development and Small Engine Testing (Invited)**<br>D. Beale, Arnold Engineering Development Complex, Arnold AFB, TN | 1130 hrs<br>Oral Presentation<br>**AEDC Analysis Branch History, Capabilities, and Services (Invited)**<br>B. Binkley, Arnold Engineering Development Complex, Arnold AFB, TN | | |

| Monday, 25 June 2018 | | | | | | |
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| **34-MDO-1** | **Aerodynamic Design/Shape Optimization I** | | | | | **Hanover E** |
| Chaired by: D. ALLAIRE, Texas A&M University and A. CUCO, EMBRAER S.A. | | | | | | |
| 0930 hrs<br>AIAA-2018-2924<br>**Increasing Conceptual Design Fidelity with Prebuilt Airfoil Databases**<br>T. MacDonald, J. Alonso, Stanford University, Stanford, CA | 1000 hrs<br>AIAA-2018-2925<br>**Morphing a CAD Model to Match a Level Set Optimised Shape**<br>S. Whyman, C. Fellows, R. Fairey, M. Gammon, International TechneGroup, Inc., Cambridge, United Kingdom; B. Dawes, N. Meah, Cambridge Flow Solutions, Ltd., Cambridge, United Kingdom; et al. | 1030 hrs<br>AIAA-2018-2926<br>**Chebyshev pseudo-spectral and Adjoint-based sensitivity analysis for Unsteady Flow Design**<br>R. Prasad, J. Choi, N. Pisharoti, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1100 hrs<br>AIAA-2018-2927<br>**Multidisciplinary Analysis of Aerodynamics-Propulsion Coupling for the OWN Concept**<br>J. Ahuja, A. Renganathan, S. Berguin, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1130 hrs<br>AIAA-2018-2928<br>**STAMPS: a Finite-Volume Solver Framework for Adjoint Codes Derived with Source-Transformation AD**<br>J. Mueller, Queen Mary University of London, London, United Kingdom; J. Hueckelheim, Imperial College London, London, United Kingdom; O. Mykhaskiv, Queen Mary University of London, London, United Kingdom | 1200 hrs<br>AIAA-2018-2929<br>**Multi-Objective Optimization of an Counter Rotating Open Rotor using Evolutionary Algorithms**<br>G. Montero Villar, D. Lindblad, N. Andersson, Chalmers University of Technology, Göteborg, Sweden | |

| Monday, 25 June 2018 | | | | | | |
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| **35-MDO-2** | **Aeroelastic and Aero-Structures Optimization I** | | | | | **Hanover G** |
| Chaired by: J. DOHERTY, University of Surrey and F. VIANA, University of Central Florida | | | | | | |
| 0930 hrs<br>AIAA-2018-2930<br>**Multi-Material Printed Trailing Edge Control Surface for an Aeroservoelastic Wind Tunnel Model**<br>A. Pankonien, R. Durscher, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Bhagat, University of Dayton Research Institute, Dayton, OH; G. Reich, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-2931<br>**A Relative Adequacy Framework for Multimodel Management in Multidisciplinary Design Optimization**<br>A. Bayoumy, M. Kokkolaras, McGill University, Montréal, Canada | 1030 hrs<br>AIAA-2018-2932<br>**Application of a Time-Accurate Aeroelastic Coupling Framework to Flutter-Constrained Design Optimization**<br>J. Kiviaho, K. Jacobson, M. Smith, G. Kennedy, Georgia Institute of Technology, Atlanta, GA | 1100 hrs<br>AIAA-2018-2933<br>**Coupled Adjoint-Based Rotor Design using a Time Spectral Fluid Structure Interaction Analysis**<br>H. Kim, R. Prasad, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1130 hrs<br>AIAA-2018-2934<br>**Modeling and Stress Analysis of Composite Skin Structure for Camber Morphing Wing**<br>B. Alsaidi, M. Akbar, S. La, W. Joe, Tennessee State University, Nashville, TN; H. You, S. Kim, Seoul National University, Seoul, South Korea; et al. | | |

| Monday, 25 June 2018 | | | | | | |
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| **36-MST-1** | **Human Factors, Perception, and Cueing** | | | | | **Embassy H** |
| Chaired by: S. BEARD, NASA/ARC-AFS Aerospace Simulation R&D and C. TAYLOR, The MITRE Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-2935<br>**Objective Motion Cueing Criteria for Commercial Transport Simulators**<br>P. Zaal, San Jose State University, Moffett Field, CA; J. Schroeder, Federal Aviation Administration, Moffett Field, CA; W. Chung, SAIC, Moffett Field, CA | 1000 hrs<br>AIAA-2018-2936<br>**Time-Varying Manual Control Identification in a Stall Recovery Task under Different Simulator Motion Conditions**<br>A. Popovici, P. Zaal, NASA Ames Research Center, Moffett Field, CA; M. Pieters, Delft University of Technology, Delft, The Netherlands | 1030 hrs<br>AIAA-2018-2937<br>**Post-stall Flight Model Fidelity Effects on Full Stall Recovery Training**<br>P. Grant, G. Moszczynski, University of Toronto, Toronto, Canada; J. Schroeder, Federal Aviation Administration, Moffett Field, CA | 1100 hrs<br>AIAA-2018-2938<br>**Human-in-the-Loop Study on Angle-of-Attack Indicator Effectiveness for Transport Category Airplanes**<br>A. Campbell, S. Shah, Federal Aviation Administration, Atlantic City, NJ; M. Reisweber, Federal Aviation Administration, Oklahoma City, OK; L. Le Vie, NASA Langley Research Center, Hampton, VA | 1130 hrs<br>AIAA-2018-2939<br>**Evaluation of Augmented Reality Tools for the provision of Tower Air Traffic Control using An Ecological Interface Design**<br>M. Ellejmi, EUROCONTROL, Brussels, Belgium; S. Bagassi, University of Bologna, Bologne, Italy; A. Persiani, ENAV, Rome, Italy | | |

| Monday, 25 June 2018 | | | | | | |
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| **37-PDL-1** | **Computational Methods and Plasma Modeling I** | | | | | **Chicago A** |
| Chaired by: T. MOELLER, University of Tennessee Space Institute and S. BANE, Purdue University- Sch of Aero and Astro | | | | | | |
| 0930 hrs<br>AIAA-2018-2940<br>**Software for plasma device simulations: Arc plasma sources**<br>M. Kundrapu, S. Averkin, P. Stoltz, Tech-X Corporation, Boulder, CO; M. Keidar, George Washington University, Washington, D.C. | 1000 hrs<br>AIAA-2018-2941<br>**Development of Plasma Fluid Modeling Code with Immersed Boundary Method**<br>K. Chen, M. Tseng, J. Wu, National Chiao Tung University, Hsinchu, Taiwan; S. Sharma, Institute for Plasma Research, Gandhinagar, India; G. Cheng, R. Branam, University of Alabama, Birmingham, Birmingham, AL | 1030 hrs<br>AIAA-2018-2942<br>**Implementation of a SUPG Stabilized Finite Element Method for a Two Fluid Plasma Model**<br>K. Croft, T. Moeller, University of Tennessee, Tullahoma, Tullahoma, TN | 1100 hrs<br>AIAA-2018-2943<br>**UV laser ablation of titanium carbide , a non-equilibrium modeling approach**<br>A. Ait Oumeziane, Aix Marseille University, Marseille, France; J. Parisse, French Air Force Academy, Salon de Provence, France | 1130 hrs<br>AIAA-2018-2944<br>**Progress on Developing a Multi-physics Simulation Platform: Rigorous Advanced Plasma Integration Testbed (RAPIT)**<br>Y. Lee, M. Hu, Plasma Taiwan Innovation Corporation, Jhubei , Taiwan; C. Su, K. Chen, M. Tseng, J. Wu, National Chiao Tung University, Hsinchu, Taiwan; et al. | | |

| Monday, 25 June 2018 | | |
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| **38-SP-1**<br>**0930 - 1830 hrs** | **University Leadership Initiative Technical Interchange** | **Regency Ballroom VI** |
| For detailed agenda, visit: https://aviation.aiaa.org/uli/ | | |

| Monday, 25 June 2018 | | | | | | |
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| **39-TP-1** | **Thermal Management and Thermal Control: Applications, Best Practices, Lessons Learned, and Technology Development and Validation** | | | | | **Embassy B** |
| Chaired by: J. BATSON, Lockheed Martin Space Systems and K. WEED, Ball Aerospace & Technologies Corporation and J. DIDION, NASA-Goddard Space Flight Center | | | | | | |
| 0930 hrs<br>AIAA-2018-2945<br>**Optimization of heat sinks in a range of configurations**<br>A. Amoako, J. Doom, South Dakota State University, Brookings, SD | 1000 hrs<br>AIAA-2018-2946<br>**Thermal Cycle Testing of Titanium Superhydrophobic Surfaces for a Spacecraft Jumping Droplet Thermal Diode**<br>C. Baker, J. Supowit, R. Miller, The Aerospace Corporation, El Segundo, CA; P. Pichardo, University of California, Los Angeles, Los Angeles, CA; J. McHale, The Aerospace Corporation, El Segundo, CA; D. Alexander, University of Nebraska, Lincoln, Lincoln, NE; et al. | 1030 hrs<br>AIAA-2018-2947<br>**Process Optimization of Ceramic Matrix Composites for Ultrasonically Absorptive TPS Material**<br>C. Dittert, M. Kütemeyer, M. Kuhn, German Aerospace Center (DLR), Stuttgart, Germany; A. Wagner, German Aerospace Center (DLR), Göttingen, Germany | 1100 hrs<br>AIAA-2018-2948<br>**Experimental and numerical acoustic characterization of ultrasonically absorptive porous materials**<br>A. Wagner, J. Martinez Schramm, C. Dittert, German Aerospace Center (DLR), Stuttgart, Germany; V. Sousa, D. Patel, C. Scalo, Purdue University, West Lafayette, IN | 1130 hrs<br>AIAA-2018-2949<br>**Asymmetric Thermal Transport by Adjusting Structural Defects**<br>A. Yousefzadi Nobakht, S. Shin, J. Wang, University of Tennessee, Knoxville, Knoxville, TN | | |

**Monday, 25 June 2018**

| 40-TP-2<br>0930 - 1230 hrs | Panel on Fundamentals of Thermal Rectification | Embassy A |
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This panel will include presentations on fundamental mechanisms of thermal rectification from leading experts based on all modes of heat transfer. Specific focus points of the panel discussion will consist of techniques for simulation and measurement, necessary and sufficient conditions, theoretical vs. realistic magnitude of the effect, and applications of thermally rectifying systems.

Panelists:

Chris Dames
University of California, Berkeley

Greg Walker
Vanderbilt University

Chris Baker
The Aerospace Corporation

**Monday, 25 June 2018**

| 41-AA-7 | Emerging Urban Aviation Noise | | | | | Spring |
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Chaired by: S. RIZZI, NASA Langley Research Center and L. ENGHARDT, DLR - German Aerospace Center

| 1400 hrs<br>Oral Presentation<br>**Initial Experimental and Computational Analyses of UAV-Scale Stacked Propeller Configurations for Urban Air Mobility Aircraft**<br>M. Patterson, N. Zawodny, D. Boyd, P. Rothhaar, S. Whiteside, X. Fei, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-2950<br>**Feedback Control of Flight Speed to Reduce Unmanned Aerial System Noise**<br>M. Galles, N. Schiller, K. Ackerman, NASA Langley Research Center, Hampton, VA; B. Newman, Old Dominion University, Norfolk, VA | 1500 hrs<br>AIAA-2018-2951<br>**Tonal Noise Prediction of a Distributed Propulsion Unmanned Aerial Vehicle**<br>K. Pascioni, National Institute of Aerospace, Hampton, VA; S. Rizzi, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-2952<br>**Electric Motor Noise for Small Quadcopters: Part 1 – Acoustic Measurements**<br>D. Huff, B. Henderson, NASA Glenn Research Center, Cleveland, OH | 1600 hrs<br>AIAA-2018-2953<br>**Electric Motor Noise for Small Quadcopters: Part II - Source Characteristics and Predictions**<br>B. Henderson, D. Huff, NASA Glenn Research Center, Cleveland, OH | 1630 hrs<br>AIAA-2018-2954<br>**Assessing noise effects of the urban air transportation system**<br>I. Terekhov, German Aerospace Center (DLR), Hamburg, Germany | |
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**Monday, 25 June 2018**

| 42-AA-8 | Turbomachinery and Core Noise I | | | | | Techwood |
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Chaired by: J. ANDERSON, Naval Surface Warfare Center

| 1400 hrs<br>AIAA-2018-2955<br>**Experimental Investigation of the Sound Reduction by Leading Edge Serrations on a Flat-Plate Axial Fan**<br>F. Krömer, S. Becker, Friedrich-Alexander University, Erlangen, Germany | 1430 hrs<br>AIAA-2018-2956<br>**On the Transfer of Leading Edge Serrations from Isolated Aerofoil to Ducted Low-Pressure Fan Application**<br>T. Biedermann, N. Hintzen, F. Kameier, Dusseldorf University of Applied Sciences, Duesseldorf, Germany; T. Chong, Brunel University London, Uxbridge, United Kingdom; C. Paschereit, Technical University of Berlin, Berlin, Germany | 1500 hrs<br>AIAA-2018-2957<br>**An Analytic Solution for Gust Cascade Interaction Including Effects of Realistic Aerofoil Geometry - Inter-Blade Region**<br>P. Baddoo, L. Ayton, University of Cambridge, Cambridge, United Kingdom | 1530 hrs<br>AIAA-2018-2958<br>**A model for the sound generated by entropy disturbances interacting with isolated blades**<br>J. Guzman Inigo, Imperial College London, London, United Kingdom; I. Duran, Reaction Engines Ltd, Abingdon, United Kingdom; A. Morgans, Imperial College London, London, United Kingdom | 1600 hrs<br>AIAA-2018-2959<br>**Investigations on Analytic Models of Broadband Wake-Blade Interaction Noise**<br>G. Grasso, S. Moreau, University of Sherbrooke, Sherbrooke, Canada; J. Christophe, C. Schram, von Kármán Institute for Fluid Dynamics, Duisburg, Germany | | |
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**Monday, 25 June 2018**

| 43-AA-9 | Acoustic/Fluid Dynamics Interactions II | | | | | Marietta |
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Chaired by: W. DEVENPORT, Virginia Tech

| 1400 hrs<br>AIAA-2018-2960<br>**Effect of rounded corners on the flow and noise from a cube**<br>Y. Wang, D. Thompson, Z. Hu, University of Southampton, Southampton, United Kingdom | 1430 hrs<br>AIAA-2018-2961<br>**Acoustic scattering by 3D elastic plates of composite materials**<br>C. Pimenta, W. Wolf, University of Campinas, Campinas, Brazil; A. Cavalieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1500 hrs<br>AIAA-2018-2962<br>**Acoustic emission from one-dimensional vibrating porous panels in a single-sided flow**<br>R. Hajian, J. Jaworski, Lehigh University, Bethlehem, PA; S. Grace, Boston University, Boston, MA | 1530 hrs<br>AIAA-2018-2963<br>**An experimental investigation of the flow and noise characteristics of structured porous coated cylinders**<br>E. Arcondoulis, Y. Liu, Y. Yang, Southern University of Science and Technology, Shenzhen, China | 1600 hrs<br>AIAA-2018-2964<br>**On the Role of the Flow Permeability of Metal Foams on Trailing Edge Noise Reduction**<br>A. Rubio Carpio, F. Avallone, D. Ragni, Delft University of Technology, Delft, The Netherlands | | |
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| Monday, 25 June 2018 | | | | | | |
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| **44-AA-10** | **Advanced Testing Techniques II** | | | | | **University** |
| Chaired by: L. CATTAFESTA, FAMU-FSU College of Engineering | | | | | | |
| 1400 hrs<br>AIAA-2018-2965<br>**Integration of Acoustic Installation Effects in Inverse Generalized BeamForming Algorithm**<br>N. Van de Wyer, D. Logothetis, C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1430 hrs<br>AIAA-2018-2966<br>**Numerical analysis of different radiation models for Clustering Inverse Beamforming in a confined flow environment.**<br>A. Ammirati, Catholic University of Leuven, Leuven, Belgium; C. Colangeli, Siemens, Leuven, Belgium; W. De Roeck, Catholic University of Leuven, Leuven, Belgium; K. Janssens, Siemens, Leuven, Belgium; W. Desmet, Catholic University of Leuven, Leuven, Belgium | 1500 hrs<br>AIAA-2018-2967<br>**Enhancing Array Techniques for Measuring Jet Engine Combustion Noise Using a Modal Isolation Method**<br>A. Hart, K. Holland, P. Joseph, University of Southampton, Southampton, United Kingdom | 1530 hrs<br>AIAA-2018-2968<br>**An optimized microphone array for the measurement of turbulent boundary layer wall pressure wavenumber-frequency spectra**<br>C. Schram, N. Van de Wyer, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1600 hrs<br>AIAA-2018-2969<br>**Initial Calibrations and Wind Tunnel Test Results for an In-Flow Reference Array Using New In-Flow Acoustic Sources in Four Array Mount Configurations**<br>W. Horne, N. Burnside, NASA Ames Research Center, Moffett Field, CA | | |

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| **45-AA-11** | **Airframe/High-Lift Noise, Special Session on Airframe Noise Flight Tests - NASA FDC Project** | | | | | **Roswell** |
| Chaired by: M. POTT-POLLENSKE, DLR - German Aerospace Center and K. YAMAMOTO, Japan Aerospace Exploration Agency | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**NASA Flight Tests and Simulations in Support of Airframe Noise Prediction and Reduction**<br>M. Khorrami, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-2970<br>**Flight and Ground Operations in Support of Airframe Noise Reduction Tests**<br>E. Baumann, E. Waggoner, NASA Armstrong Flight Research Center, Edwards, CA | 1500 hrs<br>AIAA-2018-2971<br>**The Impact of Local Meteorological Conditions on Airframe Noise Flight Test Data**<br>D. Lockard, NASA Langley Research Center, Hampton, VA; K. Bestul, Jacobs, Edwards, CA | 1530 hrs<br>AIAA-2018-2972<br>**Flight-Test Evaluation of Airframe Noise Mitigation Technologies**<br>M. Khorrami, D. Lockard, W. Humphreys, NASA Langley Research Center, Hampton, VA; P. Ravetta, AVEC, Inc., Blacksburg, VA | 1600 hrs<br>AIAA-2018-2973<br>**Airframe Noise Simulations of a Full-Scale Aircraft**<br>J. Appelbaum, B. Duda, E. Fares, Exa GmbH, Stuttgart, Germany; M. Khorrami, NASA Langley Research Center, Hampton, VA | 1630 hrs<br>AIAA-2018-2974<br>**Simulations of a Full-Scale Aircraft with Installed Airframe Noise Reduction Technologies**<br>R. Ferris, Exa Corporation, Burlington, MA; J. Appelbaum, Exa GmbH, Stuttgart, Germany; M. Khorrami, NASA Langley Research Center, Hampton, VA | 1700 hrs<br>AIAA-2018-2975<br>**Comparison of Measured and Simulated Acoustic Signatures for a Full-Scale Aircraft with and without Airframe Noise Abatement**<br>M. Khorrami, NASA Langley Research Center, Hampton, VA; P. Ravetta, AVEC, Inc., Blacksburg, VA; D. Lockard, NASA Langley Research Center, Hampton, VA; B. Duda, R. Ferris, Exa Corporation, Stuttgart, Germany |

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| **46-AA-12** | **Jet Aeroacoustics II** | | | | | **Piedmont** |
| Chaired by: J. LIU, Naval Research Laboratory | | | | | | |
| 1400 hrs<br>AIAA-2018-2976<br>**Acoustic Radiation of Subsonic Jets at the Vicinity of an Inclined Flat Plate**<br>P. Nogueira, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; J. Sirotto, Federal University of Santa Catarina, Florianópolis, Brazil; R. Miotto, University of Campinas, Campinas, Brazil; A. Cavalieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; J. Cordioli, Federal University of Santa Catarina, Florianópolis, Brazil; W. Wolf, University of Campinas, Campinas, Brazil | 1430 hrs<br>AIAA-2018-2977<br>**Analysis of far-field coherence of subsonic jet noise**<br>J. Sirotto, J. Cordioli, Federal University of Santa Catarina, Florianópolis, Brazil; A. Cavalieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1500 hrs<br>AIAA-2018-2978<br>**Amplitude scaling of turbulent-jet wavepackets**<br>L. Antonialli, A. Cavalieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; O. Schmidt, T. Colonius, California Institute of Technology, Pasadena, CA; A. Towne, Stanford University, Stanford, CA; G. Brès, Cascade Technologies, Inc., San Frascisco, CA; et al. | 1530 hrs<br>AIAA-2018-2979<br>**On the interpretation of pressure POD modes in the near field of a subsonic jet in terms of hydrodynamic and acoustic pressures**<br>M. Mancinelli, National Center for Scientific Research (CNRS), Poitiers, France; T. Pagliaroli, Niccolò Cusano University, Rome, Italy; R. Camussi, Roma Tre University, Rome, Italy; T. Castelain, Claude Bernard University Lyon 1, Lyon, France | 1600 hrs<br>AIAA-2018-2980<br>**Prediction of installed jet noise due to swept wings**<br>B. Lyu, A. Dowling, University of Cambridge, Cambridge, United Kingdom | 1630 hrs<br>AIAA-2018-2981<br>**Numerical Simulation of the Aerodynamics and Acoustics of a Turbulent Wall Jet with Particulates**<br>W. Wang, T. Patel, S. Balachandar, S. Miller, University of Florida, Gainesville, Gainesville, FL | |

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| **47-AFM-2** | **Small Unmanned Aircraft Systems II** | | | | | **Embassy C** |
| Chaired by: C. WOOLSEY, Virginia Tech and B. JOLLY, USAF | | | | | | |
| 1400 hrs<br>AIAA-2018-2982<br>**In-Flight Validation of a Robust Flight Controller Featuring Anti-Windup Compensation**<br>C. Weiser, D. Ossmann, German Aerospace Center (DLR), Wessling, Germany; M. Heller, Technical University of Munich, Munich, Germany | 1430 hrs<br>AIAA-2018-2983<br>**An Experimental Investigation of Tractor and Pusher Hexacopter Performance**<br>P. Sharma, E. Atkins, University of Michigan, Ann Arbor, Ann Arbor, MI | 1500 hrs<br>AIAA-2018-2984<br>**Unmanned Aerial System Framework for Human-Robot Interaction**<br>H. Lee, M. McCrink, J. Gregory, Ohio State University, Columbus, OH | 1530 hrs<br>AIAA-2018-2985<br>**Design and Development of an Agile Single-engine Holonomic Multicopter UAV**<br>M. Hedayatpour, M. Mehrandezh, University of Regina, Regina, Canada; F. Janabi-Sharifi, Ryerson University, Toronto, Canada | 1600 hrs<br>AIAA-2018-2986<br>**Wind Characterization Using Onboard IMU of sUAS**<br>G. Donnell, J. Feight, N. Lannan, J. Jacob, Oklahoma State University, Stillwater, OK | | |

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| **48-AMT-2** | **Advanced Velocimetry Techniques for Fluid Flows** | | | | | **The Learning Center** |
| Chaired by: T. LOWE and K. LYNCH, Sandia National Laboratories | | | | | | |
| 1400 hrs<br>AIAA-2018-2987<br>**Practical Challenges in the Calculation of Turbulent Viscosity from PIV Data**<br>S. Beresh, N. Miller, Sandia National Laboratories, Albuquerque, NM; B. Smith, Utah State University, Logan, UT | 1430 hrs<br>AIAA-2018-2988<br>**A Spectrally-resolved Rayleigh scattering set-up to measure velocity and temperature in high-speed flows**<br>J. Panda, NASA Ames Research Center, Moffett Field, CA; B. Drain, Aerospace Computing, Inc., Moffett Field, CA | 1500 hrs<br>AIAA-2018-2989<br>**Application of STARFLEET Velocimetry in the NASA Langley 0.3-meter Transonic Cryogenic Tunnel**<br>D. Reese, P. Danehy, NASA Langley Research Center, Hampton, VA; N. Jiang, J. Felver, D. Richardson, Spectral Energies, LLC, Dayton, OH; J. Gord, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1530 hrs<br>AIAA-2018-2990<br>**Evolution of the hot channel and blast wave structure generated from femtosecond tagging in quiescent air**<br>M. New-Tolley, M. Shneider, R. Miles, Princeton University, Princeton, NJ | 1600 hrs<br>AIAA-2018-2991<br>**Real-Time, High-Bandwidth Measurement of Large Amplitude Velocity and Temperature Fluctuations Using Constant Voltage Anemometry**<br>A. Mangalam, Tao of Systems Integration, Inc., Hampton, VA | | |

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| **49-APA-6** | **Special Session: Stability and Control Prediction: Current State of the Art (Invited)** | | | | | **Greenbriar** |
| Chaired by: T. CHYCZEWSKI, Northrop Grumman Aerospace Systems and K. KARA, Khalifa University of Science, Technology & Research (KUSTAR) | | | | | | |
| 1400 hrs<br>AIAA-2018-2992<br>**Stability Derivative Estimation: Methods and Practical Considerations for Conventional Transonic Aircraft (Invited)**<br>S. Klausmeyer, Textron Aviation, Wichita, KS | 1430 hrs<br>AIAA-2018-2993<br>**CFD Predictions of the Stability and Control Characteristics of the E-2D Advanced Hawkeye (Invited)**<br>B. Green, R. Czerwiec, T. Shafer, M. Rhinehart, Naval Air Systems Command, Patuxent River, MD | 1500 hrs<br>AIAA-2018-2994<br>**CFD-Based Stability and Control Modeling of Fighter Aircraft Useful to the GNC Community (Invited)**<br>S. Morton, Department of Defense High Performance Computing Modernization Program, Vicksburg, MS; D. McDaniel, University of Alabama, Birmingham, Birmingham, AL | 1530 hrs<br>Oral Presentation<br>**Investigations in Reduced-Order Aerodynamic Modeling of Aircraft Approaching Stall (Invited)**<br>N. Frink, S. McMillin, K. Cunningham, P. Murphy, B. Hiller, G. Shah, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>Oral Presentation<br>**A Unified Perspective of Unsteady Aerodynamics and Its Application to Stability and Control (Invited)**<br>W. Silva, NASA Langley Research Center, Hampton, VA; A. Shelton, Leidos, Inc., Valparaiso, FL; C. Martin, Lockheed Martin Corporation, Eglin, FL; D. Reasor, Air Force Research Laboratory, Eglin AFB, FL | 1630 hrs<br>AIAA-2018-2995<br>**Characterization of Stability and Control Derivatives Through Watertunnel Testing (Invited)**<br>K. Shweyk, The Boeing Company, Huntington Beach, CA | 1700 hrs<br>AIAA-2018-2996<br>**Stability and Control Investigations in Early Stages of Aircraft Design (Invited)**<br>Y. Hasan, J. Flink, S. Freund, German Aerospace Center (DLR), Braunschweig, Germany; T. Klimmek, German Aerospace Center (DLR), Göttingen, Germany; R. Kuchar, C. Liersch, German Aerospace Center (DLR), Braunschweig, Germany; et al. |

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| **50-APA-7/ATIO.ACD-3** | **Special Session: UCAV Systems Design II - Aerodynamic Shaping (Invited)** | | | | | **Hanover F** |
| Chaired by: R. CUMMINGS, US Air Force Academy and K. VANDEN, USAF | | | | | | |
| 1400 hrs<br>AIAA-2018-2997<br>**On Uncertainty Quantification of the Flow Predictions around the NATO STO AVT-251 Unmanned Combat Aerial Vehicle (Invited)**<br>A. Da Ronch, J. Drofelnik, University of Southampton, Southampton, United Kingdom; M. van Rooij, National Aerospace Laboratory (NLR) , Amsterdam, The Netherlands; M. Panzeri, R. d'Ippolito, Noesis Solutions, Leuven, Belgium | 1430 hrs<br>AIAA-2018-2998<br>**Generation of a Reduced Order Model of an Unmanned Combat Air Vehicle using Indicial Response Functions (Invited)**<br>M. van Rooij, Netherlands Aerospace Centre (NLR), Amsterdam, The Netherlands; N. Frink, NASA Langley Research Center, Hampton, VA; B. Hiller, Georgia Institute of Technology, Atlanta, GA; M. Ghoreyshi, U.S. Air Force Academy, Colorado Springs, CO; M. Voskuijl, Delft University of Technology, Delft, The Netherlands | 1500 hrs<br>AIAA-2018-2999<br>**Aerodynamic Loads Identification and Modeling of UCAV Configurations with Control Surfaces Using Prescribed CFD Maneuvers (Invited)**<br>J. Allen, M. Ghoreyshi, A. Jirasek, M. Satchell, U.S. Air Force Academy, Colorado Springs, CO | 1530 hrs<br>AIAA-2018-3000<br>**A Multi-fidelity Aerodynamic Modelling Approach for NATO AVT 251 UCAV – MULDICON (Invited)**<br>H. Kaya, H. Tiftikci, U. Kutluay, E. Sakarya, Turkish Aerospace Industries, Inc., Ankara, Turkey | 1600 hrs<br>AIAA-2018-3001<br>**A Multi-objective Multi-disciplinary Optimization Approach for NATO AVT 251 UCAV – MULDICON (Invited)**<br>A. Karakoc, TUBITAK, Ankara, Turkey; H. Kaya, Turkish Aerospace Industries, Inc., Ankara, Turkey | | |

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| **51-APA-8** | **Aerodynamic Testing: Ground, Wind-Tunnel and Flight Testing II** | | | | | **Baker** |
| Chaired by: G. GATLIN, NASA Langley Research Center and N. RATNAYAKE, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3002<br>**Wake vortex mechanisms behind semi-porous cylinders**<br>J. Aguiar, D. Birch, M. Pelacci, University of Surrey, Guildford, United Kingdom | 1430 hrs<br>AIAA-2018-3003<br>**In-Flight Attachment Line Motion Estimation**<br>A. Mangalam, Tao of Systems Integration, Inc., Hampton, VA | 1500 hrs<br>AIAA-2018-3004<br>**Transonic Wind Tunnel Test of Wing Oscillating in Pitch**<br>G. Begnini, C. Bones, C. Spode, Embraer, São José dos Campos, Brazil | 1530 hrs<br>AIAA-2018-3005<br>**Flight Test of a Paint-Riblet for Reducing Skin-Friction**<br>M. Kurita, A. Nishizawa, D. Kwak, H. Iijima, Y. Iijima, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan; H. Takahashi, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; et al. | 1600 hrs<br>AIAA-2018-3006<br>**Aerodynamic Flow Field above the Flight Deck of an Aircraft Carrier and its Influence on the Take-Off Performances**<br>R. Bardera-Mora, A. Garcia-Magariño, National Institute of Aerospace Technology (INTA), Torrejon de Ardoz, Spain; A. Rodriguez-Sevillano, M. Barcala-Montejano, Technical University of Madrid, Madrid, Spain | 1630 hrs<br>AIAA-2018-3007<br>**Low Acoustic Noise and Turbulence (LANT) wind-tunnel at USP-EESC**<br>J. Serrano Rico, University of Pamplona, Pamplona, Colombia; F. Amaral, C. Bresci, M. Beraldo, M. Medeiros, University of São Paulo, São Carlos, Brazil | |

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| **52-APA-9** | **Applied CFD and Numerical Correlations with Experimental Data I** | | | | | **Fairlie** |
| Chaired by: C. HUMMER, USAF and S. VIKEN, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3008<br>**Dynamic Maneuver and 6DOF Exit Simulations for C-130 H/J Airdrop Configurations**<br>K. Bergeron, Army Research, Development and Engineering Command, Natick, MA; M. Ghoreyshi, A. Jirasek, U.S. Air Force Academy, Colorado Springs, CO | 1430 hrs<br>AIAA-2018-3009<br>**Computational Fluid Dynamics Analysis of the Stall Characteristics of a Wing Designed Based on Prandtl's Minimum Induced Drag**<br>S. Yoo, NASA Armstrong Flight Research Center, Edwards, CA | 1500 hrs<br>AIAA-2018-3010<br>**CFD study of airfoil lift reduction caused by ice roughness**<br>G. Tagawa, F. Morency, University of Québec, Montréal, Canada; H. Beaugendre, National Center for Scientific Research (CNRS), Bordeaux, France | 1530 hrs<br>AIAA-2018-3011<br>**Analysis of shock oscillations of an external compression supersonic inlet through unsteady numerical simulations**<br>P. Grenson, S. Beneddine, ONERA, Meudon, France | | | |

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| **53-ASE-3** | **Supercooled Liquid Water Icing Physics** | | | | | **Hanover C** |
| Chaired by: Y. HAN and P. VILLEDIEU | | | | | | |
| 1400 hrs<br>AIAA-2018-3012<br>**A shallow water type model to describe the dynamic of thin partially wetting films for the simulation of anti-icing systems**<br>J. Lallement, P. Trontin, C. Laurent, P. Villedieu, ONERA, Toulouse, France | 1430 hrs<br>AIAA-2018-3013<br>**An Experimental Study of the Dynamic Ice Accreting Process over a Rotating Aero-engine Fan Model**<br>L. Li, Y. Liu, H. Hu, Iowa State University, Ames, IA | 1500 hrs<br>AIAA-2018-3014<br>**Ice Roughness and Thickness Evolution on a Business Jet Airfoil**<br>S. McClain, Baylor University, Waco, TX; M. Vargas, NASA Glenn Research Center, Cleveland, OH; J. Tsao, Ohio Aerospace Institute, Cleveland, OH; A. Broeren, NASA Glenn Research Center, Cleveland, OH | 1530 hrs<br>AIAA-2018-3015<br>**A Novel Method for Constructing Analog Roughness Patterns to Replicate Ice Accretion Characteristics**<br>J. Clemenson, T. Shannon, S. McClain, Baylor University, Waco, TX | 1600 hrs<br>AIAA-2018-3016<br>**Convection from Surfaces with Ice Roughness Characterized at Increasing Accumulation Times**<br>J. McCarrell, T. Shannon, S. McClain, Baylor University, Waco, TX | 1630 hrs<br>AIAA-2018-3017<br>**Fracture of Ice at Interfaces from Molecular Dynamics Simulations**<br>A. Afshar, J. Zong, D. Thompson, D. Meng, Mississippi State University, Mississippi State, MS | 1700 hrs<br>AIAA-2018-3018<br>**Numerical study on the condensed and frozen water vapor on a flat plate using an open source code**<br>S. Park, H. Kihara, K. Abe, Kyushu University, Fukuoka, Japan |

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| **54-ASE-4** | **Managing Vortex Encounter II (Invited)** | | | | | **Hanover D** |
| Chaired by: A. BROWN, National Research Council Canada and D. THOMPSON, Mississippi State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3019<br>**Wake Turbulence Evolution and Hazard Analysis for a General Aviation Takeoff Accident (Invited)**<br>C. Schwarz, D. Fischenberg, German Aerospace Center (DLR), Braunschweig, Germany; F. Holzäpfel, German Aerospace Center (DLR), Oberpfaffenhofen, Germany | 1430 hrs<br>AIAA-2018-3020<br>**GEM4D, a General vortex Encounter Model with 4 Degrees of Freedom: Formulation, Validation, and Use (Invited)**<br>D. Delisi, NorthWest Research Associates, Redmond, WA; G. Greene, Self, Hampton, VA; J. Tittsworth, Federal Aviation Administration, Washington, D.C. | 1500 hrs<br>AIAA-2018-3021<br>**Comparison of In-Flight Test Data to Aircraft Wake Turbulence Models (Invited)**<br>L. Davenport, R. Frej Vitalle, CSSI, Inc., Washington, D.C.; F. Proctor, NASA Langley Research Center, Langley, VA | 1530 hrs<br>Oral Presentation<br>**Flight demonstration of airborne lidar for CAT detection (Invited)**<br>N. Matayoshi, H. Inokuchi, S. Machida, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan | 1600 hrs<br>AIAA-2018-3022<br>**Investigating the Potential Future Usage of Combined Airborne Wake Vortex Prediction Models and Measurement Sensors (Invited)**<br>M. Steen, P. Hecker, Technical University of Braunschweig, Braunschweig, Germany | 1630 hrs<br>AIAA-2018-3023<br>**A Flight Study of Unsteady Aerodynamic Loading Induced by Wake Vortex Encounter (Invited)**<br>A. Brown, National Research Council Canada, Gloucester, Canada | |

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| **55-ATIO.ACD-4/MDO-3** | **Aircraft Design Optimization I** | | | | | **Hanover A** |
| Chaired by: E. DIGIROLAMO, Lockheed Martin Aeronautics | | | | | | |
| 1400 hrs<br>AIAA-2018-3024<br>**Preliminary Design of a Next Generation Super-Mid-Size Business Jet**<br>M. Delisle, M. Morrow, T. Takahashi, Arizona State University, Tempe, AZ | 1430 hrs<br>AIAA-2018-3025<br>**Multidisciplinary Overall Aircraft Design Process Dedicated to Blended Wing Body Configurations**<br>J. Gauvrit-Ledogar, ONERA, Palaiseau, France; S. Defoort, ONERA, Toulouse, France; A. Tremolet, ONERA, Palaiseau, France; F. Morel, ONERA, Toulouse, France | 1500 hrs<br>AIAA-2018-3026<br>**Consequences of Multi or Single disciplinary optimization results on aircraft component cost and weight**<br>T. van der Laan, L. Hootsmans, GKN Aerospace, Papendrecht, The Netherlands | 1530 hrs<br>AIAA-2018-3027<br>**Planetary exploration by space drones: design and challenges**<br>M. Hassanalian, D. Rice, New Mexico State University, Las Cruces, NM; S. Johnstone, Los Alamos National Laboratory, Los Alamos, NM; A. Abdelkefi, New Mexico State University, Las Cruces, NM | 1600 hrs<br>AIAA-2018-3028<br>**HALE Multidisciplinary Design Optimization Part I: Solar-Powered Single and Multiple-Boom Aircraft**<br>D. Colas, N. Roberts, V. Suryakumar, Facebook, Inc., Menlo Park, CA | 1630 hrs<br>AIAA-2018-3029<br>**HALE Multidisciplinary Design Optimization Part II: Solar-Powered Flying-Wing Aircraft**<br>D. Colas, N. Roberts, V. Suryakumar, Facebook, Inc., Menlo Park, CA | |

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| **56-ATIO.ATM-3** | **UAS in the NAS I** | | | | | **Embassy D** |
| Chaired by: P. WEI, Iowa State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3030<br>**Initial approach to collect small Unmanned Aircraft System off-nominal operational situations data**<br>J. Jung, NASA Ames Research Center, Moffett Field, CA; C. Drew, KBR, Inc., Moffett Field, CA; S. Nag, Bay Area Environmental Research Institute, Moffett Field, CA; E. Torres, SAIC, Moffett Field, CA; A. Ishihara, H. Modi, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; et al. | 1430 hrs<br>AIAA-2018-3031<br>**Characterizing UAS Collision Consequences in Future UTM**<br>B. Rattanagraikanakorn, A. Sharpanskykh, M. Schuurman, D. Gransden, H. Blom, C. Wagter, Delft University of Technology, Delft, The Netherlands | 1500 hrs<br>AIAA-2018-3032<br>**A Throughput Based Capacity Metric for Low-Altitude Airspace**<br>V. Bulusu, R. Sengupta, University of California, Berkeley, Berkeley, CA; E. Mueller, M. Xue, NASA Ames Research Center, Moffett Field, CA | 1530 hrs<br>AIAA-2018-3033<br>**Conflict Risk Assessment of Structured and Unstructured Traffic of Small Unmanned Aircraft Systems**<br>S. Kim, Korea Transport Institute, Sejong, South Korea | 1600 hrs<br>AIAA-2018-3034<br>**Safety and Controller Workload Assessment of Lost C2 Link Contingency Procedures for Seoul-Jeju Route**<br>J. Kang, H. Lee, H. Oh, K. Choi, H. Lee, Inha University, Incheon, South Korea; H. Hong, Korea Transport Institute, Sejong, South Korea; et al. | 1630 hrs<br>AIAA-2018-3035<br>**Obstacle-Avoidance Trajectory Planning for Attitude-Constrained Quadrotors using Second-order Cone Programming**<br>Z. Wang, G. Xu, L. Liu, T. Long, Beijing Institute of Technology, Beijing, China | |

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| **57-ATIO.ATM-4** | **ATC/ATM Including NextGen I** | | | | | **Embassy G** |
| Chaired by: A. SARAF, ATAC Corporation | | | | | | |
| 1400 hrs<br>AIAA-2018-3036<br>**Enhanced Stochastic Optimization Model (ESOM) for Setting Flow Rates in Collaborative Trajectory Options Programs (CTOP)**<br>R. Hoffman, B. Hackney, Metron Aviation, Inc., Dulles, VA; P. Wei, G. Zhu, Iowa State University, Ames, IA | 1430 hrs<br>AIAA-2018-3037<br>**Collaborative Trajectory Options Program within the NAS Flow Advisory Manager**<br>C. Kaler, W. Hall, C. Brinton, A. Fernandes, G. Hunter, Mosaic ATM, Inc., Leesburg, VA | 1500 hrs<br>AIAA-2018-3038<br>**Development and Analysis of Decision Support for the Collaborative Trajectory Options Program (CTOP)**<br>W. Hall, B. Capozzi, G. Hunter, Mosaic ATM, Inc., Leesburg, VA; M. Klopfenstein, A. Klein, AvMet Applications, Inc., Reston, VA | 1530 hrs<br>AIAA-2018-3039<br>**Fairness Metric-Based Trajectory Negotiation for Merging Air Traffic Management**<br>S. Park, P. Dutta, P. Menon, Optimal Synthesis, Inc., Los Altos, CA | 1600 hrs<br>AIAA-2018-3040<br>**Impact of Different Trajectory Option Set Participation Levels within an Air Traffic Management Collaborative Trajectory Option Program**<br>H. Yoo, C. Brasil, San Jose State University, Moffett Field, CA; N. Smith, NASA Ames Research Center, Moffett Field, CA; N. Buckley, G. Hodell, San Jose State University, Moffett Field, CA; S. Kalush, Human Solutions, Inc., Washington, D.C.; et al. | 1630 hrs<br>AIAA-2018-3041<br>**Relative Trajectory Cost Prediction for Trajectory Options Set Generation in CTOP Simulations**<br>I. Tereshchenko, M. Hansen, University of California, Berkeley, Berkeley, CA; R. Hoffman, B. Hackney, Metron Aviation, Inc., Dulles, VA | 1700 hrs<br>AIAA-2018-3042<br>**An Interval-based TOS Allocation Model for Collaborative Trajectory Options Program (CTOP)**<br>G. Zhu, P. Wei, Iowa State University, Ames, IA |

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| **58-ATIO.ATM-5** | **Trajectory Management** | | | | | **Embassy F** |
| Chaired by: K. SHETH, NASA/ARC-AFO | | | | | | |
| 1400 hrs<br>AIAA-2018-3043<br>**Initial Implementation and Operational Use of TASAR in Alaska Airlines Flight Operations**<br>D. Wing, K. Burke, NASA Langley Research Center, Hampton, VA; J. Henderson, Engility Corporation, Andover, MA; R. Vivona, Aurora Flight Sciences, Cambridge, MA; J. Woodward, Alaska Airlines, Seattle, WA | 1430 hrs<br>AIAA-2018-3044<br>**Understanding Extended Projected Profile (EPP) Trajectory Error Using a Medium-Fidelity Aircraft Simulation**<br>N. Guerreiro, M. Underwood, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-3045<br>**Integrated Trajectory-Location-Routing for Rapid Humanitarian Deliveries using Unmanned Aerial Vehicles**<br>J. Escribano Macias, P. Angeloudis, W. Ochieng, Imperial College London, London, United Kingdom | 1530 hrs<br>AIAA-2018-3046<br>**Advanced Trajectory Modeling with Air-Ground Data Exchange**<br>G. Enea, MITRE Corporation, McLean, VA; J. Bronsvoort, Airservices Australia, Melbourne, Australia; S. Mondoloni, R. Sgorcea, MITRE Corporation, McLean, VA | 1600 hrs<br>AIAA-2018-3047<br>**Trajectory Optimization and the Clearable Route Network**<br>W. Hall, G. Hunter, Mosaic ATM, Inc., Leesburg, VA | 1630 hrs<br>AIAA-2018-3048<br>**A Near-Optimal Methodology for Synthesizing Trajectory Option Sets under Time Varying Constraints**<br>P. Dutta, S. Park, P. Menon, Optimal Synthesis, Inc., Los Altos, CA | |

| Monday, 25 June 2018 | | | | | | |
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| **59-ATIO.GA-1** | **General Aviation Safety, Efficiency, and Operations** | | | | | **Embassy H** |
| Chaired by: K. KNOPP, FAA and K. HOFFLER, Adaptive Aerospace Group, Inc. | | | | | | |
| 1400 hrs<br>AIAA-2018-3049<br>**Retrospective Analysis of Approach Stability in General Aviation Operations**<br>A. Rao, Ohio State University, Columbus, OH; T. Puranik, Georgia Institute of Technology, Atlanta, GA | 1430 hrs<br>AIAA-2018-3050<br>**Uncertainty Quantification Analysis of the Aviation Environmental Design Tool in Emission Inventory and Air Quality Modeling**<br>Y. Li, D. Lim, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA; G. Noel, U.S. Department of Transportation, Cambridge, MA | 1500 hrs<br>AIAA-2018-3051<br>**Helicopter Lightweight Flight Recorder Image Analysis for Flight Data Monitoring Purpose**<br>B. Kuo, W. Guan, P. Chen, Aviation Safety Council Taiwan, New Taipei City, Taiwan; F. Hsiao, F. Chang, Tamkung University, New Taipei City, Taiwan | 1530 hrs<br>AIAA-2018-3052<br>**Improving Hazard Analysis of Integrated Modular Avionics System based on System-Theoretic Process Analysis**<br>H. Rong, China National Aeronautical Radio Electronics Research Institute, Shanghai, China | | | |

**Monday, 25 June 2018**

| 60-ATIO.TF-2 | On-Demand Mobility Operations and Regulations | | | | | Hanover B |
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| Chaired by: V. STOUFFER, LMI and B. BARMORE, NASA-Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3053<br>**Maintenance Considerations for Electric Urban Air Mobility Vehicles and Feedback from Aircraft Maintenance Technicians**<br>R. Naru, B. German, Georgia Institute of Technology, Atlanta, GA | 1430 hrs<br>AIAA-2018-3054<br>**Development of a Methodology for Parametric Analysis of STOL Airpark Geo-Density**<br>J. Robinson, M. Sokollek, C. Justin, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-3055<br>**Door-to-Door Travel Time Comparative Assessment for Conventional Transportation Methods and Short Takeoff and Landing On Demand Mobility Concepts**<br>L. Wei, C. Justin, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1530 hrs<br>AIAA-2018-3056<br>**A Study on the Impact of Aircraft Technology on the Future of Regional Transportation Using Small Aircraft**<br>S. Roy, A. Maheshwari, W. Crossley, D. DeLaurentis, Purdue University, West Lafayette, IN | | | |

**Monday, 25 June 2018**

| 61-F360-2<br>1400 - 1600 hrs | Monday Forum 360: Investment Perspectives on the Aviation Market | Centennial IV |
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Moderator: Van Espahbodi, Co-Founder, Managing Partner, Starburst Aerospace Accelerator

Panelists:

**Maryanna Saenko**
Principal
Khosla Ventures

**Brian Schettler**
Managing Director
Boeing HorizonX Ventures

**Peter Truwit**
Associate
Seraph Group

**Monday, 25 June 2018**

| 62-FC-3 | Actuators and Sensors for Flow Control | | | | | Auburn |
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| Chaired by: A. AHMED, Auburn University | | | | | | |
| 1400 hrs<br>AIAA-2018-3057<br>**High temperature gradient wall shear stress micro-sensors for flow separation control**<br>C. Ghouila-Houri, Q. Gallas, E. Garnier, ONERA, Palaiseau, France; A. Talbi, P. Pernod, National Center for Scientific Research (CNRS), Lille, France; R. Viard, Fluiditech, Thurmelec, Pulversheim, France | 1430 hrs<br>AIAA-2018-3058<br>**Volumetric Reduced-Order Models of Zero-Net Mass-Flux Actuator**<br>R. Messahel, Y. Bury, J. Bodart, N. Doué, Higher Institute of Aeronautics and Space, Toulouse, France | 1500 hrs<br>AIAA-2018-3059<br>**Experimental Investigation of Geometric Design Parameters of a High Frequency Fluidic Oscillator at Turbomachinery Relevant Conditions**<br>V. Bettrich, R. Niehuis, University of the German Federal Armed Forces, Munich, Germany | 1530 hrs<br>AIAA-2018-3060<br>**Three-Dimensional Wake Characteristics Associated with the Jet Assisted Surface Mounted Actuator**<br>S. Gildersleeve, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY | 1600 hrs<br>AIAA-2018-3061<br>**Super-Lift and Thrusting Airfoil of Coflow Jet Actuated by Micro-Compressors**<br>G. Zha, Y. Yang, Y. Ren, B. McBreen, University of Miami, Coral Gables, FL; E. White, Texas A&M University, College Station, TX | 1630 hrs<br>AIAA-2018-3062<br>**Design of Injection and Suction Ducts for Co-Flow Jet Airfoils with Embedded Micro-Compressor Actuator**<br>Y. Ren, G. Zha, University of Miami, Coral Gables, FL | |

**Monday, 25 June 2018**

| 63-FC-4/APA-10 | Flow Control Applications: Simulations and Modeling | | | | | Courtland |
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| Chaired by: V. VATSA, NASA-Langley Research Center and J. SPYROPOULOS, NAVAIR | | | | | | |
| 1400 hrs<br>AIAA-2018-3063<br>**Numerical Simulation of a Simplified High-Lift CRM Configuration Embedded with Fluidic Actuators**<br>V. Vatsa, NASA Langley Research Center, Hampton, VA; B. Duda, Exa Corporation, Munich, Germany; J. Lin, L. Pack Melton, M. O'Connell, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-3064<br>**Unstructured Large Eddy Simulation of a Turboshaft Ejector on Rotorcraft**<br>P. Tamm, J. Spyropoulos, Naval Air Systems Command, Patuxent River, MD | 1500 hrs<br>AIAA-2018-3065<br>**Numerical Simulations of Fan/Airframe Interaction with Active Flow-Control**<br>F. Sartor, A. Burlot, M. Méheut, ONERA, Meudon, France | 1530 hrs<br>AIAA-2018-3067<br>**Aircraft Control Surfaces Using Co-flow Jet Active Flow Control Airfoil**<br>J. Zhang, K. Xu, Y. Yang, Y. Ren, P. Patel, G. Zha, University of Miami, Coral Gables, FL | 1600 hrs<br>AIAA-2018-3066<br>**Performance Enhancement of Boundary Layer Ingesting Inlet Using Active Flow Control Methods**<br>I. Rudin, Technion–Israel Institute of Technology, Haifa, Israel; E. Arad, Rafael Advanced Defense Systems, Ltd., Haifa, Israel; J. Cohen, Technion–Israel Institute of Technology, Haifa, Israel | | |

| Monday, 25 June 2018 | | | | | | |
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| **64-FC-5/FD-10** | **Modal Analysis for Flow Control (Invited)** | | | | | **Vinings** |
| Chaired by: M. HEMATI, University of Minnesota and K. DURAISAMY | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**Applications of Modal Analysis to Active Flow Control (Invited)**<br>K. Taira, Y. Sun, C. Yeh, A. Nair, Q. Liu, Florida State University, Tallahassee, FL | 1430 hrs<br>Oral Presentation<br>**Resolvent Analysis of Exact Coherent States (Invited)**<br>K. Rosenberg, B. McKeon, California Institute of Technology, Pasadena, CA | 1500 hrs<br>Oral Presentation<br>**Color of Turbulence: Low-complexity stochastic dynamical modeling of turbulent flows (Invited)**<br>A. Zare, M. Jovanovic, University of Southern California, Los Angeles, CA; T. Georgiou, University of California, Irvine, Irvine, CA | 1530 hrs<br>Oral Presentation<br>**On Reduced Order Models for Control of a Canonical Separated Flow (Invited)**<br>E. Deem, L. Cattafesta, Florida State University, Tallahassee, FL; H. Zhang, C. Rowley, Princeton University, Princeton, NJ; R. Mittal, Johns Hopkins University, Baltimore, MD; M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN | 1600 hrs<br>AIAA-2018-3068<br>**SINDy analysis of disturbance and plant model superposition on a rolling delta wing (Invited)**<br>M. Le Provost, D. Williams, Illinois Institute of Technology, Chicago, IL; S. Brunton, University of Washington, Seattle, Seattle, WA | 1630 hrs<br>Oral Presentation<br>**Data-driven Reduced Order Models for Adaptive Control of Combustor Instabilities (Invited)**<br>K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI | |

| Monday, 25 June 2018 | | | | | | |
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| **65-FD-11** | **Stability and Transition II: High-Speed I** | | | | | **International South** |
| Chaired by: J. CHAPELIER, Purdue University and M. CHOUDHARI, NASA-Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3069<br>**Görtler Instability and Its Control via Surface Suction Over an Axisymmetric Cone at Mach 6**<br>F. Li, M. Choudhari, P. Paredes, NASA Langley Research Center, Hampton, VA; S. Schneider, P. Portoni, Purdue University, West Lafayette, IN | 1430 hrs<br>AIAA-2018-3070<br>**Boundary-Layer Instability on a Slender Cone with Highly Swept Fins**<br>F. Turbeville, S. Schneider, Purdue University, West Lafayette, IN | 1500 hrs<br>AIAA-2018-3071<br>**Instabilities in Mach 6 Flow over a Cone with a Swept Fin**<br>A. Knutson, S. Gs, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | 1530 hrs<br>AIAA-2018-3072<br>**Parametric Boundary-Layer Stability Analysis on a Hypersonic Finned Circular Cone**<br>C. Mullen, A. Moyes, T. Kocian, E. Beyak, A. Riha, H. Reed, Texas A&M University, College Station, TX | 1600 hrs<br>AIAA-2018-3073<br>**Measurements of Freestream Fluctuations in the NASA Langley 20-Inch Mach 6 Tunnel**<br>A. Chou, NASA Langley Research Center, Hampton, VA; A. Leidy, Texas A&M University, College Station, TX; R. King, B. Bathel, G. Herring, NASA Langley Research Center, Hampton, VA | 1630 hrs<br>AIAA-2018-3074<br>**Commissioning of the Oxford High Density Tunnel (HDT) for Boundary Layer Instability Measurements at Mach 7**<br>S. Wylie, L. Doherty, M. McGilvray, University of Oxford, Oxford, United Kingdom | |

| Monday, 25 June 2018 | | | | | | |
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| **66-FD-12** | **Stability and Transition III: Roughness I** | | | | | **Lenox** |
| Chaired by: L. DUAN, Missouri University of Science and Technology and D. GARMANN, Air Force Research Laboratory | | | | | | |
| 1400 hrs<br>AIAA-2018-3075<br>**Two-Dimensional Surface Irregularities on Swept Wing Boundary-Layer Transition: Forward Facing Steps**<br>A. Rius Vidales, M. Kotsonis, Delft University of Technology, Delft, The Netherlands; A. Antunes, R. Cosin, Embraer, São José dos Campos, Brazil | 1430 hrs<br>AIAA-2018-3076<br>**Direct Numerical Simulation of Receptivity to Roughness in a Swept-Wing Boundary Layer at High Reynolds Numbers**<br>G. Nicholson, C. Zhang, L. Duan, Missouri University of Science and Technology, Rolla, MO; M. Malik, F. Li, NASA Langley Research Center, Hampton, VA; A. Uzun, National Institute of Aerospace, Hampton, VA | 1500 hrs<br>AIAA-2018-3077<br>**Toward A Generalized Roughness-Induced-Transition Mitigation Strategy Using A Streamwise Array of 2D Flat Strips.**<br>S. Suryanarayanan, D. Goldstein, University of Texas, Austin, Austin, TX; A. Berger, E. White, Texas A&M University, College Station, TX; G. Brown, Princeton University, Princeton, NJ | 1530 hrs<br>AIAA-2018-3078<br>**Evolution of Tollmien Schlichting Disturbances over Naturally Distributed Rough Surfaces**<br>M. Mughal, H. Xu, Imperial College London, London, United Kingdom | | | |

| Monday, 25 June 2018 | | | | | | |
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| **67-FD-13** | **Flow-Induced Flutter: Advances in Modeling, Experiments and Applications I** | | | | | **International North** |
| Chaired by: R. MITTAL, Johns Hopkins University and J. SEIDEL, USAF Academy | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**Interactions of Vortices and Flexible Wings**<br>I. Gursul, Z. Wang, University of Bath, Bath, United Kingdom | 1430 hrs<br>AIAA-2018-3079<br>**Asymmetric Buckling of Curved Flapping Wings**<br>D. MacPhee, University of Alabama, Tuscaloosa, Tuscaloosa, AL; M. Luhar, University of Southern California, Los Angeles, CA | 1500 hrs<br>AIAA-2018-3080<br>**Computational Modelling and Analysis of Aeroelastic Flutter**<br>K. Menon, R. Mittal, Johns Hopkins University, Baltimore, MD | 1530 hrs<br>Oral Presentation<br>**The use of Cyber-Physical systems to optimize aeroelastic instabilities for energy harvesting**<br>Y. Su, K. Breuer, Brown University, Providence, RI | 1600 hrs<br>Oral Presentation<br>**Fluttering Response of a Flexible Piezo-electromechanical Smart Structure**<br>K. Shoele, Florida State University, Tallahassee, FL | 1630 hrs<br>AIAA-2018-3081<br>**Flow-Induced Flutter of Hanging Banners: Experiments and Validated Computational Models**<br>Z. Dou, A. Rips, N. Welsh, J. Seo, R. Mittal, Johns Hopkins University, Baltimore, MD | |

| Monday, 25 June 2018 | | | | | | |
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| **68-FD-14** | **Fundamental Fluid Flows II: Bluff Bodies** | | | | | **Kennesaw** |
| Chaired by: K. DISOTELL, Youngstown State University and G. ELLIOTT, University of Illinois | | | | | | |
| 1400 hrs<br>AIAA-2018-3082<br>**Numerical Study of Flow Physics and Drag of Spheres in Unsteady Motion**<br>F. Liu, P. Liu, Q. Qu, L. Lin, T. Hu, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1430 hrs<br>AIAA-2018-3083<br>**Heat and Fluid Flow around a Cylinder in Wake**<br>F. Zafar, M. Alam, Harbin Institute of Technology, Shenzhen, China | 1500 hrs<br>AIAA-2018-3084<br>**Three-Dimensional Structure of the Compressible Mixing Layer of an Axisymmetric, Supersonic, Separated Flow**<br>B. Kirchner, T. Tetef, G. Elliott, J. Dutton, University of Illinois, Urbana-Champaign, Urbana, IL | 1530 hrs<br>AIAA-2018-3085<br>**A new test stand for measuring wall shear stress.**<br>C. Tinney, University of Texas, Austin, Austin, TX | | | |

| Monday, 25 June 2018 | | | | | | |
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| **69-FD-15** | **Unsteady and Separated Flows II: Flow Control and Oscillatory Flows** | | | | | **Edgewood** |
| Chaired by: S. BHATTACHARYA, University of Central Florida and S. DAWSON, California Institute of Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-3086<br>**Large Scale Spanwise Periodic Vortex Gusts or Single Spanwise Vortex Impinging on a Rectangular Wing**<br>K. Engin, E. Aydin, B. Zaloglu, I. Fenercioglu, O. Cetiner, Istanbul Technical University, Istanbul, Turkey | 1430 hrs<br>AIAA-2018-3087<br>**Numerical Study of Flapping-Wing Flow Physics in Nonuniform Freestream Using the High-Order Spectral Difference Method on Dynamic Unstructured Grids**<br>N. Poudel, M. Yu, University of Maryland, Baltimore County, Baltimore, MD | 1500 hrs<br>AIAA-2018-3088<br>**Passive Flow Control on Backward Facing Step**<br>N. Findanis, Pentair Environmental Systems, Sydney, Australia | 1530 hrs<br>AIAA-2018-3089<br>**Aeroelastic Flutter in the Presence of an Active Flap**<br>T. Wang, K. Shoele, Florida State University, Tallahassee, FL | 1600 hrs<br>AIAA-2018-3090<br>**Lift Disturbance Cancellation with Fast-Flap Actuation**<br>A. Medina, Air Force Research Laboratory, Wright-Patterson AFB, OH; M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN | | |

| Monday, 25 June 2018 | | | | | | |
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| **70-FD-17** | **Reduced-Order and Data-Driven Modeling for Flow Control** | | | | | **Harris** |
| Chaired by: Q. WANG, MIT and M. WEI, Kansas State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3091<br>**Multilayer Convolution Frameworks for Data-Driven Discovery of Fluid flow Models**<br>S. Puligilla, B. Jayaraman, Oklahoma State University, Stillwater, OK | 1430 hrs<br>AIAA-2018-3092<br>**Temporal Extrapolation of Quasi-Periodic Solutions via DMD-like Methods**<br>V. Beltrán, S. Le Clainche Martinez, J. Vega, Technical University of Madrid, Madrid, Spain | 1500 hrs<br>AIAA-2018-3093<br>**Energy Transfer Mechanisms in Nonuniform Density Viscous Swirling Flows: A Linear Stability Analysis**<br>A. Mishra, Georgia Institute of Technology, Atlanta, GA | 1530 hrs<br>AIAA-2018-3094<br>**Data-Driven ROM for the Prediction of Dynamic Stall**<br>H. Gao, M. Wei, Kansas State University, Manhattan, KS; J. Hrynuk, Army Research Laboratory, Aberdeen Proving Ground, MD | 1600 hrs<br>AIAA-2018-3095<br>**Eigenvalue Reassignment by Particle Swarm Optimization toward Stability and Accuracy in Nonlinear Reduced-Order Models**<br>E. Rezaian, M. Wei, Kansas State University, Manhattan, KS | | |

| Monday, 25 June 2018 | | | | | | |
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| **71-FD-18/FC-6** | **Tribute to Anatol Roshko** | | | | | **Inman** |
| Chaired by: E. JOHNSEN, University of Michigan and M. MUNSON, U.S. Army Research Office | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**More Than a Scientific Legacy**<br>M. Munson, Army Research Laboratory, Durham, NC | 1430 hrs<br>Oral Presentation<br>**Anatol Roshko's view on education at Galcit**<br>M. Gharib, California Institute of Technology, Pasadena, CA | 1500 hrs<br>Oral Presentation<br>**Turbulent Shear Layers: The Legacy of Anatol Roshko**<br>D. Papamoschou, University of California, Irvine, Irvine, CA | 1530 hrs<br>Oral Presentation<br>**A Different Perspective on Vortex-Induced Vibrations, Shaped By Anatol**<br>J. Klamo, Naval Postgraduate School, Monterey, CA | 1600 hrs<br>Oral Presentation<br>**Tracking coherent structures from fish wakes to the Gulf Stream**<br>M. Green, Syracuse University, Syracuse, NY | 1630 hrs<br>Oral Presentation<br>**Anatol Roshko: Selected contributions to gasdynamics**<br>H. Hornung, California Institute of Technology, Pasadena, CA | |

**Monday, 25 June 2018**

| 72-GT-3 | AEDC: Advancements in Propulsion T&E at the AEDC | | | | | Embassy E |
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| Chaired by: P. KELLY, QuantiTech, Inc. and K. BUTLER, Arnold Engineering Development Complex | | | | | | |
| 1400 hrs<br>AIAA-2018-3096<br>**Characterization and Capability of the Turbine Engine Corrosion Testing Facility at Arnold Engineering Development Complex (Invited)**<br>A. Moon, Arnold Engineering Development Complex, Arnold AFB, TN | 1430 hrs<br>Oral Presentation<br>**Analysis Technique To Determine The Underlying Wave Structure Of Combustion Instabilities From Surface Mounted High Response Static Pressure Sensors (Invited)**<br>A. Hale, Arnold Engineering Development Complex, Arnold AFB, TN | 1500 hrs<br>Oral Presentation<br>**Demonstration of a Remotely-Controlled Swirl Generator for Simulating Aircraft Inlet Secondary Flows During Turbine Engine Ground Tests (Invited)**<br>D. Beale, Arnold Engineering Development Complex, Arnold AFB, TN | 1530 hrs<br>AIAA-2018-3097<br>**Sweep Test Techniques to Reduce Cost of Turbine Engine Altitude Testing (Invited)**<br>A. Jackson, QuantiTech, Inc., Huntsville, AL | 1600 hrs<br>AIAA-2018-3098<br>**Recent Turbine Engine Accelerated Mission Testing Accomplishments at AEDC (Invited)**<br>S. Arnold, P. Kelly, Arnold Engineering Development Complex, Arnold AFB, TN | 1630 hrs<br>AIAA-2018-3099<br>**Revolution-Based Processing of Oscillatory Signals in Rotating Equipment (Invited)**<br>N. Harrison, Arnold Engineering Development Complex, Arnold AFB, TN | |

**Monday, 25 June 2018**

| 73-GT-13<br>1400 - 1600 hrs | Wind Tunnel Models, Balances, and Support Hardware Fabrication Capabilities | Dunwoody |
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Panelists will highlight the crucial skill area for wind tunnel testing of test hardware design and fabrication in terms of state of the art, industry direction and associated strategies, and strengths and challenges. Panelists will make 15 minute presentations followed by moderated discussion of key points from the presentation and from the the audience.

Moderator: John Micol

Panelists:

| **Chris Atheide** | **R. David King** | **Kenneth Sullivan** | **Ray Rhew** |
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| Director of New Business<br>Tri-Models | Design Engineer Manager, Force Measurement Systems<br>Calspan | President/CEO<br>Micro Craft, Inc. | Branch Head, Aeronautics Systems Engineering<br>NASA Langley Research Center |

**Monday, 25 June 2018**

| 74-MDO-4 | Non-Deterministic Design Methods and Applications | | | | | Hanover E |
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| Chaired by: L. MAININI, United Technologies Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3100<br>**Early Failure in Probabilistic Asset Fleet Management**<br>A. Dourado, F. Viana, University of Central Florida, Orlando, FL | 1430 hrs<br>AIAA-2018-3101<br>**Parametric Uncertainty Quantification of Aviation Environmental Design Tool**<br>D. Lim, Y. Li, M. LeVine, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-3102<br>**Hessian-based Dimension Reduction for Optimization Under Uncertainty**<br>K. Panda, J. Hicken, Rensselaer Polytechnic Institute, Troy, NY | 1530 hrs<br>AIAA-2018-3103<br>**Uncertainty quantification in industrial turbo-machinery design using sparse polynomial chaos expansions**<br>S. Abraham, P. Tsirikoglou, C. Lacor, G. Ghorbaniasl, Vrije Universiteit Brussel, Brussels, Belgium; D. Wunsch, C. Hirsch, NUMECA International, Brussels, Belgium; et al. | 1600 hrs<br>AIAA-2018-3104<br>**Optimization Under Uncertainty: Rethinking Margins at the Conceptual Design**<br>D. Bianchi, T. Orra, C. Silva, Embraer, São José dos Campos, Brazil; F. Silvestre, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1630 hrs<br>AIAA-2018-3105<br>**Optimization of a Chain of Nonlinear Resonators for Vibration Mitigation**<br>S. Ahmadisoleymani, S. Missoum, University of Arizona, Tucson, Tucson, AZ | |

**Monday, 25 June 2018**

| 75-MDO-5 | Aerodynamic Design/Shape Optimization II | | | | | | Hanover G |
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| Chaired by: M. BHATIA, Mississippi State University and S. TOWNSEND | | | | | | | |
| 1400 hrs<br>AIAA-2018-3106<br>**An Active Variable Camber Continuous Trailing Edge Flapped Wing Wind Tunnel Model for Aeroelastic "In-Flight" Shape Optimization Tests**<br>N. Precup, M. Mor, E. Livne, University of Washington, Seattle, Seattle, WA | 1430 hrs<br>AIAA-2018-3107<br>**CFD-based Analysis and Surrogate-based Optimization of Bio-inspired Surface Riblets for Aerodynamic Efficiency**<br>S. Lulekar, P. Ghassemi, S. Chowdhury, University at Buffalo, Buffalo, NY | 1500 hrs<br>AIAA-2018-3108<br>**Aerothermodynamic Design Optimization of Hypersonic Vehicles**<br>S. Eyi, K. Hanquist, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI | 1530 hrs<br>AIAA-2018-3109<br>**A Study to Compare Deterministic and Non-Deterministic Multi-point Optimization for Airfoil Shape Design**<br>T. Kanno, W. Crossley, Purdue University, West Lafayette, IN | 1600 hrs<br>AIAA-2018-3110<br>**Adjoint-based Local Reanalysis of Nonlinear PDEs**<br>J. Crean, K. Panda, J. Hicken, Rensselaer Polytechnic Institute, Troy, NY | 1630 hrs<br>AIAA-2018-3111<br>**Simulation and Adjoint-based Design for Variable Density Incompressible Flows with Heat Transfer**<br>T. Economon, Bosch Research and Technology Center, Palo Alto, CA | 1700 hrs<br>AIAA-2018-3112<br>**Aerodynamic Shape Optimization of Wing-Body-Tail Configuration via Efficient Surrogate-Based Optimization**<br>W. Kai, Z. Han, W. Song, Northwestern Polytechnical University, Xi'an, China |

| Monday, 25 June 2018 | | | | | | |
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| **76-PDL-2** | **Computational Methods and Plasma Modeling II** | | | | | **Chicago A** |
| Chaired by: S. BANE, Purdue University- Sch of Aero and Astro | | | | | | |
| 1400 hrs<br>AIAA-2018-3113<br>**When Parabolized Propagation Fails: A Matrix Square Root Propagator for EM Waves**<br>L. Keefe, I. Zilberter, T. Madden, Air Force Research Laboratory, Kirtland AFB, NM | 1430 hrs<br>AIAA-2018-3114<br>**CFD model of a liquid fueled high-velocity oxy-fuel combustor for MHD power application**<br>H. Kim, National Energy Technology Laboratory, Albany, OR; E. Huckaby, National Energy Technology Laboratory, Morgantown, WV; C. Woodside, National Energy Technology Laboratory, Albany, OR | 1500 hrs<br>AIAA-2018-3115<br>**An efficient solver for magneto-plasma dynamic thruster equations**<br>S. Jaisankar, S. T, Indian Institute of Science, Bangalore, India | | | | |

| Monday, 25 June 2018 | | | | | | |
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| **77-TP-3** | **Special Session: Aerothermodynamics in NASA's Mars 2020 Mission** | | | | | **Embassy B** |
| Chaired by: K. EDQUIST, NASA Langley Research Center and A. BRANDIS, AMA Inc at NASA Ames | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**The Mars 2020 Entry, Descent, and Landing System**<br>P. Brugarolas, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; D. Way, NASA Langley Research Center, Hampton, VA; A. Chen, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1430 hrs<br>AIAA-2018-3116<br>**Computational Aerothermodynamic Environments for the Mars 2020 Entry Capsule**<br>A. Wise, NASA Langley Research Center, Hampton, VA; D. Prabhu, Analytical Mechanics Associates, Inc., Moffett Field, CA; C. Johnston, NASA Langley Research Center, Hampton, VA; D. Saunders, Analytical Mechanics Associates, Inc., Moffett Field, CA; K. Edquist, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>Oral Presentation<br>**Radiative Heating Indicators and Uncertainty Analysis for Mars 2020**<br>A. Brandis, Analytical Mechanics Associates, Inc., Moffett Field, CA; C. Johnston, K. Edquist, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>Oral Presentation<br>**Aerothermodynamic Design of the Mars 2020 Entry Capsule**<br>K. Edquist, A. Wise, C. Johnston, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>Oral Presentation<br>**Sizing and Margins Assessment of the Mars2020 Acusil-II Thermal Protection System**<br>M. Mahzari, R. Beck, T. White, H. Hwang, NASA Ames Research Center, Moffett Field, CA; J. Williams, Analytical Mechanics Associates, Inc., Moffett Field, CA; A. Wise, NASA Langley Research Center, Hampton, VA; et al. | 1630 hrs<br>Oral Presentation<br>**Estimation of Heatshield Mass Loss for Mars 2020 Entry Vehicle**<br>M. Mahzari, NASA Ames Research Center, Moffett Field, CA; J. Williams, Analytical Mechanics Associates, Inc., Moffett Field, CA; R. Beck, H. Hwang, NASA Ames Research Center, Moffett Field, CA; A. Wise, K. Edquist, NASA Langley Research Center, Hampton, VA; et al. | 1700 hrs<br>Oral Presentation<br>**Terrain Relative Navigation for the Mars 2020 Mission**<br>P. Brugarolas, A. Chen, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; D. Way, NASA Langley Research Center, Hampton, VA |

| Monday, 25 June 2018 | | |
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| **78-NW-2**<br>**1600 - 1630 hrs** | **Networking Coffee Break** | **Centennial Foyer** |

| Monday, 25 June 2018 | | |
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| **79-RL-1**<br>**1630 - 1800 hrs** | **Rising Leaders Speed Mentoring** | **Regency Ballroom V** |

| Monday, 25 June 2018 | | |
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| **80-AA-13**<br>**1730 - 1830 hrs** | **Progress in Prediction of Jet Noise and Quantification of Aircraft/Engine Components** | **International North** |
| **Krishna Viswanathan**<br>The Boeing Company<br>(AIAA-2018-3117) | | |

| Monday, 25 June 2018 | | |
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| **81-APA-11**<br>**1730 - 1830 hrs** | **Aerodynamics Award Lecture** | **International South** |
| "Computational Methods for Periodic Unsteady Aerodynamic Problems"<br>**Kenneth Hall**<br>Julian Francis Abele Professor of Mechanical Engineering and Materials Science<br>Duke University | | |

| Monday, 25 June 2018 | | |
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| **82-RL-2**<br>**1800 - 1930 hrs** | **Rising Leaders Reception** | **Regency Ballroom V** |

# Tuesday

**Tuesday, 26 June 2018**

| 83-SB-2<br>0730 - 0800 hrs | Speakers' Briefing | Session Rooms |
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**Tuesday, 26 June 2018**

| 84-PLNRY-2<br>0800 - 0900 hrs | Tuesday Plenary: Evolution of the F-35 | Centennial I, II, III |
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Keynote Speaker
**Jeff Babione**
Vice President and General Manager, Advanced Development Programs
Lockheed Martin Aeronautics Company

**Tuesday, 26 June 2018**

| 85-NW-3<br>0900 - 0930 hrs | Networking Coffee Break | Centennial Foyer |
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**Tuesday, 26 June 2018**

**86-AA-14** — General Acoustics — Spring

Chaired by: D. CASALINO, EXA GmbH

| 0930 hrs<br>AIAA-2018-3118<br>**Assessment of Unsteady Propagation Characteristics and Corrections in Aeroacoustic Wind Tunnels Using an Acoustic Pulse**<br>C. Bahr, F. Hutcheson, NASA Langley Research Center, Hampton, VA; D. Stead, Science and Technology Corporation, Hampton, VA | 1000 hrs<br>AIAA-2018-3119<br>**Trailing-edge noise of a flat plate with several liner-type porous appendices**<br>S. Moreau, B. Dignou, P. Jaiswal, G. Yakhina, Y. Pasco, M. Sanjose, University of Sherbrooke, Sherbrooke, Canada; et al. | 1030 hrs<br>AIAA-2018-3121<br>**On the superior performance of leading edge slits over serrations for the reduction of aerofoil interaction noise**<br>C. Paruchuri, P. Joseph, University of Southampton, Southampton, United Kingdom; L. Ayton, University of Cambridge, Cambridge, United Kingdom | 1100 hrs<br>AIAA-2018-3122<br>**Development of a test rig for the measurement of turbulent boundary layer wall pressure statistics**<br>N. Van de Wyer, A. Zapata, D. Nogueira, C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1130 hrs<br>AIAA-2018-3123<br>**Acoustic Localisation of Gunshots in the Presence of Obstacles**<br>A. Sinha, T. Singh, Indian Institute of Technology Bombay, Mumbai, India | | |
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**Tuesday, 26 June 2018**

**87-AA-15** — Integration Effects and Flight Acoustics II — Techwood

Chaired by: R. EWERT, DLR - German Aerospace Center and J. JUNE, NASA Langley Research

| 0930 hrs<br>AIAA-2018-3124<br>**Aircraft System Noise Assessment of the NASA D8 Subsonic Transport Concept**<br>I. Clark, R. Thomas, NASA Langley Research Center, Hampton, VA; Y. Guo, NEAT Consulting, Seal Beach, CA | 1000 hrs<br>AIAA-2018-3125<br>**Aircraft System Noise Prediction Uncertainty Quantification for a Hybrid Wing Body Subsonic Transport Concept**<br>J. June, R. Thomas, NASA Langley Research Center, Hampton, VA; Y. Guo, NEAT Consulting, Seal Beach, CA | 1030 hrs<br>AIAA-2018-3126<br>**Far Term Noise Reduction Roadmap for the Mid-Fuselage Nacelle Subsonic Transport**<br>Y. Guo, NEAT Consulting, Seal Beach, CA; R. Thomas, I. Clark, J. June, NASA Langley Research Center, Hampton, VA | 1100 hrs<br>AIAA-2018-3127<br>**Opportunities and Challenges for X-plane Acoustic Flight Research**<br>R. Thomas, NASA Langley Research Center, Hampton, VA; Y. Guo, NEAT Consulting, Seal Beach, CA | | | |
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| Tuesday, 26 June 2018 | | | | | | |
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| **88-AA-16** | **Acoustic/Fluid Dynamics Interactions III** | | | | | **Marietta** |
| Chaired by: A. TOWNE | | | | | | |
| 0930 hrs<br>AIAA-2018-3128<br>**A Validation of High-Order Compact ILES Code for Trailing-Edge Noise at High Reynolds Numbers**<br>J. Lewis, U.S. Air Force, Wright-Patterson AFB, OH; R. Mankbadi, V. Golubev, L. Nguyen, S. Salehian, Embry-Riddle Aeronautical University, Daytona Beach, FL | 1000 hrs<br>AIAA-2018-3129<br>**Deterministic and Statistical Analysis of Trailing-Edge Noise Mechanisms with and without Serrations**<br>G. Romani, Delft University of Technology, Delft, The Netherlands; W. van der Velden, Exa GmbH, Stuttgart, Germany; D. Casalino, Delft University of Technology, Delft, The Netherlands | 1030 hrs<br>AIAA-2018-3130<br>**Aeroacoustic airfoil shape optimization utilizing semi-empirical models for trailing edge noise prediction**<br>K. Volkmer, T. Carolus, University of Siegen, Siegen, Germany | 1100 hrs<br>AIAA-2018-3131<br>**Effects of Trailing Edge Serrations on Shielding of Aeroacoustic Noise Sources by a Momentum Wake**<br>N. Dousti, S. Khader, S. Mayoral, California State University, Fullerton, CA | 1130 hrs<br>AIAA-2018-3132<br>**Airfoil Self-Noise Reduction Using Fractal-Serrated Trailing Edge**<br>S. Hasheminejad, T. Chong, Brunel University London, London, United Kingdom; P. Joseph, G. Lacagnina, University of Southampton, Southampton, United Kingdom | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **89-AA-17** | **Advanced Testing Techniques III** | | | | | **University** |
| Chaired by: C. SCHRAM, von Karman Institute for Fluid Dynamics and S. MULA, Independent Consultant | | | | | | |
| 0930 hrs<br>AIAA-2018-3133<br>**An Experimental Facility for Measuring the Acoustic Reflection and Transmission of Higher-Order Modes in Heated Flows, Part 1: Design and Methodology**<br>S. Lympany, A. Karon, M. Wadsworth, R. Funk, K. Ahuja, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-3134<br>**An Experimental Facility for Measuring the Acoustic Reflection and Transmission of Higher-Order Modes in Heated Flows, Part 2: Experiments and Analysis**<br>S. Lympany, K. Ahuja, Georgia Institute of Technology, Atlanta, GA | 1030 hrs<br>AIAA-2018-3135<br>**Aerofoil Surface Pressure Reconstruction from Far-Field Array Measurements**<br>F. Casagrande Hirono, P. Joseph, F. Fazi, University of Southampton, Southampton, United Kingdom | 1100 hrs<br>AIAA-2018-3136<br>**The UTwente Aeroacoustic Wind Tunnel Upgrade**<br>L. de Santana, M. Sanders, C. Venner, H. Hoeijmakers, University of Twente, Enschede, The Netherlands | 1130 hrs<br>AIAA-2018-3137<br>**S1MAWind Tunnel New Aeroacoustic Capability: a Traversing Microphone Array**<br>F. Nicolas, M. Rey, ONERA, Meudon, France | 1200 hrs<br>AIAA-2018-3138<br>**Design of an Aeroacoustic Wind Tunnel Facility at the University of Bristol**<br>Y. Mayer, H. Kamliya Jawahar, M. Szoke, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | |

| Tuesday, 26 June 2018 | | | | | | |
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| **90-AA-18** | **Airframe/High-Lift Noise II** | | | | | **Roswell** |
| Chaired by: W. SCHROEDER, RWTH AACHEN, Institute of Aerodynamics | | | | | | |
| 0930 hrs<br>AIAA-2018-3139<br>**Numerical and experimental insights into the noise generation of a circulation control airfoil**<br>L. Rossian, A. Suryadi, K. Rossignol, R. Ewert, M. Herr, J. Delfs, German Aerospace Center (DLR), Braunschweig, Germany; et al. | 1000 hrs<br>AIAA-2018-3140<br>**Computation of Circulation Control Airfoil Aeroacoustics**<br>Y. Wu, K. Wang, M. Wang, University of Notre Dame, Notre Dame, IN | 1030 hrs<br>AIAA-2018-3141<br>**The Use of Micro-jets for Airfoil Self-noise Control**<br>M. Szoke , D. Fiscaletti, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | 1100 hrs<br>AIAA-2018-3142<br>**Aerodynamic and Aeroacoustic Performance of Three-element High Lift Airfoil fitted with Morphing Fillers**<br>H. Kamliya Jawahar, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom; C. Silva, Embraer, São José dos Campos, Brazil | 1130 hrs<br>AIAA-2018-3143<br>**Application of Amiet's theory for noise prediction of general airfoil profiles subjected to spanwise-varying inflow conditions**<br>R. Miotto, W. Wolf, University of Campinas, Campinas, Brazil; L. de Santana, C. Venner, University of Twente, Enschede, The Netherlands | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **91-AA-19** | **Jet Aeroacoustics III** | | | | | **Piedmont** |
| Chaired by: K. VISWANATHAN, Boeing Commercial Airplanes | | | | | | |
| 0930 hrs<br>AIAA-2018-3144<br>**The Flow and Turbulence Characteristics of a Heated Supersonic Jet with an Offset Total Temperature Non-Uniformity**<br>D. Mayo, K. Daniel, T. Lowe, W. Ng, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1000 hrs<br>AIAA-2018-3145<br>**Experimental Investigation of the Very Near Pressure Field of a Heated Supersonic Jet with a Total Temperature Non-Uniformity**<br>K. Daniel, D. Mayo, T. Lowe, W. Ng, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1030 hrs<br>AIAA-2018-3146<br>**Inclusion of Broadband Shock-Associated Noise in Spectral Decomposition of Noise from High-performance Military Aircraft**<br>T. Neilsen, A. Vaughn, K. Gee, S. Swift, Brigham Young University, Provo, UT; A. Wall, Air Force Research Laboratory, Wright-Patterson AFB, OH; J. Downing, Blue Ridge Research and Consulting, LLC, Asheville, NC; et al. | 1100 hrs<br>AIAA-2018-3147<br>**Sound production by shock leakage in supersonic jet screech**<br>D. Edgington-Mitchell, J. Weightman, D. Honnery, J. Soria, Monash University, Clayton, Australia | 1130 hrs<br>AIAA-2018-3148<br>**Optical Flow Visualization of a Mach 3 jet at 150,000 frames per second**<br>J. Valdez, C. Tinney, University of Texas, Austin, Austin, TX | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **92-AFM-3** | **Aircraft Flight Dynamics I** | | | | | **Embassy C** |
| Chaired by: D. MURRI, NASA Engineering and Safety Center and K. SHWEYK, Boeing Engineering Operations & Technology | | | | | | |
| 0930 hrs<br>AIAA-2018-3149<br>**Theory of Generalized Structure and Its Application in Aircraft Design**<br>G. Song, The Boeing Company, Seal Beach, CA | 1000 hrs<br>AIAA-2018-3150<br>**Aeroservoelastic Modeling and Analysis of a Highly Flexible Flutter Demonstrator**<br>M. Wuestenhagen, T. Kier, Y. Meddaikar, M. Pusch, D. Ossmann, German Aerospace Center (DLR), Wessling, Germany | 1030 hrs<br>AIAA-2018-3151<br>**The Take-off an Unpowered Glider by Winch or Car**<br>V. Kargin, S. Haser, Turkish Aerospace Industries, Inc., Ankara, Turkey; A. Dogan, University of Texas, Arlington, Arlington, TX | 1100 hrs<br>AIAA-2018-3152<br>**A Study of a Trajectory Optimization of a Short Haul Flight**<br>D. Zammit-Mangion, University of Malta, Msida, Malta; I. Madani, Cranfield University, Bedford, United Kingdom | 1130 hrs<br>AIAA-2018-3153<br>**A New Concept for Three-Dimensional Aerodynamic Attitude Flight Envelope**<br>A. Abdallah, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **93-AFM-4** | **Flight Test and System Identification** | | | | | **Greenbriar** |
| Chaired by: S. D'SOUZA, NASA-ARC and N. FEZANS, DLR - German Aerospace Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3154<br>**Experimental Flight Characterization of a Canard-Controlled, Subsonic Missile**<br>F. Fresconi, I. Celmins, J. Maley, B. Nelson, Army Research Laboratory, Aberdeen Proving Ground, MD | 1000 hrs<br>AIAA-2018-3155<br>**Real-Time Parameter Estimation for Flexible Aircraft**<br>J. Grauer, NASA Langley Research Center, Hampton, VA; M. Boucher, NASA Armstrong Flight Research Center, Edwards, CA | 1030 hrs<br>AIAA-2018-3156<br>**Estimation of Lateral Directional Aerodynamic Derivatives from Flight Data of Unmanned Powered Parafoil Aerial Vehicle**<br>V. Devalla, R. Jaiswal, A. Mondal, K. Sharma, C. Thomas, O. Prakash, University of Petroleum and Energy Studies, Dehradun, India | 1100 hrs<br>AIAA-2018-3157<br>**Frequency-Domain Deconvolution for Flight Dynamics Applications**<br>J. Grauer, NASA Langley Research Center, Hampton, VA; M. Boucher, NASA Armstrong Flight Research Center, Edwards, CA | | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **94-AFM-5** | **Missiles, Projectiles, and Re-Entry Vehicles Flight Mechanics I** | | | | | **Regency Ballroom VI** |
| Chaired by: C. KARLGAARD, Analytical Mechanics Associates Inc | | | | | | |
| 0930 hrs<br>AIAA-2018-3158<br>**Approach for Understanding Range Extension of Gliding Indirect Fire Munitions**<br>J. Bryson, J. Vasile, I. Celmins, F. Fresconi, Army Research Laboratory, Aberdeen Proving Ground, MD | 1000 hrs<br>AIAA-2018-3159<br>**Efficiency of Aerodynamic Interceptors for Subsonic Missiles Roll Attitude Control**<br>S. Mandic, M. Pavic, B. Pavkovic, M. Ignjatovic, Military Technical Institute, Belgrade, Serbia | 1030 hrs<br>AIAA-2018-3160<br>**Robust Flight Envelope Generation Approach for Mars Entry using Uncertainty Quantification and Reachable Controllable Sets**<br>X. Jiang, S. Li, Nanjing University of Aeronautics and Astronautics, Nanjing, China | 1100 hrs<br>AIAA-2018-3161<br>**Space Debris reduction using Eddy Currents**<br>K. Sharma, S. Ghazali, A. Dalai, K. Sarawat, V. Devalla, S. Joshi, University of Petroleum and Energy Studies, Dehradun, India; et al. | | | |

**Tuesday, 26 June 2018**

| 95-AMT-3/GT-4<br>0930 - 1230 hrs | Special Session: Optical Diagnostics in High-Enthalpy Short Duration Wind Tunnels (Invited) | The Learning Center |
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**Advanced Diagnostics in Impulse Facilities**
TJ McIntyre and Richard G Morgan, University of Queensland

**Complementary Laser Diagnostic Techniques for High-Enthalpy Impulse Facilities**
S. O'Byrne L. Le Page, T. Kaseman, and R. Manoharan, University of New South Wales, Y. Krishna, King Abdullah University of Science and Technology, H. Kleine, University of New South Wales

**Non-Intrusive Diagnostics for High Enthalpy Flows in LENS XX**
Ron Parker, CUBRC

**Direct Optical Measurement of Shock-Boundary Interaction in Hypervelocity Flow**
Nelson Yanes, Andrew Knisely, and Joanna M Austin, California Institute of Technology

**PSP/TSP in Hypersonic Facilities: Lessons Learned. Example: Determination of Heat Transfer into a Wedge Model in HEG Using TSP**
Walter Beck, German Aerospace Center (DLR)

**The Current Measurement Technique for Surface Heat-Flux in High-Enthalpy Shock Tunnel**
Hideyuki Tanno, Japan Aerospace Exploration Agency (JAXA)

**Tuesday, 26 June 2018**

| 96-APA-12/ATIO.ACD-5 | Special Session: UCAV Systems Design III - Engine Integration (Invited) | Hanover F |
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Chaired by: M. SCHOENENBERGER, NASA Langley Research Center and N. HALL, Lockheed Martin Corporation

| 0930 hrs<br>AIAA-2018-3162<br>**Design and Integration of a Low Observable Intake for the MULDICON Platform (Invited)**<br>H. Edefur, M. Tormalm, Swedish Defense Research Agency (FOI), Stockholm, Sweden | 1000 hrs<br>AIAA-2018-3163<br>**Preliminary Engine Design for the MULDICON Configuration (Invited)**<br>S. Zenkner, R. Becker, German Aerospace Center (DLR), Cologne, Germany | 1030 hrs<br>AIAA-2018-3164<br>**Computational Design of S-Duct Intakes for the NATO AVT-251 Multi-Disciplinary Configuration (Invited)**<br>A. Jirasek, P. Aref, M. Ghoreyshi, R. Cummings, M. Satchell, U.S. Air Force Academy, Colorado Springs, CO | 1100 hrs<br>AIAA-2018-3165<br>**Automated Optimisation of the MULDICON Inlet with Minimum Losses and Reduced Sight onto the Compressor Front Face (Invited)**<br>C. Voss, R. Becker, German Aerospace Center (DLR), Cologne, Germany; M. Trost, RWTH Aachen University, Aachen, Germany | 1130 hrs<br>AIAA-2018-3166<br>**IR-Signature of the MULDICON Configuration determined by the IR-Signature Model MIRA (Invited)**<br>E. Lindermeir, M. Ruetten, German Aerospace Center (DLR), Wessling, Germany | 1200 hrs<br>AIAA-2018-3167<br>**IR Signature Design Effort for the MULDICON Configuration (Invited)**<br>M. Dalenbring, H. Edefur, U. Falk, M. Tormalm, L. Tysell, Swedish Defense Research Agency (FOI), Stockholm, Sweden | |
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**Tuesday, 26 June 2018**

| 97-APA-13 | Applied CFD and Numerical Correlations with Experimental Data II | Fairlie |
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Chaired by: B. MARPLES and N. RAJMOHAN, Aerion Technologies Inc. and M. CONWAY, The Aerospace Corporation

| 0930 hrs<br>AIAA-2018-3168<br>**Reduced-Order Modeling of Steady Aerodynamics for 2D Store Separation Analysis**<br>A. Sinha, Indian Institute of Technology Bombay, Mumbai, India; S. Garg, PEC University of Technology, Chandigarh, India | 1000 hrs<br>AIAA-2018-3169<br>**Combining CFD, EFD and FFD Data via Gappy Proper Orthogonal Decomposition**<br>A. Kaveh, W. Habashi, Z. Zhan, M. Fossati, McGill University, Montréal, Canada | 1030 hrs<br>AIAA-2018-3170<br>**Changes in Modern Lifting-Line Methods for Swept Wings and Viscous Effects**<br>J. Chreim, M. Pimenta, University of São Paulo, São Paulo, Brazil; J. Dantas, Institute for Technological Research, São Paulo, Brazil; G. Assi, University of São Paulo, São Paulo, Brazil | 1100 hrs<br>AIAA-2018-3171<br>**Transonic Lattice Boltzmann Simulations of the NASA-CRM in the European Transonic Windtunnel**<br>B. Konig, D. Singh, E. Fares, Exa GmbH, Stuttgart, Germany; M. Wright, European Transonic Windtunnel, Cologne, Germany | 1130 hrs<br>AIAA-2018-3172<br>**A Variational Approach for the Dynamics of Unsteady Point Vortices with Application to Impulsively Started Aerofoil**<br>A. Hussein, Virginia Polytechnic Institute and State University, Blacksburg, VA; H. Taha, University of California, Irvine, Irvine, CA; S. Ragab, M. Hajj, Virginia Polytechnic Institute and State University, Blacksburg, VA | | |
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**Tuesday, 26 June 2018**

| 98-APA-14 | Bio-Inspired Aerodynamics | Courtland |
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Chaired by: L. ZIENTARSKI, AFRL/RQVC and K. CASPER, Sandia National Laboratories

| 0930 hrs<br>AIAA-2018-3173<br>**Aerodynamic investigation of the free flapping flight of a Saker falcon with the help of 3D multi-view reconstruction method**<br>M. Heinold, C. Kähler, University of the German Federal Armed Forces, Munich, Germany | 1000 hrs<br>AIAA-2018-3174<br>**Design Optimization of a Covert Feather-Inspired Deployable Structure for Increased Lift**<br>C. Duan, J. Waite, A. Wissa, University of Illinois, Urbana-Champaign, Urbana, IL | 1030 hrs<br>AIAA-2018-3175<br>**Experimental Study of Flow in Wake Robotic Bird**<br>F. Gijsman, H. Hoeijmakers, University of Twente, Enschede, The Netherlands | 1100 hrs<br>AIAA-2018-3176<br>**Impacts of airfoil characteristics on the aerodynamic loads for albatross-inspired fixed wing drones**<br>A. Stempeck, M. Hassanalian, A. Abdelkefi, New Mexico State University, Las Cruces, NM | | | |
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| Tuesday, 26 June 2018 | | | | | | |
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| **99-APA-15/FC-7** | **Flow Control Development and Applications I** | | | | | **Baker** |
| Chaired by: R. KREEGER, NASA Glenn Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3177<br>**Evaluation of a Griffith Type Transonic Laminar Flow Airfoil**<br>A. Collazo Garcia, P. Ansell, University of Illinois, Urbana-Champaign, Urbana, IL | 1000 hrs<br>AIAA-2018-3178<br>**Analysis of a 3D Unsteady Morphing Wing with Seamless Side-edge Transition**<br>C. Abdessemed, Y. Yao, A. Bouferrouk, P. Narayan, University of the West of England, Bristol, United Kingdom | 1030 hrs<br>AIAA-2018-3179<br>**Mechanisms of Pressure Loss Recovery by Repetitive Energy Deposition in Supersonic Intake Model**<br>A. Sasoh, M. Myokan, H. Bottini, A. Iwakawa, Nagoya University, Nagoya, Japan | 1100 hrs<br>AIAA-2018-3180<br>**Experimental Investigation of Vertical Stabilizer with Vortex Generators and Dorsal Fin**<br>S. Koike, Y. Ito, M. Murayama, K. Nakakita, K. Yamamoto, K. Kusunose, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan | 1130 hrs<br>AIAA-2018-3181<br>**Development of Experimental Techniques for Hybrid Laminar Flow Control in the ARA Transonic Wind Tunnel**<br>S. Lawson, A. Ciarella, P. Wong, Aircraft Research Association, Ltd., Bedford, United Kingdom | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **100-ASE-5** | **Supercooled Large Droplet Icing** | | | | | **Hanover C** |
| Chaired by: M. VARGAS, NASA Glenn Research Center and W. SANDEL, Honeywell Inc. | | | | | | |
| 0930 hrs<br>AIAA-2018-3182<br>**Further Examinations of Bimodal SLD Ice Accretion in the NASA Icing Research Tunnel**<br>M. Potapczuk, NASA Glenn Research Center, Cleveland, OH; J. Tsao, Ohio Aerospace Institute, Cleveland, OH | 1000 hrs<br>AIAA-2018-3183<br>**Further Evaluation of Swept Wing Icing Scaling with Maximum Combined Cross Section Ice Shape Profiles**<br>J. Tsao, Ohio Aerospace Institute, Cleveland, OH | 1030 hrs<br>AIAA-2018-3184<br>**Weber Number Tests in the NASA Icing Research Tunnel**<br>M. King, NASA Glenn Research Center, Cleveland, OH; W. Bachalo, Artium Technologies, Inc., Sunnyvale, CA; D. Bell, McKinley Climatic Laboratory, Fort Walton Beach, FL | 1100 hrs<br>AIAA-2018-3185<br>**Design of an Icing Wind Tunnel Contraction for Supercooled Large Drop Conditions**<br>D. Orchard, K. Szilder, C. Davison, National Research Council Canada, Ottawa, Canada | 1130 hrs<br>AIAA-2018-3186<br>**Surface Temperature Mapping Using Luminescent Imaging for Super-Cooled Large Droplet Icing**<br>W. Patterson, University of Notre Dame, Notre Dame, IN; Y. Nishio, University of Electro-Communications, Chofu, Japan; J. Gonzales, A. Mallette, University of Notre Dame, Notre Dame, IN; Y. Hirai, PPSM, Paris, France; H. Sakaue, University of Notre Dame, Notre Dame, IN | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **101-ASE-6** | **Wake Turbulence** | | | | | **Hanover D** |
| Chaired by: L. DAVENPORT, CSSI, Inc. and Z. ZHENG, The University of Kansas | | | | | | |
| 0930 hrs<br>AIAA-2018-3187<br>**Estimation of Ambient Winds in Turbulent Conditions through an Unscented Kalman Filter**<br>R. Frej Vitalle, CSSI, Inc., Washington, D.C. | 1000 hrs<br>AIAA-2018-3188<br>**Contrail Flight Data for a Variety of Jet Fuels**<br>A. Brown, National Research Council Canada, Gloucester, Canada | 1030 hrs<br>AIAA-2018-3189<br>**Numerical Simulation of contrail formation on the Common Research Model wing/body/engine configuration**<br>E. Montreuil, W. Ghedhaifi, V. Chmielaski, F. Vuillot, F. Gand, ONERA, Palaiseau, France; A. Loseille, National Institute for Research in Computer Science and Control (INRIA), Saclay, France | 1100 hrs<br>AIAA-2018-3190<br>**Wake Turbulence Mitigation in High Altitude Airspace Using Lateral Offset Procedures**<br>L. Davenport, S. Murphy, CSSI, Inc., Washington, D.C.; E. Johnson, Federal Aviation Administration, Washington, D.C. | | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **102-ATIO.ACD-6** | **Aircraft Performance** | | | | | **Hanover A** |
| Chaired by: R. PEREZ, Royal Mil College of Canada and M. ORR, Boeing Commercial Airplanes | | | | | | |
| 0930 hrs<br>AIAA-2018-3191<br>**A Framework for General Aviation Aircraft Performance Model Calibration and Validation**<br>T. Puranik, E. Harrison, S. Min, I. Chakraborty, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-3192<br>**On the Applicability of Empirical Drag Estimation Methods for Unmanned Air Vehicle Design**<br>F. Goetten, M. Havermann, C. Braun, Aachen University of Applied Sciences, Aachen, Germany; F. Gómez, C. Bil, RMIT University, Melbourne, Australia | 1030 hrs<br>AIAA-2018-3193<br>**An Integrated Design Approach for Advanced Flight Control Systems with Multifunctional Flight Control Devices**<br>T. Lampl, M. Hornung, Technical University of Munich, Munich, Germany | 1100 hrs<br>AIAA-2018-3194<br>**Design of an Electric Actuated Airbrake for Dynamic Airspeed Control of an Unmanned Aeroelastic Research UAV**<br>F. Sendner, P. Stahl, C. Rössler, M. Hornung, Technical University of Munich, Munich, Germany | 1130 hrs<br>AIAA-2018-3195<br>**Study on the Influence of Related Characters on the Inherent Lateral-directional Stability of Flying wing**<br>L. Song, W. Chenhao, H. Jun, Beihang University, Beijing, China; H. Yang, Zhejiang University, Hangzhou, China | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **103-ATIO.ATM-6** | **Reliability and Safety** | | | | | **Embassy D** |
| Chaired by: A. RAO, The Ohio State University | | | | | | |
| 0930 hrs<br>AIAA-2018-3196<br>**Hidden Markov Model based Terminal Area Safety Margin Evaluation Tool (TASMET)**<br>S. Subramanian, P. Kostiuk, Z. Wang, Robust Analytics, Inc., Crofton, MD | 1000 hrs<br>AIAA-2018-3197<br>**Evaluation of COTS Solutions to Support Flight Operations Quality Assurance in Business/Corporate Aviation**<br>M. Bromfield, T. Walton, Coventry University, Coventry, United Kingdom; D. Wright, M. Rusby, Corporate Aviation Safety Executive, Redhill, United Kingdom | 1030 hrs<br>AIAA-2018-3198<br>**Development of Possible Go-Around Criteria for Transport Aircraft**<br>A. Campbell, Federal Aviation Administration, Atlantic City, NJ; P. Zaal, San Jose State University, Moffett Field, CA; J. Schroeder, Federal Aviation Administration, Moffett Field, CA; S. Shah, Federal Aviation Administration, Atlantic City, NJ | 1100 hrs<br>AIAA-2018-3199<br>**Automated aircraft separation safety assurance using Bayesian networks**<br>S. Nannapaneni, Wichita State University, Wichita, KS; A. Dubey, S. Mahadevan, Vanderbilt University, Nashville, TN | 1130 hrs<br>AIAA-2018-3200<br>**Testing Enabling Technologies for Safe UAS Urban Operations**<br>A. Moore, NASA Langley Research Center, Hampton, VA; S. Balachandran, National Institute of Aerospace, Hampton, VA; S. Young, E. Dill, M. Logan, L. Glaab, NASA Langley Research Center, Hampton, VA; et al. | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **104-ATIO.DE-1** | **Design Processes and Education** | | | | | **Embassy F** |
| Chaired by: N. HINES, The Boeing Company and K. BENSON, Cobham | | | | | | |
| 0930 hrs<br>AIAA-2018-3201<br>**Increasing Bloom's Hierarchical Learning in Aerospace Engineering – a Case Study of Forensic Engineering Course using a "Chain of Events"**<br>M. Schuurman, G. Saunders-Smits, C. Rans, Delft University of Technology, Delft, The Netherlands | 1000 hrs<br>AIAA-2018-3202<br>**Quantifying Uncertainties during the Early Design Stage of a Gas Turbine Disc by Utilizing a Bayesian Framework**<br>B. Profir, M. Eres, J. Scanlan, University of Southampton, Southampton, United Kingdom; R. Bates, C. Argyrakis, Rolls-Royce Group plc, Derby, United Kingdom | 1030 hrs<br>AIAA-2018-3203<br>**Systematic Design Methodology for Integrated Prognostic and Health Management Systems**<br>R. Li, W. Verhagen, R. Curran, Delft University of Technology, Delft, The Netherlands | 1100 hrs<br>AIAA-2018-3204<br>**UAV, sensor and mission matching approach using the visualization environment**<br>E. Fokina, J. Feger, M. Hornung, Technical University of Munich, Garching, Germany | 1130 hrs<br>AIAA-2018-3205<br>**Advanced turboprop multidisciplinary design and optimization within AGILE project**<br>P. Della Vecchia, L. Stingo, F. Nicolosi, A. De Marco, University of Naples "Federico II", Naples, Italy; G. Cerino, Leonardo, Pomigliano D'Arco, Italy; P. Ciampa, German Aerospace Center (DLR), Hamburg, Germany; et al. | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **105-ATIO.TF-3** | **Electric Propulsion Integration and Contributory Technologies** | | | | | **Hanover B** |
| Chaired by: M. PATTERSON, NASA Langley Research Center and N. BORER, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3206<br>**An Optimal Propeller Design for In-Flight Power Recuperation on an Electric Aircraft**<br>D. Erzen, M. Andrejasic, Pipistrel d.o.o. Ajdovscina, Ajdovscina, Slovenia; T. Kosel, University of Ljubljana, Ljubljana, Slovenia | 1000 hrs<br>AIAA-2018-3207<br>**Design of a Dual Rotor Axial Rim Motor for Electric Aircraft**<br>T. Tallerico, J. Chin, Z. Cameron, NASA Glenn Research Center, Cleveland, OH | 1030 hrs<br>Oral Presentation<br>**Exploring Non-Uniform Propeller Rotational Speeds in High-Lift Propeller Systems**<br>X. Fei, NASA Langley Research Center, Hampton, VA; B. German, Georgia Institute of Technology, Atlanta, GA; M. Patterson, NASA Langley Research Center, Hampton, VA | 1100 hrs<br>AIAA-2018-3208<br>**Range Equation For a Series Hybrid Electric Aircraft**<br>R. Ravishankar, S. Chakravarthy, Indian Institute of Technology Madras, Chennai, India | 1130 hrs<br>AIAA-2018-3209<br>**Towards an Aircraft with Reduced Lateral Static Stability Using Differential Thrust**<br>E. Nguyen Van, D. Alazard, P. Pastor, Higher Institute of Aeronautics and Space, Toulouse, France; C. Döll, ONERA, Toulouse, France | 1200 hrs<br>AIAA-2018-3210<br>**Whirl Flutter Analysis of a Free-Flying Electric Driven Propeller Aircraft**<br>C. Hoover, J. Shen, University of Alabama, Tuscaloosa, Tuscaloosa, AL | |

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| **106-F360-3**<br>**0930 - 1130 hrs** | **Tuesday Forum 360: Reflection on Partnerships within the F-35 Enterprise** | **Centennial IV** |

Moderator: Graham Warwick, Technology Managing Editor, Aviation Week & Space Technology

Panelists:

| **Eric Branyan** | **Declan Holland** | **Frank Carus** | **Thomas Johnson** | **John Mazur** | **J.D. McFarlan** |
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| Vice President, F-35 Supply Chain Management<br>Lockheed Martin Corporation | Vice President US Business<br>BAE Systems, Inc. | Vice President and JSF F-35 Program Manager, Aerospace Systems<br>Northrop Grumman Corporation | F135 Program Chief Engineer (Ret.)<br>Pratt & Whitney | Lead, Foreign Military Sales<br>F-35 Joint Program Office | Vice President, F-35 Test & Verification<br>Lockheed Martin Aeronautics Company |

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| **107-FC-8** | **Transition Control** | | | | | **Vinings** |
| Chaired by: D. RIZZETTA, AFRL/RQVA | | | | | | |
| 0930 hrs<br>AIAA-2018-3211<br>**Direct Numerical Simulation of Transition Control via Local Dynamic Surface Modification**<br>D. Rizzetta, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-3212<br>**Passive control of a Mach 5.92 flat-plate boundary layer using steady blowing and suction**<br>X. Wang, University of Alabama, Tuscaloosa, Tuscaloosa, AL | 1030 hrs<br>AIAA-2018-3213<br>**Transition Manipulation by the Use of an Electrorheologically Driven Membrane**<br>T. Schomberg, F. Gerland, F. Liese, O. Wünsch, University of Kassel, Kassel, Germany; M. Ruetten, German Aerospace Center (DLR), Göttingen, Germany | 1100 hrs<br>AIAA-2018-3214<br>**Experimental Characterization of the Laminar-Turbulent Transition of a Sucked Boundary Layer due to Surface Defects in a Two-Dimensional Incompressible Flow**<br>J. Methel, O. Vermeersch, M. Forte, ONERA, Toulouse, France; G. Casalis, Higher Institute of Aeronautics and Space, Toulouse, France | 1130 hrs<br>AIAA-2018-3215<br>**Swept-Wing Transition Control Using AC-DBD Plasma Actuators**<br>S. Yadala Venkata, University of Poitiers, Poitiers, France; M. Hehner, University of Stuttgart, Stuttgart, Germany; J. Serpieri, Delft University of Technology, Delft, The Netherlands; N. Benard, University of Poitiers, Poitiers, France; M. Kotsonis, Delft University of Technology, Delft, The Netherlands | 1200 hrs<br>AIAA-2018-3216<br>**Numerical Investigations of Boundary-layer Flow Transition Control with Plasma Actuators**<br>L. Wang, J. Li, S. Fu, Tsinghua University, Beijing, China | |

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| **108-FD-19** | **Stability and Transition IV: High-Speed II** | | | | | **International South** |
| Chaired by: X. ZHONG, University of California Los Angeles and C. SCALO | | | | | | |
| 0930 hrs<br>AIAA-2018-3217<br>**Transition Delay via Vortex Generators in a Hypersonic Boundary Layer at Flight Conditions**<br>P. Paredes, M. Choudhari, F. Li, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-3218<br>**The Supersonic Mode and the Role of Wall Temperature in Hypersonic Boundary Layers with Thermochemical Nonequilibrium Effects**<br>C. Knisely, X. Zhong, University of California, Los Angeles, Los Angeles, CA | 1030 hrs<br>AIAA-2018-3219<br>**Direct Numerical Simulation of Acoustic Disturbances in the Rectangular Test Section of a Hypersonic Wind Tunnel**<br>C. Deegan, L. Duan, Missouri University of Science and Technology, Rolla, MO; M. Choudhari, NASA Langley Research Center, Hampton, VA | 1100 hrs<br>AIAA-2018-3220<br>**Input-Output Analysis of Shock Boundary Layer Interaction**<br>A. Dwivedi, S. Gs, G. Candler, J. Nichols, University of Minnesota, Twin Cities, Minneapolis, MN; M. Jovanovic, University of Southern California, Los Angeles, CA | 1130 hrs<br>AIAA-2018-3221<br>**Transient growth in oblique shock wave/laminar boundary layer interactions at Mach 5.92**<br>N. Hildebrand, J. Nichols, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN; M. Jovanovic, University of Southern California, Los Angeles, CA | | |

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| **109-FD-20** | **CFD Modeling and Applications (Applications of CFD, CFD Optimization, Error and Uncertainty, Validation, etc.) II** | | | | | **Harris** |
| Chaired by: V. DIPPOLD, NASA Glenn Research Center and B. TESTER | | | | | | |
| 0930 hrs<br>AIAA-2018-3222<br>**Numerical Investigation of Cavitation Characteristics of a Liquid Oxygen Turbo Pump**<br>Q. Liu, L. Gong, Harbin Institute of Technology, Harbin, China; H. Gao, R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1000 hrs<br>AIAA-2018-3223<br>**Generating a Grid for Unstructured RANS Simulations of Jet Flows**<br>V. Dippold, NASA Glenn Research Center, Cleveland, OH | 1030 hrs<br>AIAA-2018-3224<br>**Hybrid RANS/LES Simulation of Transitional Shockwave/Boundary-Layer Interaction**<br>B. Tester, J. Coder, University of Tennessee, Knoxville, Knoxville, TN; C. Combs, J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN | 1100 hrs<br>AIAA-2018-3225<br>**A Bias-aware EnKF Estimator for Aerodynamic Flows**<br>A. da Silva, T. Colonius, California Institute of Technology, Pasadena, CA | 1130 hrs<br>AIAA-2018-3226<br>**Analysis of uncertainty sources in DNS of a turbulent mixing layer using Nek5000**<br>J. Colmenares, S. Poroseva, University of New Mexico, Albuquerque, Albuquerque, NM; Y. Peet, Arizona State University, Tempe, AZ; S. Murman, NASA Ames Research Center, Moffett Field, CA | 1200 hrs<br>AIAA-2018-3227<br>**A Physics-Based Actuator Disk Model for Hydrokinetic Turbines**<br>J. Bowman, S. Bhushan, D. Thompson, Mississippi State University, Mississippi State, MS; D. O'Doherty, University of South Wales, Treforest, United Kingdom; T. O'Doherty, A. Mason-Jones, Cardiff University, Cardiff, United Kingdom | |

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| **110-FD-21** | **Fundamental Fluid Flows III: Instability** | | | | | **Lenox** |
| Chaired by: M. BORG, Air Force Research Laboratory and J. CROUCH, Boeing Commercial Airplanes | | | | | | |
| 0930 hrs<br>AIAA-2018-3228<br>**Effect of Varying Reynolds Number Ratio on Transition to Turbulence in Unsteady Flows**<br>B. Oluwadare, S. He, University of Sheffield, Sheffield, United Kingdom | 1000 hrs<br>AIAA-2018-3229<br>**Global Instability Analysis of Unswept- and Swept-Wing Transonic Buffet Onset**<br>J. Crouch, The Boeing Company, Seattle, WA; A. Garbaruk, M. Strelets, St. Petersburg Polytechnic University, Saint Petersburg, Russia | 1030 hrs<br>AIAA-2018-3230<br>**Influence of Critical Anomaly on the Linear Stability of Planar Mixing Layers with Streamwise Periodicity**<br>H. Barros, R. Freitas, Fluminense Federal University (UFF), Niterói, Brazil; C. Falcão, Federal University of Santa Maria, Santa Maria, Brazil; L. Alves, Fluminense Federal University (UFF), Niterói, Brazil | 1100 hrs<br>AIAA-2018-3231<br>**Large-Eddy Simulation of the mutual induction dynamics of double helical vortices**<br>J. Chapelier, Purdue University, West Lafayette, IN; B. Wasistho, Kord Technologies, Huntsville, AL; C. Scalo, Purdue University, West Lafayette, IN | | |

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| **111-FD-22** | **Unsteady and Separated Flows III: Wakes and Bluff Bodies** | | | | | **Edgewood** |
| Chaired by: H. DONG, University of Virginia | | | | | | |
| 0930 hrs<br>AIAA-2018-3232<br>**Experimental and Numerical Investigation of Airfoil Performance in Cylinder Wake**<br>J. Lefebvre, A. Jones, University of Maryland, College Park, College Park, MD; L. Jarman, M. Smith, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-3233<br>**A Reduced-order Estimate of Ship Airwake Interactions**<br>C. Tinney, University of Texas, Austin, Austin, TX; J. Shipman, P. Panickar, CRAFT Technologies, Inc., Pipersville, PA | 1030 hrs<br>AIAA-2018-3234<br>**Flow past circular cylinders in tandem: a comparison between LES and IDDES**<br>M. Ilie, K. Harris, Georgia Southern University, Statesboro, GA | 1100 hrs<br>AIAA-2018-3235<br>**Flow Induced Motions observed in Blunt Body with Free Rotational Apparatus in Three Degrees of Freedom**<br>K. Hiraki, Kyushu Institute of Technology, Kitakyushu, Japan | 1130 hrs<br>AIAA-2018-3236<br>**Wake capture and aerodynamics of passively pitching tandem flapping plates**<br>J. Wang, P. Han, R. Zhu, G. Liu, X. Deng, H. Dong, University of Virginia, Charlottesville, Charlottesville, VA | | |

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| **112-FD-23** | **Multiphysics and Cross-Disciplinary Fluid Dynamics I: Combustion I** | | | | | **Dunwoody** |
| Chaired by: D. RAGNI, Delft University of Technology and C. BIL, RMIT University | | | | | | |
| 0930 hrs<br>AIAA-2018-3237<br>**Experimental and numerical investigation of a valveless pulse combustor**<br>H. Yan, Z. Duan, Northwestern Polytechnical University, Xi'an, China; H. Ma, Aero Engine Corporation of China (AECC), Shenyang, China | 1000 hrs<br>AIAA-2018-3238<br>**Numerical Simulations of Particle Transport and Deposition Experiments at Gas Turbine Temperatures**<br>P. Forsyth, D. Gillespie, M. McGilvray, University of Oxford, Oxford, United Kingdom | 1030 hrs<br>AIAA-2018-3239<br>**Design, Modeling and Testing of a O2/CH4 Igniter for a Hybrid Rocket Motor**<br>A. Conte, J. Rabinovitch, E. Jens, A. Chandler Karp, B. Nakazono, D. Vaughan, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1100 hrs<br>AIAA-2018-3240<br>**Numerical investigation of sustained planar detonation waves in a periodic domain**<br>P. Gupta, K. Schwinn, Purdue University, West Lafayette, IN; G. Lodato, National Institute of Applied Sciences (INSA), Rouen, France; C. Slabaugh, C. Scalo, Purdue University, West Lafayette, IN | 1130 hrs<br>AIAA-2018-3241<br>**Numerical Study of Supersonic Turbulent Combustion by Flamelet/ Progress Variable Model**<br>Z. Gao, H. Liu, C. Jiang, C. Lee, Beihang University, Beijing, China | | |

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| **113-FD-24** | **Adaptive Grids and Error Estimation** | | | | | **Inman** |
| Chaired by: C. OLLIVIER GOOCH, University of British Columbia and M. O'CONNELL, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3242<br>**Nonlinear corrector for RANS equations**<br>L. Frazza, F. Alauzet, A. Loseille, A. Dervieux, National Institute for Research in Computer Science and Control (INRIA), Saclay, France | 1000 hrs<br>AIAA-2018-3243<br>**Multi-Mesh CFD for 2D Flows**<br>C. Jackson, C. Roy, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1030 hrs<br>AIAA-2018-3244<br>**Mesh adaptation for fluid-structure interaction problems**<br>J. Vanharen, R. Feuillet, F. Alauzet, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France | | | | |

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| **114-FD-25** | **Overset Meshing and Mesh Redistribution** | | | | | **International North** |
| Chaired by: Z. WANG, University of Kansas and K. SREENIVAS, University of Tennessee at Chattanooga and SimCenter | | | | | | |
| 0930 hrs<br>AIAA-2018-3245<br>**An Adaptive Mesh Redistribution Approach for Time-Spectral/ Harmonic-Balance Flow Solvers**<br>R. Djeddi, K. Ekici, University of Tennessee, Knoxville, Knoxville, TN | 1000 hrs<br>AIAA-2018-3246<br>**A continuous-mesh optimization technique for piecewise polynomial approximation on tetrahedral grids**<br>A. Rangarajan, A. Chakraborty, G. May, RWTH Aachen University, Aachen, Germany; V. Dolejsi, Charles University, Prague, Czechia | 1030 hrs<br>AIAA-2018-3247<br>**An Overset Generalized Minimal Residual Method for the Multi-Solver Paradigm in Helios.**<br>D. Jude, University of Maryland, College Park, College Park, MD; J. Sitaraman, Parallel Geometric Algorithms, LLC, Sunnyvale, CA; V. Lakshminarayan, Science and Technology Corporation, Moffett Field, CA; J. Baeder, University of Maryland, College Park, College Park, MD | 1100 hrs<br>AIAA-2018-3248<br>**Theoretical Analysis of a Partition of Unity Direct Overset Finite Element Method.**<br>D. French, J. Benek, C. Schrock, Air Force Research Laboratory, Wright-Patterson AFB, OH | | | |

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| **115-GT-5**<br>**0930 - 1200 hrs** | **National Partnership for Aeronautical Testing (NPAT) Mini-Facility Users Meeting (FUM)** | **Embassy E** |
| The topic for discussion is "Uncertainty - How does wind tunnel data uncertainty get translated to flight uncertainties?" The purpose of NPAT is to expand cooperation between the DoD and NASA to consult on the management of their respective aeronautical test facilities taking into account the military, civilian, academic, and commercial aerospace interests. The use of the FUM brings needed insight from industry to NPAT discussions and research. The use of Mini FUMs (approximately 2-3 hours each & two per year) has significantly improved communication with industry and usually includes an industry panel. | | |

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| **116-ITAR-1** | **AEDC: Enhanced T&E for Flight Vehicles at the AEDC I** ITAR | | | | | **Kennesaw** |
| Chaired by: D. MARREN and D. LEWIS, National Aerospace Solutions (NAS) | | | | | | |
| 0930 hrs<br>AIAA-2018-4292<br>**Mach 18 Capability Upgrade to the AEDC Hypervelocity Wind Tunnel No. 9 (Invited)**<br>J. Lafferty, N. Fredrick, Arnold Engineering Development Complex, Silver Spring, MD; J. Korte, Analytical Mechanics Associates, Inc., Hampton Roads, VA; K. Tatum, National Aerospace Solutions, Tullahoma, TN; D. Daniel, QuantiTech, Inc., Tullahoma, TN; K. Buesking, Materials Research & Design, Inc., Wayne, , PA; et al. | 1000 hrs<br>AIAA-2018-4293<br>**CFD-Optimization of Mach 18 Nozzle Contour for the Hypervelocity Wind Tunnel No. 9 (Invited)**<br>J. Korte, Analytical Mechanics Associates, Inc., Hampton, VA; K. Tatum, D. Daniel, J. Lafferty, Arnold Engineering Development Complex, Arnold AFB, TN | 1030 hrs<br>AIAA-2018-4294<br>**Development, Processing, and Characterization of High Strength Silicon Nitride (Invited)**<br>D. Hladio, Materials Research & Design, Inc., Wayne, PA; S. DiPietro, Exothermics, Inc., Amherst, NH | 1100 hrs<br>AIAA-2018-4295<br>**Extended Life, High Mach Throats for AEDC Tunnel-9 (Invited)**<br>G. Tiscia, Materials Research & Design, Inc., Wayne, PA; N. Fredrick, Arnold Engineering Development Complex, Silver Spring, MD; K. Buesking, Materials Research & Design, Inc., Wayne, PA | 1130 hrs<br>Oral Presentation<br>**The Towed Aerial Plume Simulator (TAPS) in Support of Open Air Testing of Installed IRCM Sensors) (Invited)**<br>R. Hiers, Arnold Engineering Development Complex, Arnold AFB, TN; J. McMorrow, Center for Countermeasures, Wright-Patterson AFB, NM; D. Brown, Arnold Engineering Development Complex, Arnold AFB, TN | 1200 hrs<br>Oral Presentation<br>**The Joint Standard Instrumentation Suite (JSIS) (Invited)**<br>R. Hiers, Arnold Engineering Development Complex, Arnold AFB, TN; J. McMorrow, Center for Countermeasures, White Sands Missile Range, NM; D. Brown, Arnold Engineering Development Complex, Arnold AFB, TN | |

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| **117-MDO-6**<br>**0930 - 1230 hrs** | **MDO Student Paper Competition Finalists Panel** | **Hanover G** |
| This session is the final stage of the MDO Student Paper Competition, during which oral presentations will be made. | | |

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| **118-MDO-7** | **Special Session: The AGILE Project** | | | | | **Hanover E** |
| Chaired by: G. KURUVILA, Boeing Research & Technology and N. BARTOLI, ONERA | | | | | | |
| 0930 hrs<br>AIAA-2018-3249<br>**AGILE the Next Generation of Collaborative MDO: Achievements and Open Challenges**<br>P. Ciampa, B. Nagel, German Aerospace Center (DLR), Hamburg, Germany | 1000 hrs<br>AIAA-2018-3250<br>**Robust Nacelle Optimization Design investigated in the AGILE European project**<br>N. Bartoli, T. Lefebvre, ONERA, Toulouse, France; S. Dubreuil, M. Panzeri, R. d'Ippolito, Noesis Solutions, Leuven, Belgium; K. Anisimov, TsAGI, Zhukovsky, Russia; et al. | 1030 hrs<br>AIAA-2018-3251<br>**A Critical Look at Design Automation Solutions for Collaborative MDO in the AGILE Paradigm**<br>I. van Gent, Delft University of Technology, Delft, The Netherlands; B. Aigner, RWTH Aachen University, Aachen, Germany; B. Beijer, KE-Works, Delft, The Netherlands; G. La Rocca, Delft University of Technology, Delft, The Netherlands | 1100 hrs<br>AIAA-2018-3252<br>**A clustered and surrogate-based MDA use case for MDO scenarios in AGILE project**<br>T. Lefebvre, N. Bartoli, S. Dubreuil, ONERA, Toulouse, France; M. Panzeri, R. Lombardi, Noesis Solutions, Leuven, Belgium; W. Lammen, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands; et al. | 1130 hrs<br>AIAA-2018-3253<br>**A collaborative design method for the aircraft supply chain: multi-level optimization**<br>B. De Wit, W. Lammen, J. Vankan, H. Timmermans, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands; D. Charbonnier, CFS Engineering, Lausanne, Switzerland; T. van der Laan, GKN Aerospace, Papendrecht, The Netherlands; et al. | 1200 hrs<br>AIAA-2018-3254<br>**MDO Framework for university research collaboration : AGILE Academy Initiatives & Outcomes**<br>P. Prakasha, P. Ciampa, German Aerospace Center (DLR), Hamburg, Germany; P. Della Vecchia, UNINA, Naples, Italy; B. Aigner, RWTH Aachen University, Aachen, Germany; I. van Gent, Delft University of Technology, Delft, The Netherlands | |

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| **119-MST-2** | **Modeling and Simulation of Air Vehicle Dynamics and Environments I** | | | | | **Embassy H** |
| Chaired by: P. GRANT, University of Toronto and D. KEATING, The Charles Stark Draper Laboratory, Inc. | | | | | | |
| 0930 hrs<br>AIAA-2018-3255<br>**Modeling of a 6 DOF Very Flexible Unmanned Aerial Vehicle**<br>R. Chandramohan, Gulfstream Aerospace Corporation, Savannah, GA | 1000 hrs<br>AIAA-2018-3256<br>**Design, Development and Validation of a Cessna Citation X Aerodynamic Model using OpenVSP Software**<br>M. Segui, G. Ghazi, R. Botez, E. Thompson, University of Québec, Montréal, Canada | 1030 hrs<br>AIAA-2018-3257<br>**Adaptive Nonlinear Flight Control of STOL-Aircraft Based on Incremental Nonlinear Dynamic Inversion**<br>Y. Beyer, A. Kuzolap, M. Steen, Technical University of Braunschweig, Braunschweig, Germany; J. Diekmann, N. Fezans, German Aerospace Center (DLR), Braunschweig, Germany | 1100 hrs<br>AIAA-2018-3258<br>**Analytical Determination of a Helicopter Height-Velocity Curve**<br>M. Harris, D. Kunz, J. Hess, Air Force Institute of Technology, Wright-Patterson AFB, OH | | | |

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| **120-NIA-1** | **Graduate Student Research Papers I - Hosted by the National Institute of Aerospace** | | | | | **Embassy G** |
| Chaired by: C. BRITCHER, Old Dominon University and D. STANLEY, National Institute of Aerospace | | | | | | |
| 0930 hrs<br>AIAA-2018-3259<br>**Littoral Observation by Collaborative Unmanned Systems for Target Detection**<br>K. Watson, M. Martin, A. Carnevale, Georgia Institute of Technology, Atlanta, GA; A. Corbin, Purdue University, West Lafayette, IN; A. Floyd, Massachusetts Institute of Technology, Cambridge, MA; A. Gupta, Georgia Institute of Technology, Atlanta, GA; et al. | 1000 hrs<br>AIAA-2018-3260<br>**Automatic Patrol Trajectory Control of UAV in A Forest Surveillance and Fires Detection Mission**<br>L. Zhang, Fudan University, Shanghai, China; Z. Liu, Concordia University, Montréal, Canada; Y. Dong, University of Michigan, Ann Arbor, Ann Arbor, MI; Y. Zhang, Concordia University, Montréal, Canada; J. Ai, Fudan University, Shanghai, China | 1030 hrs<br>AIAA-2018-3261<br>**Application of PSK Modulation for Secure ADS-B Avionics**<br>A. Nguyen, A. Amrhar, J. Zambrano, G. Brown, R. Landry, University of Québec, Montréal, Canada; O. Yeste, National Radio Astronomy Observatory Technology Center, Charlottesville, VA | 1100 hrs<br>AIAA-2018-3262<br>**A Mars Exploration Concept Systems Design with an Innovative Unmanned Autonomous Vehicle and "Carrier" Ground Rover Configuration. Part I: System Design**<br>M. Lacerda, D. Park, S. Patel, D. Schrage, Georgia Institute of Technology, Atlanta, GA | 1130 hrs<br>AIAA-2018-3263<br>**Angle of attack displays in the cockpit – are they fit for purpose?**<br>S. Everett, M. Bromfield, S. Scott, A. Stedmon, Coventry University, Coventry, United Kingdom | | |

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| **121-PDL-3** | **Plasma/Laser Ignition, Combustion, and Propulsion** | | | | | **Chicago A** |
| Chaired by: J. ZIMMERMAN, CU Aerospace and S. BANE, Purdue University- Sch of Aero and Astro | | | | | | |
| 0930 hrs<br>AIAA-2018-3264<br>**Quasi-DC Discharge Mixing Enhancement in a Supersonic Combustor with a Cavity-Based Flameholder**<br>A. Houpt, S. Leonov, University of Notre Dame, Notre Dame, IN; T. Ombrello, R. Leiweke, S. Okhovat, C. Carter, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-3265<br>**Impulse Generation of Donut-Spherical Laser Launch System in a wide range of ambient pressure**<br>D. Tran, K. Eguchi, X. Chongfa, K. Mori, Nagoya University, Nagoya, Japan | 1030 hrs<br>AIAA-2018-3266<br>**Optimization of the AF-MPDT geometry and operating parameters for the low current to mass flow rate ratio regime**<br>A. Kitaeva, Beihang University, Beijing, China; T. Andreussi, SITAEL S.p.A., Pisa, Italy; H. Tang, B. Wang, Beihang University, Beijing, China | | | | |

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| **122-TP-4** | **Transport Properties and Thermophysical Properties I** | | | | | **Embassy A** |
| Chaired by: S. SHIN, The University of Tennessee and D. HENGEVELD | | | | | | |
| 0930 hrs<br>AIAA-2018-3267<br>**Extension of Kestrel to General Thermochemical Models, Part II**<br>R. Bond, University of Tennessee, Tullahoma, Tullahoma, TN; D. Stefanski, University of Tennessee, Oak Ridge, Oak Ridge, TN | 1000 hrs<br>AIAA-2018-3268<br>**Thermophysical Properties of Temperature Sensitive Paint**<br>W. Stryczniewicz, Institute of Aviation, Warsaw, Poland; A. Panas, Air Force Institute of Technology, Warsaw, Poland; R. Szczepaniak, Polish Air Force Academy, Deblin, Poland | 1030 hrs<br>AIAA-2018-3269<br>**Comparison of Different Approaches for Numerical Simulation of High Enthalpy Flows at Thermochemical Equilibrium**<br>A. Diwakar, V. Ramasahayam, K. Bodi, Indian Institute of Technology Bombay, Mumbai, India | | | | |

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| **123-TP-5** | **Ablation: Modeling, Experiments, and Applications I** | | | | | **Embassy B** |
| Chaired by: A. MARTIN, University of Kentucky and M. WINTER, University of Kentucky | | | | | | |
| 0930 hrs<br>AIAA-2018-3270<br>**Development of a Coupled Thermo-elastic Solver for Modeling Woven Thermal Protection Systems**<br>D. Dang, University of Michigan, Ann Arbor, Ann Arbor, MI; E. Stern, NASA Ames Research Center, Moffett Field, CA; I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI | 1000 hrs<br>AIAA-2018-3271<br>**Conjugate Analyses of Ablation in the HIPPO Nozzle**<br>P. Cross, Naval Air Warfare Center, China Lake, CA; I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI | 1030 hrs<br>AIAA-2018-3272<br>**Implementation and Verification of a Surface Recession Module in a Finite Volume Ablation Solver**<br>J. Cooper, O. Schroeder, H. Weng, A. Martin, University of Kentucky, Lexington, Lexington, KY | 1100 hrs<br>AIAA-2018-3273<br>**The Laser Enhanced Arc-Jet Facility (LEAF-Lite): Simulating Convective and Radiative Heating with Arc-jets and Multiple 50-kW CW Lasers**<br>G. Cushman, Jacobs, Moffett Field, CA; A. Alunni, Analytical Mechanics Associates, Inc., Moffett Field, CA; J. Balboni, P. Zell, NASA Ames Research Center, Moffett Field, CA; J. Hartman, Sierra Lobo, Inc., Moffett Field, CA; D. Empey, Jacobs, Moffett Field, CA | 1130 hrs<br>AIAA-2018-3274<br>**Modeling of Gas-Phase Chemical Kinetics for Pyrolyzing Ablators**<br>S. Chen, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI; N. Martin, D. Fletcher, University of Vermont, Burlington, Burlington, VT | | |

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| **124-LUNCH-1**<br>**1230 - 1400 hrs** | **Excellence in Aerospace Awards Luncheon** | **Centennial I, II, III** |

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| **125-AA-20** | **Interior Noise/Structural Acoustics and Sonic Boom** | | | | | **Spring** |
| Chaired by: J. DELFS, DLR - German Aerospace Center and D. PAPAMOSCHOU, University of California Irvine | | | | | | |
| 1400 hrs<br>AIAA-2018-3275<br>**Up in the Air: In-Flight Wavenumber Characterization of Surface Pressure Fluctuations at Transonic Conditions**<br>S. Haxter, C. Spehr, German Aerospace Center (DLR), Göttingen, Germany | 1430 hrs<br>AIAA-2018-3276<br>**Effect of flush-mounted sensors and upstream flow developments on measured wall pressure spectra**<br>N. Hu, German Aerospace Center (DLR), Braunschweig, Germany; L. Erbig, Daimler AG, Sindelfingen, Germany | 1500 hrs<br>AIAA-2018-3277<br>**Acoustic characterization of a porous metasurface with embedded partitions**<br>Y. Fang, X. Zhang, J. Zhou, J. Guo, R. Fattah, Hong Kong University of Science and Technology, Hong Kong, Hong Kong; G. Zhou, AVIC Aerodynamics Research Institute, Harbin, China; et al. | 1530 hrs<br>AIAA-2018-3278<br>**Sonic Boom and Drag Evaluation of Supersonic Business Jet Concepts**<br>Y. Sun, H. Smith, Cranfield University, Bedford, United Kingdom | | | |

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| **126-AA-21** | **Turbomachinery and Core Noise II** | | | | | **Techwood** |
| Chaired by: K. KNOBLOCH, DLR-German Aerospace Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3279<br>**Acoustic Directivity of the DGEN Aero-propulsion Research Turbofan at Multiple Farfield Array Locations**<br>D. Sutliff, NASA Glenn Research Center, Cleveland, OH | 1430 hrs<br>AIAA-2018-3280<br>**DGEN Aeropropulsion Research Turbofan (DART): Lossless Projection of Measured Engine Noise Spectra to a 1-Foot-Radius Arc**<br>C. Brown, D. Sutliff, NASA Glenn Research Center, Cleveland, OH | 1500 hrs<br>AIAA-2018-3281<br>**Core/Combustor-Noise Baseline Measurements for the DGEN Aeropropulsion Research Turbofan**<br>D. Boyle, B. Henderson, L. Hultgren, NASA Glenn Research Center, Cleveland, OH | 1530 hrs<br>AIAA-2018-3282<br>**Using LES for combustion noise propagation to the far-field by considering the jet flow of a dual-stream nozzle**<br>M. Férand, Safran Group, Villaroche, France; G. Daviller, CERFACS, Toulouse, France; S. Moreau, University of Sherbrooke, Sherbrooke, Canada; T. Poinsot, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; C. Sensiau, Safran Group, Villaroche, France | 1600 hrs<br>AIAA-2018-3283<br>**On the prediction of far-field fan noise attenuation due to liners considering uniform and shear flows**<br>D. Braga, A. Spillere, J. Cordioli, A. da Silva, Federal University of Santa Catarina, Florianópolis, Brazil; D. Reis, Embraer, São José dos Campos, Brazil | | |

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| **127-AA-22** | **Acoustic/Fluid Dynamics Interactions IV** | | | | | **Marietta** |
| Chaired by: R. POWERS and D. JUVE, Ecole Centrale de Lyon | | | | | | |
| 1400 hrs<br>AIAA-2018-3284<br>**Analytic solutions for reduced leading-edge noise aerofoils**<br>L. Ayton, University of Cambridge, Cambridge, United Kingdom; C. Paruchuri, University of Southampton, Southampton, United Kingdom | 1430 hrs<br>AIAA-2018-3285<br>**Effect of Leading Edge serrations in reducing aerofoil noise near stall conditions**<br>G. Lacagnina, C. Paruchuri, T. Berk, P. Joseph, University of Southampton, Southampton, United Kingdom; S. Hasheminejad, Brunel University London, Uxbridge, United Kingdom; O. Stalnov, Technion–Israel Institute of Technology, Haifa, Israel; et al. | 1500 hrs<br>AIAA-2018-3286<br>**Broadband leading edge interaction noise prediction using numerical grid generated turbulence -- An Extended Abstract**<br>S. Petrikat, R. Karve , D. Angland, University of Southampton, Southampton, United Kingdom | 1530 hrs<br>AIAA-2018-3287<br>**Mimicking the serration effects on aerofoil by leading edge blowing**<br>Y. Al-Okbi, T. Chong, Brunel University London, Uxbridge, United Kingdom; O. Stalnov, Technion–Israel Institute of Technology, Haifa, Israel | 1600 hrs<br>AIAA-2018-3288<br>**An Experimental Investigation of the Effect of Bluff Body Bluntness Factor on Wake-vortex Noise Generation**<br>W. Elsahhar, S. Showkat Ali, R. Theunissen, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | 1630 hrs<br>AIAA-2018-3289<br>**On the Effect of Leading Edge Serrations on Aerofoil Noise Production**<br>T. Chong, Brunel University London, Uxbridge, United Kingdom; T. Biedermann, O. Koster, University of Applied Sciences, Dusseldorf, Germany; S. Hasheminejad, Brunel University London, Uxbridge, United Kingdom | |

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| **128-AA-23** | **Advanced Testing Techniques IV** | | | | | **University** |
| Chaired by: T. SCHULTZ, The Boeing Company | | | | | | |
| 1400 hrs<br>AIAA-2018-3290<br>**Unsteady Surface Pressure Measurements on Trailing Edge Serrations Based on Digital MEMS Microphones.**<br>M. Sanders, L. de Santana, University of Twente, Enschede, The Netherlands; M. Azarpeyvand, University of Bristol, Bristol, United Kingdom; C. Venner, University of Twente, Enschede, The Netherlands | 1430 hrs<br>AIAA-2018-3291<br>**Deconvolution of the wave number - frequency spectra of wall pressure fluctuations**<br>S. Prigent, R. Engelman, E. Salze, C. Bailly, École Centrale de Lyon, Ecully, France | 1500 hrs<br>AIAA-2018-3292<br>**Experimental Study of Axisymmetric Cavities in Supersonic Flow**<br>B. Brooker, Jacobs, Bingham Farms, MI; N. Chaganti, S. Olcmen, G. Cheng, University of Alabama, Tuscaloosa, Tuscaloosa, AL | 1530 hrs<br>AIAA-2018-3293<br>**Jet noise estimation from single snapshot tomographic PIV**<br>D. Ragni, F. Avallone, J. Schneiders, Delft University of Technology, Delft, The Netherlands; A. Ianiro, Charles III University of Madrid, Madrid, Spain; D. Casalino, Delft University of Technology, Delft, The Netherlands | 1600 hrs<br>AIAA-2018-3294<br>**Localization and far field extrapolation of acoustic sources from wind tunnel experiments for jet engine installation noise**<br>H. Siller, S. Oertwig, German Aerospace Center (DLR), Berlin, Germany | 1630 hrs<br>AIAA-2018-3295<br>**Acoustic behaviour of ground plates for aircraft noise flight tests**<br>V. Blandeau, V. Regnier, P. Bousquet, Airbus, Toulouse, France | |

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| **129-AA-24** | **Airframe/High-Lift Noise III** | | | | | **Roswell** |
| Chaired by: D. MOREAU | | | | | | |
| 1400 hrs<br>AIAA-2018-3296<br>**Characterization of the Fluctuating Pressure Field in the Airfoil-Wall Junction: Measurements and Computations**<br>M. Awasthi, Y. Yauwenas, J. Rowlands, D. Moreau, C. Doolan, University of New South Wales, Sydney, Australia | 1430 hrs<br>AIAA-2018-3297<br>**The Prediction of Noise from Turbulent Boundary Layers Attached to Porous Media**<br>E. Pager, S. Miller, University of Florida, Gainesville, Gainesville, FL | 1500 hrs<br>AIAA-2018-3298<br>**Vortex Sound Models: Passive and Active Noise Control**<br>M. Priddin, D. Baker, L. Ayton, N. Peake, University of Cambridge, Cambridge, United Kingdom | 1530 hrs<br>AIAA-2018-3299<br>**Analysis of nose landing gear noise comparing numerical computations, prediction models and flyover and wind-tunnel measurements**<br>R. Merino-Martinez, Delft University of Technology, Delft, The Netherlands; E. Neri, Trinity College Dublin, Dublin, Ireland; M. Snellen, Delft University of Technology, Delft, The Netherlands; J. Kennedy, Trinity College Dublin, Dublin, Ireland; D. Simons, Delft University of Technology, Delft, The Netherlands; G. Bennett, Trinity College Dublin, Dublin, Ireland | 1600 hrs<br>AIAA-2018-3300<br>**Further Noise Reduction Design for Landing Gear toward FQUROH Second Flight Demonstration**<br>T. Takaishi, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; T. Kumada, Sumitomo Precision Products Company, Ltd., Amagasaki, Japan; Y. Yokokawa, Y. Ito, M. Murayama, R. Sakai, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; et al. | 1630 hrs<br>AIAA-2018-3301<br>**Investigation of the Ffowcs-Williams and Hawkings Analogy on an Isolated Landing Gear Wheel**<br>A. Hajczak, L. Sanders, F. Vuillot, ONERA, Châtillon, France; P. Druault, Pierre and Marie Curie University, Paris, France | |

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| **130-AA-25** | **Jet Aeroacoustics IV** | | | | | **Piedmont** |
| Chaired by: D. EDGINGTON-MITCHELL | | | | | | |
| 1400 hrs<br>AIAA-2018-3302<br>**Large-eddy simulations of co-annular turbulent jet using a Voronoi-based mesh generation framework**<br>G. Brès, S. Bose, M. Emory, F. Ham, Cascade Technologies, Inc., Palo Alto, CA; O. Schmidt, G. Rigas, California Institute of Technology, Pasadena, CA; et al. | 1430 hrs<br>AIAA-2018-3303<br>**High-Temperature Effects on Aerodynamic and Acoustics Characteristics of a Rectangular Supersonic Jet**<br>S. Chen, R. Gojon, M. Mihaescu, Royal Institute of Technology (KTH), Stockholm, Sweden | 1500 hrs<br>AIAA-2018-3304<br>**Acoustic Characteristics of a Supersonic Twin-jet Configuration**<br>K. Goparaju, S. Unnikrishnan, D. Gaitonde, Ohio State University, Columbus, OH | 1530 hrs<br>AIAA-2018-3305<br>**Study of the generation of shock waves by high-speed jets using conditional averaging**<br>P. Pineau, C. Bogey, École Centrale de Lyon, Lyon, France | 1600 hrs<br>AIAA-2018-3306<br>**Crackle in the noise of high-performance aircraft**<br>C. Tam, Florida State University, Tallahassee, FL; J. Spyropoulos, A. Aubert, R. Powers, Naval Air Systems Command, Patuxent River, MD | | |

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| **131-AFM-6** | **Special Session: NASA Learn-to-Fly Project – UAS Autonomy** | | | | | **Embassy C** |
| Chaired by: K. CUNNINGHAM, NASA Langley Research Center and E. HEIM, NASA Langley Research Ctr | | | | | | |
| 1400 hrs<br>AIAA-2018-3307<br>**NASA's Learn-to-Fly Project Overview**<br>E. Heim, E. Viken, J. Brandon, M. Croom, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-3308<br>**Learn to Fly Test Setup and Concept of Operations**<br>S. Riddick, R. Busan, D. Cox, S. Laughter, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-3309<br>**Practical Aspects of Real-Time Modeling for the Learn-To-Fly Concept**<br>E. Morelli, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-3310<br>**Autonomous Guidance Algorithms for NASA Learn-to-Fly Technology Development**<br>J. Foster, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>AIAA-2018-3311<br>**Online Control Design for Learn-to-Fly**<br>S. Snyder, B. Bacon, E. Morelli, NASA Langley Research Center, Hampton, VA; S. Frost, C. Teubert, W. Okolo, NASA Ames Research Center, Moffett Field, CA | 1630 hrs<br>AIAA-2018-3312<br>**A Learn-to-Fly Approach for Adaptively Tuning Flight Control Systems**<br>J. Grauer, NASA Langley Research Center, Hampton, VA | 1700 hrs<br>AIAA-2018-3313<br>**Fuzzy Modeling and Parallel Distributed Compensation for Aircraft Flight Control from Simulated Flight Data**<br>R. Weinstein, NASA Langley Research Center, Hampton, VA; J. Hubbard, M. Cunningham, University of Maryland, College Park, College Park, MD |

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| **132-AMT-4** | **Luminescent Measurement Techniques for Fluid Flows and Combustion** | | | | | **The Learning Center** |
| Chaired by: N. ROOZEBOOM, NASA Ames Research Center and J. JEWELL, Air Force Research Laboratory | | | | | | |
| 1400 hrs<br>AIAA-2018-3314<br>**Fast Response Pressure Sensitive Paint Measurement on a Hypersonic Compression Corner**<br>X. Xiang, M. Yuan, J. Yu, China Aerospace Science and Technology Corporation (CASC), Beijing, China | 1430 hrs<br>AIAA-2018-3315<br>**Surface Pressure Measurement on Supersonic Free-Flight Projectiles Using Unsteady PSP Techniques**<br>D. Numata, Tokai University, Hiratsuka, Japan; K. Ohtani, Tohoku University, Sendai, Japan | 1500 hrs<br>AIAA-2018-3316<br>**Measurement of an Oscillating Shock Wave in a Transonic Flow Using Two Different Pressure Sensitive Paints* (*Ru-based on anodized aluminum *vs.* Pt-based with screen layer)**<br>W. Beck, C. Klein, U. Henne, German Aerospace Center (DLR), Göttingen, Germany; M. Merienne, Y. Le Sant, P. Molton, ONERA, Meudon, France | 1530 hrs<br>AIAA-2018-3317<br>**Comparison of PSP and TSP Measurement Techniques for Fast Rotating Blades**<br>Y. Li, D. Peng, W. Zhou, W. Wang, Y. Liu, Shanghai Jiao Tong University, Shanghai, China; S. Oouchida, IHI Corporation, Yokohama, Japan; et al. | 1600 hrs<br>AIAA-2018-3318<br>**Measurement of Unsteady Forces on a Store in a Cavity Using Dynamic Pressure-Sensitive Paint**<br>J. Crafton, S. Stanfield, N. Rogoshchenkov, S. Palluconi, Innovative Scientific Solutions, Inc., Dayton, OH; R. Schmit, Air Force Research Laboratory, Wright-Patterson AFB, OH | | |

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| **133-APA-16** | **Special Session: Collaborative Ground Test and Computations: Synergy in Communication, Planning and Execution (Invited)** | | | | | **Greenbriar** |
| Chaired by: J. FREEMAN, Air Force Institute of Technology and P. MORGAN, Ohio Aerospace Institute | | | | | | |
| 1400 hrs<br>AIAA-2018-3319<br>**The NASA Juncture Flow Test as a Model for Effective CFD/Experimental Collaboration (Invited)**<br>C. Rumsey, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-3320<br>**Interactive Computations and Experiments in Stability and Transition Research (Invited)**<br>H. Reed, T. Kocian, W. Saric, Texas A&M University, College Station, TX | 1500 hrs<br>AIAA-2018-3321<br>**Challenges and Perspectives on CFD and Experimental Interactions for Complex Unsteady Flows (Invited)**<br>D. Garmann, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1530 hrs<br>AIAA-2018-3322<br>**Experimental/Computational Collaboration for Large-scale Multi-physics Prediction Challenges (Invited)**<br>G. Elliott, J. Freund, University of Illinois, Urbana-Champaign, Urbana, IL | 1600 hrs<br>AIAA-2018-3323<br>**Preliminary Aerodynamic Measurements from a Magnetic Suspension and Balance System in a Low-Speed Wind Tunnel (Invited)**<br>M. Schoenenberger, D. Cox, T. Schott, A. Mackenzie, O. Ramirez, NASA Langley Research Center, Hampton, VA; C. Britcher, Old Dominion University, Norfolk, VA; et al. | 1630 hrs<br>AIAA-2018-3324<br>**Collaborative Experiments and Computations in Aircraft Icing (Invited)**<br>R. Kreeger, A. Broeren, NASA Glenn Research Center, Cleveland, OH | 1700 hrs<br>Oral Presentation<br>**CFD and Wind Tunnel Testing of an Oblique Flying Wing Aircraft (Invited)**<br>B. Kinkade, A. Arata, A. Carpenter, Northrop Grumman Corporation, Redondo Beach, CA |

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| **134-APA-17/ATIO.ACD-7** | **Special Session: UCAV Systems Design IV - Structural Concepts, Control Concepts (Invited)** | | | | | **Hanover A** |
| Chaired by: N. HARIHARAN, CREATE-AV and L. ZIENTARSKI, AFRL/RQVC | | | | | | |
| 1400 hrs<br>AIAA-2018-3325<br>**Structural Design Efforts for the MULDICON Configuration (Invited)**<br>J. Schweiger, Innovative Aircraft Concepts, Bad Heilbrunn, Germany; A. Cunningham, Lockheed Martin Corporation, Fort Worth, TX; E. Sakarya, Turkish Aerospace Industries, Inc., Ankara, Turkey; M. Dalenbring, Swedish Defense Research Agency (FOI), Stockholm, Sweden; A. Voss, German Aerospace Center (DLR), Göttingen, Germany | 1430 hrs<br>AIAA-2018-3326<br>**Gust Loads Calculation of a Flying Wing Configuration (Invited)**<br>A. Voss, German Aerospace Center (DLR), Göttingen, Germany | 1500 hrs<br>AIAA-2018-3327<br>**Investigations on flutter stability of the DLR-F19/SACCON configuration (Invited)**<br>G. Voss, German Aerospace Center (DLR), Göttingen, Germany; C. Vidy, Airbus, Manching, Germany; D. Schaefer, German Aerospace Center (DLR), Göttingen, Germany | 1530 hrs<br>AIAA-2018-3328<br>**A Study on Evaluation of Aeroelastic Characteristics of a UCAV Configuration (Invited)**<br>E. Sakarya, Ç. Koçan, B. Okumus, Turkish Aerospace Industries, Inc., Ankara, Turkey | 1600 hrs<br>AIAA-2018-3329<br>**Control Device Studies for Yaw Control without Vertical Tail Plane on a 53° Swept Flying Wing Configuration (Invited)**<br>P. Loechert, K. Huber, C. Liersch, A. Schuette, German Aerospace Center (DLR), Braunschweig, Germany | 1630 hrs<br>AIAA-2018-3330<br>**Some LO-UCAV Directional Control Issues (Invited)**<br>S. Hitzel, Airbus, Manching, Germany | |

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| **135-APA-18** | **Applied CFD and Numerical Correlations with Experimental Data III** | | | | | **Fairlie** |
| Chaired by: C. TILMANN, AFRL/RQV and J. VASILE, U. S. Army Research Laboratory (APG) | | | | | | |
| 1400 hrs<br>AIAA-2018-3331<br>**Second-order Interpolation Techniques for Accurate Surface Data Estimation in Immersed-Boundary Methods**<br>A. Bharadwaj S, S. Ghosh, Indian Institute of Technology Madras, Chennai, India | 1430 hrs<br>AIAA-2018-3332<br>**Sensitivity to Turbulence Models and Numerical Dissipation of the CRM Drag Prediction**<br>J. Botella Calatayud, B. Leonard, L. Temmerman, C. Hirsch, NUMECA International, Brussels, Belgium | 1500 hrs<br>AIAA-2018-3333<br>**Numerical Investigation of Laminar to Turbulent Boundary Layer Transition over Airship Envelopes**<br>A. Magar, K. K M, Annasaheb Dange College of Engineering & Technology, Sangli, India; R. Pant, Indian Institute of Technology Bombay, Mumbai, India | 1530 hrs<br>AIAA-2018-3334<br>**CFD analysis of axisymmetric bodies of revolution using OpenFOAM**<br>M. Reddy, R. Pant, Indian Institute of Technology Bombay, Mumbai, India | 1600 hrs<br>AIAA-2018-3335<br>**Hydrodynamics and Hydroacoustics of Flow Past a Cylinder for Underwater Radiated Noise Applications**<br>S. Saxena, ESI Group, San Jose, CA; F. Mendonca, ESI Group, Berkshire, United Kingdom; A. Golota, ESI Group, San Jose, CA; K. Sengupta, ESI Group, Pune, India | | |

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| **136-APA-19/FC-9** | **Flow Control Development and Applications II** | | | | | **Baker** |
| Chaired by: K. MULLENERS, EPFL and T. WONG, U. S. Army AMRDEC | | | | | | |
| 1400 hrs<br>AIAA-2018-3336<br>**A Fluidic Device for Active Flow Control: Simulation vs. Experiment with Emphasis on Application**<br>M. Staats, S. Löffler, C. Ebert, T. Grund, J. Weiss, Technical University of Berlin, Berlin, Germany | 1430 hrs<br>AIAA-2018-3337<br>**Experimental Inner Pressure Analysis of a Sweeping Jet Actuator**<br>B. Slupski, K. Kara, V. Parezanovic, D. Kyritsis, Khalifa University, Abu Dhabi, United Arab Emirates | 1500 hrs<br>AIAA-2018-3338<br>**Aerodynamic Characteristics of an Elasto-Flexible Membrane Wing based on Experimental and Numerical Investigations**<br>J. Piquee, I. López, C. Breitsamter, R. Wüchner, K. Bletzinger, Technical University of Munich, Munich, Germany | 1530 hrs<br>AIAA-2018-3339<br>**Numerical Investigation of Transonic Flow over Porous Medium Using Immersed Boundary Method**<br>A. Sahoo, S. Roy, S. Ghosh, Indian Institute of Technology Madras, Chennai, India | 1600 hrs<br>AIAA-2018-3340<br>**Numerical Investigation of Thrust Vectoring for a High-Aspect Ratio Nozzle of an Unmanned Combat Air Vehicle**<br>M. Ruetten, German Aerospace Center (DLR), Göttingen, Germany | | |

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| **137-ASE-7** | **Ice Adhesion Testing and Modeling Methods (Invited)** | | | | | **Hanover C** |
| Chaired by: R. KREEGER, NASA Glenn Research Center and J. PALACIOS, The Pennsylvania State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3341<br>**An Experimental Study of the Adhesion Strength of Impact Ice (Invited)**<br>A. Work, A. Gyekenyesi, Ohio Aerospace Institute, Brook Park, OH; R. Kreeger, J. Salem, M. Vargas, D. Drabiak, NASA Glenn Research Center, Cleveland, OH | 1430 hrs<br>AIAA-2018-3342<br>**Design, Fabrication, Calibration, and Testing of a Centrifugal Ice Adhesion Test Rig with Strain Rate Control Capability (Invited)**<br>R. Douglass, J. Palacios, G. Schneeberger, Pennsylvania State University, University Park, PA | 1500 hrs<br>AIAA-2018-3343<br>**Fracture Mechanics Based Approach for Ice Adhesion Characterization (Invited)**<br>D. Bishoy, C. Giuffre, A. Bastawros, Iowa State University, Ames, IA | 1530 hrs<br>AIAA-2018-3344<br>**Initial Development of a Model to Predict Impact Ice Adhesion Stress (Invited)**<br>D. Thompson, D. Meng, A. Afshar, R. Bassou, J. Zong, Mississippi State University, Mississippi State, MS; E. Bonaccurso, Airbus, Munich, Germany; et al. | 1600 hrs<br>Oral Presentation<br>**International Project Summary of ICE-WIPS – a hybrid aircraft ice-protection system using an icephobic coating and an electric heater (Invited)**<br>H. Sakaue, University of Notre Dame, Notre Dame, IN; K. Morita, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; S. Kimura, Kanagawa Institute of Technology, Atsugi, Japan | 1630 hrs<br>Oral Presentation<br>**Multiscale Design of Low Ice Adhesion Materials (Invited)**<br>M. Vargas, NASA Glenn Research Center, Cleveland, OH | |

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| **138-ATIO.ATM-7** | **UAS in the NAS II** | | | | | **Embassy D** |
| Chaired by: J. JUNG, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3345<br>**An Efficient Decomposition-based Cooperative Path Planning Method for Multiple UAVs**<br>Y. Cao, T. Long, Z. Wang, L. Liu, Beijing Institute of Technology, Beijing, China | 1430 hrs<br>AIAA-2018-3346<br>**A Framework for small Unmanned Aircraft System(sUAS) Trajectory Validation**<br>H. Yu, L. Ren, M. Castillo-effen, General Electric Company, Niskayuna, NY | 1500 hrs<br>AIAA-2018-3347<br>**UAV Traffic Information Exchange Network**<br>H. Chao, A. Maheshwari, V. Sudarsanan, S. Tamaskar, D. DeLaurentis, Purdue University, West Lafayette, IN | 1530 hrs<br>AIAA-2018-3348<br>**Layered Geofences in Complex Airspace Environments**<br>M. Stevens, E. Atkins, University of Michigan, Ann Arbor, Ann Arbor, MI | 1600 hrs<br>AIAA-2018-3349<br>**Modeling Ground Collision Severity of Small Unmanned Aircraft Systems**<br>J. Breunig, S. Sayed, MITRE Corporation, McLean, VA | | |

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| **139-ATIO.ATM-8** | **ATC/ATM including NextGen II** | | | | | **Embassy G** |
| Chaired by: P. WEI, Iowa State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3350<br>**Using Mobile Devices for IFR Clearance Delivery and Release and Data Exchange**<br>P. Diffenderfer, S. Wilkins, K. Long, MITRE Corporation, McLean, VA | 1430 hrs<br>AIAA-2018-3351<br>**Performance Assessment of the North Atlantic Organized Track System Using the Global Oceanic Model**<br>Y. Liang, A. Izadi, N. Hinze, A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1500 hrs<br>AIAA-2018-3352<br>**Computational Methods for Flight Routing Costs in Collaborative Trajectory Options Programs**<br>R. Hoffman, B. Hackney, R. Kicinger, Metron Aviation, Inc., Dulles, VA; M. Ball, University of Maryland, College Park, College Park, MD; G. Zhu, Iowa State University, Ames, IA | 1530 hrs<br>AIAA-2018-3353<br>**Examination of Mode S EHS Wind Observations for Use in Wake Vortex Mitigation Applications**<br>C. Engholm, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; F. Robasky, DAG Consulting, Inc., Burlington, MA; A. Banerjee, M. McPartland, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA | 1600 hrs<br>AIAA-2018-3354<br>**Derivation of Trajectory Predictor Input Distributions from Observed Data**<br>J. Rudnyk, J. Ellerbroek, J. Hoekstra, Delft University of Technology, Delft, The Netherlands | 1630 hrs<br>AIAA-2018-3355<br>**Simulation-Based Analysis of Early Scheduling in the Time-Based Flow Management (TBFM) System for Flights with Expect Departure Clearance Times (EDCT)**<br>C. Swol, S. Stalnaker, P. Coats, MITRE Corporation, McLean, VA | |

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| **140-ATIO.GA-2/ATIO.TF-4/ATIO.GRE-1** | **NASA's Fostering Ultra-Efficient, Low-Emitting Aviation Power (FUELEAP) Project (Invited)** | | | | | **Hanover D** |
| Chaired by: N. BORER, NASA Langley Research Center and S. BRICENO, Georgia Institute of Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-3356<br>**Catalyzing Disruptive Mobility Opportunities through Transformational Aviation Power**<br>N. Borer, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-3357<br>**Design and Performance of a Hybrid-Electric Fuel Cell Flight Demonstration Concept**<br>N. Borer, S. Geuther, B. Litherland, L. Kohlman, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-3358<br>**Solid Oxide Fuel Cell - Steam Reformation Power System Configuration Options for an All-Electric Commuter Airplane Flight Demonstrator**<br>T. Stoia, C. Balan, S. Atreya, P. O'Neil, The Boeing Company, Huntington Beach, CA | 1530 hrs<br>AIAA-2018-3359<br>**Integration Concept for a Hybrid-Electric Solid-Oxide Fuel Cell Power System into the X-57 "Maxwell"**<br>K. Papathakis, O. Schnarr, NASA Armstrong Flight Research Center, Edwards, CA; T. Lavelle, NASA Glenn Research Center, Cleveland, OH; N. Borer, NASA Langley Research Center, Hampton, VA; T. Stoia, S. Atreya, The Boeing Company, Huntington Beach, CA | 1600 hrs<br>AIAA-2018-3360<br>**Evaluation Studies of an 800 W Solid Oxide-Based Fuel Cell Stack for Electrical Power in Aviation**<br>J. Goldsby, I. Jakupca, S. Farmer, R. Green, B. Demattia, P. Loyselle, NASA Glenn Research Center, Cleveland, OH | 1630 hrs<br>AIAA-2018-3361<br>**Employing Model-Based Systems Engineering (MBSE) on a NASA Aeronautic Research Project: A Case Study**<br>K. Gough, N. Phojanamongkolkij, NASA Langley Research Center, Hampton, VA | 1700 hrs<br>AIAA-2018-3362<br>**FUELEAP Model-Based System Safety Analysis**<br>K. Woodham, P. Graydon, N. Borer, NASA Langley Research Center, Hampton, VA; K. Papathakis, NASA Ames Research Center, Moffett Field, CA; T. Stoia, C. Balan, The Boeing Company, Huntington Beach, CA |

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| **141-ATIO.TF-5** | **UAM Airspace Simulation Results or Algorithms** | | | | | **Hanover B** |
| Chaired by: E. MUELLER, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3363<br>**Overview of NASA's ATM-X Project**<br>W. Chan, NASA Ames Research Center, Moffett Field, CA; B. Barmore, J. Kibler, NASA Langley Research Center, Hampton, VA; P. Lee, NASA Ames Research Center, Moffett Field, CA; N. O'Connor, NASA Langley Research Center, Hampton, VA; K. Palopo, NASA Ames Research Center, Moffett Field, CA; et al. | 1430 hrs<br>AIAA-2018-3364<br>**Exploratory Analysis of the Airspace Throughput and Sensitivities of an Urban Air Mobility System**<br>K. Goodrich, B. Barmore, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-3365<br>**Simulation Evaluations of an Autonomous Urban Air Mobility Network Management and Separation Service**<br>C. Bosson, Universities Space Research Association, Moffett Field, CA; T. Lauderdale, NASA Ames Research Center, Moffett Field, CA | 1530 hrs<br>Oral Presentation<br>**TCAS alerts from simulated Urban Air Mobility flights along FAA helicopter routes in Dallas-Fort Worth**<br>A. Cone, D. Thipphavong, NASA Ames Research Center, Moffett Field, CA | | | |

**Tuesday, 26 June 2018**

| 142-F35-1 | F-35 Track - Program Overview | | | | | Regency Ballroom VI |
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| Chaired by: R. MANGE, Lockheed Martin Aeronautics and J. HAMSTRA, Lockheed Martin Aeronautics and L. SAMPSON, Lockheed Martin Corporation | | | | | | |
| 1400 hrs<br>AIAA-2018-3366<br>**F-35 Program History – From JAST to IOC**<br>A. Sheridan, Lockheed Martin Corporation, Fort Worth, TX; R. Burnes, F-35 Joint Program Office, Arlington, VA | 1430 hrs<br>AIAA-2018-3367<br>**F-35 Air Vehicle Configuration Development**<br>M. Counts, B. Kiger, J. Hoffschwelle, A. Houtman, G. Henderson, Lockheed Martin Corporation, Fort Worth, TX | 1500 hrs<br>AIAA-2018-3368<br>**F-35 Air Vehicle Technology Overview**<br>C. Wiegand, Lockheed Martin Corporation, Fort Worth, TX | 1530 hrs<br>AIAA-2018-3369<br>**F-35 Production – Advanced Manufacturing and the Digital Thread**<br>D. Kinard, Lockheed Martin Corporation, Fort Worth, TX | 1600 hrs<br>AIAA-2018-3370<br>**F-35 Weapons Design Integration**<br>D. Hayward, A. Duff, Lockheed Martin Corporation, Fort Worth, TX; C. Wagner, F-35 Joint Program Office, Arlington, VA | 1630 hrs<br>AIAA-2018-3371<br>**F-35 System Development and Demonstration Flight Testing at Edwards Air Force Base and Naval Air Station Patuxent River**<br>M. Hudson, M. Glass, Lockheed Martin Corporation, Fort Worth, TX; T. Hamilton, U.S. Air Force, Edwards AFB, CA; E. Somers, R. Caldwell, Lockheed Martin Corporation, Fort Worth, TX | 1700 hrs<br>**Open Discussion** |

**Tuesday, 26 June 2018**

| 143-F360-4<br>1400 - 1600 hrs | Tuesday Forum 360: Inventors and Innovators | Centennial IV |
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Moderator: John Tylko, Chief Innovation Officer, Aurora Flight Sciences Corporation

Panelists:

**Andrew Gibson**
President and Co-Founder
Empirical Systems Aerospace, Inc.

**Bruce Holmes**
Vice President, Digital Aviation
SmartSky Networks, LLC

**Daniel Morris**
Director, Peninsula Technology Incubator
National Institute of Aerospace

**Kevin Noertker**
Co-Founder, Chief Executive Officer
Ampaire

**Tuesday, 26 June 2018**

| 144-FC-10 | Flow Control Using Fluidic Actuators | | | | | Vinings |
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| Chaired by: E. DEMAURO, Rutgers, The State University of New Jersey | | | | | | |
| 1400 hrs<br>AIAA-2018-3372<br>**Meandering of a Wing Tip Vortex Under the Effect of Synthetic Jet Actuation**<br>M. Dghim, University of Sherbrooke, Sherbrooke, Canada; M. Ferchichi, Royal Military College of Canada, Kingston, Canada; H. Fellouah, University of Sherbrooke, Sherbrooke, Canada | 1430 hrs<br>AIAA-2018-3373<br>**Near Wake Vortex Shedding and Noise Control Using Sweeping Jet Actuators**<br>W. Elsahhar, R. Theunissen, M. Azarpeyvand, University of Bristol, Bristol, United Kingdom | 1500 hrs<br>AIAA-2018-3374<br>**Friction Drag Reduction on a Clark-Y Airfoil Using Uniform Blowing**<br>K. Eto, Y. Kondo, K. Fukagata, Keio University, Yokohama, Japan; N. Tokugawa, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan | 1530 hrs<br>AIAA-2018-3375<br>**Characterization of the Suction-and-Oscillatory-Blowing actuator by the hybrid RANS-LES CFD**<br>A. Prachar, P. Vrchota, Aerospace Research and Test Establishment (VZLÚ), Prague, Czechia | 1600 hrs<br>AIAA-2018-3376<br>**Transonic Super-critical Airfoil Enhancement by Coflow Jet Downstream of Normal Shock**<br>M. Fernandez, R. Delgado, J. Hoffmann, G. Zha, University of Miami, Coral Gables, FL | 1630 hrs<br>AIAA-2018-3377<br>**Turbulence enhancement driven by cavity flow control**<br>M. Garcia Sainz, National University of La Plata, La Plata, Argentina; J. Delnero, J. Marañon, National Scientific and Technical Research Council (CONICET), La Plata, Argentina | |

**Tuesday, 26 June 2018**

| 145-FC-11/APA-20<br>1400 - 1730 hrs | Strategies for AFC Technology Transition | Courtland |
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**A Proposal to Adopt A Past, Real-World Flow Control Capability to Provide an 'Acid-Test' for AFC Technology Transition**
Robert Dowgwillo

**Active Flow Separation with the DLR F15 Configuration**
Vlad Ciobaca

**Bluff Bodies as a Potential Open Challenge Problem for Active Flow Control**
Jacques Boree

**If Active Flow Control is to Become a Design Tool in Aerodynamics, Do We need to Depart from Prandtl's Classical Approach?**
Israel Wygnanski

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| **146-FD-26** | **Stability and Transition VI: Models and Tools I** | | | | | **International South** |
| Chaired by: R. RANJAN and L. ALVES, UFF | | | | | | |
| 1400 hrs<br>AIAA-2018-3378<br>**On the Use of Mean Flow Perturbation for Global Stability Analysis**<br>R. Ranjan, S. Unnikrishnan, D. Gaitonde, Ohio State University, Columbus, OH | 1430 hrs<br>AIAA-2018-3379<br>**Acoustic Receptivity of Compressible Tollmien-Schlichting Waves with an Efficient Time-Harmonic Linearized Navier-Stokes Method**<br>H. Raposo, S. Mughal, Imperial College London, London, United Kingdom; R. Ashworth, Airbus, Bristol, United Kingdom | 1500 hrs<br>AIAA-2018-3380<br>**DEKAF: spectral multi-regime basic-state solver for boundary layer stability**<br>K. Groot, Delft University of Technology, Delft, The Netherlands; F. Miró Miró, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; E. Beyak, A. Moyes, Texas A&M University, College Station, TX; F. Pinna, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; H. Reed, Texas A&M University, College Station, TX | 1530 hrs<br>AIAA-2018-3381<br>**Development of Stability Analysis Tools for High Speed Compressible Flows**<br>R. Bhagwat, P. Subbareddy, North Carolina State University, Raleigh, NC | 1600 hrs<br>AIAA-2018-3382<br>**Implementation and Assessment of the Amplification Factor Transport Laminar-Turbulent Transition Model**<br>M. Denison, T. Pulliam, NASA Ames Research Center, Moffett Field, CA | 1630 hrs<br>AIAA-2018-3383<br>**An Indicator of the Dominant Instability in Transition on an Extended Correlation Based Transition Model**<br>H. Nie, W. Song, Z. Han, Z. Zhu, Northwestern Polytechnical University, Xi'an, China | 1700 hrs<br>AIAA-2018-3384<br>**Development of a New Transitional Flow Model Integrating the Wray-Agarwal Turbulence Model with an Intermittency Transport Equation**<br>H. Nagapetyan, R. Agarwal, Washington University in St. Louis, St. Louis, MO |

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| **147-FD-27** | **Stability and Transition V: General** | | | | | **Lenox** |
| Chaired by: A. CHOU, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3385<br>**Flows over convex surfaces undergoing transient growth**<br>M. Karp, P. Hack, Stanford University, Stanford, CA | 1430 hrs<br>AIAA-2018-3386<br>**The Influence of the Boundary Layer Thickness on the Stability of the Rossiter Modes of a Compressible Rectangular Cavity**<br>M. Mathias, M. Medeiros, University of São Paulo, São Carlos, Brazil | 1500 hrs<br>AIAA-2018-3387<br>**Impact Of Upstream Wake On Boundary Layer Regime: From Modal To Bypass Transition**<br>G. Delattre, J. Brazier, M. Forte, L. Pascal, ONERA, Toulouse, France | 1530 hrs<br>AIAA-2018-3388<br>**Effect of Constant Wall-Temperature and Suction on Linear Stability of Streamwise Corner-Flow**<br>J. Staudenmeyer, U. Rist, University of Stuttgart, Stuttgart, Germany | 1600 hrs<br>AIAA-2018-3389<br>**Crossflow Stability of a Swept Flat Plate with Wavy Leading Edge**<br>M. Owen, A. Frendi, University of Alabama, Huntsville, Huntsville, AL | 1630 hrs<br>AIAA-2018-3390<br>**Comparison between Theories and Experiments in Transition of Purely Oscillating Pipe Flow**<br>Y. Lee, A. Abdulrasool, Embry-Riddle Aeronautical University, Daytona Beach, FL | |

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| **148-FD-28** | **Flow-Induced Flutter: Advances in Modeling, Experiments and Applications II** | | | | | **International North** |
| Chaired by: J. SEIDEL, USAF Academy and K. SHOELE, Florida State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3391<br>**Effects of Armament Placement on Nonlinear Dynamic Behavior of High-aspect Ratio Wing Due to Shooting and Blast-Induced Gust**<br>P. Mardanpour, E. Izadpanahi, S. Rastkar, S. Calastawad, C. Levy, Florida International University, Miami, FL | 1430 hrs<br>Oral Presentation<br>**Enhanced Small-Scale Heat Transfer Using Autonomously Fluttering Reeds**<br>S. Jha, T. Crittenden, Y. Svyatoslav, A. Glezer, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-3392<br>**Large Amplitude Limit Cycle Oscillations of Fully Coupled Fluid-Structure Interactions**<br>J. Seidel, T. Siefers, C. Fagley, T. McLaughlin, U.S. Air Force Academy, Colorado Springs, CO | 1530 hrs<br>Oral Presentation<br>**A High-Fidelity Framework for Unsteady Aeroelastic Analysis and Design**<br>K. Jacobson, J. Kiviaho, G. Kennedy, M. Smith, Georgia Institute of Technology, Atlanta, GA; S. Massey, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>Oral Presentation<br>**Validation Experiments for Computational Models of Flow-Induced Flutter**<br>R. Mittal, Z. Dou, A. Rips, Johns Hopkins University, Baltimore, MD | | |

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| **149-FD-29** | **Shock-Wave/Boundary-Layer Interactions I** | | | | | **Edgewood** |
| Chaired by: J. POGGIE, Purdue University- Sch of Aero and Astro and L. DUAN, Missouri University of Science and Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-3393<br>**Effects of curvature in high-speed inlets**<br>A. Deshpande, J. Poggie, Purdue University, West Lafayette, IN | 1430 hrs<br>AIAA-2018-3394<br>**Investigation of Supersonic Flow Past a Wall-Mounted Hemisphere With Turbulent Boundary Layer Impingement**<br>E. DeMauro, E. Eisenberg, R. Panco, A. Pournadali Khamseh, N. Kianvashrad, D. Knight, Rutgers University, Piscataway, NJ | 1500 hrs<br>AIAA-2018-3395<br>**Numerical and experimental study of nominal 2-D Shock-Wave / Turbulent Boundary Layer Interactions**<br>P. Touré, E. Schuelein, German Aerospace Center (DLR), Göttingen, Germany | 1530 hrs<br>AIAA-2018-3396<br>**Fin-Generated Shock Wave/Turbulent Boundary Layer Interactions on a Cylindrical Surface with a Distorted Incoming Boundary Layer**<br>J. Pickles, B. Mettu, P. Subbareddy, V. Narayanaswamy, North Carolina State University, Raleigh, NC | 1600 hrs<br>AIAA-2018-3397<br>**Computational Study of Flow on a Sliced Cone-Flap Geometry**<br>J. Thome, J. Reinert, A. Dwivedi, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | 1630 hrs<br>AIAA-2018-3398<br>**Aero-thermo-elastic Simulation of Shock-Boundary Layer Interaction over a Compliant Surface**<br>A. Shahriar, K. Shoele, R. Kumar, Florida State University, Tallahassee, FL | |

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| **150-FD-30** | **Multiphysics and Cross-Disciplinary Fluid Dynamics II: Combustion II** | | | | | **Dunwoody** |
| Chaired by: C. BIL, RMIT University and D. CASALINO, EXA GmbH | | | | | | |
| 1400 hrs<br>AIAA-2018-3399<br>**Numerical simulation of hydrogen-fueled supersonic combustion using the linear-eddy model based on IDDES method**<br>J. Niu, Tsinghua University, Beijing, China | 1430 hrs<br>AIAA-2018-3400<br>**Thermal Performance of a Kerosene-Fired Variable-Mixing Oxy-Fuel Burner**<br>M. Darbandi, M. Ghafourizadeh, Sharif University of Technology, Tehran, Iran; G. Schneider, University of Waterloo, Waterloo, Canada | | | | | |

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| **151-FD-31/MVC-1** | **FD-MVCE Special Session** | | | | | **Inman** |
| Chaired by: S. DEY, NRL and K. VOGIATZIS, ENGILITY | | | | | | |
| 1400 hrs<br>AIAA-2018-3401<br>**A Qualitative Study on the Effects of Mesh Guideline Modification for Unstructured Mesh Generation of the NASA High Lift Common Research Model (HL-CRM)**<br>W. Jones, NASA Langley Research Center, Hampton, VA; C. Woeber, Pointwise, Inc., Fort Worth, TX | 1430 hrs<br>AIAA-2018-3402<br>**Geometry Modelling: Underlying Concepts and Requirements for Computational Simulation (Invited)**<br>N. Taylor, MBDA, Filton, United Kingdom; R. Haimes, Massachusetts Institute of Technology, Cambridge, MA | 1530 hrs<br>**Panel: Geometry Modelling: Current Challenges and Future Requirements** | | | | |

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| **152-FD-32** | **Advances in LES and Hybrid Methods** | | | | | **Harris** |
| Chaired by: G. MEDIC and J. LARSSON, University of Maryland | | | | | | |
| 1400 hrs<br>AIAA-2018-3403<br>**Synthetic Inflow Methods for Turbulent Boundary Layer Simulations: a Physics-Based Approach Versus a Data-Driven Approach**<br>S. Shinde, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI | 1430 hrs<br>AIAA-2018-3404<br>**Evaluation of Inflow Turbulence Methods in Large-Eddy Simulations of a Supersonic Boundary Layer**<br>M. Mankbadi, M. Vyas, J. DeBonis, N. Georgiadis, NASA Glenn Research Center, Cleveland, OH | 1500 hrs<br>AIAA-2018-3405<br>**Wall modeled LES of compressible flows at non-equilibrium conditions**<br>B. Mettu, P. Subbareddy, North Carolina State University, Raleigh, NC | 1530 hrs<br>AIAA-2018-3406<br>**Grid-Adaptation and Convergence-Verification in Large Eddy Simulation: A Robust and Systematic Approach**<br>S. Toosi, J. Larsson, University of Maryland, College Park, College Park, MD | 1600 hrs<br>AIAA-2018-3407<br>**An investigation of an implicit large-eddy simulation framework for the vorticity transport equations**<br>D. Foti, K. Duraisamy, University of Michigan, Ann Arbor, Ann Arbor, MI | 1630 hrs<br>AIAA-2018-3408<br>**Model-Invariant Hybrid RANS-LES Computations on Unstructured Meshes**<br>S. Ravindran, S. Woodruff, NASA Langley Research Center, Hampton, VA | 1700 hrs<br>AIAA-2018-3409<br>**The improvement and application of Very Large Eddy Simulation Approach**<br>Y. Li, J. Bai, Northwestern Polytechnical University, Xi'an, China; Y. Zhang, Xi'an Jiaotong University, Xi'an, China |

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| **153-FT-2/ATIO.TF-6** | **Flight Test Technologies from 150kts to 1000kts** | | | | | **Embassy F** |
| Chaired by: S. GINN, NASA AFRC | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**LEAPTech/HEIST Experiment Test and Evaluation Lessons Learned**<br>J. Lechniak, S. Clarke, K. Papathakis, S. Ginn, NASA Armstrong Flight Research Center, Edwards, CA | 1430 hrs<br>Oral Presentation<br>**X-57 Project Update: Electrification, Integration, and Vehicle Tests**<br>S. Clarke, NASA Armstrong Flight Research Center, Edwards, CA | 1500 hrs<br>Oral Presentation<br>**X-57 GIMC-SCEPTOR High Lift System Overview**<br>D. Avanesian, NASA Glenn Research Center, Cleveland, OH | 1530 hrs<br>AIAA-2018-3410<br>**X-57 Modification 2 Motor Thermal Analysis**<br>J. Chin, S. Schnulo, A. Smith, R. Edwards, T. Tallerico, NASA Glenn Research Center, Cleveland, OH | 1600 hrs<br>AIAA-2018-3411<br>**Initial Flight Testing of an eXternal Vision System (XVS) for the Low Boom Flight Demonstrator (LBFD)**<br>L. Kramer, S. Williams, T. Arthur, R. Bailey, K. Shelton, K. Severance, NASA Langley Research Center, Hampton, VA; et al. | 1630 hrs<br>AIAA-2018-3412<br>**An Overview of Lessons Learned from Sonic Boom Flight Research Projects Conducted by NASA Armstrong Flight Research Center**<br>E. Waggoner, L. Cliatt, NASA Armstrong Flight Research Center, Edwards, CA; M. Hill, Jacobs, Edwards, CA; E. Haering, NASA Armstrong Flight Research Center, Edwards, CA | 1700 hrs<br>Oral Presentation<br>**AQUIFER (Aqueous, QUick-charging battery Integration For Electric flight Research)**<br>R. Ouellette, The Boeing Company, Huntington Beach, CA; S. Ginn, K. Papathakis, NASA Armstrong Flight Research Center, Edwards, CA |

| Tuesday, 26 June 2018 | | | | | | |
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| **154-GT-6** | **RDT&E Capabilities: Defining RDT&E Experimental/Computational Capability and Workforce Challenges** | | | | | **Embassy E** |
| Chaired by: S. DUNN, Jacobs and D. MARREN | | | | | | |
| 1400 hrs<br>AIAA-2018-3413<br>**Aerospace Human Resources for the 21st Century: Workforce Challenges Facing Research and Development (Invited)**<br>D. Marren, Arnold Engineering Development Complex, White Oak, MD; S. Dunn, Jacobs, Hampton, VA; P. Piscopo, Institute for Defense Analyses, Alexandria, VA | 1430 hrs<br>**Panel: Applying a New and Proven Capability Valuation Approach to a Broader Range of RDT&E Capabilities** | | | | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **155-ITAR-2** | **Aero-Optics and Directed Energy** | | | | | **Kennesaw** |
| Chaired by: S. SHERER, AFRL/RQVA | | | | | | |
| 1400 hrs<br>AIAA-2018-4296<br>**CFD Simulation of Aero-Optic Propagation in Various Flow Conditions**<br>D. Weston, S. Sherer, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-4297<br>**Progress in Aperture Integration for Flight Vehicles**<br>R. Johnson, M. Stanek, 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, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1500 hrs<br>Oral Presentation<br>**Invited - The effect on the transonic aero-optical environment on a hemispherical turret by an upstream porous fence**<br>S. Gordeyev, E. Jumper, University of Notre Dame, Notre Dame, IN; D. Wittich, Air Force Research Laboratory, Kirtland AFB, NM | 1530 hrs<br>AIAA-2018-4298<br>**Passive Flow Control for an Aircraft Optical Window**<br>J. Tam, I. Zilberter, E. Ahn, D. Wittich, Air Force Research Laboratory, Kirtland AFB, NM | 1600 hrs<br>AIAA-2018-4299<br>**Computational Analysis of Flow Control Integration for Directed Energy Applications**<br>M. Frede, University of Dayton, Dayton, OH; D. Weston, Ohio Aerospace Institute, Brook Park, OH; S. Sherer, Air Force Research Laboratory, Wright-Patterson AFB, OH | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **156-MDO-8** | **Design Optimization of Complex Systems** | | | | | **Hanover E** |
| Chaired by: T. ASHURI, Arkansas Tech University and M. STELMACK, Lockheed Martin Aeronautics | | | | | | |
| 1400 hrs<br>AIAA-2018-3414<br>**A Multi-Fidelity Approach to Address Multi-Objective Mixed-Discrete Nonlinear Programming Problems**<br>S. Jain, W. Crossley, S. Roy, Purdue University, West Lafayette, IN | 1430 hrs<br>AIAA-2018-3415<br>**Uncertainty-aware Optimal Flight State Selection for a Transitioning UAV via Simulation-based Learning**<br>C. Zeng, A. Behjat, S. Chowdhury, University at Buffalo, Buffalo, NY | 1500 hrs<br>AIAA-2018-3416<br>**Shape Optimization under Stochastic Conditions by Design-space Augmented Dimensionality Reduction**<br>A. Serani, M. Diez, National Research Council (CNR), Rome, Italy | 1530 hrs<br>AIAA-2018-3417<br>**Efficient multidisciplinary design optimization strategy using enhanced collaboration pursing method**<br>P. Yang, C. Han, Beihang University, Beijing, China | 1600 hrs<br>AIAA-2018-3418<br>**Multidisciplinary Design Optimization of Slender Flight Vehicle Considering Aeroelasticity**<br>Z. Wei, L. Liu, Z. Wang, T. Long, Beijing Institute of Technology, Beijing, China | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **157-MDO-9** | **Emerging Methods in Multidisciplinary Design Optimization** | | | | | **Hanover G** |
| Chaired by: J. HICKEN, Rensselaer Polytechnic Institute | | | | | | |
| 1400 hrs<br>AIAA-2018-3419<br>**Expanded MDO for Effectiveness Based Design Technologies: EXPEDITE Program Introduction**<br>D. Allison, R. Kolonay, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-3420<br>**A Deep Learning Approach to an Airfoil Inverse Design Problem**<br>E. Yilmaz, B. German, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-3421<br>**A New Statistical Approach to Enhance the Performance of Model-Free Optimal Controls Algorithms**<br>T. Ashuri, E. Vasquez Mayen, R. Hamidi, Arkansas Tech University, Russellville, AR | 1530 hrs<br>AIAA-2018-3422<br>**Identifying Multiple Optima in Aerodynamic Design Spaces**<br>D. Poole, C. Allen, T. Rendall, University of Bristol, Bristol, United Kingdom | 1600 hrs<br>AIAA-2018-3423<br>**Comparative Studies on Parameters Adaption of Support Vector Regression for Engineering Optimization**<br>S. He, K. Zhang, Northwestern Polytechnical University, Xi'an, China | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **158-MDO-10** | **Special Session: Realizing Performance Adaptive Aeroelastic Wing: Progress and Challenges** | | | | | **Hanover F** |
| Chaired by: B. DANOWSKY, Systems Technology, Inc. and R. KAPANIA, Virginia Tech | | | | | | |
| 1400 hrs<br>AIAA-2018-3424<br>**Multiobjective Optimization of Composite Flying-wings with SpaRibs and Multiple Control Surfaces**<br>W. Zhao, R. Kapania, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1430 hrs<br>AIAA-2018-3425<br>**Development of Longitudinal Flight Dynamics Analysis Framework with Controllability and Observability Metrics**<br>R. Gupta, N. Love, R. Kapania, Virginia Polytechnic Institute and State University, Blacksburg, VA; D. Schmidt, D K Schmidt & Associates, Monument, CO | 1500 hrs<br>AIAA-2018-3426<br>**Flutter Suppression Control Design for a Small, Flexible Flying-Wing Aircraft**<br>A. Kotikalpudi, B. Danowsky, Systems Technology, Inc., Hawthorne, CA; D. Schmidt, D K Schmidt & Associates, Monument, CO; J. Theis, Technical University of Hamburg, Hamburg, Germany; P. Seiler, University of Minnesota, Twin Cities, Minneapolis, MN | 1530 hrs<br>AIAA-2018-3427<br>**Flight Testing Flutter Suppression on a Small Flexible Flying-Wing Aircraft**<br>B. Danowsky, A. Kotikalpudi, Systems Technology, Inc., Hawthorne, CA; D. Schmidt, D K Schmidt & Associates, Monument, CO; C. Regan, P. Seiler, University of Minnesota, Twin Cities, Minneapolis, MN | 1600 hrs<br>AIAA-2018-3428<br>**Non-Intrusive Computation of Rigid-Body/Flexible-Body Coupling Integrals**<br>R. Gupta, N. Love, R. Kapania, Virginia Polytechnic Institute and State University, Blacksburg, VA; D. Schmidt, D K Schmidt & Associates, Monument, CO | 1630 hrs<br>AIAA-2018-3429<br>**Elastic Axis Determination and Extraction of Vibration Mode Shapes of a Light Weight Composite Aircraft**<br>M. Jrad, W. Zhao, R. Kapania, Virginia Polytechnic Institute and State University, Blacksburg, VA; D. Schmidt, D K Schmidt & Associates, Monument, CO | |

| Tuesday, 26 June 2018 | | | | | | |
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| **159-MST-3** | **Simulation Architectures and Technologies** | | | | | **Embassy H** |
| Chaired by: D. KEATING, The Charles Stark Draper Laboratory, Inc. and B. APONSO, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3430<br>**Managing Multi-protocol Network Definitions in Aircraft Simulation and Test**<br>B. Hale, Applied Dynamics International, Ann Arbor, MI | 1430 hrs<br>AIAA-2018-3431<br>**An Investigation of Parallel Programming Techniques Applied to Monte Carlo Simulations for Post-Flight Reconstruction of Spacecraft Trajectory**<br>R. Williams, J. Green, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-3432<br>**Parallelization of a Six Degree of Freedom Entry Vehicle Trajectory Simulation Using OpenMP and OpenACC**<br>J. Green, R. Williams, NASA Langley Research Center, Hampton, VA; J. Gutierrez, Northeastern University, Boston, MA | | | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **160-PDL-4** | **Plasma Diagnostics and Experimental Techniques** | | | | | **Chicago A** |
| Chaired by: A. SHASHURIN, Purdue University- Sch of Aero and Astro and J. ZIMMERMAN, CU Aerospace | | | | | | |
| 1400 hrs<br>AIAA-2018-3433<br>**Direct Measurements of Multiphoton Ionization Cross-Sections in Various Gases**<br>A. Sharma, M. Slipchenko, M. Shneider, K. Rahman, A. Shashurin, Princeton University, Princeton, NJ | 1430 hrs<br>AIAA-2018-3434<br>**Focused Laser Differential Interferometer for Supersonic Boundary Layer Measurements on Flat Plate Geometries**<br>A. Houpt, S. Leonov, University of Notre Dame, Notre Dame, IN | 1500 hrs<br>AIAA-2018-3435<br>**Radar REMPI Diagnostic for Low Neutral Density Measurements of Xenon in Helium Buffer Gas: Experiments and Modeling**<br>C. Galea, M. Shneider, Princeton University, Princeton, NJ; T. Chng, École Polytechnique, Palaiseau, France; A. Dogariu, Princeton University, Princeton, NJ; R. Miles, Texas A&M University, College Station, TX | | | | |

| Tuesday, 26 June 2018 | | | | | | |
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| **161-TP-6** | **Aerothermodynamics and Thermal Protection Systems I** | | | | | **Embassy A** |
| Chaired by: D. KUNTZ, Sandia National Laboratories and K. WEED, Ball Aerospace & Technologies Corporation | | | | | | |
| 1400 hrs<br>AIAA-2018-3436<br>**Parametric Study of the Wake of Slender Hypersonic Vehicles using a Three-Temperature Model**<br>M. Clarey, R. Greendyke, Air Force Institute of Technology, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-3437<br>**Shock Tube Radiation Measurements in Nitrogen**<br>A. Brandis, B. Cruden, Analytical Mechanics Associates, Inc., Moffett Field, CA | 1500 hrs<br>AIAA-2018-3438<br>**Kinetics of $O_2$-$N_2$ collisions at hypersonic temperatures**<br>D. Andrienko, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI | 1530 hrs<br>AIAA-2018-3439<br>**Implementation of a Nitrogen Chemical Kinetics Model Based on ab-Initio Data for Hypersonic CFD**<br>R. Chaudhry, N. Singh, M. Grover, T. Schwartzentruber, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | 1600 hrs<br>AIAA-2018-3440<br>**Reliability-Based Design of Thermal Protection Systems with Support Vector Machines**<br>L. White, T. West, A. Brune, NASA Langley Research Center, Hampton, VA | | |

| Tuesday, 26 June 2018 | | |
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| 162-NW-4<br>1600 - 1630 hrs | Networking Coffee Break | Exposition Hall |

| Tuesday, 26 June 2018 | | |
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| 163-SP-2<br>1630 - 1830 hrs | Transformational Electric Flight Workshop and Expo | Regency Ballroom VII |
| For detailed agenda, visit: https://aviation.aiaa.org/ElectricFlight/ | | |

| Tuesday, 26 June 2018 | | |
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| 164-AA-26<br>1730 - 1830 hrs | CEAS Aeroacoustics Award Lecture | International North |
| | **Sjoerd Rienstra**<br>Eindhoven University of Technology | |

| Tuesday, 26 June 2018 | | |
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| 165-FD-33<br>1730 - 1830 hrs | Fluid Dynamics Award Lecture | International South |
| | **Helen Reed**<br>Texas A&M University | |

| Tuesday, 26 June 2018 | | |
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| 166-NW-5<br>1830 - 2000 hrs | Reception in Exposition Hall | Exposition Hall |

## Wednesday

| Wednesday, 27 June 2018 | | |
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| 167-SB-3<br>0730 - 0800 hrs | Speakers' Briefing | Session Rooms |

| Wednesday, 27 June 2018 | | |
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| 168-PLNRY-3<br>0800 - 0900 hrs | Wednesday Plenary: Aviation Transformation - The Ultimate Team Sport | Centennial I, II, III |
| | Keynote Speaker<br>**Michael Huerta**<br>Senior Advisor<br>Macquarie Holdings | |

| Wednesday, 27 June 2018 | | |
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| 169-NW-6<br>0900 - 0930 hrs | Networking Coffee Break | Exposition Hall |

| Wednesday, 27 June 2018 | | | | | | |
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| 170-AA-27 | Duct Acoustics I | | | | | Spring |
| Chaired by: W. SCHUSTER, Honeywell International, Inc. | | | | | | |
| 0930 hrs<br>AIAA-2018-3441<br>**Impedance Eduction for Multisegment Liners**<br>M. Jones, W. Watson, D. Nark, B. Howerton, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-3442<br>**Impedance Eduction in a Duct Using Linearized Euler Equations**<br>W. Watson, M. Jones, NASA Langley Research Center, Hampton, VA | 1030 hrs<br>AIAA-2018-3443<br>**Effects of Cavity Diameter on Acoustic Impedance in a Complex Acoustic Environment**<br>M. Brown, M. Jones, NASA Langley Research Center, Hampton, VA | 1100 hrs<br>AIAA-2018-3444<br>**Assessment of Axial Wave Number and Mean Flow Uncertainty on Acoustic Liner Impedance Eduction**<br>D. Nark, M. Jones, NASA Langley Research Center, Hampton, VA; E. Piot, ONERA, Toulouse, France | 1130 hrs<br>AIAA-2018-3445<br>**Applications of Parallel-Element, Embedded Mesh-Cap Acoustic Liner Concepts**<br>M. Jones, D. Nark, NASA Langley Research Center, Hampton, VA; A. Baca, C. Smith, Hexcel Corporation, Casa Grande, AZ | 1200 hrs<br>AIAA-2018-3446<br>**Aeroacoustics Comparison of Double- and Single-layer Perforated Liners in Presence of Joint Bias-grazing Flow**<br>D. Zhao, University of Canterbury, Christchurch, New Zealand; C. Ji, Nanyang Technological University, Singapore, Singapore; L. Ang, National University of Singapore, Singapore, Singapore | |

| Wednesday, 27 June 2018 | | | | | | |
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| **171-AA-28** | **Propeller Rotorcraft and V/STOL Noise I** | | | | | **University** |
| Chaired by: M. ROGER, Ecole Centrale de Lyon | | | | | | |
| 0930 hrs<br>AIAA-2018-3447<br>**Rotor Noise Generation in a Turbulent Wake using Lattice-Boltzmann Methods**<br>I. Gonzalez-Martino, G. Romani, J. Wang, D. Casalino, Exa Corporation, Paris, France | 1000 hrs<br>AIAA-2018-3448<br>**Aerodynamic Performance and Acoustic Measurements of a High-Lift Propeller in an Isolated Configuration**<br>N. Zawodny, H. Haskin, D. Nark, NASA Langley Research Center, Hampton, VA | 1030 hrs<br>AIAA-2018-3449<br>**Aeroacoustic Study of small scale Rotors for mini Drone Propulsion: Serrated Trailing Edge Effect.**<br>T. Pagliaroli, Niccolò Cusano University, Rome, Italy; R. Camussi, Roma Tre University, Rome, Italy; P. Candeloro, O. Giannini, G. Bella, R. Panciroli, Niccolò Cusano University, Rome, Italy | 1100 hrs<br>AIAA-2018-3450<br>**Investigation Towards a Better Understanding of Noise Generation from UAV Propellers**<br>E. Pang, A. Cambray, D. Rezgui, M. Azarpeyvand, S. Showkat Ali, University of Bristol, Bristol, United Kingdom | 1130 hrs<br>AIAA-2018-3451<br>**Trailing Edge Noise of Innovative Mini-RPA Propeller Blade Geometry**<br>H. Akila, National Polytechnic School, Algiers, Algeria; B. Marinus, Royal Military Academy, Brussels, Belgium; S. Larbi, National Polytechnic School, Algiers, Algeria | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **172-AA-29** | **Computational Aeroacoustics I** | | | | | **Marietta** |
| Chaired by: Y. DETANDT, Free Field Technologies | | | | | | |
| 0930 hrs<br>AIAA-2018-3452<br>**Enhanced Fan Broadband Noise Prediction Based on a 2D Synthetic Turbulence Method**<br>C. Kissner, A. Wohlbrandt, S. Guerin, German Aerospace Center (DLR), Berlin, Germany | 1000 hrs<br>AIAA-2018-3453<br>**Noise Generation Mechanism by Muzzle Blast Waves with Optimized Immersed Boundary Method**<br>H. Choung, J. Ko, S. Lee, Seoul National University, Seoul, South Korea | 1030 hrs<br>AIAA-2018-3454<br>**Overset LES of a Solid and Porous NACA0012 Trailing Edge**<br>P. Bernicke, R. Akkermans, V. Bharadwaj, Technical University of Braunschweig, Braunschweig, Germany; R. Ewert, J. Dierke, L. Rossian, German Aerospace Center (DLR), Braunschweig, Germany | 1100 hrs<br>AIAA-2018-3455<br>**Impedance Eduction of Acoustic Liners via the Inverse Helmholtz Solver (iHS) Approach**<br>D. Patel, P. Gupta, C. Scalo, Purdue University, West Lafayette, IN | 1130 hrs<br>AIAA-2018-3456<br>**Simulation of Sound Absorption by Scattering Bodies Treated with Acoustic Liners Using a Time-Domain Boundary Element Method**<br>M. Pizzo, F. Hu, Old Dominion University, Norfolk, VA; D. Nark, NASA Langley Research Center, Hampton, VA | 1200 hrs<br>AIAA-2018-3457<br>**Sonic Boom Prediction Using FUN3D High-Order U-MUSCL Schemes**<br>S. Yang, Randolph School, Huntsville, AL; H. Yang, R. Harris, CFD Research Corporation, Huntsville, AL | |

| Wednesday, 27 June 2018 | | | | | | |
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| **173-AA-30** | **Airframe/High-Lift Noise IV** | | | | | **Roswell** |
| Chaired by: M. MURAYAMA, Japan Aerospace Exploration Agency | | | | | | |
| 0930 hrs<br>AIAA-2018-3458<br>**Experimental and Numerical Analysis of the Aerodynamic and Aeroacoustic Properties of a 2D High-Lift Wing Model**<br>L. Lima Pereira, L. Botero, M. de Araujo, F. Catalano, University of São Paulo, São Carlos, Brazil; D. Reis, E. Coelho, Embraer, São José dos Campos, Brazil | 1000 hrs<br>AIAA-2018-3459<br>**SWAHILI: an experimental aerodynamic and acoustic database of a 2D high lift wing with sweep angle and flap side edge**<br>E. Manoha, R. Davy, ONERA, Châtillon, France; M. Pott-Pollenske, German Aerospace Center (DLR), Braunschweig, Germany; S. Barré, Dassault-Aviation, Saint Cloud, France | 1030 hrs<br>AIAA-2018-3460<br>**Experimental Study of Slat Noise from 30P30N Three-Element High-Lift Airfoil in JAXA Kevlar-Wall Low-Speed Wind Tunnel**<br>M. Murayama, Y. Yokokawa, H. Ura, K. Nakakita, K. Yamamoto, Y. Ito, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan; et al. | 1100 hrs<br>AIAA-2018-3461<br>**Assessment of Noise Reduction Concepts for Leading-Edge Slat Noise**<br>Y. Zhang, A. O'Neill, L. Cattafesta, Florida State University, Tallahassee, FL; K. Pascioni, M. Choudhari, M. Khorrami, NASA Langley Research Center, Hampton, VA; et al. | 1130 hrs<br>AIAA-2018-3462<br>**Measurement of Flow Separation Noise on a Full-scale Wind Turbine**<br>S. Buck, Siemens, Boulder, CO | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **174-AA-31** | **Jet Aeroacoustics V** | | | | | **Piedmont** |
| Chaired by: N. MURRAY, The University of Mississippi | | | | | | |
| 0930 hrs<br>AIAA-2018-3463<br>**Towards Forced Eddy Simulation of Airframe Induced Noise Radiation from Coherent Hydrodynamic Structures of Jet Flow**<br>A. Neifeld, R. Ewert, German Aerospace Center (DLR), Braunschweig, Germany | 1000 hrs<br>AIAA-2018-3464<br>**Detection of Screech Mode-Switching Using the Discrete Wavelet Transform**<br>K. Berman, A. Karon, A. Medda, K. Ahuja, Georgia Institute of Technology, Atlanta, GA | 1030 hrs<br>AIAA-2018-3465<br>**Kinematic wavepacket model for broadband shock associated noise in underexpanded supersonic jets**<br>M. Wong, D. Edgington-Mitchell, D. Honnery, Monash University, Clayton, Australia; P. Jordan, National Center for Scientific Research (CNRS), Poitiers, France; A. Savarese, Airbus, Toulouse, France | 1100 hrs<br>AIAA-2018-3466<br>**Acoustically informed statistics for wavepacket models**<br>S. Unnikrishnan, Ohio State University, Columbus, OH; A. Cavalieri, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; D. Gaitonde, Ohio State University, Columbus, OH | 1130 hrs<br>AIAA-2018-3467<br>**Non-compact sources of sound in high-speed turbulent jets using input-output analysis**<br>J. Jeun, J. Nichols, University of Minnesota, Twin Cities, Minneapolis, MN | | |

**Wednesday, 27 June 2018**

**175-AA-32** — **Airframe/High-Lift Noise V** — **Techwood**

Chaired by: T. SUZUKI, The Boeing Company

| 0930 hrs | 1000 hrs | 1030 hrs | 1100 hrs | 1130 hrs | 1200 hrs |
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| AIAA-2018-3468 | AIAA-2018-3469 | AIAA-2018-3470 | AIAA-2018-3472 | AIAA-2018-3473 | AIAA-2018-3471 |
| **A Numerical Study of Installation Effects of the Rudimentary Landing Gear Benchmark Problem** | **Progress in aeroacoustic experimental investigation of high-lift device and landing gear model at D5 wind tunnel** | **Analysis of Simulated and Experimental Noise Sources of Boeing 777 Main Gear Model via CLEAN in 3D** | **Detached Eddy Simulation of the Flow Noise Generation of Cylinders with Porous Cover** | **Development of a Wire Mesh Screen Model for Unsteady Simulation of Noise Reduction Devices, with Application to the Tandem Cylinder Configuration** | **Experimental Investigation of Acoustical Coupling between Cavity Flow and Cross Cylinder Wake** |
| Y. Hou, D. Angland, University of Southampton, Southampton, United Kingdom; A. Scotto, Airbus, Toulouse, France | P. Liu, Y. Xing, L. Li, H. Guo, Beihang University, Beijing, China | P. Ravetta, AVEC, Inc., Blacksburg, VA; M. Khorrami, NASA Langley Research Center, Hampton, VA; B. Konig, E. Fares, Exa GmbH, Stuttgart, Germany | T. Geyer, S. Sharma, Brandenburg University of Technology, Cottbus, Germany; E. Sarradj, Technical University of Berlin, Berlin, Germany | M. Terracol, E. Manoha, ONERA, Châtillon, France | X. Liang, G. Hao, T. Hu, P. Liu, Beihang University, Beijing, China |

**Wednesday, 27 June 2018**

**176-AFM-7** — **System Identification and Parameter Estimation** — **Embassy C**

Chaired by: N. FEZANS, DLR - German Aerospace Center and B. JOLLY, USAF

| 0930 hrs | 1000 hrs | 1030 hrs | 1100 hrs |
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| AIAA-2018-3474 | AIAA-2018-3475 | AIAA-2018-3476 | AIAA-2018-3477 |
| **Applying a Time-Based Green's Theorem Approach to Compute Damping Derivatives and to Monitor Forced-Oscillation Testing** | **Open Loop System Identification of a Small Multirotor Vehicle with an Active Feedback Control System** | **Comparison of Open Loop and Closed Loop System Identification of a UAV** | **Practical Aspects of the Frequency Domain Approach for Aircraft System Identification** |
| A. Pototzky, Self, Yorktown, VA | M. Cunningham, J. Hubbard, University of Maryland, College Park, College Park, MD | O. Simsek, A. Bayrak, S. Karatoprak, Turkish Aerospace Industries, Inc., Ankara, Turkey; A. Dogan, University of Texas, Arlington, Arlington, TX | E. Morelli, J. Grauer, NASA Langley Research Center, Hampton, VA |

**Wednesday, 27 June 2018**

**177-AMT-5** — **Special Session: Tomographic Methods for Gas Dynamic Diagnostics** — **The Learning Center**

**0930 - 1230 hrs**

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| **Recent Advances on the Application of a Model-Based Iterative Reconstruction Approach to Sparse TDLAT Datasets** | **Recent Progress in Flow Imaging Techniques Based on Linear and Nonlinear Tomography** | **Chemical Species Tomography in the Bayesian Framework** | **Tomographic Methods to Measure Water Droplet Distributions in Wind Tunnels** | **Temperature and H2O Mole Fraction Imaging in Combustion Systems using Laser Absorption Tomography** | **Towards Limited Data Tomography Based on Supercontinuum Laser Absorption** |
| Kristin M. Busa-Rice, Michael S. Brown, Zeeshan Nadir, Charles A. Bouman, and Mary L. Comer | Weiwei Cai, Clemens Kaminski | Kyle J Daun, Samuel J Grauer, Paul J. Hadwin, and Timothy A Sipkens | Steven Izen, David Rohler, Timothy Bencic | Scott Sanders | Johannes Emmert, Sani van der Kley, Steven Wagner, Technical University of Darmstadt |

**Wednesday, 27 June 2018**

**178-APA-21** — **Special Session: Aeropropulsive Interactions (Invited)** — **Greenbriar**

Chaired by: N. HALL, Lockheed Martin Corporation and J. RAULEDER, Technical University of Munich

| 0930 hrs | 1000 hrs | 1030 hrs | 1100 hrs | 1130 hrs |
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| Oral Presentation | AIAA-2018-3478 | AIAA-2018-3479 | AIAA-2018-3480 | AIAA-2018-3481 |
| **Wind Tunnel testing of a propeller wingtip interaction (Invited)** | **Proposal of a Unified Control Strategy for Vertical Take-off and Landing Transition Aircraft Configurations (Invited)** | **Integrated Reference Model for a Tilt-rotor Vertical Take-off and Landing Transition UAV (Invited)** | **Control Allocation Framework for a Tilt-rotor Vertical Take-off and Landing Transition Aircraft Configuration (Invited)** | **Investigation on Approach to Control Lift Distribution of Wing by Distributed Propellers** |
| S. Ginn, NASA Armstrong Flight Research Center, Edwards, CA; D. Vicroy, NASA Langley Research Center, Hampton, VA; R. Hooker, Helden Aerospace, Atlanta, GA | S. Raab, J. Zhang, P. Bhardwaj, F. Holzapfel, Technical University of Munich, Munich, Germany | P. Bhardwaj, S. Raab, J. Zhang, F. Holzapfel, Technical University of Munich, Munich, Germany | J. Zhang, P. Bhardwaj, S. Raab, F. Holzapfel, Technical University of Munich, Munich, Germany | C. Xue, Z. Zhou, H. Wang, Northwestern Polytechnical University, Xi'an, China |

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| **179-APA-22** | **Aerodynamic-Structural Dynamics Interaction I** | | | | | **Fairlie** |
| Chaired by: C. PASILIAO, AFRL/RW and M. TUFTS, AFRL/RQHF | | | | | | |
| 0930 hrs<br>AIAA-2018-3482<br>**Distributed Sensing of a Cantilever Beam and Plate using a Fiber Optic Sensing System**<br>P. Heaney, T. Ivanco, NASA Langley Research Center, Hampton, VA; O. Bilgen, Rutgers University, Piscataway, NJ | 1000 hrs<br>AIAA-2018-3483<br>**Modeling of Iced Rotor Dynamics via CFD-CSD Coupling**<br>M. Yassin, M. Nathoo, Z. Zhan, W. Habashi, McGill University, Montréal, Canada; M. Fossati, University of Strathclyde, Glasgow, United Kingdom | 1030 hrs<br>AIAA-2018-3484<br>**Modeling and aerodynamic impacts of inclined square cylinders on the performance of galloping systems**<br>U. Javed, A. Abdelkefi, New Mexico State University, Las Cruces, NM | 1100 hrs<br>AIAA-2018-3485<br>**Limit Cycle Characterization of an Aeroelastic Airfoil in the Wake of an Upstream Bluff Body**<br>Z. Gianikos, B. Kirschmeier, M. Bryant, North Carolina State University, Raleigh, NC | 1130 hrs<br>AIAA-2018-3486<br>**3D Aeroelastic Simulation of Flow Over a Solid Airfoil**<br>J. Zorn, R. Davis, University of California, Davis, Davis, CA | 1200 hrs<br>AIAA-2018-3487<br>**Status Report on Aeroelasticity in the Vehicle Development for X-57 Maxwell**<br>J. Heeg, B. Stanford, C. Wieseman, S. Massey, J. Moore, NASA Langley Research Center, Hampton, VA; R. Truax, NASA Armstrong Flight Research Center, Edwards, CA | |

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| **180-APA-23** | **Low Speed, Low Reynolds Number Aerodynamics** | | | | | **Baker** |
| Chaired by: J. MILGRAM and P. JOHNSON, The Boeing Company | | | | | | |
| 0930 hrs<br>AIAA-2018-3488<br>**Analysis of UGS Double-Link Flapping Wing Ornithopter: Aerodynamics, Kinematics and Controls System**<br>S. Srigrarom, A. Zainudin, S. Rais, W. Liew, K. Tan, University of Glasgow, Glasgow, United Kingdom | 1000 hrs<br>AIAA-2018-3489<br>**A Time Spectral Method for the Analysis of Unsteady Flows past Airfoils at Low Reynolds Numbers**<br>D. Mateescu, A. Khaled, McGill University, Montréal, Canada | 1030 hrs<br>AIAA-2018-3490<br>**Influence of large-scale free-stream turbulence on an SD7003 airfoil at low Reynolds numbers.**<br>S. Herbst, C. Kähler, R. Hain, University of the German Federal Armed Forces, Neubiberg, Germany | 1100 hrs<br>AIAA-2018-3491<br>**Experimental study of 3-DOF hawkmoth hovering motion with rigid and flexible wings**<br>Y. Ryu, Ryerson University, Toronto, Canada; J. Chang, Korea Aerospace University, Goyang, South Korea; J. Chung, Ryerson University, Toronto, Canada | | | |

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| **181-ASE-8** | **Experimental Icing Aerodynamics** | | | | | **Hanover C** |
| Chaired by: M. BRAGG, University of Washington and A. PUEYO, Bombardier | | | | | | |
| 0930 hrs<br>AIAA-2018-3492<br>**Independent Effects of Reynolds and Mach Numbers on the Aerodynamics of an Iced Swept Wing**<br>A. Broeren, NASA Glenn Research Center, Cleveland, OH; S. Lee, Vantage Partners, LLC, Cleveland, OH; B. Woodard, University of Illinois, Urbana-Champaign, Urbana, IL; C. Lum, University of Washington, Seattle, Seattle, WA; T. Smith, Federal Aviation Administration, Atlantic City, NJ | 1000 hrs<br>AIAA-2018-3493<br>**Comparison of Iced Aerodynamic Measurements on Swept Wing from Two Wind Tunnels**<br>S. Lee, Vantage Partners, LLC, Cleveland, OH; A. Broeren, NASA Glenn Research Center, Cleveland, OH; B. Woodard, University of Illinois, Urbana-Champaign, Urbana, IL; C. Lum, University of Washington, Seattle, Seattle, WA; T. Smith, Federal Aviation Administration, Atlantic City, NJ | 1030 hrs<br>AIAA-2018-3494<br>**Summary of Ice Shape Geometric Fidelity Studies on an Iced Swept Wing**<br>B. Woodard, University of Illinois, Urbana-Champaign, Urbana, IL; A. Broeren, S. Lee, NASA Glenn Research Center, Cleveland, OH; C. Lum, M. Bragg, University of Washington, Seattle, Seattle, WA | 1100 hrs<br>AIAA-2018-3495<br>**Effect of Simulated Scalloped Ice on the Aerodynamics of a Swept-Wing at Low-Reynolds Number**<br>N. Sandhu, M. Soltani, M. Bragg, C. Lum, University of Washington, Seattle, Seattle, WA; B. Woodard, University of Illinois, Urbana-Champaign, Urbana, IL; A. Broeren, NASA Glenn Research Center, Cleveland, OH; et al. | 1130 hrs<br>AIAA-2018-3496<br>**Effects of Ice Accretion on the Aerodynamic Performance and Wake Characteristics of an UAS Propeller Model**<br>Y. Liu, L. Li, H. Hu, Iowa State University, Ames, IA | | |

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| **182-ASE-9** | **Atmospheric Modeling (Invited)** | | | | | **Hanover D** |
| Chaired by: N. AHMAD, NASA Langley Research Center and S. MARRAS, New Jersey Institute of Technology | | | | | | |
| 0930 hrs<br>AIAA-2018-3497<br>**A Class of Finite-Volume Models for Atmospheric Flows Across Scales (Invited)**<br>J. Szmelter, M. Gillard, Loughborough University, Loughborough, United Kingdom; P. Smolarkiewicz, C. Kühnlein, European Centre for Medium-Range Weather Forecasts, Reading, United Kingdom | 1000 hrs<br>Oral Presentation<br>**Forecasting turbulence for aviation applications (Invited)**<br>R. Sharman, D. Munoz-Esparza, National Center for Atmospheric Research, Boulder, CO | 1030 hrs<br>Oral Presentation<br>**A Numerical Investigation of Aerosol-Cloud-Radiation Interactions (Invited)**<br>Z. Boybeyi, George Mason University, Fairfax, VA | 1100 hrs<br>Oral Presentation<br>**On stabilization schemes and sub-grid scale eddy viscosity models for the anti-aliasing of the spectral element solution of the Euler equations for atmospheric simulations (Invited)**<br>S. Marras, New Jersey Institute of Technology, Newark, NJ | 1130 hrs<br>AIAA-2018-3498<br>**High-Resolution Wave Propagation Method for Stratified Flows (Invited)**<br>N. Ahmad, NASA Langley Research Center, Hampton, VA | | |

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| **183-ATIO.ACD-8** | **Aircraft Takeoff and Landing** | | | | | **Hanover A** |
| Chaired by: T. TAKAHASHI, Arizona State University and J. MERRET, Gulfstream Aerospace Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-3499<br>**Market-driven Derivation of Field Performance Requirements for Conceptual Aircraft Design**<br>N. Dzikus, I. Terekhov, J. Hartmann, V. Gollnick, German Aerospace Center (DLR), Hamburg, Germany | 1000 hrs<br>AIAA-2018-3501<br>**Wind Accountability and Obstacle Clearance Limited Takeoff for Commercial Transport Aircraft**<br>J. Beard, T. Takahashi, Arizona State University, Tempe, AZ | 1030 hrs<br>AIAA-2018-3500<br>**(Un)stabilized Approach - An Introduction to Dynamic Flight Conditions during Takeoff and Landing Climb**<br>T. Takahashi, M. Delisle, Arizona State University, Tempe, AZ | 1100 hrs<br>AIAA-2018-3502<br>**Speed Stability and Obstacle Clearance During Engine Inoperative Takeoff**<br>M. Delisle, T. Takahashi, Arizona State University, Tempe, AZ | 1130 hrs<br>AIAA-2018-3503<br>**Improved Aircraft Departure Modeling for Environmental Impact Assessment**<br>D. Lim, M. LeVine, V. Ngo, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA | | |

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| **184-ATIO.ATM-9** | **UAS in the NAS III** | | | | | **Embassy D** |
| Chaired by: L. REN, GE Global Research | | | | | | |
| 0930 hrs<br>AIAA-2018-3504<br>**Simulation-based UAS Swarm Selection for Monitoring and Detection of Migrant Border Crossings**<br>C. Harris, M. Sokollek, L. Nunez, M. Balchanos, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-3505<br>**Sensitivity Analysis of Detect and Avoid Well Clear Parameter Variations on UAS DAA Sensor Requirements**<br>J. Hardy, D. Jack, K. Hoffler, Adaptive Aerospace Group, Inc., Hampton, VA | 1030 hrs<br>AIAA-2018-3506<br>**Exploration of Three Dimensional, Hierarchical, Large Scale UAV System Interactions**<br>T. Nysetvold, J. Salmon, Brigham Young University, Provo, UT | 1100 hrs<br>AIAA-2018-3507<br>**Analysis of Influence of UAS Speed Range and Turn Performance on Detect and Avoid Sensor Requirements**<br>D. Jack, J. Hardy, K. Hoffler, Adaptive Aerospace Group, Inc., Hampton, VA | 1130 hrs<br>AIAA-2018-3508<br>**Perspective and ATM Impact of Detect And Avoid Integration in Tactical and MALE RPAS**<br>E. Filippone, F. Corraro, Italian Aerospace Research Center (CIRA), Capua, Italy; M. Ducci, Deep Blue Srl, Rome, Italy; F. Tomasello, EuroUSC Italia, Rome, Italy | | |

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| **185-ATIO.ATM-10** | **Human Factors** | | | | | **Embassy G** |
| Chaired by: A. EVANS, Crown Consulting, Inc. | | | | | | |
| 0930 hrs<br>AIAA-2018-3509<br>**Floating Home: Speed Stability and Inadvertent Stalls During a Balked Landing**<br>M. Delisle, T. Takahashi, Arizona State University, Tempe, AZ | 1000 hrs<br>AIAA-2018-3510<br>**Designing graceful degradation into complex systems: The interaction between causes of degradation and the association with degradation prevention and recovery**<br>T. Edwards, San Jose State University, Moffett Field, CA; P. Lee, NASA Ames Research Center, Moffett Field, CA | 1030 hrs<br>AIAA-2018-3511<br>**Airplane Capabilities: Translating Non-Normal Information for Operational Decision-Making**<br>R. Mumaw, San Jose State University, San Jose, CA; M. Feary, NASA Ames Research Center, Moffett Field, CA; L. Fucke, Diehl Aviation, Hamburg, Germany | 1100 hrs<br>AIAA-2018-3512<br>**Laser attacks on aircraft: Shining the light on public attitude**<br>J. Carroll, D. Richards, Coventry University, Coventry, United Kingdom | 1130 hrs<br>AIAA-2018-3513<br>**Preliminary Development of a Cruise Altitude and Speed Optimization Decision Support Tool**<br>C. Li, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA | 1200 hrs<br>AIAA-2018-3514<br>**The role of the media in the public perception of Unmanned Aerial Vehicles**<br>D. Richards, Coventry University, Coventry, United Kingdom | |

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| **186-ATIO.TF-7** | **Overview of Convergent Aeronautics Solutions** | | | | | **Hanover B** |
| Chaired by: M. WASZAK, NASA Langley Research Center and P. CORNELL, NASA Glenn Research Center | | | | | | |
| 0930 hrs<br>Oral Presentation<br>**Conformal Lightweight Antenna Structures for Aeronautical Communication Technologies**<br>J. Downey, M. Meador, NASA Glenn Research Center, Cleveland, OH | 1000 hrs<br>Oral Presentation<br>**Fostering Ultra-Efficient, Low-Emitting Aviation Power (FUELEAP)**<br>N. Borer, NASA Langley Research Center, Hampton, VA | 1030 hrs<br>Oral Presentation<br>**Innovative Electric Motor Designs Enabled by Additive Manufacturing**<br>M. Halbig, NASA Glenn Research Center, Cleveland, OH | 1100 hrs<br>Oral Presentation<br>**Lithium-Air Batteries for Electric Aircraft**<br>R. Viggiano, NASA Glenn Research Center, Cleveland, OH; J. Lawson, NASA Ames Research Center, Moffett Field, CA; V. Lvovich, NASA Glenn Research Center, Cleveland, OH | 1130 hrs<br>Oral Presentation<br>**Spanwise Adaptive Wing Project – Overview and Lessons Learned**<br>O. Benafan, NASA Glenn Research Center, Cleveland, OH; M. Moholt, NASA Armstrong Flight Research Center, Edwards, CA | | |

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| **187-F35-2** | **F-35 Track - Air System Design** | | | | | **Regency Ballroom VI** |
| Chaired by: R. MANGE, Lockheed Martin Aeronautics and J. HAMSTRA, Lockheed Martin Aeronautics and L. SAMPSON, Lockheed Martin Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-3515<br>**F-35 Structural Design, Development, and Verification**<br>R. Ellis, P. Gross, J. Yates, J. Casement, R. Chichester, Lockheed Martin Corporation, Fort Worth, TX; K. Nesmith, F-35 Joint Program Office, Arlington, VA | 1000 hrs<br>AIAA-2018-3516<br>**F-35 Flight Control Law Design, Development and Verification**<br>J. Harris, Lockheed Martin Corporation, Fort Worth, TX | 1030 hrs<br>AIAA-2018-3517<br>**F-35 Propulsion System Integration, Development & Verification**<br>S. Wurth, Lockheed Martin Corporation, Fort Worth, TX | 1100 hrs<br>AIAA-2018-3518<br>**F-35 Subsystems Design, Development & Verification**<br>D. Robbins, J. Bobalik, D. De Stena, N. Martin, K. Plag, K. Rail, Lockheed Martin Corporation, Fort Worth, TX; et al. | 1130 hrs<br>AIAA-2018-3519<br>**F-35 Mission Systems Design, Development & Verification**<br>G. Lemons, K. Carrington, Lockheed Martin Corporation, Fort Worth, TX | 1200 hrs<br>AIAA-2018-3520<br>**F-35 Information Fusion**<br>T. Frey, C. Aguilar, K. Engebretson, D. Faulk, L. Lenning, Lockheed Martin Corporation, Fort Worth, TX | |

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| **188-F360-5**<br>**0930 - 1130 hrs** | **Wednesday Forum 360: Air Traffic Management Modernization** | **Centennial IV** |

Moderator: Donald Richardson, Chief Operating Officer, Donrich Research Inc.

Panelists:

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| **Ravi Chaudhary**<br>Director, Advanced Programs and Innovation<br>Office of Commercial Space Transportation<br>FAA | **Parimal Kopardekar**<br>Senior Technologist for Air Transportation Systems<br>NASA Ames Research Center | **John Maffei**<br>Deputy Director, NextGen Portfolio Management and Technology Development Directorate<br>FAA | **Robert Pearce**<br>Deputy Associate Administrator for Strategy, Acting Director for Airspace Operations and Safety Program<br>Aeronautics Research Mission Directorate<br>NASA Headquarters | **James Ray**<br>Senior Advisor for Infrastructure<br>Office of the Secretary<br>U.S. Department of Transportation | **Melissa Rudinger**<br>Vice President of Regulatory Affairs<br>Aircraft Owners and Pilots Association (AOPA) | **Richard Terry**<br>Director of Line Operations<br>Delta Air Lines | **James Ullmann**<br>Director of Safety and Technology<br>National Air Traffic Controllers Association (NATCA) |

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| **189-FC-12/PDL-5** | **Flow Control Using Plasma Actuators I** | | | | | **Chicago A** |
| Chaired by: J. LITTLE, The University of Arizona and R. MILES, Princeton University | | | | | | |
| 0930 hrs<br>AIAA-2018-3521<br>**Parallel Vortex Body Interaction Enabled by Active Flow Control**<br>A. Weingaertner, P. Tewes, J. Little, University of Arizona, Tucson, Tucson, AZ | 1000 hrs<br>AIAA-2018-3522<br>**Preliminary Experimental Study on Closed-loop Flow Separation Control Utilizing Deep Q-Network over Fixed Angle-of-Attack Airfoil**<br>S. Shimomura, Tokyo University of Agriculture and Technology, Tokyo, Japan; S. Sekimoto, Tokyo University of Science, Tokyo, Japan; H. Fukumoto, A. Oyama, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; K. Fujii, Tokyo University of Science, Tokyo, Japan; H. Nishida, Tokyo University of Agriculture and Technology, Tokyo, Japan | 1030 hrs<br>AIAA-2018-3523<br>**Mitigation of Laminar Separation Flutter Using Plasma-Based Actuators**<br>C. Barnes, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1100 hrs<br>AIAA-2018-3524<br>**Simulations of Plasma Flow Control Strategies for Trailing Edge Separation**<br>J. Franck, Brown University, Providence, RI; J. Cooney, N. Fine, Aquanis, Inc., East Greenwich, RI | 1130 hrs<br>AIAA-2018-3525<br>**Control of Tip-Leakage Vortices Using Segmented Plasma Actuators**<br>C. Anzalotta, E. Fernandez, D. Silva, S. Bhattacharya, University of Central Florida, Orlando, FL | | |

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| **190-FC-13/APA-24** | **Passive Flow Control** | | | | | **Vinings** |
| Chaired by: K. GRANLUND, North Carolina State University and S. MUPPIDI, NASA Ames Research Center (AMA Inc) | | | | | | |
| 0930 hrs<br>AIAA-2018-3526<br>**Near-Wake Flow Modulation by A Cube On A Backward-Facing Ramp**<br>S. Tandon, S. Shinde, K. Maki, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI | 1000 hrs<br>AIAA-2018-3527<br>**On the role of trailing edge geometry in cavity flow control**<br>Q. Liu, Florida State University, Tallahassee, FL; F. Gómez, RMIT University, Melbourne, Australia | 1030 hrs<br>AIAA-2018-3528<br>**Drag Reduction with Teardrop-shaped Dimples**<br>J. Tay, T. Lim, National University of Singapore, Singapore, Singapore | 1100 hrs<br>AIAA-2018-3529<br>**Yaw Moment Modification in NASCAR Race Vehicles via Passive Tail Blowing**<br>E. Jacuzzi, NASCAR Research & Development, Concord, NC; K. Granlund, North Carolina State University, Raleigh, NC | 1130 hrs<br>AIAA-2018-3530<br>**Computational Investigation of Vertical Stabilizer with Vortex Generators and Dorsal Fin**<br>Y. Ito, M. Murayama, S. Koike, K. Yamamoto, K. Nakakita, K. Kusunose, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan | | |

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| **191-FD-34** | **Stability and Transition VII: Roughness II** | | | | | **International South** |
| Chaired by: M. CHOUDHARI, NASA-Langley Research Center and M. YU, University of Maryland, Baltimore County | | | | | | |
| 0930 hrs<br>AIAA-2018-3531<br>**Transition Induced by Tandem Rectangular Roughness Elements on a Supersonic Flat Plate**<br>A. Chou, M. Kegerise, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-3532<br>**Effect of Distributed Patch of Smooth Roughness Elements on Transition in a High-Speed Boundary Layer**<br>M. Choudhari, F. Li, P. Paredes, NASA Langley Research Center, Hampton, VA | 1030 hrs<br>AIAA-2018-3533<br>**Effects of Freestream Reynolds Number and Trip Height on High-Speed Transition**<br>P. Shrestha, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | 1100 hrs<br>AIAA-2018-3534<br>**An Asymptotic Framework to Describe the Roughness Effect on Supersonic Boundary-layer Instability Modes**<br>M. Dong, Tianjin University, Tianjin, China | | | |

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| **192-FD-35** | **CFD Modeling and Applications (Applications of CFD, CFD Optimization, Error and Uncertainty, Validation, etc.) III** | | | | | **Harris** |
| Chaired by: C. SCALO and K. LIU | | | | | | |
| 0930 hrs<br>AIAA-2018-3535<br>**Numerical Simulation Analysis Based on Nonlinear Coupled Constitutive Model for Continuum and Rarefied Gas Flows in Micro-Channel**<br>Q. He, Northwestern Polytechnical University, Xi'an, China | 1000 hrs<br>AIAA-2018-3536<br>**Numerical and Experimental Analysis of a Transcritical Thermoacoustic Prototype**<br>D. Alexander, M. Migliorino, S. Heister, C. Scalo, Purdue University, West Lafayette, IN | 1030 hrs<br>AIAA-2018-3537<br>**Numerical studies of a buoy system; a comparison between LES and SAS**<br>M. Ilie, K. Harris, Georgia Southern University, Statesboro, GA | | | | |

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| **193-FD-36** | **Fundamental Fluid Flows IV: Separated Flows** | | | | | **Lenox** |
| Chaired by: J. WEISS, Ecole de Technologie Superieure and J. MAJDALANI, Auburn University | | | | | | |
| 0930 hrs<br>AIAA-2018-3538<br>**Spanwise Aspects of Unsteadiness in a Pressure-Induced Turbulent Separation Bubble**<br>A. Le Floc'h, A. Mohammed-Taifour, L. Dufresne, J. Weiss, University of Québec, Montréal, Canada | 1000 hrs<br>AIAA-2018-3539<br>**Separated shear layer characteristics of rectangular sections**<br>D. Moore, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY | 1030 hrs<br>AIAA-2018-3540<br>**Flow Structure Identification in the Near Wake of a Supersonic Separated Flow Using FAEMD**<br>M. Koll, A. Scott, G. Elliott, J. Dutton, University of Illinois, Urbana-Champaign, Urbana, IL | 1100 hrs<br>AIAA-2018-3541<br>**Effect of Upstream Disturbance on the Development of a Wall-Bounded Plane Jet at Subsonic Mach Numbers with Separated Flow**<br>T. Kanuma, K. Kuramata, Y. Inoue, H. Maekawa, University of Electro-Communications, Chofu, Japan | | | |

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| **194-FD-37** | **High-Speed Flows I** | | | | | **Edgewood** |
| Chaired by: M. GAMBA, University of Michigan and G. GOODWIN, Naval Research Laboratory | | | | | | |
| 0930 hrs<br>AIAA-2018-3542<br>**Rigid Body Response of a Mach 2 Shock Train to Downstream Forcing**<br>L. Edelman, M. Gamba, University of Michigan, Ann Arbor, Ann Arbor, MI | 1000 hrs<br>AIAA-2018-3543<br>**Experimental Investigation of the Influence of the Pressure Gradient on the Transonic Mixing Behavior in Blunt-Body Wakes using Tracer LIF**<br>M. Beuting, University of Duisburg-Essen, Duisburg, Germany; J. Richter, B. Weigand, University of Stuttgart, Stuttgart, Germany; C. Schulz, University of Duisburg-Essen, Duisburg, Germany | 1030 hrs<br>AIAA-2018-3544<br>**Numerical Investigation of Transonic Mixing Behavior in the Wake of a Central Injector at different Reynolds numbers**<br>J. Richter, University of Stuttgart, Stuttgart, Germany; M. Beuting, C. Schulz, University of Duisburg-Essen, Duisburg, Germany; B. Weigand, University of Stuttgart, Stuttgart, Germany | 1100 hrs<br>AIAA-2018-3545<br>**Large Eddy Simulation of Continuously Adjustable Hypersonic Wind Tunnel**<br>J. Maxwell, Naval Research Laboratory, Washington, D.C. | 1130 hrs<br>AIAA-2018-3546<br>**The Effect of Underexpansion on a Jet in Cross Flow**<br>T. Knast, Monash University, Clayton, Australia; L. Mears, N. Arora, T. Guha, Florida State University, Tallahassee, FL; D. Edgington-Mitchell, D. Honnery, Monash University, Clayton, Australia; et al. | 1200 hrs<br>AIAA-2018-3547<br>**Investigation of Articulating Nosecone for Flight Control under Mach 2 Conditions**<br>E. Stephen, G. Abate, T. McLaughlin, U.S. Air Force Academy, Colorado Springs, CO; A. Bouveret, D. Laversanne, J. Gerini, French Air Force Academy, Salon de Provence, France; et al. | |

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| **195-FD-38** | **Multiphysics and Cross-Disciplinary Fluid Dynamics III: High Speed** | | | | | **Dunwoody** |
| Chaired by: W. DZIEDZIC and D. CARTER, Air Force Research Laboratory | | | | | | |
| 0930 hrs<br>AIAA-2018-3548<br>**Panel Flutter Induced by Transitional Shock Wave Boundary Layer Interaction**<br>V. Shinde, J. McNamara, D. Gaitonde, Ohio State University, Columbus, OH; C. Barnes, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-3549<br>**Stochastic Store Trajectory of Ice Models with Forced Ejection from a Cavity into Supersonic Flow**<br>D. Chin, K. Granlund, North Carolina State University, Raleigh, NC; I. Maatz, R. Schmit, Air Force Research Laboratory, Wright-Patterson AFB, OH; M. Reeder, Air Force Institute of Technology, Wright-Patterson AFB, OH | 1030 hrs<br>AIAA-2018-3550<br>**Numerical Investigation of the Gas-particle Flow in the Shock tube Using Discrete Particle and Continuum Model**<br>A. Kimura, A. Matsuo, Keio University, Yokohama, Japan | 1100 hrs<br>AIAA-2018-3551<br>**Large Eddy Simulation of Three Dimensional Wall Effects in a Scramjet Cavity Flameholder**<br>E. Oren, J. Komives, Air Force Institute of Technology, Wright-Patterson AFB, OH; D. Peterson, Air Force Research Laboratory, Wright-Patterson AFB, OH | | | |

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| **196-FD-39** | **Verification, Validation and Uncertainty Quantification** | | | | | **International North** |
| Chaired by: E. DUQUE, Intelligent Light and J. MASTERS, National Aerospace Solutions | | | | | | |
| 0930 hrs<br>AIAA-2018-3552<br>**Design Space Exploration Using Uncertainty-Based Bounding Methods in Computational Fluid Dynamics**<br>J. Valenti, S. Miller, M. Yukish, M. Kinzel, Pennsylvania State University, University Park, PA | 1000 hrs<br>AIAA-2018-3553<br>**Uncertainty Quantification of Turbulence Model Coefficients in OpenFOAM and Fluent for Mildly Separated Flows**<br>I. Witte, K. Stephanopoulos, T. Wray, R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1030 hrs<br>AIAA-2018-3554<br>**A Closed-form Analytical Model for Predicting 2D Boundary layer thickness for Verification, Calibration and Validation of Navier-Stokes Solvers**<br>V. Sanal Kumar, Indian Space Research Organisation, Trivandrum, India; V. Sankar, V. Natarajan, N. Chandrasekaran, Indian Institute of Science, Bangalore, India; V. Saravanan, S. Padmanabhan, Kumaraguru College of Technology, Coimbatore, India; et al. | 1100 hrs<br>AIAA-2018-3555<br>**Modeling Particle Drag in Accelerating Flows with Implications for SBLI in PIV - A Numerical Analysis**<br>D. Kalagotla, P. Orkwis, M. Turner, University of Cincinnati, Cincinnati, OH | | | |

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| **197-FD-40** | **Parallel Algorithms** | | | | | **Inman** |
| Chaired by: W. ANDERSON, NASA Langley Research Center and S. KARMAN, Pointwise, Inc. | | | | | | |
| 0930 hrs<br>AIAA-2018-3556<br>**rebl-AMR : A Parallel Red-Black Tree Adaptive Mesh Refinement Software for Complex Geometry Flow Simulations**<br>J. Hasbestan, I. Senocak, University of Pittsburgh, Pittsburgh, PA | 1000 hrs<br>AIAA-2018-3557<br>**A GPU Accelerated Adjoint Solver for Shape Optimization**<br>A. Mishra, D. Jude, J. Baeder, University of Maryland, College Park, College Park, MD | 1030 hrs<br>AIAA-2018-3558<br>**Asynchronous fine-grain parallel smoothers for computational fluid dynamics**<br>A. Kashi, S. Vangara, S. Nadarajah, McGill University, Montréal, Canada | 1100 hrs<br>AIAA-2018-3559<br>**A Fast Turbulence Generator using Graphics Processing Units**<br>A. Richards, T. Saad, J. Sutherland, University of Utah, Salt Lake City, Salt Lake City, UT | | | |

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| **198-FT-3/AFM-8** | **Flight Test Techniques** | | | | | **Embassy F** |
| Chaired by: B. COBLEIGH, NASA Armstrong Flight Research Center and S. DUTTA, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3560<br>**Experimental Measurements of Fuel Savings During Aircraft Wake Surfing**<br>C. Hanson, J. Pahle, J. Reynolds, S. Andrade, B. Nelson, NASA Armstrong Flight Research Center, Edwards, CA | 1000 hrs<br>AIAA-2018-3561<br>**Experimental Measurements of Passenger Ride Quality During Aircraft Wake Surfing**<br>C. Hanson, S. Andrade, J. Pahle, NASA Armstrong Flight Research Center, Edwards, CA | 1030 hrs<br>AIAA-2018-3562<br>**Design, Development, and Flight Evaluation of Pilot Displays and Long-Track Control for Wake Surfing Applications**<br>J. Reynolds, Jacobs, Edwards, CA; J. Pahle, C. Hanson, NASA Armstrong Flight Research Center, Edwards, CA | | | | |

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| **199-GT-7** | **New and Improved Ground Test Facilities** | | | | | **Embassy E** |
| Chaired by: R. RHEW, NASA Langley Research Center and M. RIVERS, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3563<br>**Performance Optimization of X3R: A New Reflected Shock Tunnel Mode for the X3 Expansion Tube**<br>S. Stennett, D. Gildfind, P. Jacobs, R. Morgan, University of Queensland, St. Lucia, Australia | 1000 hrs<br>AIAA-2018-3564<br>**Extended Model for Dynamic Depletion and Test Section Conditions for a Blow-Down Hypersonic Wind Tunnel**<br>J. Maxwell, Naval Research Laboratory, Washington, D.C. | 1030 hrs<br>AIAA-2018-3565<br>**Method of Characteristics Design of High-Temperature Wind Tunnel Nozzles with Vibrational Relaxation**<br>W. Starshak, C. Butler, S. Laurence, University of Maryland, College Park, College Park, MD | 1100 hrs<br>AIAA-2018-3566<br>**Design of Conventional and Detonation-Driven Hypervelocity Expansion Tubes**<br>J. Lawson, J. Austin, California Institute of Technology, Pasadena, CA | 1130 hrs<br>AIAA-2018-3567<br>**Automatic Operation of the JAXA 2m by 2m Continuous Transonic Wind Tunnel**<br>S. Nagai, T. Karasawa, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; M. Magome, J. Mashiro, IHI Aerospace Engineering, Tomioka, Japan; M. Chinen, Y. Ganaha, Cosmotec Company, Ltd., Chiyoda Ward, Japan | 1200 hrs<br>AIAA-2018-3568<br>**Characterizing Wave Propagation in an Unsteady Transonic Wind Tunnel**<br>W. Zhu, B. Harter, J. Gregory, J. Bons, Ohio State University, Columbus, OH | |

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| **200-MDO-12** | **Aeroelastic and Aero-Structures Optimization II** | | | | | **Hanover G** |
| Chaired by: F. ENGELSEN, The Boeing Company and T. ASHURI, Arkansas Tech University | | | | | | |
| 0930 hrs<br>AIAA-2018-3569<br>**Optimization of Nonlinear Energy Sinks for the Mitigation of Limit Cycle Oscillations**<br>B. Pidaparthi, S. Missoum, University of Arizona, Tucson, Tucson, AZ | 1000 hrs<br>AIAA-2018-3570<br>**Enabling Modular Aerostructural Optimization: Individual Discipline Feasible without the Jacobians**<br>A. Dener, J. Hicken, Rensselaer Polytechnic Institute, Troy, NY; G. Kenway, Science and Technology Corporation, Moffett Field, CA; J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI | 1030 hrs<br>AIAA-2018-3571<br>**Aerostructural Design Optimization of a Flexible Wing Aircraft with Continuous Morphing Trailing Edge**<br>G. Fujiwara, University of Washington, Seattle, Seattle, WA; N. Nguyen, NASA Ames Research Center, Moffett Field, CA; E. Livne, M. Bragg, University of Washington, Seattle, Seattle, WA | 1100 hrs<br>AIAA-2018-3572<br>**Loads and Structural Optimization Process for Composite Long Range Transport Aircraft Configuration**<br>K. Bramsiepe, V. Handojo, Y. Meddaikar, M. Schulze, T. Klimmek, German Aerospace Center (DLR), Göttingen, Germany | 1130 hrs<br>AIAA-2018-3573<br>**Implementation of Active and Passive Load Alleviation Methods on a Generic mid-Range Aircraft Configuration**<br>V. Handojo, German Aerospace Center (DLR), Göttingen, Germany; P. Lancelot, R. De Breuker, Delft University of Technology, Delft, The Netherlands | 1200 hrs<br>AIAA-2018-3574<br>**Nonlinear Static Aeroelastic Trim and Stability Analysis of Highly Flexible All-Wing Aircraft**<br>C. Zhang, Z. Zhou, P. Meng, Northwestern Polytechnical University, Xi'an, China | |

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| **201-MDO-13** | **Shape and Topology Optimization I** | | | | | **Hanover F** |
| Chaired by: B. STANFORD, NASA Langley Research Center and S. KAMBAMPATI, UCSD | | | | | | |
| 0930 hrs<br>AIAA-2018-3575<br>**Immersed Boundary Eigenvalue Analysis of Timoshenko Beams and Mindlin Plates**<br>W. Arsalane, M. Bhatia, Mississippi State University, Mississippi State, MS | 1000 hrs<br>AIAA-2018-3576<br>**Comparison of Sensitivity Analysis Methods for Structural Shape Optimization**<br>S. Satam, M. Kulkarni, Embry-Riddle Aeronautical University, Daytona Beach, FL | 1030 hrs<br>AIAA-2018-3577<br>**Level-set Topology Optimization of Thermoelastic Structures - A Comparison of Compliance, Strain Energy, and Stress Objectives**<br>D. Neiferd, R. Grandhi, Wright State University, Dayton, OH; J. Deaton, P. Beran, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1100 hrs<br>AIAA-2018-3578<br>**Loading and planform shape influence on the wing structural layout through topology optimization.**<br>F. Crescenti, T. Kipouros, A. Savill, Cranfield University, Cranfield, United Kingdom | 1130 hrs<br>AIAA-2018-3579<br>**A Bilevel Methodology for solving a Structural Optimization Problem with both Continuous and Categorical Variables**<br>P. Barjhoux, University of Toulouse, Toulouse, France; Y. Diouane, Higher Institute of Aeronautics and Space, Toulouse, France; S. Grihon, Airbus, Toulouse, France; D. Bettebghor, ONERA, Toulouse, France; J. Morlier, National Center for Scientific Research (CNRS), Toulouse, France | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **202-MST-4** | **Modeling and Simulation of Air Vehicle Dynamics and Environments II** | | | | | **Embassy H** |
| Chaired by: B. APONSO, NASA Ames Research Center and P. GRANT, University of Toronto | | | | | | |
| 0930 hrs<br>AIAA-2018-3580<br>**Verifying Implementation of the Dryden Turbulence Model and MIL-F-8785 Gust Gradient**<br>M. Madden, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-3581<br>**Development of Advanced Aerodynamic Data Fusion Techniques for Flight Simulation Database Construction**<br>M. Tyan, M. Kim, V. Pham, C. Choi, T. Nguyen, J. Lee, Konkuk University, Seoul, South Korea | 1030 hrs<br>AIAA-2018-3582<br>**Polynomial Chaos Expansion-Based Uncertainty Quantification for Dynamic Simulation Model**<br>S. Xiaobing, T. Chao, P. Ma, M. Yang, Harbin Institute of Technology, Harbin, China | 1100 hrs<br>AIAA-2018-3583<br>**A Novel Method to Build a Factor Space for Model Validation**<br>K. Fang, M. Yang, Y. Zhou, Harbin Institute of Technology, Harbin, China | 1130 hrs<br>AIAA-2018-3584<br>**Characterizing Effects of Aircraft Dynamics on Airborne Antenna Arrays by Generating In-Flight Deformed Geometry for Finite Element Analysis**<br>P. Mendoza Strilchuk, E. Arnold, University of Kansas, Lawrence, Lawrence, KS | | |

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| **203-SP-3**<br>**0930 - 1900 hrs** | **Transformational Electric Flight Workshop and Expo** | **Regency Ballroom VII** |
| For detailed agenda, visit: https://aviation.aiaa.org/ElectricFlight/ | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **204-TP-7** | **Transport Properties and Thermophysical Properties II** | | | | | **Embassy A** |
| Chaired by: D. HENGEVELD and S. SHIN, The University of Tennessee and K. NAWAZ, ORNL | | | | | | |
| 0930 hrs<br>AIAA-2018-3585<br>**Numerical Simulation of Soot Formation in a JP Combustor Using Different Surrogate Fuels**<br>M. Darbandi, M. Ghafourizadeh, Sharif University of Technology, Tehran, Iran; G. Schneider, University of Waterloo, Waterloo, Canada; M. Saeidi, Sharif University of Technology, Tehran, Iran | 1000 hrs<br>AIAA-2018-3586<br>**First-Principle Calculations of Collision Integrals for $N_2$-O System**<br>H. Luo, S. Macheret, A. Alexeenko, Purdue University, West Lafayette, IN | 1030 hrs<br>AIAA-2018-3587<br>**Numerical Calculation of the Effective Thermal Conductivity of Three-Dimensional Three-Scale Microstructures**<br>L. Mattos, M. Cruz, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil; J. Bravo-Castillero, University of Havana, Havana, Cuba | | | | |

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| **205-TP-8** | **Ablation: Modeling, Experiments, and Applications II** | | | | | **Embassy B** |
| Chaired by: A. MARTIN, University of Kentucky and P. YEE, The Aerospace Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-3588<br>**In-Situ Ablation Experiments of Cork-based and Carbon Phenolic Thermal Protection Materials in an X-Ray Synchrotron Facility**<br>I. Sakraker, A. Joshi, H. Böhrk, German Aerospace Center (DLR), Stuttgart, Germany; D. Haenschke, A. Cecilia, Karlsruhe Institute of Technology, Karlsruhe, Germany | 1000 hrs<br>AIAA-2018-3589<br>**Overview of the second test-flight of the Kentucky Re-entry Universal Payload System (KRUPS)**<br>J. Sparks, A. Martin, University of Kentucky, Lexington, Lexington, KY | 1030 hrs<br>AIAA-2018-3590<br>**Characterization of a radiometer window for Mars aftbody heating including ablation product deposition using a miniature arc jet**<br>R. Miller, Stanford University, Stanford, CA; C. Tang, M. McGlaughlin, T. White, NASA Ames Research Center, Moffett Field, CA; T. Ho, M. MacDonald, Jacobs, Moffett Field, CA; et al. | | | | |

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| **206-RL-3**<br>**1230 - 1430 hrs** | **Diversity in Aerospace Lunch Panel** | **Regency Ballroom V** |

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| **207-LEC-1**<br>**1300 - 1400 hrs** | **SAE/AIAA William Littlewood Memorial Lecture** | **Centennial I, II, III** |
| "Highly Efficient Civil Aviation, Now via Operations - AAR & Challenges"<br>**Raj Nangia**<br>Honorary Research Fellow, University of Bristol, Bristol, United Kingdom<br>AIAA-2018-3591 | | |

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| **208-AA-33** | **Computational Aeroacoustics II** | | | | | **Marietta** |
| Chaired by: O. SCHMIDT | | | | | | |
| 1400 hrs<br>AIAA-2018-3592<br>**Dynamic Hybrid RANS/LES Assessment of Sound Generation and Propagation for Flow Over a Circular Cylinder**<br>X. Wang, S. Bhushan, Mississippi State University, Mississippi State, MS; B. Manshoor, Tohoku University, Sendai, Japan; E. Luke, A. Sescu, Mississippi State University, Mississippi State, MS; Y. Hattori, Tohoku University, Sendai, Japan; et al. | 1430 hrs<br>AIAA-2018-3593<br>**Parametric Analysis of the Influence of Slat Geometry on Acoustic Noise**<br>L. Botero, L. Lima Pereira, D. Acevedo, F. Catalano, University of São Paulo, São Carlos, Brazil; D. Reis, E. Coelho, Embraer, São José dos Campos, Brazil | 1500 hrs<br>AIAA-2018-3594<br>**Computational Study of Subsonic and Supersonic Acoustic Cavity Flows Using CESE Method**<br>G. Cheng, S. Olcmen, University of Alabama, Tuscaloosa, Tuscaloosa, AL; B. Venkatachari, National Institute of Aerospace, Hampton, VA; B. Brooker, Jacobs, Bingham Farms, MI; S. Chang, NASA Glenn Research Center, Cleveland, OH | 1530 hrs<br>AIAA-2018-3595<br>**Experimental and Numerical Study of Passive Gap Noise**<br>L. Erbig, Daimler AG, Sindelfingen, Germany; N. Hu, German Aerospace Center (DLR), Braunschweig, Germany; S. Lardeau, Siemens, Nuremberg, Germany | 1600 hrs<br>AIAA-2018-3596<br>**Airfoil trailing-edge noise prediction combining a random particle-mesh method with a Helmholtz solver**<br>A. Kadar, S. Le Bras, H. Bériot, Siemens, Leuven, Belgium; C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; V. Korchagin, W. De Roeck, Catholic University of Leuven, Leuven, Belgium; et al. | 1630 hrs<br>AIAA-2018-3597<br>**Random-eddy-superposition technique for leading edge noise predictions**<br>Z. Shen, X. Zhang, Hong Kong University of Science and Technology, Hong Kong, Hong Kong | 1700 hrs<br>AIAA-2018-3598<br>**Study on Aeroacoustic Noise Characteristic of Retractable Aerial Refueling Assembly**<br>G. Xu, Z. Pan, W. Lei, Aviation Industry of China (AVIC), Xi'an, China |

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| **209-AA-34** | **Propeller Rotorcraft and V/STOL Noise II** | | | | | **University** |
| Chaired by: S. LEE, University of California, Davis and J. STEPHENSON, U. S. Army | | | | | | |
| 1400 hrs<br>AIAA-2018-3599<br>**Low-Noise Operating Mode for Propeller-Driven Electric Airplanes**<br>J. Berton, NASA Glenn Research Center, Cleveland, OH; D. Nark, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-3600<br>**Computational Investigation and Validation of Flow Induced Noise of Legacy NACA Propeller**<br>E. Tejnil, Z. Zhang, Northrop Grumman Corporation, Sunnyvale, CA | 1500 hrs<br>AIAA-2018-3601<br>**Aeroacoustic Wind Tunnel Testing of a 1:6.5 Model Scale Innovative Regional Turboprop**<br>A. Di Marco, R. Camussi, L. Burghignoli, F. Centracchio, Roma Tre University, Rome, Italy; M. Averardo, M. Di Giulio, Leonardo, Naples, Italy; et al. | 1530 hrs<br>AIAA-2018-3602<br>**An inverse aeroacoustic problem with aerodynamic constraint for a helicopter rotor**<br>Q. Zhao, X. Li, Beihang University, Beijing, China | | | |

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| **210-AA-35** | **Duct Acoustics II** | | | | | **Spring** |
| Chaired by: S. RIENSTRA, Technische Universiteit Eindhoven | | | | | | |
| 1400 hrs<br>AIAA-2018-3603<br>**Lumped model for vortex sound in large Solid Rocket Motors**<br>L. Hirschberg, CentraleSupélec, Paris, France; T. Schuller, Fluid Mechanics Institute of Toulouse (IMFT), Toulouse, France; C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; J. Collinet, ArianeGroup, Les Mureaux, France | 1430 hrs<br>AIAA-2018-3604<br>**Investigation of the modulated turbulence above bias flow liner perforations with laser-optical measurements**<br>A. Schulz, German Aerospace Center (DLR), Berlin, Germany; J. Gürtler, J. Czarske, Technical University of Dresden, Dresden, Germany; F. Bake, L. Enghardt, German Aerospace Center (DLR), Berlin, Germany | 1500 hrs<br>AIAA-2018-3605<br>**Acoustic Liner Drag: Further Measurements on Novel Facesheet Perforate Geometries**<br>B. Howerton, M. Jones, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-3606<br>**Experimental investigation of the output duct role in the transient bleed valve noise**<br>P. Laffay, École Centrale de Lyon, Ecully, France; S. Moreau, University of Sherbrooke, Sherbrooke, Canada; M. Jacob, Higher Institute of Aeronautics and Space, Toulouse, France; J. Regnard, Safran Group, Moissy-Cramayel, France | 1600 hrs<br>AIAA-2018-3607<br>**Nonlinear Acoustics in a Non-Parallel Boundary Layer over an Acoustic Lining**<br>O. Petrie, University of Cambridge, Cambridge, United Kingdom; E. Brambley, University of Warwick, Coventry, United Kingdom | 1630 hrs<br>AIAA-2018-3608<br>**Broadband Inlet Liner Design for the DGEN Aero-propulsion Research Turbofan**<br>D. Nark, M. Jones, NASA Langley Research Center, Hampton, VA; D. Sutliff, NASA Glenn Research Center, Cleveland, OH | |

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| **211-AA-36** | **Jet Aeroacoustics VI** | | | | | **Piedmont** |
| Chaired by: M. DOTY, NASA - Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3609<br>**Directionally Targeted Jet Noise Suppression: Benefits of Asymmetric Downstream Fluidic Injection**<br>P. Rajput, New York University, New York, NY; S. Kumar, New York University, Abu Dhabi, United Arab Emirates | 1430 hrs<br>AIAA-2018-3610<br>**Analysis of Fluid Insert Noise Reduction Method with PIV**<br>J. Morgan, C. Shoemaker, D. McLaughlin, P. Morris, Z. Berger, Pennsylvania State University, University Park, PA | 1500 hrs<br>AIAA-2018-3611<br>**Noise Measurement of Small Turbofan Engine with Notched Nozzle for Jet Noise Reduction**<br>T. Ishii, K. Nagai, H. Oinuma, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; T. Oishi, R. Kagaya, IHI Corporation, Nishitama, Japan; Y. Ishii, Bruel & Kjaer Japan, Tokyo, Japan | 1530 hrs<br>AIAA-2018-3612<br>**Experimental and Numerical Study of Jet Noise Reduction for Supersonic Aircraft Using Variable Folding Nozzle Concept**<br>J. Akatsuka, T. Ishii, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan | 1600 hrs<br>AIAA-2018-3613<br>**Green's Function Applicable to Turbofan Exhaust Noise in Jets with an External Center-Body**<br>A. Khavaran, NASA Glenn Research Center, Cleveland, OH | 1630 hrs<br>AIAA-2018-3614<br>**Comparison of Noise from High-Performance Military Aircraft for Ground Run-up and Flyover Operations**<br>B. Reichman, K. Gee, T. Neilsen, S. Swift, Brigham Young University, Provo, UT; A. Wall, Air Force Research Laboratory, Wright-Patterson AFB, OH; J. Downing, Blue Ridge Research and Consulting, LLC, Asheville, NC; et al. | |

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| **212-AA-37** | **Jet Aeroacoustics VII** | | | | | **Techwood** |
| Chaired by: E. MANOHA, ONERA and A. PILON, Lockheed Martin Aeronautics | | | | | | |
| 1400 hrs<br>AIAA-2018-3615<br>**Flow and sound fields of low-Reynolds-number temporal jets at Mach numbers from 0.3 to 2**<br>C. Bogey, P. Pineau, École Centrale de Lyon, Ecully, France | 1430 hrs<br>AIAA-2018-3616<br>**An experimental investigation of the wall pressure field induced by a low and moderate Mach numbers jet on a tangential flat plate**<br>M. Mancinelli, National Center for Scientific Research (CNRS), Poitiers, France; R. Camussi, Roma Tre University, Rome, Italy | 1500 hrs<br>AIAA-2018-3617<br>**Jet Noise Prediction: Validation and Physical Insight**<br>W. van der Velden, Exa GmbH, Stuttgart, Germany; D. Casalino, Delft University of Technology, Delft, The Netherlands; P. Gopalakrishnan, A. Jammalamadaka, Y. Li, R. Zhang, Exa Corporation, Burlington, MA; et al. | 1530 hrs<br>AIAA-2018-3618<br>**Adaptive Wall-Modelled Large Eddy Simulation of Jet Noise in Isolated and Installed Configurations**<br>M. Angelino, H. Xia, G. Page, Loughborough University, Loughborough, United Kingdom | 1600 hrs<br>AIAA-2018-3619<br>**Noise source, length and time scale distributions in installed jets with a flight stream**<br>J. Tyacke, Z. Wang, P. Tucker, University of Cambridge, Cambridge, United Kingdom | | |

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| **213-AFM-9** | **Aircraft Flight Dynamics II** | | | | | **Embassy C** |
| Chaired by: C. WOOLSEY, Virginia Tech and A. DOGAN, University of Texas at Arlington | | | | | | |
| 1400 hrs<br>AIAA-2018-3620<br>**Directional Stabilization of a Fixed-Wing Aircraft Using Potential Shaping**<br>J. Fahmi, C. Woolsey, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1430 hrs<br>AIAA-2018-3621<br>**Rapid Load Calculations Using an Efficient Unsteady Aerodynamic Solver**<br>D. Kharlamov, J. Drofelnik, A. Da Ronch, S. Walker, University of Southampton, Southampton, United Kingdom | 1500 hrs<br>AIAA-2018-3622<br>**Efficient Unsteady Model Estimation Using Computational and Experimental Data**<br>P. Murphy, N. Frink, S. McMillin, K. Cunningham, G. Shah, NASA Langley Research Center, Hampton, VA | | | | |

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| **214-AFM-10** | **Missiles, Projectiles, and Re-Entry Vehicles Flight Mechanics II** | | | | | **Embassy C** |
| Chaired by: S. DUTTA, NASA Langley Research Center and F. FRESCONI, US Army Research Lab | | | | | | |
| 1400 hrs<br>No Presentations | | | 1530 hrs<br>AIAA-2018-3623<br>**Modeling and Flight Performance of Supersonic Disk-Gap-Band Parachutes In Slender Body Wakes**<br>S. Muppidi, Analytical Mechanics Associates, Inc., Moffett Field, CA; C. O'Farrell, C. Tanner, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; J. Van Norman, Analytical Mechanics Associates, Inc., Hampton, VA; I. Clark, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1600 hrs<br>AIAA-2018-3624<br>**Reconstruction of the Advanced Supersonic Parachute Inflation Research Experiment Sounding Rocket Flight Test**<br>C. Karlgaard, J. Tynis, Analytical Mechanics Associates, Inc., Hampton, VA; C. O'Farrell, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1630 hrs<br>AIAA-2018-3625<br>**ASPIRE Flight Mechanics Modeling and Post Flight Analysis**<br>S. Dutta, E. Queen, A. Bowes, NASA Langley Research Center, Hampton, VA; E. Leylek, M. Ivanov, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA | 1700 hrs<br>AIAA-2018-3626<br>**Systematic Design of a Parachute Recovery System for the Stratos III Student Built Sounding Rocket.**<br>L. Pepermans, M. Rozemeijer, E. Menting, N. Suard, S. Khurana, Delft University of Technology, Delft, The Netherlands |

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| **215-AMT-6** | **Spectroscopic Methods** | | | | | **The Learning Center** |
| Chaired by: A. FAGAN, NASA Glenn Research Center and T. IOPPOLO, Southern Methodist University | | | | | | |
| 1400 hrs<br>AIAA-2018-3627<br>**Design of a Multi-Color Plenoptic Camera for Snapshot Hyperspectral Imaging**<br>T. Fahringer, P. Danehy, NASA Langley Research Center, Hampton, VA; W. Hutchins, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1430 hrs<br>AIAA-2018-3628<br>**Development of a Virtually Imaged Phase Array (VIPA) Spectrometer for Diagnostic Applications**<br>C. Limbach, Texas A&M University, College Station, TX | 1500 hrs<br>AIAA-2018-3629<br>**Nitric Oxide Planar Laser-Induced Fluorescence Thermometry Measurements in a Hypersonic Boundary Layer**<br>C. McDougall, W. Hinman, C. Johansen, University of Calgary, Calgary, Canada; B. Bathel, J. Inman, P. Danehy, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-3630<br>**Temperature Profiling of the Atmosphere by Filtered Rayleigh Scattering**<br>A. Rekhy, Texas A&M University, College Station, TX; M. Shneider, Princeton University, Princeton, NJ; R. Miles, Texas A&M University, College Station, TX | 1600 hrs<br>AIAA-2018-3631<br>**Rapid-response Measurement System of the Halon Replacement Agent Pentafluoroethane (HFC-125) Based on QCL-TDLAS**<br>W. Yuan, S. Lu, H. Zhang, Y. Guan, University of Science and Technology of China, Hefei, China | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **216-APA-25** | **Special Session: AeroGust (Invited)** | | | | | **Greenbriar** |
| Chaired by: D. JONES and K. KARA, Khalifa University of Science, Technology & Research (KUSTAR) | | | | | | |
| 1400 hrs<br>AIAA-2018-3632<br>**The Future of Non-linear Modelling of Aeroelastic Gust Interaction (Invited)**<br>C. Wales, C. Valente, R. Cook, A. Gaitonde, D. Jones, J. Cooper, University of Bristol, Bristol, United Kingdom | 1430 hrs<br>AIAA-2018-3633<br>**A Kriging Based Corrected Potential Flow ROM for Gust Load Calculations (Invited)**<br>A. Malan, University of Cape Town, Cape Town, South Africa | 1500 hrs<br>AIAA-2018-3634<br>**High Fidelity Gust Simulations Over a Supercritical Airfoil (Invited)**<br>B. Tartinville, NUMECA International, Brussels, Belgium; V. Barbieux, Numflo, Mons, Belgium; L. Temmerman, NUMECA International, Brussels, Belgium | 1530 hrs<br>AIAA-2018-3635<br>**Nonlinear Unsteady Reduced Order Models based on Computational Fluid Dynamics for Gust Loads Predictions (Invited)**<br>P. Bekemeyer, M. Ripepi, R. Heinrich, S. Goertz, German Aerospace Center (DLR), Braunschweig, Germany | 1600 hrs<br>AIAA-2018-3636<br>**Uncertainty Quantification of Aeroelastic Systems with Structural or Aerodynamic Nonlinearities (Invited)**<br>R. Cook, C. Wales, A. Gaitonde, D. Jones, J. Cooper, University of Bristol, Bristol, United Kingdom; B. Tartinville, NUMECA International, Watermael-Boitsfort, Belgium; et al. | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **217-APA-26/MDO-14** | **Aerodynamic Shape Optimization I** | | | | | **Baker** |
| Chaired by: J. AZEVEDO | | | | | | |
| 1400 hrs<br>AIAA-2018-3637<br>**A Parametric Study of Multimodality in Aerodynamic Shape Optimization of Wings**<br>G. Streuber, D. Zingg, University of Toronto, Toronto, Canada | 1430 hrs<br>AIAA-2018-3638<br>**Adjoint-based Volumetric Shape Optimization of Turbine Blades**<br>M. Luers, MTU Aero Engines, Munich, Germany; M. Sagebaum, Technical University of Kaiserslautern, Kaiserslautern, Germany; S. Mann, MTU Aero Engines, Munich, Germany; J. Backhaus, German Aerospace Center (DLR), Cologne, Germany; D. Grossmann, MTU Aero Engines, Munich, Germany; N. Gauger, Technical University of Kaiserslautern, Kaiserslautern, Germany | 1500 hrs<br>AIAA-2018-3639<br>**Distributed-Flap Layout Trade Study on a Highly Flexible Common Research Model**<br>D. Rodriguez, Science and Technology Corporation, Hampton, VA; M. Aftosmis, M. Nemec, NASA Ames Research Center, Moffett Field, CA; G. Anderson, Science and Technology Corporation, Hampton, VA | | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **218-APA-27** | **Aerodynamic-Structural Dynamics Interaction II** | | | | | **Fairlie** |
| Chaired by: M. TUFTS, AFRL/RQHF and M. CONWAY, The Aerospace Corporation | | | | | | |
| 1400 hrs<br>AIAA-2018-3640<br>**Adjustments and Uncertainty Quantification for SLS Aerodynamic Sectional Loads**<br>D. Dalle, Science and Technology Corporation, Moffett Field, CA; S. Rogers, NASA Ames Research Center, Moffett Field, CA; H. Lee, J. Meeroff, Science and Technology Corporation, Moffett Field, CA | 1430 hrs<br>AIAA-2018-3641<br>**Experimental investigation of transonic flow effects on a laminar airfoil leading to limit cycle oscillations**<br>M. Braune, A. Hebler, German Aerospace Center (DLR), Göttingen, Germany | 1500 hrs<br>AIAA-2018-3642<br>**Swiss/Finnish Collaboration on Aero-elastic simulations for the F/A-18 fighter.**<br>J. Vos, D. Charbonnier, CFS Engineering, Lausanne, Switzerland; T. Siikonen, E. Salminen, Finflo, Ltd., Espo, Finland; A. Gehri, P. Stefani, RUAG Group, Emmen, Switzerland | 1530 hrs<br>AIAA-2018-3643<br>**Buffeting and Single Degree of Freedom Flutter at Transonic Speeds**<br>W. Luber, EADS, Munich, Germany | 1600 hrs<br>AIAA-2018-3644<br>**Modeling Limit Cycle Oscillations Using a Second-Order Pseudo-Spectral Harmonic Balance Approach**<br>H. Li, K. Ekici, University of Tennessee, Knoxville, Knoxville, TN | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **219-APA-28** | **Propeller Aerodynamics** | | | | | **Roswell** |
| Chaired by: K. SREENIVAS, University of Tennessee at Chattanooga and SimCenter | | | | | | |
| 1400 hrs<br>AIAA-2018-3645<br>**Experimental study of the effects of bio-inspired blades and 3D printing on the performance of a small propeller**<br>C. Hintz, P. Khanbolouki, University of New Mexico, Albuquerque, Albuquerque, NM; A. Perez, University of Los Andes, Bogota, Colombia; M. Tehrani, S. Poroseva, University of New Mexico, Albuquerque, Albuquerque, NM | 1430 hrs<br>AIAA-2018-3646<br>**Development of a Vortex Particle Code for the Modeling of Wake Interaction in Distributed Propulsion**<br>E. Alvarez, A. Ning, Brigham Young University, Provo, UT | 1500 hrs<br>AIAA-2018-3647<br>**Application of Leading Edge Tubercles to Enhance Propeller Performance**<br>A. Asghar, R. Perez, W. Allan, Royal Military College of Canada, Kingston, Canada | 1530 hrs<br>AIAA-2018-3648<br>**Numerical Investigation of Swirl Recovery Design for Propeller Propulsion Systems**<br>Q. Li, X. Liu, G. Eitelberg, L. Veldhuis, Delft University of Technology, Delft, The Netherlands | 1600 hrs<br>AIAA-2018-3649<br>**Aerodynamic Modelling of Propeller Forces and Moments at High Angle of Incidence**<br>Y. Leng, H. Yoo, T. Jardin, Higher Institute of Aeronautics and Space, Toulouse, France; M. Bronz, French Civil Aviation University, Toulouse, France; J. Moschetta, Higher Institute of Aeronautics and Space, Toulouse, France | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **220-ASE-10** | **Atmospheric and Space Environments: Models and Observations** | | | | | **Hanover D** |
| Chaired by: Z. ZHENG, The University of Kansas and D. THOMPSON, Mississippi State University | | | | | | |
| 1400 hrs<br>AIAA-2018-3650<br>**Toward development of the energetic particle radiation nowcast model for assessing the radiation environment in the altitude range from that used by the commercial aviation in the troposphere to LEO, MEO, and GEO**<br>V. Tenishev, D. Borovikov, M. Combi, I. Sokolov, T. Gombosi, University of Michigan, Ann Arbor, Ann Arbor, MI | 1430 hrs<br>AIAA-2018-3651<br>**Simulation of Atomization Equipment in Icing Cloud Simulation System**<br>H. Deng, S. Chang, H. Tang, Beihang University, Beijing, China | 1500 hrs<br>AIAA-2018-3652<br>**Characterization of Rapid Charging Events due to Sheath Capacitance and Impact on the International Space Station Plasma Hazard Process**<br>W. Hartman, W. Schmidl, R. Mikatarian, The Boeing Company, Houston, TX | | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **221-ASE-11** | **Ice-Phobics, Anti-Icing, De-Icing, and Ice Shedding** | | | | | **Hanover C** |
| Chaired by: A. WORK and G. BOTURA, United Technologies Aerospace Systems | | | | | | |
| 1400 hrs<br>AIAA-2018-3653<br>**An Explorative Study to Use Thermal Effects of Duty-Cycled Plasma Actuation for Aircraft Icing Mitigation**<br>Y. Liu, C. Kolbakir, H. Hu, H. Hu, Iowa State University, Ames, IA | 1430 hrs<br>AIAA-2018-3654<br>**An Experimental Study on the Durability of Icephobic Slippery Liquid-Infused Porous Surfaces (SLIPS) Pertinent to Aircraft Anti-/De-Icing**<br>L. Ma, Z. Zhang, Y. Liu, H. Hu, Iowa State University, Ames, IA | 1500 hrs<br>AIAA-2018-3655<br>**An Experimental Study on the Durability of a Hydro-/Ice-phobic Surface Coating for Aircraft Icing Mitigation**<br>Z. Zhang, L. Ma, Y. Liu, H. Hu, Iowa State University, Ames, IA | 1530 hrs<br>AIAA-2018-3656<br>**Testing of Elastomer Icephobic Coatings**<br>N. Kool, University of Twente, Enschede, The Netherlands; G. Chevrette, D. Orchard, National Research Council Canada, Ottawa, Canada | 1600 hrs<br>AIAA-2018-3657<br>**Experimental characterization of anti-icing system and accretion of re-emitted droplets on turbojet engine blades**<br>G. Linassier, M. Balland, Safran Group, Moissy-Cramayel, France; H. Pervier, M. Pervier, D. Hammond, Cranfield University, Cranfield, United Kingdom; E. Radenac, ONERA, Toulouse, France | 1630 hrs<br>AIAA-2018-3658<br>**An Experimental Investigation on an Electric-Thermal Strategy for Wind Turbines Icing Mitigation**<br>L. Gao, Y. Liu, C. Kolbakir, H. Hu, Iowa State University, Ames, IA | 1700 hrs<br>AIAA-2018-3659<br>**Rotor Ice Shedding and Trajectory Analyses in Forward Flight**<br>M. Anthony, M. Nathoo, Z. Zhan, W. Habashi, McGill University, Montréal, Canada; M. Fossati, University of Strathclyde, Glasgow, United Kingdom |

| Wednesday, 27 June 2018 | | | | | | |
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| **222-ATIO.ACD-9** | **Aircraft Design Studies** | | | | | **Hanover A** |
| Chaired by: F. NICOLOSI, University of Naples and S. KOMADINA, Raytheon Missile Systems | | | | | | |
| 1400 hrs<br>AIAA-2018-3660<br>**Conceptual design of PrandtlPlane transport aircraft and preliminary CFD investigation of transonic flight**<br>V. Cipolla, SkyBox Engineering, Pisa, Italy; A. Frediani, K. Abu Salem, University of Pisa, Pisa, Italy; V. Binante, E. Rizzo, SkyBox Engineering, Pisa, Italy; M. Maganzi, CUBIT, Pisa, Italy | 1430 hrs<br>AIAA-2018-3661<br>**Technical Viability and Operational Assessment of a Supersonic Business Jet**<br>O. Gonzalez Gallego, R. Perez, P. Jansen, Royal Military College of Canada, Kingston, Canada | 1500 hrs<br>AIAA-2018-3662<br>**Performance evaluation and DOC Estimation of an Innovative Turboprop Configuration**<br>F. Nicolosi, S. Corcione, V. Trifari, V. Cusati, M. Ruocco, P. Della Vecchia, University of Naples "Federico II", Naples, Italy | 1530 hrs<br>AIAA-2018-3663<br>**Conceptual design of disruptive aircraft configurations based on High-Fidelity OAD process**<br>S. Defoort, ONERA, Toulouse, France; M. Méheut, ONERA, Meudon, France; B. Paluch, ONERA, Lille, France; R. Liaboeuf, ONERA, Toulouse, France; R. Murray, ONERA, Palaiseau, France; D. Mincu, ONERA, Châtillon, France; et al. | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **223-ATIO.ATM-11** | **ATC/ATM including NextGen III** | | | | | **Embassy G** |
| Chaired by: Y. JUNG, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3664<br>**Towards Autonomous Air Trac Control for Sequencing and Separation - A Deep Reinforcement Learning Approach**<br>M. Brittain, P. Wei, Iowa State University, Ames, IA | 1430 hrs<br>AIAA-2018-3665<br>**Using an Automated Air Traffic Simulation Capability for a Parametric Study in Traffic Flow Management**<br>H. Arneson, NASA Ames Research Center, Moffett Field, CA; A. Evans, Crown Consulting, Inc., Moffett Field, CA; D. Kulkarni, P. Lee, NASA Ames Research Center, Moffett Field, CA; J. Li, Universities Space Research Association, Moffett Field, CA; M. Wei, NASA Ames Research Center, Moffett Field, CA | 1500 hrs<br>AIAA-2018-3666<br>**A Data Driven Analysis of a Tactical Surface Scheduler**<br>J. Coupe, L. Bagasol, L. Chen, H. Lee, Y. Jung, NASA Ames Research Center, Moffett Field, CA | 1530 hrs<br>AIAA-2018-3667<br>**Towards High-Density Urban Air Mobility**<br>M. Lowry, NASA Ames Research Center, Moffett Field, CA | 1600 hrs<br>AIAA-2018-3668<br>**Operational Integration of Required Time of Arrival (RTA) with Time-Based Management (TBM): Concept of Operations and Human-in-the-Loop Simulation Results**<br>G. Enea, R. Sgorcea, J. Timberlake, S. Osborne, MITRE Corporation, McLean, VA | 1630 hrs<br>AIAA-2018-3669<br>**Trajectory Prediction Sensitivity Analysis Using Monte Carlo Simulations**<br>J. Rudnyk, J. Ellerbroek, J. Hoekstra, Delft University of Technology, Delft, The Netherlands | |

| Wednesday, 27 June 2018 | | | | | | |
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| **224-ATIO.ATM-12** | **Data Science in ATC/ATM I** | | | | | **Embassy D** |
| Chaired by: J. JONES, MIT Lincoln Laboratory | | | | | | |
| 1400 hrs<br>AIAA-2018-3670<br>**En Route Flight Time Prediction Under Convective Weather Events**<br>G. Zhu, C. Matthews, P. Wei, Iowa State University, Ames, IA; M. Lorch, S. Chakravarty, Rockwell Collins, Inc., Cedar Rapids, IA | 1430 hrs<br>AIAA-2018-3671<br>**Similar Day Analysis for Traffic Flow Management, with Applications to Estimating Flight Operator Preferences**<br>E. Vargo, C. Taylor, MITRE Corporation, McLean, VA | 1500 hrs<br>AIAA-2018-3672<br>**Machine Learning Prediction of Airport Delays in the US Air Transportation Network**<br>K. Chandramouleeswaran, D. Krzemien, K. Burns, H. Tran, University of Illinois, Urbana-Champaign, Urbana, IL | 1530 hrs<br>AIAA-2018-3673<br>**Modeling Key Predictors of Airport Runway Configurations Using Learning Algorithms**<br>A. Altinok, R. Kiran, B. Bue, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; K. Bilimoria, NASA Ames Research Center, Moffett Field, CA | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **225-ATIO.TF-8/ATIO.ATM-13** | **UAM Concepts and Considerations** | | | | | **Hanover B** |
| Chaired by: K. GOODRICH, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3674<br>**Airborne Trajectory Management for Urban Air Mobility**<br>W. Cotton, Cotton Aviation Enterprises, Lakeway, TX; D. Wing, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-3675<br>**The Evolution of Piloting for Aviation On –Demand/Urban Air Mobility**<br>M. Feary, NASA Ames Research Center, Moffett Field, CA | 1500 hrs<br>AIAA-2018-3676<br>**Urban Air Mobility Airspace Integration Concepts and Considerations**<br>D. Thipphavong, NASA Ames Research Center, Moffett Field, CA; R. Apaza, NASA Glenn Research Center, Cleveland, OH; B. Barmore, NASA Langley Research Center, Hampton, VA; V. Battiste, NASA Ames Research Center, Moffett Field, CA; C. Belcastro, NASA Langley Research Center, Hampton, VA; B. Burian, NASA Ames Research Center, Moffett Field, CA; et al. | 1530 hrs<br>AIAA-2018-3677<br>**System-Level Urban Air Mobility Transportation Modeling and Determination of Energy-Related Constraints**<br>L. Kohlman, M. Patterson, NASA Langley Research Center, Hampton, VA | | | |

**Wednesday, 27 June 2018**

| 226-F35-3 | F-35 Track - Test and Evaluation | | | | | Regency Ballroom VI |
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| Chaired by: R. MANGE, Lockheed Martin Aeronautics and J. HAMSTRA, Lockheed Martin Aeronautics and L. SAMPSON, Lockheed Martin Corporation | | | | | | |
| 1400 hrs<br>AIAA-2018-3678<br>**F-35 Carrier Suitability Flight Testing**<br>M. Wilson, Lockheed Martin Corporation, Fort Worth, TX | 1430 hrs<br>AIAA-2018-3679<br>**F-35 Aerodynamic Performance Verification**<br>D. Parsons, A. Eckstein, J. Azevedo, Lockheed Martin Aeronautics, Fort Worth, TX | 1500 hrs<br>Oral Presentation<br>**F-35 High Angle of Attack Flight Control Development and Flight Test Results**<br>D. Canin, Lockheed Martin Corporation, Fort Worth, TX | 1530 hrs<br>AIAA-2018-3680<br>**F-35 Weapons Separation Test and Verification**<br>C. Hetreed, M. Carroll, J. Collard, Lockheed Martin Corporation, Fort Worth, TX; R. Snyder, Naval Research Laboratory, Patuxent River, MD | 1600 hrs<br>AIAA-2018-3681<br>**F-35 STOVL Performance Requirements Verification**<br>D. Levin, D. Parsons, Lockheed Martin Corporation, Fort Worth, TX; D. Panteny, P. Wilson, BAE Systems, Patuxent River, MD; M. Rask, Lockheed Martin Corporation, Fort Worth, TX | 1630 hrs<br>AIAA-2018-3682<br>**F-35 Climatic Chamber Testing & System Verification**<br>V. Rodriguez, Lockheed Martin Corporation, Fort Worth, TX; S. Brelage, Naval Air Systems Command, Patuxent River, MD; M. Thompson, BAE Systems, Leonardtown, MD; B. Flynn, Lockheed Martin Corporation, Fort Worth, TX | 1700 hrs<br>**Open Discussion** |

**Wednesday, 27 June 2018**

| 227-F360-6<br>1400 - 1600 hrs | Wednesday Forum 360: Entering a New Era of General Aviation (Part 23) | Centennial IV |
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Moderator: Nicholas Borer, Advanced Air Vehicle Configurator Technical Lead, Aeronautics Systems Analysis Branch, NASA Langley Research Center

Panelists:

**Ella Atkins**
Professor, Aerospace Engineering
University of Michigan

**Anna Dietrich**
Co-Founder
Terrafugia

**Stéphane Fymat**
Vice President, Product Management and Marketing
BendixKing, Honeywell Aerospace

**Zohaib Mian**
Senior Autonomous Systems Architect
Mercedes-Bosch Autonomous Driving Project
Robert Bosch LLC

**Wes Ryan**
Unmanned Systems Certification Lead
Policy & Innovation Division
FAA

**David Sizoo**
FAA

**Wednesday, 27 June 2018**

| 228-FC-15 | Dynamic and Static Stall Flow Control | | | | | Vinings |
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| Chaired by: S. BENTON, Air Force Research Laboratory and E. DEMAURO, Rutgers, The State University of New Jersey | | | | | | |
| 1400 hrs<br>AIAA-2018-3683<br>**Evaluation of Thermoacoustic-based Forcing for Control of Dynamic Stall**<br>S. Benton, M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-3684<br>**Open- and closed-loop control investigations of unsteady Coanda actuation on a high-lift configuration**<br>Y. El Sayed M., P. Oswald, S. Sattler, P. Kumar, R. Radespiel, C. Behr, Technical University of Braunschweig, Braunschweig, Germany; et al. | 1500 hrs<br>AIAA-2018-3685<br>**Experiments on a Dynamic Bubble Burst Control Plate for Airfoil Stall Suppression**<br>H. Yamato, S. Asai, Y. Sunada, K. Rinoie, University of Tokyo, Tokyo, Japan | 1530 hrs<br>AIAA-2018-3686<br>**Experimental Study of Flow Field Airfoil with Synthetic Jets for Flow Separation Control**<br>H. Hoeijmakers, D. Wirtz, University of Twente, Enschede, The Netherlands | 1600 hrs<br>AIAA-2018-3687<br>**Computational and Experimental Studies on Flow-Separation Control via Blowing-Suction Devices**<br>W. Stalewski, W. Stryczniewicz, Institute of Aviation, Warsaw, Poland | 1630 hrs<br>AIAA-2018-3688<br>**Experimental Characterization of a High-Lift Supercritical Airfoil with Microjets**<br>K. Aley, T. Guha, R. Kumar, Florida State University, Tallahassee, FL | |

**Wednesday, 27 June 2018**

| 229-FC-16 | Feedback Flow Control | | | | | Courtland |
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| Chaired by: R. KING | | | | | | |
| 1400 hrs<br>AIAA-2018-3689<br>**Closed-loop active flow control of repetitive disturbances in a linear stator cascade**<br>S. Steinberg, R. King, Technical University of Berlin, Berlin, Germany | 1430 hrs<br>AIAA-2018-3690<br>**Reduced-Order Models for Feedback Control of Transient Energy Growth**<br>A. Kalur, M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN | 1500 hrs<br>AIAA-2018-3691<br>**Feedback Control of Karman Vortex Shedding from a Cylinder using Deep Reinforcement Learning**<br>H. Koizumi, S. Tsutsumi, E. Shima, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan | 1530 hrs<br>AIAA-2018-3692<br>**Optimal Actuator Selection for Airfoil Separation Control**<br>D. Bhattacharjee, M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN; B. Klose, G. Jacobs, San Diego State University, San Diego, CA | 1600 hrs<br>AIAA-2018-3693<br>**Revisiting the separation principle for improved transition control**<br>H. Yao, M. Hemati, University of Minnesota, Twin Cities, Minneapolis, MN | 1630 hrs<br>AIAA-2018-3694<br>**Identification of Disturbances and their Propagation Velocity in Transitional Boundary Layer**<br>I. Gluzman, Y. Oshman, J. Cohen, Technion–Israel Institute of Technology, Haifa, Israel | 1700 hrs<br>AIAA-2018-3695<br>**Closed-loop control of a piezo-fluidic amplifier**<br>C. Nicholls, M. Bacic, University of Oxford, Oxford, United Kingdom |

| Wednesday, 27 June 2018 | | | | | | |
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| **230-FD-41** | **Stability and Transition VIII: Models and Tools II** | | | | | **International South** |
| Chaired by: H. KLINE, National Institute of Aerospace and G. ZHA, University of Miami | | | | | | |
| 1400 hrs<br>AIAA-2018-3696<br>**Stability Analysis of Hypersonic Flows in Local Thermodynamic Equilibrium Conditions by Means of Nonlinear PSE**<br>L. Zanus, F. Pinna, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1430 hrs<br>AIAA-2018-3697<br>**Reduced model for transition prediction in hypersonic flows**<br>F. Pinna, L. Zanus, S. Demange, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; M. Olazabal-Loume, French Alternative Energies and Atomic Energy Commission, Le Barp, France | 1500 hrs<br>AIAA-2018-3698<br>**Using parabolized stability equations to model boundary-layer transition in direct and large-eddy simulations**<br>A. Lozano-Duran, P. Hack, P. Moin, Stanford University, Stanford, CA | 1530 hrs<br>AIAA-2018-3699<br>**Hypersonic Chemically Reacting Boundary-Layer Stability using LASTRAC**<br>H. Kline, National Institute of Aerospace, Hampton, VA; C. Chang, F. Li, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>AIAA-2018-3700<br>**An alternative method to calculate cross-flow instabilities**<br>S. Le Clainche Martinez, Technical University of Madrid, Madrid, Spain; M. Wu, Z. Han, Northwestern Polytechnical University, Xi'an, China; E. Ferrer, Technical University of Madrid, Madrid, Spain | 1630 hrs<br>AIAA-2018-3701<br>**Laminar to turbulent transition prediction in hypersonic flows with metamodels.**<br>F. Danvin, M. Olazabal-Loume, French Alternative Energies and Atomic Energy Commission, Le Barp, France; F. Pinna, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | |

| Wednesday, 27 June 2018 | | | | | | |
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| **231-FD-42** | **Shock-Wave/Boundary-Layer Interactions II** | | | | | **Lenox** |
| Chaired by: S. LAURENCE, University of Maryland, College Park | | | | | | |
| 1400 hrs<br>AIAA-2018-3702<br>**Hypersonic Shock-Wave/Boundary-Layer Interactions on a Cone/Flare Model**<br>C. Running, T. Juliano, University of Notre Dame, Notre Dame, IN; J. Jewell, M. Borg, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-3703<br>**High-Speed Schlieren Imaging and Hot-wire Characterization of Cylinder-Induced Hypersonic Shock Boundary Layer Interactions**<br>A. Leidy, I. Neel, N. Tichenor, R. Bowersox, Texas A&M University, College Station, TX; J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN | 1500 hrs<br>AIAA-2018-3704<br>**Amplification and Structure of Streamwise-Velocity Fluctuations in Four Shock-Wave/Turbulent Boundary-Layer Interactions**<br>N. Parziale, M. Mustafa, Stevens Institute of Technology, Hoboken, NJ; M. Smith, E. Marineau, Arnold Engineering Development Complex, Silver Spring, MD | 1530 hrs<br>AIAA-2018-3705<br>**Two Camera Plenoptic PIV Applied to Shock Wave-Boundary Layer Interactions**<br>C. Jones, C. Clifford, B. Thurow, Auburn University, Auburn, AL; L. Mears, N. Arora, F. Alvi, Florida State University, Tallahassee, FL | 1600 hrs<br>AIAA-2018-3706<br>**Measurements in Regions of Shock Wave/Turbulent Boundary Layer Interaction From MACH 4 to 7 at Flight Duplicated Velocities to Evaluate and Improve the Models of Turbulence in CFD Codes**<br>M. Holden, CUBRC, Buffalo, NY | 1630 hrs<br>AIAA-2018-3707<br>**Volumetric Study of a Turbulent Boundary Layer and Swept Impinging Oblique SBLI at Mach 2.3**<br>J. Threadgill, J. Little, University of Arizona, Tucson, AZ | |

| Wednesday, 27 June 2018 | | | | | | |
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| **232-FD-43** | **High-Speed Flows II** | | | | | **Edgewood** |
| Chaired by: X. ZHONG, University of California Los Angeles and D. KNIGHT, Rutgers University | | | | | | |
| 1400 hrs<br>AIAA-2018-3708<br>**Simulation of Hypersonic Shock-Shock Interaction over a Hemisphere**<br>N. Kianvashrad, D. Knight, Rutgers University, New Brunswick, NJ | 1430 hrs<br>AIAA-2018-3709<br>**Development of New Techniques for Studying Unsteady Behavior in Hypersonic Boundary Layer Interactions**<br>O. Tumuklu, D. Levin, University of Illinois, Urbana-Champaign, Urbana, IL; V. Theofilis, University of Liverpool, Liverpool, United Kingdom | 1500 hrs<br>AIAA-2018-3710<br>**An Improved Ducros Sensor for the Simulation of Compressible Flows with Shocks**<br>T. Hendrickson, A. Kartha, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | 1530 hrs<br>AIAA-2018-3711<br>**CFD Analyses of Hypersonic Flow Regimes with Stephan-Maxwell Diffusion Equation**<br>H. Gür, S. Eyi, Middle East Technical University, Ankara, Turkey | 1600 hrs<br>AIAA-2018-3712<br>**Turbulent Hypersonic Flow Effects on Optical Sensor Performance**<br>L. Mackey, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI; T. Leger, J. Jewell, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1630 hrs<br>AIAA-2018-3713<br>**Direct Numerical Simulation of Blowing in a Hypersonic Boundary Layer on a Flat Plate with Slots**<br>A. Cerminara, R. Deiterding, N. Sandham, University of Southampton, Southampton, United Kingdom | |

| Wednesday, 27 June 2018 | | | | | | |
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| **233-FD-44** | **Multiphysics and Cross-Disciplinary Fluid Dynamics IV: CFD Modeling** | | | | | **Dunwoody** |
| Chaired by: A. CUCO, EMBRAER S.A. and A. MISHRA, University of Maryland, College Park | | | | | | |
| 1400 hrs<br>AIAA-2018-3714<br>**Assessment of Non-Spherical Point-Particle Models in LES using Direct Particle-Fluid Simulations**<br>K. Fröhlich, L. Schneiders, M. Meinke, W. Schroeder, RWTH Aachen University, Aachen, Germany | 1430 hrs<br>AIAA-2018-3715<br>**An adaptive timestepping algorithm for particle time integration in coupled CFD-DEM simulations.**<br>H. Sitaraman, R. Grout, National Renewable Energy Laboratory, Golden, CO | 1500 hrs<br>AIAA-2018-3716<br>**An Implicit Finite-Volume Method for Compressible Turbulent Multiphase Flows on Unstructured Grids**<br>A. Pandare, H. Luo, North Carolina State University, Raleigh, NC | 1530 hrs<br>AIAA-2018-3717<br>**Nonlinear analysis of hybrid galloping energy harvesting system integrated with a nonlinear torsional spring**<br>U. Javed, A. Abdelkefi, New Mexico State University, Las Cruces, NM | 1600 hrs<br>AIAA-2018-3718<br>**Interaction of an Oscillating Flexible Plate and Nucleate Pool Boiling Vapor Bubble: Fluid-Structure Interaction in a Multimaterial Multiphase System**<br>M. Vahab, K. Shoele, M. Sussman, Florida State University, Tallahassee, FL | 1630 hrs<br>AIAA-2018-3719<br>**Transient Thermochemical Erosion Modeling for Solid Propellant Rocket Motor Nozzles Including the Effect of Shape Change and Anisotropy**<br>O. Onay, ROKETSAN Missile Industries, Inc., Ankara, Turkey; S. Eyi, Middle East Technical University, Ankara, Turkey | |

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| **234-FD-45** | **Geometry Modeling, Mesh Generation and Flow Visualization** | | | | | **International North** |
| Chaired by: K. VOGIATZIS, ENGILITY and W. JONES, NASA-Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3720<br>**Using a Low-Fidelity Potential Flow Model as a Surrogate for a High-Fidelity Viscous Flow Model**<br>J. Rossetti, J. Dannenhoffer, Syracuse University, Syracuse, NY | 1430 hrs<br>AIAA-2018-3721<br>**Enabling virtual topology for high quality CFD surface meshing of complex CAD geometry**<br>M. Gammon, C. Fellows, S. Whyman, International TechneGroup, Inc., Cambridge, United Kingdom | 1500 hrs<br>AIAA-2018-3722<br>**Three-Dimensional Prism-Dominant Mesh Generation for Viscous Flows Around Surface Slope Discontinuities**<br>J. Pardue, A. Chernikov, Old Dominion University, Norfolk, VA | 1530 hrs<br>AIAA-2018-3723<br>**On the Modeling of Curvature in General Curviliner Coordinates.**<br>P. Piperni, Clarkson University, Potsdam, NY | 1600 hrs<br>AIAA-2018-3724<br>**Vortex Detection on Unsteady CFD Simulations Using Recurrent Neural Networks**<br>V. Rajendran, K. Kelly, Nanyang Technological University, Singapore, Singapore; E. Leonardi, Rolls-Royce Group plc, Singapore, Singapore; K. Menzies, Rolls-Royce Group plc, Bristol, United Kingdom | 1630 hrs<br>AIAA-2018-3725<br>**Visualizing a Trillion-Cell Simulated CFD Solution on an Engineering Workstation**<br>S. Imlay, C. Mackey, D. Taflin, Tecplot, Inc., Bellevue, WA | |

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| **235-FD-46** | **Turbulence Modeling: Applications** | | | | | **Harris** |
| Chaired by: Y. PEET, Arizona State University and A. UZUN, National Institute of Aerospace | | | | | | |
| 1400 hrs<br>AIAA-2018-3726<br>**Large Eddy Simulations of Turbulent Supersonic Channel Flows**<br>L. Schiavo, W. Wolf, University of Campinas, Campinas, Brazil; B. Olson, Lawrence Livermore National Laboratory, Livermore, CA; J. Azevedo, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil | 1430 hrs<br>AIAA-2018-3727<br>**Improvements on the detached eddy simulation for supersonic mixing layers**<br>P. Guo, Z. Gao, C. Jiang, C. Lee, Beihang University, Beijing, China | 1500 hrs<br>AIAA-2018-3728<br>**Variable turbulent Prandtl number model applied to hypersonic shock/boundary-layer interactions**<br>S. Roy, K. Sinha, Indian Institute of Technology Bombay, Mumbai, India | | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **236-FD-47** | **Low Re and Bio-Inspired II: Unsteady Low Re Wing Aerodynamics** | | | | | **Inman** |
| Chaired by: M. GREEN, Syracuse University and K. MOORED, Lehigh University | | | | | | |
| 1400 hrs<br>AIAA-2018-3729<br>**Three-Dimensional Separation on Finite Aspect Ratio Swept Back Wings**<br>S. Hayostek, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY | 1430 hrs<br>AIAA-2018-3730<br>**Turbulence effect on flat plate pitching airfoil**<br>S. Algozino, J. Delnero, J. Marañon, G. Capittini, National University of La Plata, La Plata, Argentina | 1500 hrs<br>AIAA-2018-3731<br>**Low Reynolds number airfoil dynamics: three different flow patterns within an angle of attack range of four degrees**<br>B. Klose, G. Jacobs, San Diego State University, San Diego, CA; J. Tank, G. Spedding, University of Southern California, Los Angeles, CA | 1530 hrs<br>AIAA-2018-3732<br>**Unsteady Performance of Finite-Span Pitching Propulsors in Mixtures of Side-by-Side and In-Line Arrangements**<br>M. Kurt, K. Moored, Lehigh University, Bethlehem, PA | 1600 hrs<br>AIAA-2018-3733<br>**An Assessment of Flow Development in a Separation Bubble Subjected to Spanwise Modulated Disturbances using Particle Image Velocimetry**<br>J. Kurelek, S. Yarusevych, University of Waterloo, Waterloo, Canada; M. Kotsonis, Delft University of Technology, Delft, The Netherlands | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **237-FT-4** | **Spanwise Adaptive Wing from Ground to Flight** | | | | | **Embassy F** |
| Chaired by: B. COBLEIGH, NASA Armstrong Flight Research Center and R. THOMPSON, NASA Armstrong Flight Research Center | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**Overview of the Spanwise Adaptive Wing Project**<br>M. Moholt, NASA Armstrong Flight Research Center, Edwards, CA; O. Benafan, NASA Glenn Research Center, Cleveland, OH | 1430 hrs<br>Oral Presentation<br>**Spanwise Adaptive Wing – Shape Memory Alloy Actuators and Control**<br>J. Mabe, M. Bass, The Boeing Company, St. Louis, MO; S. Bieniawski, H. Arntson, The Boeing Company, Tukwila, WA; O. Benafan, NASA Glenn Research Center, Cleveland, OH | 1500 hrs<br>Oral Presentation<br>**Aerodynamic Analyses in Support of the Spanwise Adaptive Wing Project**<br>M. Smith, NASA Armstrong Flight Research Center, Edwards, CA; N. Alley, C. Sandwich, Area-I, Inc., Kennesaw, GA | 1530 hrs<br>Oral Presentation<br>**Flight Test Evaluation of a Spanwise Adaptive Wing using the PTERA Unmanned Aerial Vehicle**<br>J. Steele, D. Kuehme, N. Curran, C. Khosravi, N. Alley, Area-I, Inc., Kennesaw, GA; P. Ortiz, NASA Armstrong Flight Research Center, Edwards, CA | 1600 hrs<br>Oral Presentation<br>**Spanwise Adaptive Wing Simulation**<br>D. Spivey, NASA Armstrong Flight Research Center, Edwards, CA | 1630 hrs<br>Oral Presentation<br>**Preflight Predictions of PTERA Spanwise Adaptive Wing on Lateral Stability and Control**<br>P. Suh, B. Cogan, NASA Armstrong Flight Research Center, Edwards, CA | 1700 hrs<br>Oral Presentation<br>**Spanwise Adaptive Wing – Shape Memory Alloy Scale-Up and High Torque Actuator Mechanisms**<br>O. Benafan, S. Bauman, S. Gerdts, NASA Glenn Research Center, Cleveland, OH; D. Gaydosh, Ohio Aerospace Institute, Cleveland, OH; J. Mabe, M. Bass, The Boeing Company, Berkeley, MO |

| Wednesday, 27 June 2018 | | | | | | |
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| **238-GT-8** | **Design and Analysis of Ground Test Facilities** | | | | | **Embassy E** |
| Chaired by: R. PARYZ, NASA Langley Research Center and J. PATRICK, Lockheed Martin Aeronautics | | | | | | |
| 1400 hrs<br>AIAA-2018-3734<br>**Characterization of an Aerodynamic and Scramjet Propulsion Test Facility**<br>K. Brandão, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; D. Carinhana, V. Leite, Institute for Advanced Studies, São José dos Campos, Brazil; J. Guimarães, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; G. Batista, ETEP, São José dos Campos, Brazil | 1430 hrs<br>AIAA-2018-3735<br>**Design of a Real-Time Test Bench for UAV Servo Actuators**<br>L. Anastasopoulos, M. Hornung, Technical University of Munich, Garching, Germany | 1500 hrs<br>AIAA-2018-3736<br>**Preliminary Experimental Investigation on MHD Power Generation by Using Arc Heater**<br>D. Ou, China Aerospace Science and Technology Corporation (CASC), Beijing, China | 1530 hrs<br>AIAA-2018-3737<br>**Design of Torsional Test Stand for Micro-Newton Force Detection**<br>L. Schultz, T. Cogger, R. Good, J. Schneider, R. Rothschild, W. Nollet, Fort Lewis College, Durango, CO | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **239-ITAR-4** | **Aerodynamic Systems** | | | | | **Kennesaw** |
| Chaired by: J. SCHMISSEUR, The University of Tennessee, Space Institute | | | | | | |
| 1400 hrs<br>AIAA-2018-4300<br>**Development of Guidance Laws for a Reduced Order Dynamic Aircraft Model**<br>J. Brendlinger, G. Russell, PC Krause and Associates, West Lafayette, IN | 1430 hrs<br>AIAA-2018-4301<br>**Flight Demonstration of Laminar-Flow Height Criteria for 2-D and 3-D Excrescences on an Unswept Wing, consider for ITAR session**<br>G. Duncan, A. Sullivan, C. Pomerantz, Northrop Grumman Corporation, Redondo Beach, CA; R. Westphal, California Polytechnic State University, San Luis Obispo, CA | 1500 hrs<br>AIAA-2018-4302<br>**Coupled Aerodynamic, Propulsion, and Thermal Modeling in Operational Analysis Studies Using AFSIM**<br>D. Allison, Air Force Research Laboratory, Wright-Patterson AFB, OH; K. Shimmin, PC Krause and Associates, West Lafayette, IN | 1530 hrs<br>AIAA-2018-4303<br>**The Development of a Rapid and Reliable Skin Friction Drag Estimation Tool for Aerodynamic Models**<br>R. Kumar, B. Marples, R. Heisler, S. Popkin, Johns Hopkins University Applied Physics Laboratory, Laurel, MD | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **240-MDO-15** | **Aircraft Design Optimization II** | | | | | **Hanover G** |
| Chaired by: M. HENSON, Lockheed Martin Aeronautics and L. MAININI, United Technologies Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3738<br>**Development of a Multi-Segment Mission Planning Tool for SCEPTOR X-57**<br>S. Schnulo, J. Chin, R. Falck, J. Gray, NASA Glenn Research Center, Cleveland, OH; K. Papathakis, S. Clarke, NASA Armstrong Flight Research Center, Edwards, CA; et al. | 1430 hrs<br>AIAA-2018-3739<br>**High-Fidelity Structural Design and Optimization of Blended-Wing-Body Transports**<br>J. Qian, J. Alonso, Stanford University, Stanford, CA | 1500 hrs<br>AIAA-2018-3740<br>**Solar Aircraft Design Trade Studies Using Geometric Programming**<br>M. Burton, M. Drela, C. Courtin, Massachusetts Institute of Technology, Cambridge, MA; D. Colas, V. Suryakumar, N. Roberts, Facebook, Inc., Menlo Park, CA | 1530 hrs<br>AIAA-2018-3741<br>**A multi-fidelity framework to support the design of More-Electric Actuation**<br>A. Garcia Garriga, S. Ponnusamy, L. Mainini, United Technologies Corporation, Cork, Ireland | 1600 hrs<br>AIAA-2018-3742<br>**Integrating Air Systems in Aircraft Multidisciplinary Design Optimization**<br>A. Tfaily, M. Kokkolaras, McGill University, Montréal, Canada | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **241-MDO-16** | **Metamodeling and Approximation Methods I** | | | | | **Hanover F** |
| Chaired by: V. KALIVARAPU, Iowa State University and F. VIANA, University of Central Florida | | | | | | |
| 1400 hrs<br>AIAA-2018-3743<br>**Metamodeling for Effectiveness Based Aircraft Design Under Uncertainty**<br>D. Clark, Wright State University, Dayton, OH; D. Allison, Air Force Research Laboratory, Wright-Patterson AFB, OH; H. Bae, Wright State University, Dayton, OH; E. Forster, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-3744<br>**Efficient prediction of forward aerodynamic sensitivities using a reduced-order model**<br>A. Kaminsky, K. Ekici, University of Tennessee, Knoxville, Knoxville, TN | 1500 hrs<br>AIAA-2018-3745<br>**Efficient global multidisciplinary optimization based on surrogate models**<br>S. Dubreuil, N. Bartoli, T. Lefebvre, ONERA, Toulouse, France; C. Gogu, National Center for Scientific Research (CNRS), Toulouse, France | 1530 hrs<br>AIAA-2018-3747<br>**Dual-Sampling Based Co-Kriging Method for Design Optimization Problems with Multi-Fidelity Models**<br>R. Shi, L. Liu, T. Long, Y. Wu, Y. Tang, Beihang University, Beijing, China | 1600 hrs<br>AIAA-2018-3748<br>**Comparative Studies of Support Vector Regression and Kriging - Theory and Applications**<br>K. Zhang, S. He, Z. Han, Northwestern Polytechnical University, Xi'an, China | 1630 hrs<br>AIAA-2018-3746<br>**A Comparative Study of Large-scale Gaussian Process Regression**<br>H. Liu, Rolls-Royce Group plc, Singapore, Singapore; J. Cai, Y. Ong, Nanyang Technological University, Singapore, Singapore; Y. Wang, Rolls-Royce Group plc, Singapore, Singapore | |

| Wednesday, 27 June 2018 | | | | | | |
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| **242-MST-5** | **Modeling and Simulation for Fault Detection and Prediction** | | | | | **Embassy H** |
| Chaired by: G. CHATTERJI, NASA Ames Research Center and R. RUFF, The MathWorks, Inc. | | | | | | |
| 1400 hrs<br>AIAA-2018-3749<br>**Study on risk assessment of civil aircraft flight control system failure**<br>S. Yang, J. Zhang, J. Yang, Civil Aviation University of China, Tianjin, China | 1430 hrs<br>AIAA-2018-3750<br>**Applications of Derived Grey Model for Complex System Forecasting**<br>W. Niu, W. Niu, Aviation Industry Corporation of China (AVIC), Xi'an, China; J. Cheng, Chinese Academy of Sciences, Xi'an, China | | | | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **243-MST-6** | **Scenario Development and Mission Planning** | | | | | **Embassy H** |
| Chaired by: C. TAYLOR, The MITRE Corporation and P. ZAAL, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>**No Presentations** | | | 1530 hrs<br>AIAA-2018-3751<br>**Automated Scenario Generation for Human-in-the-Loop Simulations**<br>G. Chatterji, Crown Consulting, Inc., Moffett Field, CA; K. Palopo, NASA Ames Research Center, Moffett Field, CA; Y. Zheng, Crown Consulting, Inc., Moffett Field, CA; J. Nguyen, Optimal Synthesis, Inc., Moffett Field, CA | 1600 hrs<br>AIAA-2018-3752<br>**A Mission Optimization Tool for Air to Ground Tactical Operations**<br>M. Akgul, G. Aydin, ROKETSAN Missile Industries, Inc., Ankara, Turkey | 1630 hrs<br>AIAA-2018-3753<br>**Fuzzy Modelling of Zero-pressure Balloon Ascent**<br>K. Garg, R. Emami, Luleå University of Technology, Kiruna, Sweden | |

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| **244-PDL-6/FC-17** | **Flow Control Using Plasma Actuators II** | | | | | **Chicago A** |
| Chaired by: D. ASHPIS, NASA Glenn Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3754<br>**Expansion Tube Magnetohydrodynamic Experiments with Argon Test Gas**<br>D. Gildfind, S. Lewis, C. James, H. Wei, T. McIntyre, University of Queensland, St. Lucia, Australia | 1430 hrs<br>AIAA-2018-3755<br>**Magnetohydrodynamic Drag Force Measurements in an Expansion Tube**<br>D. Smith, D. Gildfind, C. James, T. McIntyre, V. Wheatley, University of Queensland, Brisbane, Australia | 1500 hrs<br>AIAA-2018-3756<br>**A Parametric Study to Explore ns-DBD Plasma Actuation for Aircraft Icing Mitigation**<br>Y. Liu, C. Kolbakir, H. Hu, Iowa State University, Ames, IA | 1530 hrs<br>AIAA-2018-3757<br>**Effect of Non-Equilibrium Model on Drag Reduction of a Hemisphere-Cylinder in Supersonic Flow**<br>N. Kianvashrad, D. Knight, Rutgers University, New Brunswick, NJ | 1600 hrs<br>AIAA-2018-3758<br>**Configuration Studies for a Plasma Actuator Technique using Arc Breakdown in a Magnetic Field**<br>J. Zimmerman, D. Carroll, CU Aerospace, Champaign, IL; G. Hristov, P. Ansell, University of Illinois, Urbana-Champaign, Urbana, IL | | |

| Wednesday, 27 June 2018 | | | | | | |
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| **245-TP-9** | **Heat Transfer in Chemically Reacting or Extreme Environments** | | | | | **Embassy B** |
| Chaired by: K. NAWAZ, ORNL and M. PATE, Texas A&M University and S. SHERIF, University of Florida | | | | | | |
| 1400 hrs<br>AIAA-2018-3759<br>**Experimental study on the effects of low air pressure on the magnesium alloy fires**<br>C. Liu, S. Lu, C. Cao, H. Zhang, University of Science and Technology of China, Hefei, China | 1430 hrs<br>AIAA-2018-3760<br>**Insights into Catalytic Mechanism of $4MgCO_3Mg(OH)_25H_2O$ on Thermal Kinetics and Combustion Behavior of 5-amino-1h-tetrazole Based Propellant**<br>D. Zhang, S. Lu, H. Zhang, L. Jiang, Z. Gao, University of Science and Technology of China, Hefei, China | 1500 hrs<br>AIAA-2018-3761<br>**Spatially Resolved Analysis of Material Response to Destructive Environments Utilizing Three-Dimensional Scans**<br>J. Engerer, A. Brown, Sandia National Laboratories, Albuquerque, NM | 1530 hrs<br>AIAA-2018-3762<br>**Scale Dependence of Material Response at Extreme Incident Radiative Heat Flux**<br>A. Brown, J. Engerer, A. Ricks, J. Christian, Sandia National Laboratories, Albuquerque, NM | 1600 hrs<br>AIAA-2018-3763<br>**Extreme Incident Radiative Heat Flux Environment Tests at Intermediate Scale**<br>A. Ricks, A. Brown, J. Christian, Sandia National Laboratories, Albuquerque, NM | 1630 hrs<br>AIAA-2018-3764<br>**Ignition and Damage Thresholds of Materials at Extreme Incident Radiative Heat Flux**<br>J. Engerer, A. Brown, J. Christian, Sandia National Laboratories, Albuquerque, NM | 1700 hrs<br>AIAA-2018-3765<br>**Diagnostic Investigation of Radiation Effects on Pre-ignition Heat Flux Distribution in Dual Thrust Solid Rockets**<br>V. Saravanan, V. Natarajan, A. S, P. T R, N. M, V. S, Kumaraguru College of Technology, Coimbatore, India; et al. |

| Wednesday, 27 June 2018 | | | | | | |
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| **246-TP-10** | **Aerothermodynamics and Thermal Protection Systems II** | | | | | **Embassy A** |
| Chaired by: K. ANDERSON, CAL POLY POMONA | | | | | | |
| 1400 hrs<br>AIAA-2018-3766<br>**Aerothermal and Aerodynamic Characterization of Reacting Jets for Supersonic Retropropulsive Missions to Mars**<br>P. Raghunandan, Georgia Institute of Technology, Atlanta, GA; J. Hill, Analytical Mechanics Associates, Inc., Moffett Field, CA; S. Ruffin, Georgia Institute of Technology, Atlanta, GA; S. Muppidi, Analytical Mechanics Associates, Inc., Moffett Field, CA | 1430 hrs<br>AIAA-2018-3767<br>**Updated Stagnation Point Aeroheating Correlations for Mars Entry**<br>T. West, NASA Langley Research Center, Hampton, VA; A. Brandis, NASA Ames Research Center, Moffett Field, CA | 1500 hrs<br>AIAA-2018-3768<br>**Characterization of CO Thermochemistry in Incident Shockwaves**<br>B. Cruden, A. Brandis, Analytical Mechanics Associates, Inc., Moffett Field, CA; M. MacDonald, Jacobs, Moffett Field, CA | 1530 hrs<br>AIAA-2018-3769<br>**Modeling of Excited Oxygen in Post Normal Shock Waves**<br>K. Hanquist, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI | 1600 hrs<br>AIAA-2018-3770<br>**Uncertainty Analysis of Coaxial Thermocouple Calorimeters used in Arc Jets**<br>D. Driver, D. Philippidis, I. Terrazas-Salinas, NASA Ames Research Center, Moffett Field, CA | 1630 hrs<br>AIAA-2018-3771<br>**Effects of Test Box Pressure on Arc-Jet Flowfields and Implications for Testing**<br>T. Gokcen, Analytical Mechanics Associates, Inc., Moffett Field, CA | 1700 hrs<br>AIAA-2018-3772<br>**Laser-based Calibration and Processing Technique for a Robust Fast-Response Surface Heat Transfer Gauge**<br>R. Penty Geraets, M. McGilvray, B. Williams, P. Shah, University of Oxford, Oxford, United Kingdom |

| Wednesday, 27 June 2018 | | |
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| **247-NW-7**<br>**1600 - 1630 hrs** | **Networking Coffee Break** | **Exposition Hall** |

| Wednesday, 27 June 2018 | | |
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| **248-RL-4**<br>**1630 - 1800 hrs** | **General Aviation Rising Leaders Reception** | **Terrace Foyer** |

| Wednesday, 27 June 2018 | | |
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| **249-AA-38**<br>**1730 - 1830 hrs** | **AIAA Aeroacoustics Award Lecture** | **International North** |
| **Tim Colonius**<br>California Institute of Technology | | |

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| **250-MDO-17**<br>**1730 - 1830 hrs** | **MDO Lecture** | **International South** |
| " Promise and Challenges of MDO for Next-Generation Aircraft"<br>**Joaquim R.R.A. Martins**<br>Professor of Aerospace Engineering<br>University of Michigan | | |

| Wednesday, 27 June 2018 | | |
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| **251-NW-8**<br>**1830 - 2030 hrs** | **Aeroacoustics Reception** | **Centennial IV** |

## Thursday

| Thursday, 28 June 2018 | | |
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| **252-SB-4**<br>**0730 - 0800 hrs** | **Speakers' Briefing** | **Session Rooms** |

| Thursday, 28 June 2018 | | |
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| **253-PLNRY-4**<br>**0800 - 0900 hrs** | **Thursday Plenary: A New Era of Flight** | **Centennial I, II, III** |
| Keynote Speaker<br>**Michael Thacker**<br>Executive Vice President, Technology and Innovation<br>Bell | | |

| Thursday, 28 June 2018 | | |
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| 254-NW-9<br>0900 - 0930 hrs | Networking Coffee Break | Exposition Hall |

| Thursday, 28 June 2018 | | | | | | |
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| 255-AA-39 | Duct Acoustics III | | | | | Spring |
| Chaired by: M. JONES, NASA-Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3773<br>**Comparison of Non-Modal-Based and Modal-Based Impedance Eduction Techniques**<br>C. Weng, L. Enghardt, F. Bake, German Aerospace Center (DLR), Berlin, Germany | 1000 hrs<br>AIAA-2018-3774<br>**Smeared Impedance Model for Variable Depth Liners**<br>N. Schiller, M. Jones, NASA Langley Research Center, Hampton, VA | 1030 hrs<br>AIAA-2018-3775<br>**Statistical Inference of Liner Impedance with Shear Grazing Flow**<br>F. Mery, R. Roncen, E. Piot, F. Simon, ONERA, Toulouse, France | 1100 hrs<br>AIAA-2018-3776<br>**Calculation of Acoustic Transfer Functions for Smooth Ducts of Varying Cross Section and Non-Uniform Mean Flow using Eigen Analysis in General Curvilinear Coordinates**<br>A. Wilson, University of Southampton, Southampton, United Kingdom | 1130 hrs<br>AIAA-2018-3777<br>**Optimum impedance in the presence of an inviscid sheared flow**<br>A. Spillere, Federal University of Santa Catarina, Florianópolis, Brazil; Z. Zhang, Royal Institute of Technology (KTH), Stockholm, Sweden; J. Cordioli, Federal University of Santa Catarina, Florianópolis, Brazil; M. Åbom, H. Boden, Royal Institute of Technology (KTH), Stockholm, Sweden | 1200 hrs<br>AIAA-2018-3778<br>**Numerical Investigation on Acoustic Energy Flux Distribution in a Lined Duct**<br>C. Chen, X. Li, Beihang University, Beijing, China; F. Hu, Old Dominion University, Norfolk, VA | |

| Thursday, 28 June 2018 | | | | | | |
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| 256-AA-40 | Computational Aeroacoustics III | | | | | Marietta |
| Chaired by: D. GAITONDE, The Ohio State University and M. ILIE | | | | | | |
| 0930 hrs<br>AIAA-2018-3779<br>**A correction technique for spurious signals from the permeable Ffowcs Williams-Hawkings equation**<br>N. Ricks, L. Siozos-Rousoulis, Z. Huang, F. Contino, G. Ghorbaniasl, Vrije Universiteit Brussel, Brussels, Belgium | 1000 hrs<br>AIAA-2018-3780<br>**CFD/CAA Analysis of UHBR Engine Tonal Noise**<br>M. Laban, J. Kok, H. Brouwer, National Aerospace Laboratory (NLR), Amsterdam, The Netherlands | 1030 hrs<br>AIAA-2018-3781<br>**Prediction of turbulence-cascade interaction noise using modal approach**<br>C. Paruchuri, P. Joseph, Y. Mao, A. Wilson, University of Southampton, Southampton, United Kingdom | 1100 hrs<br>AIAA-2018-3782<br>**Computational chain for virtual fly-over simulations applied to fan noise**<br>M. Moessner, German Aerospace Center (DLR), Braunschweig, Germany; C. Kissner, German Aerospace Center (DLR), Berlin, Germany; J. Delfs, L. Enghardt, German Aerospace Center (DLR), Braunschweig, Germany | 1130 hrs<br>AIAA-2018-3783<br>**Using the Linearized Navier-Stokes Equations to Model Acoustic Liners**<br>M. Herring Jensen, COMSOL A/S, Lyngby, Denmark; E. Svensson, COMSOL AB, Stockholm, Sweden; K. Shaposhnikov, COMSOL A/S, Lyngby, Denmark | 1200 hrs<br>AIAA-2018-3784<br>**Wiggle Controlled Turbulent Flow Simulations on Structured Grid at Low Mach Number**<br>T. Ikeda, K. Yamamoto, R. Furuya, T. Hirai, K. Tanaka, K. Amemiya, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan | |

| Thursday, 28 June 2018 | | | | | | |
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| 257-AA-41 | Acoustic/Fluid Dynamics Interactions V | | | | | University |
| Chaired by: M. TERRACOL, ONERA | | | | | | |
| 0930 hrs<br>AIAA-2018-3785<br>**Analysis of aeroacoustic instabilities in Helmholtz resonators using linear scattering-transfer matrices.**<br>L. Criscuolo, H. Denayer, W. De Roeck, W. Desmet, Catholic University of Leuven, Leuven, Belgium | 1000 hrs<br>AIAA-2018-3786<br>**Hydroelastic motions of flexible fibers**<br>J. Jaworski, Lehigh University, Bethlehem, PA | 1030 hrs<br>AIAA-2018-3787<br>**Proper Orthogonal Decomposition and its Use in the Analysis of Fluid Structure Interaction Noise**<br>S. Glegg, Florida Atlantic University, Boca Raton, FL; W. Devenport, N. Molinaro, W. Alexander, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1100 hrs<br>AIAA-2018-3788<br>**Experimental Investigation of Jet-Flap-Interaction Noise Sensitivity due to varying flap parameters at a UHBR Engine/High-Lift-Wing installation**<br>C. Jente, M. Pott-Pollenske, D. Boenke, German Aerospace Center (DLR), Braunschweig, Germany; A. Buescher, I. Goldhahn, Airbus Operations GmbH, Bremen, Germany | 1130 hrs<br>AIAA-2018-3789<br>**Numerical Study of Aeroacoustics of an NACA0018 Airfoil with a Cavity at Various Angles of Attack**<br>G. Lam, R. Leung, Hong Kong Polytechnic University, Hong Kong, Hong Kong | 1200 hrs<br>AIAA-2018-3790<br>**An Attempt to Reduce Airfoil Tonal Noise Using Fluid-Structure Interaction**<br>D. Wu, G. Lam, R. Leung, Hong Kong Polytechnic University, Hong Kong, Hong Kong | |

| Thursday, 28 June 2018 | | | | | | |
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| **258-AA-42** | **Airframe/High-Lift Noise VI** | | | | | **Roswell** |
| Chaired by: Y. GUO, NEAT Consulting | | | | | | |
| 0930 hrs<br>AIAA-2018-3791<br>**Validation of an Empirical Wall Pressure Spectrum Model for Airfoil Trailing Edge Noise Predictions**<br>S. Lee, J. Shum, University of California, Davis, Davis, CA | 1000 hrs<br>AIAA-2018-3792<br>**Control of rotor trailing edge noise using porous additively manufactured blades**<br>C. Jiang, D. Moreau, Y. Yauwenas, J. Fischer, C. Doolan, University of New South Wales, Sydney, Australia; J. Gao, Shanghai Jiao Tong University, Shanghai, China; et al. | 1030 hrs<br>AIAA-2018-3793<br>**A Parametric Study on the Mesh Sensitivity: Trailing-Edge Noise Prediction by RANS Based Wall-Pressure Spectrum Models**<br>Y. Kucukosman, J. Christophe, C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1100 hrs<br>AIAA-2018-3794<br>**Noise Source Identification of Aerofoils Subjected to Leading Edge Serrations using Phased Array Beamforming**<br>T. Biedermann, P. Czeckay, Dusseldorf University of Applied Sciences, Duesseldorf, Germany; T. Geyer, Technical University of Brandenburg, Cottbus, Germany; F. Kameier, Dusseldorf University of Applied Sciences, Duesseldorf, Germany; C. Paschereit, Technical University of Berlin, Berlin, Germany | 1130 hrs<br>AIAA-2018-3795<br>**Improvement of the Near Wall Treatment in Large Eddy Simulation for Aeroacoustic Applications**<br>C. Zhang, M. Sanjose, S. Moreau, University of Sherbrooke, Sherbrooke, Canada | | |

| Thursday, 28 June 2018 | | | | | | |
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| **259-AA-43** | **Airframe/High-Lift Noise VII** | | | | | **Techwood** |
| Chaired by: D. CUPPOLETTI, Northrop Grumman | | | | | | |
| 0930 hrs<br>AIAA-2018-3796<br>**Measurement of the noise generated by wall-mounted airfoils of different thickness**<br>T. Geyer, Brandenburg University of Technology, Cottbus, Germany; D. Moreau, University of New South Wales, Sydney, Australia; J. Giesler, P. Hall, Brandenburg University of Technology, Cottbus, Germany; E. Sarradj, Technical University of Berlin, Berlin, Germany; C. Doolan, University of New South Wales, Sydney, Australia | 1000 hrs<br>AIAA-2018-3797<br>**Direct Numerical Simulation of the Self-Noise Radiated by the Installed Controlled-Diffusion Airfoil at Transitional Reynolds Number**<br>H. Wu, M. Sanjose, S. Moreau, University of Sherbrooke, Sherbrooke, Canada; R. Sandberg, University of Melbourne, Parkville, Australia | 1030 hrs<br>AIAA-2018-3798<br>**Experimental investigation of the effect of slat deflection angle variation on aerodynamic noise characteristic**<br>X. Geng, H. Guo, T. Hu, L. Li, P. Liu, Beihang University, Beijing, China | 1100 hrs<br>AIAA-2018-3799<br>**Experimental Aeroacoustic and Aerodynamic Analysis of a Large-scale Flap Side-edge Model**<br>D. Acevedo, L. Botero, L. Lima Pereira, F. Catalano, University of São Paulo, São Carlos, Brazil; D. Reis, E. Coelho, Embraer, São José dos Campos, Brazil | 1130 hrs<br>AIAA-2018-3800<br>**On the semi-empirical Prediction of Spoiler Noise**<br>M. Pott-Pollenske, German Aerospace Center (DLR), Braunschweig, Germany | | |

| Thursday, 28 June 2018 | | | | | | |
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| **260-AMT-7/GT-9** | **Optical Measurement Techniques in Ground Test** | | | | | **Embassy F** |
| Chaired by: B. THUROW, Auburn University | | | | | | |
| 0930 hrs<br>AIAA-2018-3801<br>**Multi-Material Printing Integral Digital Image Correlation Patterns**<br>A. Pankonien, R. Durscher, J. Deaton, A. Piedel, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Bhagat, University of Dayton, Dayton, OH | 1000 hrs<br>AIAA-2018-3802<br>**Measurements of Parachute Dynamics in the World's Largest Wind Tunnel by Stereo Photogrammetry**<br>E. Schairer, L. Kushner, J. Heineck, E. Solis, NASA Ames Research Center, Moffett Field, CA | 1030 hrs<br>AIAA-2018-3803<br>**Low Speed Infrared Development for the Lockheed Martin Aerodynamic Development Facilities**<br>J. Carlson, W. Baker, Lockheed Martin Corporation, Fort Worth, TX | 1100 hrs<br>AIAA-2018-3804<br>**Stereovision Based Determination of Aerodynamic Coefficients for a Wind Tunnel Model in Free Rotational Motion**<br>B. Martinez, P. Wey, M. Lisbig, D. Bidino, J. Juncker, F. Leopold, French-German Research Institute of Saint-Louis (ISL), Saint-Louis, France | 1130 hrs<br>AIAA-2018-3805<br>**Improving High Enthalpy Expansion Tube Condition Characterisation Using High Speed Imagery**<br>C. James, D. Smith, C. McLean, R. Morgan, S. Lewis, P. Toniato, University of Queensland, Brisbane, Australia | 1200 hrs<br>AIAA-2018-3806<br>**Optical Wall Shear Stress Measurements on the Leeward Side of a Delta Wing**<br>J. Lunte, C. Schnepf, E. Schuelein, German Aerospace Center (DLR), Göttingen, Germany | |

| Thursday, 28 June 2018 | | |
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| 261-AMT-8<br>0930 - 1230 hrs | Special Session: Thermographic Phosphors for High Temperature Surface and Flow Measurements (Invited) | The Learning Center |

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| **Principles of Gas Phase Thermometry Using Dispersed Thermographic Phosphor Particles**<br>Frank Beyrau, Otto von Guericke University, Magdeburg | **Recent Developments in Phosphors for Aerosol Phosphor Thermometry,**<br>David Rothamer, University of Wisconsin, Madison | **Applications of Thermographic Particle Image Velocimetry**<br>Christopher Abram, Princeton University | **Phosphor Thermometry for the Development of Energy Efficient Internal Combustion Engines**<br>Gilles Bruneaux, IFP Energies Nouvelles | **Thermographic Phosphors for High Temperature Surface Flow Measurements**<br>Konstantinos Kontis, University of Glasgow | **Thermal History Sensors for Extreme Inaccessible Environments**<br>Andrew Heyes, Strathclyde University |

| Thursday, 28 June 2018 | | |
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| 262-APA-29 | Special Session: Collaborative Flight Test and Computations: Synergy in Communication, Planning and Execution (Invited) | Piedmont |

Chaired by: J. FREEMAN, Air Force Institute of Technology and J. AZEVEDO

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| 0930 hrs<br>AIAA-2018-3807<br>**Collaboration Between Flight Test, Ground Test, and Computation on HIFiRE-5 (Invited)**<br>M. Tufts, M. Borg, R. Gosse, R. Kimmel, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-3808<br>**Analysis of High-Speed Aerodynamics of a Swept Wing with Seamless Flaps (Invited) (Invited)**<br>T. Bui, NASA Armstrong Flight Research Center, Edwards, CA | 1030 hrs<br>AIAA-2018-3809<br>**CFD Design and Flight Test of a Swept Laminar Flow Control Wing (Invited)**<br>A. Carpenter, W. Solomon, A. Sullivan, A. Korntheuer, C. Harris, Northrop Grumman Corporation, Redondo Beach, CA | 1100 hrs<br>AIAA-2018-3810<br>**AFLCMC Engineering Directorate CFD Support for USAF Flight Test Programs (Invited)**<br>C. Hummer, M. Jurkovich, A. Hall, Air Force Life Cycle Management Center, Wright-Patterson AFB, OH | | | |

| Thursday, 28 June 2018 | | |
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| 263-APA-30 | Airfoil/Wing/Configuration Aerodynamics I | Fairlie |

Chaired by: P. ANSELL, University of Illinois at Urbana-Champaign and M. GHOREYSHI, United States Air Force Academy

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| 0930 hrs<br>AIAA-2018-3811<br>**Aerodynamic Optimization of an UHBR Engine Position on a Representative Short Range Aircraft Configuration at Cruise Flight Conditions**<br>F. Lange, German Aerospace Center (DLR), Braunschweig, Germany | 1000 hrs<br>AIAA-2018-3812<br>**Numerical Drag Prediction of NASA Common Research Models Using Different Turbulence Models**<br>P. Du, R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1030 hrs<br>AIAA-2018-3813<br>**Aerodynamic Analysis of a harmonically Morphing Flap Using a Hybrid Turbulence Model and Dynamic Meshing**<br>C. Abdessemed, Y. Yao, A. Bouferrouk, P. Narayan, University of the West of England, Bristol, United Kingdom | 1100 hrs<br>AIAA-2018-3814<br>**Parametric Investigation of Box Wing Configuration in Viscous Flow Regime**<br>J. Lee, K. Tan, University of Glasgow, Singapore, Singapore; P. Wang, Singapore Institute of Technology, Singapore, Singapore | 1130 hrs<br>AIAA-2018-3815<br>**Exploration of a Slotted, Natural-Laminar-Flow Airfoil Concept**<br>M. Maughmer, Pennsylvania State University, University Park, PA; J. Coder, University of Tennessee, Knoxville, Knoxville, TN; D. Somers, Airfoils, Inc., Port Matilda, PA | 1200 hrs<br>AIAA-2018-3816<br>**Lift enhancement by wavy leading edges at Reynolds numbers between 700,000 and 3,000,000**<br>F. Rocha, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil; A. de Paula, M. Sousa, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil; A. Cavalieri, V. Kleine, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | |

| Thursday, 28 June 2018 | | |
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| 264-APA-31 | Hypersonic Aerodynamics | Courtland |

Chaired by: B. CYBYK, The Johns Hopkins University Applied Physics Laboratory and C. TILMANN, AFRL/RQV

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| 0930 hrs<br>AIAA-2018-3817<br>**Expanding the Osculating Flowfield Waverider Method Beyond Power Law Body Induced Flowfields**<br>P. Rodi, Lockheed Martin Corporation, Houston, TX | 1000 hrs<br>AIAA-2018-3818<br>**Full Free-stream Mach 12 Scramjet Testing in Expansion Tubes**<br>P. Toniato, D. Gildfind, A. Andrianatos, R. Morgan, University of Queensland, Brisbane, Australia | 1030 hrs<br>AIAA-2018-3819<br>**The Effect of Exit Velocity and Material on the Sabot Separation Launched by Ground-based Railgun**<br>H. Kasahara, A. Matsuo, Keio University, Yokohama, Japan | | | | |

| Thursday, 28 June 2018 | | | | | | |
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| **265-APA-32** | **Unsteady Aerodynamics I** | | | | | **Greenbriar** |
| Chaired by: K. MULLENERS, EPFL and T. WONG, U. S. Army AMRDEC | | | | | | |
| 0930 hrs<br>AIAA-2018-3820<br>**Investigation of Inflow Turbulence Generation Method for Large Eddy Simulation of Large Domains**<br>P. Morgan, Ohio Aerospace Institute, Dayton, OH; M. Visbal, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1000 hrs<br>AIAA-2018-3821<br>**Evaluation of Time-spectral Method based on Tau Method and Collocation Method for Unsteady Flow Analysis**<br>J. Choi, D. Im, S. Choi, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1030 hrs<br>AIAA-2018-3822<br>**Large Eddy Simulation of Surging Airfoils at High Advance Ratio and Reynolds Number**<br>J. Rane, O. Sahni, Rensselaer Polytechnic Institute, Troy, NY | 1100 hrs<br>AIAA-2018-3823<br>**Aerodynamics and aeroacoustics of two HAWT array; numerical studies using LES and IDDES**<br>C. Dao, M. Ilie, Georgia Southern University, Statesboro, GA | 1130 hrs<br>AIAA-2018-3824<br>**LES of the Unsteady Response of a Natural Laminar Flow Airfoil**<br>P. Negi, A. Hanifi, D. Henningson, Royal Institute of Technology (KTH), Stockholm, Sweden | | |

| Thursday, 28 June 2018 | | | | | | |
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| **266-APA-33** | **Wind Turbine Aerodynamics** | | | | | **Baker** |
| Chaired by: J. CODER, University of Tennessee | | | | | | |
| 0930 hrs<br>AIAA-2018-3825<br>**Analysis of modern wind turbine dynamics with active aerodynamic Blown Wing Technology control system**<br>P. Lees, L. Zalusky, Kohana Technologies, Inc., Richmond, CA; I. Couchman, Frazer-Nash Consultancy, Dorking, United Kingdom; B. Joergensen, Vestas, Aarhaus, Denmark | 1000 hrs<br>AIAA-2018-3826<br>**Automated Gradient-Based Optimization to Maximize Wind Farms Land-Use**<br>R. Rodrigues, C. Lengsfeld, University of Denver, Denver, CO | 1030 hrs<br>AIAA-2018-3827<br>**Experimental evaluation of a non-conventional flat back thick airfoil concept for large offshore wind turbines**<br>O. Ceyhan, Energy Research Center of the Netherlands, Petten, The Netherlands; W. Timmer, Delft University of Technology, Delft, The Netherlands | 1100 hrs<br>AIAA-2018-3828<br>**A Combined Experimental and Numerical Study of the Floating Wind Turbines**<br>K. Kopperstad, K. Shoele, R. Kumar, Florida State University, Tallahassee, FL | | | |

| Thursday, 28 June 2018 | | | | | | |
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| **267-ASE-12** | **Experimental Icing Test and Measurement Methods** | | | | | **Hanover C** |
| Chaired by: T. BOND, FAA and B. MATHEIS, UTC Aerospace Systems | | | | | | |
| 0930 hrs<br>AIAA-2018-3829<br>**Quantification of Dynamic Glaze Icing Process over an Airfoil Surface by using a Digital Image Projection (DIP) Technique**<br>L. Gao, Y. Liu, H. Hu, Iowa State University, Ames, IA | 1000 hrs<br>AIAA-2018-3830<br>**Aerodynamic, Laser Scanning and Photogrammetric Measurements of Cold Soaked Fuel Frost**<br>E. Soinne, Finnish Transport Safety Agency, Helsinki, Finland; T. Rosnell, National Land Survey of Finland, Helsinki, Finland | 1030 hrs<br>AIAA-2018-3831<br>**Latent Heat and Liquid Water Content (LWC) Sensor based on Transient Heat Flux Measurements**<br>Y. Han, Clemson University, Clemson, SC; J. Palacios, Pennsylvania State University, University Park, PA | 1100 hrs<br>AIAA-2018-3832<br>**Effects of Aerodynamic Blockage on Stagnation Collection Efficiency in a Wind Tunnel Icing Environment**<br>C. Clark, National Research Council Canada, Ottawa, Canada | 1130 hrs<br>Oral Presentation<br>**An Investigation of Glaciated Cloud Capabilities in the NASA Glenn Icing Research Tunnel**<br>L. King-Steen, HX5, LLC, Cleveland, OH | 1200 hrs<br>AIAA-2018-3833<br>**A Guide Creating SAE AS5562 Ice Crystal, Mixed Phase and Rain Conditions in a Wind Tunnel Environment**<br>C. Clark, D. Orchard, G. Chevrette, National Research Council Canada, Ottawa, Canada | |

| Thursday, 28 June 2018 | | | | | | |
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| **268-ATIO.ACD-10** | **Aircraft Propulsion System Design** | | | | | **Hanover A** |
| Chaired by: S. BRANDT, US Air Force Academy and D. WELLS, Lockheed Martin Aeronautics | | | | | | |
| 0930 hrs<br>AIAA-2018-3834<br>**The Effect of Initial Engine Sizing on Fighter Aircraft Final Optimized Size and Cost**<br>S. Brandt, U.S. Air Force Academy, Colorado Springs, CO | 1000 hrs<br>AIAA-2018-3835<br>**Model Fidelity Requirements in Boundary Layer Ingestion Propulsion System Conceptual Design**<br>M. Shi, M. Pokhrel, J. Gladin, E. Garcia, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1030 hrs<br>AIAA-2018-3836<br>**The Effects of Fixed Conical Spike Inlets on the Performance of Higher Bypass Ratio Engines**<br>S. Cleary, T. Takahashi, Arizona State University, Tempe, AZ | 1100 hrs<br>AIAA-2018-3837<br>**The Transient Performance of FLADE Variable Cycle Engine During Mode Transition**<br>H. Zhou, X. Gao, Aviation Industry of China (AVIC), Xi'an, China; Z. Wang, Northwestern Polytechnical University, Xi'an, China; W. Zhang, Aviation Industry of China (AVIC), Xi'an, China | 1130 hrs<br>AIAA-2018-3838<br>**Architecture Evaluation of a Single-aisle Turboelectric Aircraft with One Engine Inoperative Considerations**<br>A. Harish, J. Gladin, D. Mavris, Georgia Institute of Technology, Atlanta, GA | | |

**Thursday, 28 June 2018**

**269-ATIO.ACD-11** | **0930 - 1200 hrs** | **CADWG21 - The Sense and Nonsense of New Aircraft Configurations** | **Hanover F**

Panelists will discuss items related to the suitability of current conceptual design tools for highly original aircraft synthesis.

Moderators: Ruben Perez, Royal Military College of Canada, Timothy Takahashi, Arizona State University

Panelists:

**Sean Wakayama**
The Boeing Company

**Thomas Sebastian**
Lincoln Laboratory
Massachusetts Institute of Technology

**Nicholas Borer**
NASA Langley Research Center

**Manav Bhatia**
Mississippi State University

**Dan Raymer**
Conceptual Research Corporation

**Thursday, 28 June 2018**

**270-ATIO.ATM-14** | **Operations Management I** | **Embassy D**

Chaired by: J. KOELLING, NASA-Langley Research Center

| 0930 hrs | 1000 hrs | 1030 hrs | 1100 hrs | 1130 hrs | | |
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| AIAA-2018-3839 | AIAA-2018-3840 | AIAA-2018-3841 | AIAA-2018-3842 | AIAA-2018-3843 | | |
| **Performance Efficiency Scores for Ground Delay Programs** | **Flexible runway use modeling using pairwise RECAT-EU separation minima** | **Considering Time Uncertainties in Ground Holding for Optimal Traffic Flow Management** | **Comparison of First-Come First-Served and Optimization Based Scheduling Algorithms for Integrated Departure and Arrival Management** | **An extended analysis of sequencing arrivals at selected major European airports.** | | |
| J. Li, GRA Incorporated, Washington, D.C.; J. Gulding, K. Shetty, M. Meekma, Federal Aviation Administration, Washington, D.C. | B. Meijden, P. Roling, R. Curran, Delft University of Technology, Delft, The Netherlands | A. Andreeva-Mori, Y. Matsuno, N. Matayoshi, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan | B. Park, H. Lee, H. Lee, Inha University, Incheon, South Korea; Y. Eun, D. Jeon, Korea Aerospace Research Institute (KARI), Daejeon, South Korea; Z. Zhu, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA; et al. | C. Raphael, E. Hoffman, A. Trzmiel, K. Zeghal, EUROCONTROL, Brétigny, France | | |

**Thursday, 28 June 2018**

**271-ATIO.TF-9** | **ATTRACTOR: Toward Justifiable Trust in Autonomous Systems I** | **Hanover B**

Chaired by: N. ALEXANDROV, NASA Langley Research Center and B. ALLEN, NASA Langley Research Center

| 0930 hrs | 1000 hrs | 1030 hrs | 1100 hrs | 1130 hrs | 1200 hrs | |
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| Oral Presentation | AIAA-2018-3844 | AIAA-2018-3845 | Oral Presentation | Oral Presentation | AIAA-2018-3846 | |
| **Trust, Trustworthiness and Risk in Autonomous Decision Making** | **Serious Gaming for Building a Basis of Certification for Trust and Trustworthiness of Autonomous Systems** | **Silhouette-Informed Trajectory Generation through a Wire Maze for UAS** | **Incorporating Human Knowledge in Autonomous Systems through Machine Learning** | **Leveraging Fault-Tolerance Concepts as a Basis for Distributed Trust** | **Swarm Size Planning Tool for Multi-Job Type Missions** | |
| N. Alexandrov, NASA Langley Research Center, Hampton, VA | B. Allen, NASA Langley Research Center, Hampton, VA | J. Puig - Navarro, N. Hovakimyan, University of Illinois, Urbana-Champaign, Urbana, IL; N. Alexandrov, B. Allen, NASA Langley Research Center, Hampton, VA | K. Das, D. Iverson, V. Janakiraman, N. Oza, NASA Ames Research Center, Moffett Field, CA | P. Miner, NASA Langley Research Center, Hampton, VA | M. Chandarana, Carnegie Mellon University, Pittsburgh, PA; M. Lewis, University of Pittsburgh, Pittsburgh, PA; B. Allen, NASA Langley Research Center, Hampton, VA; K. Sycara, S. Scherer, Carnegie Mellon University, Pittsburgh, PA | |

**Thursday, 28 June 2018**

**272-ATIO.TF-10** | **UAM Research Infrastructure or Operations** | **Hanover D**

Chaired by: S. BRICENO, Georgia Institute of Technology

| 0930 hrs | 1000 hrs | 1030 hrs | 1100 hrs | 1130 hrs | | |
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| AIAA-2018-3847 | Oral Presentation | AIAA-2018-3848 | AIAA-2018-3849 | AIAA-2018-3850 | | |
| **VTOL Urban Air Mobility Concept Vehicles for Technology Development** | **NASA Testbed for Urban Air Mobility Research and Development** | **$Fe^3$: An Evaluation Tool for Low-Altitude Air Traffic Operations** | **Scaling Constraints for Urban Air Mobility Operations: Air Traffic Control, Ground Infrastructure, and Noise** | **Development of a simulation platform to evaluate integration of UAM traffic into the NAS** | | |
| C. Silva, W. Johnson, NASA Ames Research Center, Moffett Field, CA; E. Solis, Science and Technology Corporation, Moffett Field, CA; M. Patterson, K. Antcliff, NASA Langley Research Center, Hampton, VA | K. Palopo, NASA Ames Research Center, Moffett Field, CA; G. Chatterji, Crown Consulting, Inc., Moffett Field, CA; J. Murphy, NASA Ames Research Center, Moffett Field, CA; C. O'Connor, NASA Langley Research Center, Hampton, VA; A. Lee, NASA Ames Research Center, Moffett Field, CA; B. Sridhar, Universities Space Research Association, Moffett Field, CA | M. Xue, J. Rios, NASA Ames Research Center, Moffett Field, CA; J. Silva, Arctic Slope Research Corporation (ASRC), Moffett Field, CA; Z. Zhu, A. Ishihara, Stinger Ghaffarian Technologies, Inc., Moffett Field, CA | P. Vascik, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA | C. O'Connor, K. Kennedy, M. Underwood, A. Harrivel, C. Stephens, J. Comstock, NASA Langley Research Center, Hampton, VA; et al. | | |

| Thursday, 28 June 2018 | | |
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| **273-ATIO.TF-16/GRE-2**<br>**0930 - 1230 hrs** | **Rolling Recap Aircraft Electric Propulsion Topics** | **Inman** |

This session will summarize aircraft electric and hybrid electric propulsion and power developments from conferences, symposiums, and workshops held in the last year. Planned to include summaries and discussion of Propulsion and Energy, NASA Aerospace Battery Workshop, 2018 SciTech Sessions, and Transformational Vertical Flight Workshop.

| Thursday, 28 June 2018 | | |
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| **274-F360-7**<br>**0930 - 1130 hrs** | **Thursday Forum 360: NASA Aeronautics at the Dawn of a New Era of Aviation** | **Centennial IV** |

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

Opening Remarks:

**Robert Pearce**
Deputy Associate Administrator for Strategy, Acting Director for Airspace Operations and Safety Program
Aeronautics Research Mission Directorate
NASA Headquarters

Panelists:

**Peter Coen**
Manager, Commercial Supersonic Technology Project - Advanced Air Vehicles Program
Aeronautics Research Mission Directorate
NASA

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

**Davis Hackenberg**
Strategy Advisory for Urban Air Mobility
Aeronautics Research Mission Directorate
NASA Headquarters

**Parimal Kopardekar**
Senior Technologist for Air Transportation Systems
NASA Ames Research Center

**Craig Nickol**
Manager, Low Boom Flight Demonstrator Project
Integrated Aviation Systems Program
Aeronautics Research Mission Directorate
NASA

| Thursday, 28 June 2018 | | | | | | |
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| **275-FD-16** | **High-Speed Boundary Layers** | | | | | **Kennesaw** |
| Chaired by: S. LAURENCE, University of Maryland, College Park and J. KUEHL | | | | | | |
| 0930 hrs<br>AIAA-2018-3851<br>**Hypersonic Boundary-Layer Transition: Comparison of the Fundamental Resonance Breakdown for a Flared and Straight Cone at Mach 6**<br>J. Meersman, C. Hader, H. Fasel, University of Arizona, Tucson, Tucson, AZ | 1000 hrs<br>AIAA-2018-3852<br>**Nonlinear Spectral Broadening Dynamics of Second Mode Waves on a Hypersonic Flared Cone**<br>V. Sousa, Purdue University, West Lafayette, IN; A. Batista, J. Kuehl, University of Delaware, Newark, Newark, DE; C. Scalo, Purdue University, West Lafayette, IN | 1030 hrs<br>AIAA-2018-3853<br>**A Density Variance Correction Based on Wray-Agarwal Turbulence Model for Simulation of Hypersonic Flows**<br>X. Han, R. Agarwal, Washington University in St. Louis, St. Louis, MO | | | | |

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| **276-FD-48** | **NASA's Revolutionary Computational Aerosciences** | | | | | **International North** |
| Chaired by: M. MALIK, NASA-Langley Research Center and M. ROGERS, NASA-Ames Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-3854<br>**Wall-Resolved Large-Eddy Simulations of Transonic Shock-Induced Flow Separation**<br>A. Uzun, National Institute of Aerospace, Hampton, VA; M. Malik, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-3855<br>**Application of Lattice Boltzmann and Navier-Stokes Methods to NASA's Wall Mounted Hump**<br>C. Kiris, D. Stich, J. Housman, J. Kocheemoolayil, M. Barad, F. Cadieux, NASA Ames Research Center, Moffett Field, CA | 1030 hrs<br>AIAA-2018-3856<br>**Application of the Dependency Inversion Principle to Multidisciplinary Software Development**<br>M. O'Connell, C. Druyor, K. Thompson, K. Jacobson, W. Anderson, E. Nielsen, NASA Langley Research Center, Hampton, VA; et al. | 1100 hrs<br>AIAA-2018-3857<br>**PIV and Rotational Raman-Based Temperature Measurements for CFD Validation in a Single Injector Cooling Flow**<br>M. Wernet, N. Georgiadis, NASA Glenn Research Center, Cleveland, OH; R. Locke, Vantage Partners, LLC, Cleveland, OH | 1130 hrs<br>AIAA-2018-3858<br>**Using Adaptive Mesh Refinement to Study Grid Resolution Effects for Shock-Boundary Layer Interactions**<br>M. Olsen, NASA Ames Research Center, Moffett Field, CA; R. Lillard, NASA Johnson Space Center, Houston, TX | | |

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| **277-FD-49** | **CFD Modeling and Applications (Applications of CFD, CFD Optimization, Error and Uncertainty, Validation, etc.) IV** | | | | | **Vinings** |
| Chaired by: D. FRIEDLANDER, NASA Glenn Research Center and M. SIEMON, Auburn University | | | | | | |
| 0930 hrs<br>AIAA-2018-3859<br>**A convergence study of solutions using two two-equation RANS turbulence models on a finite volume solver for structured grids**<br>J. Singh Sandhu, A. Girdhar, R. Ramakrishnan, R. Teja, S. Ghosh, Indian Institute of Technology Madras, Chennai, India | 1000 hrs<br>AIAA-2018-3860<br>**Computational Fluid Dynamics Modelling of Store Separation for Transonic Generic Store**<br>G. Demir, Middle East Technical University, Ankara, Turkey | 1030 hrs<br>AIAA-2018-3861<br>**Numerical Simulations of a Quiet SuperSonic Technology (QueSST) Aircraft Preliminary Design**<br>D. Friedlander, C. Heath, R. Castner, NASA Glenn Research Center, Cleveland, OH | 1100 hrs<br>AIAA-2018-3862<br>**CFD Analysis of Heterogeneous and Homogeneous Multi-Truck Platoon Aerodynamic Drag Reduction**<br>M. Siemon, D. Nichols, Auburn University, Auburn, AL | | | |

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| **278-FD-50** | **Fundamental Fluid Flows V: Turbulence** | | | | | **Lenox** |
| Chaired by: A. GROSS, New Mexico State University | | | | | | |
| 0930 hrs<br>AIAA-2018-3863<br>**Understanding the Dependence of Near-Wake Characteristics on the Cube Height in a Turbulent Boundary Layer**<br>S. Shinde, K. Maki, E. Johnsen, University of Michigan, Ann Arbor, Ann Arbor, MI | 1000 hrs<br>AIAA-2018-3864<br>**A Three-Dimensional Experimental Study of Compressibility Effects on Turbulent Free Shear Layers**<br>K. Kim, G. Elliott, J. Dutton, University of Illinois, Urbana-Champaign, Urbana, IL | 1030 hrs<br>AIAA-2018-3865<br>**Concentration Measurements in Simulations of the Variable Density Mixing Layer**<br>J. Huang, W. McMullan, University of Leicester, Leicester, United Kingdom | 1100 hrs<br>AIAA-2018-3866<br>**Numerical Simulations of Turbulent Junction Flow**<br>A. Gross, Z. Robison, New Mexico State University, Las Cruces, NM | 1130 hrs<br>AIAA-2018-3867<br>**Numerical and Experimental Examination of Turbulent Mixing of a Heated Jet in Crossflow**<br>M. Borghi, NASA Glenn Research Center, Cleveland, OH; W. Engblom, Embry-Riddle Aeronautical University, Daytona Beach, FL; D. Thurman, P. Poinsatte, NASA Glenn Research Center, Cleveland, OH | | |

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| **279-FD-51** | **Multiphysics and Cross-Disciplinary Fluid Dynamics V** | | | | | **Dunwoody** |
| Chaired by: A. CUCO, EMBRAER S.A. and K. GRANLUND, North Carolina State University | | | | | | |
| 0930 hrs<br>AIAA-2018-3868<br>**Experimental measurement of inlet mass flow of a microjet engine and performance parameters with a five-hole probe.**<br>S. Kasper, J. Nicholson, A. Kasravi, J. Cubric, Clarkson University, Potsdam, NY | 1000 hrs<br>Oral Presentation<br>**Acoustic Characterization of a Piezoelectric Pressure Sensor for Measurement of Hypersonic Boundary Layer Instabilities**<br>J. Dosch, D. Ort, PCB Piezotronics, Inc., Depew, NY | 1030 hrs<br>AIAA-2018-3869<br>**Simultaneous Stereo Digital Image Correlation and Pressure-Sensitive Paint Measurements of a Compliant Panel in a Mach 2 Wind Tunnel**<br>D. Ogg, B. Rice, S. Peltier, J. Staines, S. Claucherty, Air Force Research Laboratory, Arnold AFB, TN; C. Combs, University of Tennessee, Tullahoma, Tullahoma, TN | 1100 hrs<br>AIAA-2018-3870<br>**Simultaneous PSP and surface deformation measurements for fluid-structure interactions in a shock tube**<br>K. Lynch, E. Jones, J. Wagner, Sandia National Laboratories, Albuquerque, NM | 1130 hrs<br>AIAA-2018-3871<br>**Resonance Start-up in a Rectangular Cavity**<br>A. Turpin, D. Chin, J. Hill, K. Granlund, North Carolina State University, Raleigh, NC | | |

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| **280-FT-5**<br>**0930 - 1230 hrs** | **Flight Testing of the F-35** | | | | | **International South** |
| **Lightning Strikes - Development of the F-35 Flight Demonstration**<br>Billie Flynn, Lockheed Martin Corporation, Patuxent River, MD | **F-35A Loads Testing: Lessons Learned**<br>Christopher Lee, Bryce Milnes, Air Force Test Center, Edwards, CA | **F-35 Flutter Testing**<br>David Boyce, Lockheed Martin Corporation, Fort Worth, TX | **F-35 Flying Qualties Flight Test Lessons Learned**<br>Dan Canin, Lockheed Martin Corporation, Fort Worth, TX | **F-35C Catapult Ride Quality Improvement Testing and Results**<br>J.C. Pope, NAVAIR, Patuxent River, MD | **F-35 Gun Flight Test: Requirements, Error Budgets, and Insanity**<br>Christopher Campbell, Raven LeClair, 461st Flight Test Squadron, Edwards AFB, CA | **How I Learned to Stop Worrying and Love Automatic Collision Avoidance: A Means to Save Dozens of Lives and Millions of Dollars in the F-35**<br>Christopher Campbell, Raven LeClair 461st Flight Test Squadron, Edwards AFB, CA |

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| **281-GT-10** | **AEDC: Enhanced T&E for Flight Vehicles at the AEDC II** | | | | | **Embassy E** |
| Chaired by: P. GOULDING, National Full-Scale Aerodynamics Complex, ARC and M. NELSON, Arnold Engineering Development Complex | | | | | | |
| 0930 hrs<br>AIAA-2018-3872<br>**Soft Sled - the Low Vibration Sled Test Capability at the Holloman High Speed Test Track (Invited)**<br>M. Hooser, U.S. Air Force, Holloman AFB, NM | 1000 hrs<br>AIAA-2018-3873<br>**Computational Modeling and Simulation Applications to Support Integrated Test and Evaluation (IT&E) at AEDC (Invited)**<br>J. Klepper, R. Knapke, J. Sirbaugh, S. Guimond, D. Daniel, QuantiTech, Inc., Arnold AFB, TN; J. Masters, National Aerospace Solutions, Arnold AFB, TN; et al. | 1030 hrs<br>AIAA-2018-3874<br>**New Large-Scale Model Inlet Performance Testing Capabilities for the AEDC PWT 16T/S Wind Tunnels (Invited)**<br>N. Payne, Arnold Engineering Development Complex, Tullahoma, TN | 1100 hrs<br>AIAA-2018-3875<br>**A Computational Study of Transonic Wall Interference for High Aspect Ratio Wind Tunnel Models at Sideslip Using Wings-Level-Yaw and Pitch-Roll Attitude Techniques (Invited)**<br>W. Schuman, Arnold Engineering Development Complex, Arnold AFB, TN | 1130 hrs<br>AIAA-2018-3876<br>**Total Force Accounting Duct Calibration Capabilities (Invited)**<br>J. Webb, Arnold Engineering Development Complex, Arnold AFB, TN | | |

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| **282-MDO-18** | **Aeroelastic and Aero-Structures Optimization III** | | | | | **Hanover E** |
| Chaired by: G. HILL, The Boeing Company | | | | | | |
| 0930 hrs<br>AIAA-2018-3877<br>**Structural Sizing of Aircraft Wings and Fuselages in Conceptual Multidisciplinary Design Processes**<br>J. Kao, University of Dayton, Dayton, OH; T. White, M. Leonard, G. Reich, Air Force Research Laboratory, Wright-Patterson AFB, OH; S. Burton, American Optimization, LLC, Springboro, OH | 1000 hrs<br>AIAA-2018-3878<br>**Aeroelastic Optimization of Wing Skin using a Level Set Method**<br>S. Townsend, Cardiff University, Cardiff, United Kingdom; B. Stanford, NASA Langley Research Center, Hampton, VA; S. Kambampati, H. Kim, University of California, San Diego, San Diego, CA | 1030 hrs<br>AIAA-2018-3879<br>**Aerostructural Optimization with Unsteady Aeroelastic Constraints in a Collaborative MDO Environment**<br>F. Torrigiani, P. Ciampa, German Aerospace Center (DLR), Hamburg, Germany | 1100 hrs<br>AIAA-2018-3880<br>**Actuation Power Minimization Control**<br>J. Lin, Control Research Corporation, Lexington, MA | | | |

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| **283-MDO-19** | **Shape and Topology Optimization II** | | | | | **Hanover G** |
| Chaired by: G. KENWAY, Univeristy of Michigan Department of Aerospace Engineering | | | | | | |
| 0930 hrs<br>AIAA-2018-3881<br>**Fast level set topology optimization using a hierarchical data structure**<br>S. Kambampati, C. Jauregui, University of California, San Diego, San Diego, CA; K. Museth, Voxel Tech, Los Angeles, CA; H. Kim, University of California, San Diego, San Diego, CA | 1000 hrs<br>AIAA-2018-3882<br>**OpenLSTO: Open-Source Software for Level Set Topology Optimization**<br>S. Kambampati, Z. Du, H. Chung, H. Kim, C. Jauregui, University of California, San Diego, San Diego, CA; S. Townsend, Cardiff University, Cardiff, United Kingdom; et al. | 1030 hrs<br>AIAA-2018-3883<br>**Design optimization of an aircraft structure considering thermal-acoustic loads**<br>R. Picelli, Cardiff University, Cardiff, United Kingdom; H. Kim, University of California, San Diego, San Diego, CA | 1100 hrs<br>AIAA-2018-3884<br>**Trajectory Optimization of a Supersonic Aircraft with a Thermal Fuel Management System**<br>J. Jasa, C. Mader, J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI | 1130 hrs<br>AIAA-2018-3885<br>**Topology Optimization of an Aircraft Wing with an Outboard X-Stabilizer**<br>M. Raheel, V. Toropov, Queen Mary University of London, London, United Kingdom | | |

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| **284-MST-7** | **Modeling and Simulation for Unmanned and Personal Aerial Vehicle Operations** | | | | | **Embassy H** |
| Chaired by: J. KRUEP, Engility Corporation and S. BEARD, NASA/ARC-AFS Aerospace Simulation R&D | | | | | | |
| 0930 hrs<br>AIAA-2018-3886<br>**Development and Demonstration of a Flight Simulator for the Dual-Aircraft Platform Concept**<br>N. Coulter, H. Moncayo, W. Engblom, Embry-Riddle Aeronautical University, Daytona Beach, FL | 1000 hrs<br>AIAA-2018-3887<br>**Evaluation and Comparison of Sailing Flight Optimization Algorithms for a Stratospheric Dual Aircraft Platform Concept**<br>N. Coulter, H. Moncayo, W. Engblom, Embry-Riddle Aeronautical University, Daytona Beach, FL | 1030 hrs<br>AIAA-2018-3888<br>**Multicopter Operations for Autonomous Assembly Applications in Manufacturing Environments**<br>C. Ochoa, K. Meuche, E. Atkins, University of Michigan, Ann Arbor, Ann Arbor, MI | 1100 hrs<br>AIAA-2018-3889<br>**Monte Carlo Simulation Based Design of a Robust Autopilot for Loitering Aerial Vehicles**<br>O. Altintas, ROKETSAN Missile Industries, Inc., Ankara, Turkey | 1130 hrs<br>AIAA-2018-3890<br>**Evaluating the Performance Impact of Cooperative Navigation for Unmanned Aerial Systems in GPS-Denied Environments**<br>M. Lau, M. Steffens, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1200 hrs<br>AIAA-2018-3891<br>**Agent-based Simulation of Urban Air Mobility**<br>R. Rothfeld, Bauhaus Luftfahrt e.V., Taufkirchen, Germany; M. Balac, ETH Zurich, Zurich, Switzerland; K. Ploetner, Bauhaus Luftfahrt e.V., Taufkirchen, Germany; C. Antoniou, Technical University of Munich, Munich, Germany | |

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| **285-MST-8** | **Modeling and Simulation for Aircraft Design and Certification** | | | | | **Embassy A** |
| Chaired by: R. RUFF, The MathWorks, Inc. and C. ATKINSON, Lockheed Martin Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-3892<br>**A novel framework approach enabling Model-based Requirements Validation and Verification**<br>B. Binder, M. Gottschall, T. Blochwitz, ESI Group, Dresden, Germany | 1000 hrs<br>AIAA-2018-3893<br>**A computational interface for Steady-State Models: An FMI Extension**<br>G. Mancuso, F. Cremona, L. Mangeruca, A. Ulisse, A. Mignogna, S. Boccabella, United Technologies Corporation, Rome, Italy; et al. | 1030 hrs<br>AIAA-2018-3894<br>**Generic Control Allocation Toolbox for Preliminary Vehicle Design**<br>J. Pei, NASA Langley Research Center, Hampton, VA; G. Bassett, University of Texas, Austin, Austin, TX; J. Grisham, University of Texas, Arlington, Arlington, TX; P. Finch, Stanford University, Stanford, CA; M. Toniolo, Analytical Mechanics Associates, Inc., Hampton, VA; L. Miller, NASA Langley Research Center, Hampton, VA; et al. | 1100 hrs<br>AIAA-2018-3895<br>**New Economical Cruise Methodology for the Cessna Citation X Business Jet by an Original Morphing Horizontal Tail Application**<br>M. Segui, M. Mantilla, G. Ghazi, R. Botez, University of Québec, Montréal, Canada | 1130 hrs<br>AIAA-2018-3896<br>**Shimmy Simulation and Virtual Verification for Amphibious Aircraft's Landing Gear Airworthiness Certification**<br>X. He, J. Ai, Fudan University, Shanghai, China; Z. Song, Civil Aviation Administration of China, Shanghai, China | | |

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| **286-NIA-2** | **Graduate Student Research Papers II - Hosted by the National Institute of Aerospace** | | | | | **Embassy G** |
| Chaired by: C. BRITCHER, Old Dominon University and D. STANLEY, National Institute of Aerospace | | | | | | |
| 0930 hrs<br>AIAA-2018-3897<br>**Online Optimal Control Prediction Method for Control Allocation**<br>M. Acheson, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-3898<br>**Low-Speed Post-Stall Wing Wake Impingement on Horizontal Stabilizer of the Common Research Model**<br>K. Tan, University of Glasgow, Singapore, Singapore; P. Wang, Singapore Institute of Technology, Singapore, Singapore; S. Srigrarom, University of Glasgow, Singapore, Singapore | 1030 hrs<br>AIAA-2018-3899<br>**Aerodynamic performance of albatross-inspired wing shape for marine unmanned air vehicles**<br>A. Stempeck, M. Hassanalian, A. Abdelkefi, New Mexico State University, Las Cruces, NM | 1100 hrs<br>AIAA-2018-3900<br>**Design of high-lift airfoil for formula student race car**<br>A. Yousry Mahgoub, H. Elzaabalawy, W. Aboelsoud, M. Abdelaziz, Ain Shams University, Cairo, Egypt | 1130 hrs<br>AIAA-2018-3901<br>**Wing color and drag reduction of albatross-inspired air vehicles**<br>M. Hassanalian, G. Throneberry, New Mexico State University, Las Cruces, NM; M. Ali, Research and Technology Center of Energy, Hammam-Lif, Tunisia; S. Ben Ayed, A. Abdelkefi, New Mexico State University, Las Cruces, NM | 1200 hrs<br>AIAA-2018-3902<br>**Affine Generalized Inverse for Optimal Control Allocation**<br>M. Acheson, NASA Langley Research Center, Hampton, VA | |

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| **287-PDL-7** | **Aero-Optics** | | | | | **Chicago A** |
| Chaired by: M. RENNIE, University of Notre Dame | | | | | | |
| 0930 hrs<br>AIAA-2018-3903<br>**Effect of Acoustic Disturbances on Aero-Optical Measurements**<br>B. Catron, M. Rennie, S. Gordeyev, E. Jumper, University of Notre Dame, Notre Dame, IN | 1000 hrs<br>AIAA-2018-3904<br>**Aero-optical effects in non-equilibrium air**<br>A. Tropina, Y. Wu, C. Limbach, R. Miles, Texas A&M University, College Station, TX | 1030 hrs<br>AIAA-2018-3905<br>**Spanwise Wavefront Measurements of a Two-Dimensional Compressible Shear Layer**<br>J. Wells, M. Rennie, E. Jumper, University of Notre Dame, Notre Dame, IN | | | | |

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| **288-TP-11** | **Heat Transfer in Heating, Cooling and Power Generation Systems I** | | | | | **Embassy C** |
| Chaired by: M. PATE, Texas A&M University and K. NAWAZ, ORNL and S. SHERIF, University of Florida | | | | | | |
| 0930 hrs<br>AIAA-2018-3906<br>**On the Modelling of Shell and Tube Heat Exchanger Characteristics**<br>E. Khalil, A. Adel, G. ElHarriri, W. Abdelmaksoud, E. Saad, Cairo University, Cairo, Egypt | 1000 hrs<br>AIAA-2018-3907<br>**Dependence of Film Cooling Effectiveness on In-Hole and Surface Roughness**<br>M. Ikwubuo, E. Caraballo, D. Munday, Miami University, Oxford, OH | 1030 hrs<br>AIAA-2018-3908<br>**Air Quality and Flow Regimes at Clean Rooms**<br>H. Metwally, E. Khalil, T. Abou Dief, A. AbouZeid, Cairo University, Cairo, Egypt | 1100 hrs<br>AIAA-2018-3909<br>**Multi-objective Genetic Algorithm Optimization of a Four-Stage Cascade Vapor Compression Refrigeration System**<br>K. Anderson, California State Polytechnic University, Pomona, CA; C. McNamara, Ingenium Technical Services, Inc., Cupertino, CA; T. Gross, California State Polytechnic University, Pomona, CA; A. Gatti, Ingenium Technical Services, Inc., Cupertino, CA | 1130 hrs<br>AIAA-2018-3910<br>**Heat Transfer Enhancement in Parabolic Trough Absorption Tube Using Twisted Tape Inserts**<br>E. Khalil, G. ElHarriri, A. ElDegwy, M. Abousabaa, Cairo University, Cairo, Egypt | | |

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| **289-TP-12** | **Spacecraft Thermal Control and Thermophysics in Spacecraft Applications** | | | | | **Embassy B** |
| Chaired by: B. TAFT, Air Force Reseach Laboratory | | | | | | |
| 0930 hrs<br>AIAA-2018-3911<br>**Effects of Zincaluminate on Thermal Behaviors and Combustion Characteristics of 5AT/Sr$(NO_3)_2$ Propellant**<br>C. Cao, S. Lu, D. Zhang, C. Liu, H. Zhang, University of Science and Technology of China, Hefei, China | 1000 hrs<br>AIAA-2018-3912<br>**Characteristic Pressure Rise with Temperature Increase in Liquid-Locked Hydrazine Systems for Satellite Refueling**<br>M. Kandula, Stinger Ghaffarian Technologies, Inc., Cape Canaveral, FL; B. Nufer, NASA Kennedy Space Center, Cape Canaveral, FL | 1030 hrs<br>AIAA-2018-3913<br>**Internal Depressurization of Hydrazine with Application to In-Orbit Satellite Refueling**<br>M. Espinosa, SAIC, Greenbelt, MD; G. Webster, NASA Goddard Space Flight Center, Greenbelt, MD; G. Coll, SAIC, Greenbelt, MD; B. Nufer, NASA Kennedy Space Center, Cape Canaveral, FL; M. Kandula, Stinger Ghaffarian Technologies, Inc., Cape Canaveral, FL; T. Aranyos, NASA Kennedy Space Center, Cape Canaveral, FL | | | | |

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| **290-LUNCH-2**<br>**1230 - 1400 hrs** | **Boxed Luncheon in Exposition Hall** | **Exposition Hall** |

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| **291-AA-44** | **Turbomachinery and Core Noise III** | | | | | **Roswell** |
| Chaired by: W. SCHUSTER, Honeywell International, Inc. | | | | | | |
| 1400 hrs<br>AIAA-2018-3914<br>**Tonal Noise Transmission through a Non-Axisymmetric Turbine OGV with Separated Flow: Prediction and Measurements**<br>J. Fernández Aparicio, A. Serrano, ITP, Alcobendas, Spain | 1430 hrs<br>AIAA-2018-3915<br>**Study of Entropy Noise through a 2D Stator using CAA**<br>A. Emmanuelli, M. Huet, T. Le Garrec, ONERA, Châtillon, France; S. Ducruix, CentraleSupélec, Gif-sur-Yvette, France | 1500 hrs<br>AIAA-2018-3916<br>**Aerodynamic and Acoustic Testing of a Turbine Exhaust Case with Integrated Hot Stream Liners in a Realistic Multi-stage Environment**<br>D. Broszat, I. Mahle, MTU Aero Engines, Munich, Germany; M. Billson, F. Wallin, GKN Aerospace, Trollhättan, Sweden; M. Spitalny, U. Tapken, German Aerospace Center (DLR), Berlin, Germany | 1530 hrs<br>AIAA-2018-3917<br>**A Frequency Domain Model for Turbine Interaction Broadband Noise: Comparison with Measurements**<br>P. Carrasco Laraña, A. Serrano, ITP, Alcobendas, Spain | 1600 hrs<br>AIAA-2018-3918<br>**Unsteady Simulations of a Fan/Outlet-Guide-Vane System. Part 3: Broadband Noise Computation**<br>T. Suzuki, P. Spalart, The Boeing Company, Seattle, WA; M. Shur, M. Strelets, A. Travin, St. Petersburg Polytechnic University, Saint Petersburg, Russia | 1630 hrs<br>AIAA-2018-3919<br>**Fan Tonal and Broadband Noise Simulations at Transonic Operating Conditions Using Lattice-Boltzmann Methods**<br>I. Gonzalez-Martino, D. Casalino, Exa Corporation, Paris, France | |

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| **292-AA-45** | **Computational Aeroacoustics IV** | | | | | **Marietta** |
| Chaired by: C. SCALO | | | | | | |
| 1400 hrs<br>AIAA-2018-3920<br>**On the theoretical self-similarity of turbulent round jets: boundary conditions and buffer zone treatments**<br>C. Moser, Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil; A. Da Ronch, University of Southampton, Southampton, United Kingdom | 1430 hrs<br>AIAA-2018-3921<br>**GPU CABARET Solutions for the CoJen Jet Noise Experiment**<br>A. Markesteijn, GPU-prime, Ltd., Cambridge, United Kingdom; S. Karabasov, Queen Mary University of London, London, United Kingdom | 1500 hrs<br>AIAA-2018-3922<br>**Aerodynamic and Aeroacoustic Numerical Investigation of an Axial Fan using Lattice Boltzmann Methods**<br>T. Hainaut, T. Le Garrec, C. Polacsek, D. Mincu, S. Deck, ONERA, Châtillon, France | 1530 hrs<br>AIAA-2018-3923<br>**An Acoustic Resonance Study with an Open-Jet Wind Tunnel Geometry Using a Time-Accurate Local-Time-Stepping CESE Method**<br>C. Yen, E. Duell, S. Muller, Jacobs, Tullahoma, TN | 1600 hrs<br>AIAA-2018-3924<br>**Evaluation of Wind Turbine Noise based on Numerical Simulation Methods**<br>B. Fassmann, N. Reiche, R. Ewert, M. Herr, J. Delfs, German Aerospace Center (DLR), Braunschweig, Germany | 1630 hrs<br>AIAA-2018-3925<br>**Numerical Investigation of Low-Noise Airfoils Inspired by the Down Coat of Owls**<br>A. Bodling, A. Sharma, Iowa State University, Ames, IA | |

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| **293-AA-46** | **Duct Acoustics IV** | | | | | **Spring** |
| Chaired by: F. BAKE, DLR-German Aerospace Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3926<br>**An experimental multi-ports methodology for fan acoustic installation effects**<br>J. Dominique, J. Christophe, C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; R. Corralejo, Dyson, Ltd., Malmesbury, United Kingdom | 1430 hrs<br>AIAA-2018-3927<br>**Modal Deconvolution Method in a Finite Circular Duct, using Flush-mounted Microphones**<br>S. Fauqueux, R. Davy, ONERA, Palaiseau, France | 1500 hrs<br>AIAA-2018-3928<br>**Sound Absorption of Sintered Stainless Steel Fiber Blocks**<br>J. Tuasikal, K. Sato, H. Daiguji, University of Tokyo, Tokyo, Japan; T. Ishii, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan | 1530 hrs<br>AIAA-2018-3929<br>**Hybrid Methods for the Prediction of the Noise Radiated by a Mach 0.5 Ducted Orifice Flow**<br>Z. Jardon, Vrije Universiteit Brussel, Ixelles, Belgium; U. Karban, Middle East Technical University, Kalkanli, Turkey; J. Christophe, C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1600 hrs<br>AIAA-2018-3931<br>**Acoustic Propagation in Pipes with Corrugated Treatment**<br>J. Golliard, University of Maine, Le Mans, France; Y. Aurégan, T. Humbert, University of Le Mans, Le Mans, France | |

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| **294-AA-47** | **Acoustic/Fluid Dynamics Interactions VI** | | | | | **University** |
| Chaired by: K. AHUJA, Georgia Institute of Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-3932<br>**On the sensitivity of the acoustics of short circular holes to inlet edge geometries**<br>D. Yang, J. Guzman Inigo, H. Johnson, A. Morgans, Imperial College London, London, United Kingdom | 1430 hrs<br>AIAA-2018-3933<br>**The Dynamic Response of a Pinhole Microphone under Flows of Varying Shear Stress**<br>N. Balantrapu, R. Repasky, L. Joseph, W. Devenport, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1500 hrs<br>AIAA-2018-3934<br>**The Large Scale Structures of a High Reynolds Number Turbulent Boundary Layer over Rough Surfaces**<br>R. Repasky, L. Joseph, N. Molinaro, W. Devenport, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1530 hrs<br>AIAA-2018-3935<br>**Broadband Airfoil-Noise Source Localization by Microphone Arrays and Modeling of a Swept Free-Tip Blade**<br>G. Yakhina, M. Roger, École Centrale de Lyon, Ecully, France; A. Finez, V. Baron, MicrodB, Ecully, France; S. Moreau, Sherbrooke University , Sherbrooke, Canada; J. Giez, Safran Group, Moissy-Cramayel, France | 1600 hrs<br>AIAA-2018-3936<br>**Airfoil dual acoustic feedback mechanisms at low-to-moderate Reynolds number**<br>E. Arcondoulis, A. Zander, University of Adelaide, Adelaide, Australia; C. Doolan, University of New South Wales, Sydney, Australia; L. Brooks, University of Adelaide, Adelaide, Australia; Y. Liu, Southern University of Science and Technology, Shenzhen, China | 1630 hrs<br>AIAA-2018-3937<br>**Kinematic and Acoustic Similarities of Separated Turbulent Boundary Layers**<br>A. Suryadi, German Aerospace Center (DLR), Braunschweig, Germany | |

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| **295-AA-49** | **Jet Aeroacoustics VIII** | | | | | **Techwood** |
| Chaired by: B. HENDERSON, NASA Glenn Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3938<br>**Spatiotemporal-correlation analysis of jet noise from a round nozzle high-performance aircraft**<br>S. Swift, K. Gee, T. Neilsen, Brigham Young University, Provo, UT; A. Wall, Air Force Research Laboratory, Wright-Patterson AFB, OH; J. Downing, M. James, Blue Ridge Research and Consulting, LLC, Asheville, NC | 1430 hrs<br>AIAA-2018-3939<br>**Resonance and Tones in Dual-Stream Nozzles induced by vortex shedding from struts**<br>I. Milanovic, University of Hartford, Hartford, CT; K. Zaman, C. Miller, NASA Glenn Research Center, Cleveland, OH | 1500 hrs<br>AIAA-2018-3940<br>**Experimental and computational study of tones occurring with a coaxial nozzle**<br>K. Zaman, NASA Glenn Research Center, Cleveland, OH; I. Milanovic, University of Hartford, Hartford, CT; A. Fagan, C. Miller, NASA Glenn Research Center, Cleveland, OH | 1530 hrs<br>AIAA-2018-3941<br>**Modelling Noise Sources in Offset Two-Stream Jets Using Linear Stability Theory**<br>N. Sohoni, A. Sinha, Indian Institute of Technology Bombay, Mumbai, India | 1600 hrs<br>AIAA-2018-3942<br>**Investigation of noise characteristics of jet noise from high-BPR turbofan engines in model-scale**<br>I. Lee, Y. Zhang, D. Lin, Commercial Aircraft Corporation of China, Ltd. (COMAC), Beijing, China | 1630 hrs<br>AIAA-2018-3943<br>**Large-Eddy Simulations of Supersonic Jet Noise Generation Using Wall Modeling**<br>J. Liu, A. Corrigan, Naval Research Laboratory, Washington, D.C. | |

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| **296-AMT-9/FD-52** | **Diagnostics in Reacting Flows** | | | | | **The Learning Center** |
| Chaired by: V. NARAYANASWAMY, North Carolina State Univ and K. VENKATESAN, GE | | | | | | |
| 1400 hrs<br>AIAA-2018-3944<br>**Investigation of Soot Formation Near Flame-Wall Interaction Region in Rich Ethylene/Air Flames**<br>A. Jain, Y. Wang, W. Kulatilaka, Texas A&M University, College Station, TX | 1430 hrs<br>AIAA-2018-3945<br>**Structure and Dynamics of Liquid-Fueled Piloted Spray Flames**<br>Y. Wang, T. Paschal, W. Kulatilaka, Texas A&M University, College Station, TX | 1500 hrs<br>AIAA-2018-3946<br>**Effects of wall heat loss on deflagration-to-detonation transition in micro-scale tubes studied via chemiluminescence imaging**<br>Y. Chi, Q. Lei, J. He, Z. Wang, W. Fan, Northwestern Polytechnical University, Xi'an, China | 1530 hrs<br>AIAA-2018-3947<br>**Comparison of Detonation Initiation by Hot Jet and Obstacles Studied via Chemiluminescence Imaging at 200 kHz**<br>J. Zheng, Q. Lei, J. He, Y. Chi, W. Fan, Northwestern Polytechnical University, Xi'an, China | 1600 hrs<br>AIAA-2018-3948<br>**Characterization of detonation re-initiation mode in a flat channel with a pre-detonator using chemiluminescence imaging at 200 kHz**<br>J. He, Q. Lei, J. Zheng, Y. Chi, W. Fan, Northwestern Polytechnical University, Xi'an, China | | |

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| **297-APA-34/MDO-20** | **Aerodynamic Shape Optimization II** | | | | | **Baker** |
| Chaired by: G. KURUVILA, Boeing Research & Technology and T. MAGEE, The Boeing Company | | | | | | |
| 1400 hrs<br>AIAA-2018-3949<br>**Universal Airfoil Parametrization Using B-Splines**<br>D. Rajnarayan, Self, Mountain View, CA; A. Ning, J. Mehr, Brigham Young University, Provo, UT | 1430 hrs<br>AIAA-2018-3950<br>**Optimization Methodology for a 2-D Course Correction of a 155 mm Spin-Stabilized Projectile**<br>G. Arnoult, M. Zeidler, Nexter Munitions, Bourges, France; E. Garnier, ONERA, Meudon, France | 1500 hrs<br>AIAA-2018-3951<br>**Gradient-Limiting Shape Control for Efficient Aerodynamic Optimisation**<br>L. Kedward, C. Allen, T. Rendall, University of Bristol, Bristol, United Kingdom | 1530 hrs<br>AIAA-2018-3952<br>**Efficient Multi-Resolution Approaches for Exploration of External Aerodynamic Shape and Topology**<br>L. Kedward, A. Payot, T. Rendall, C. Allen, University of Bristol, Bristol, United Kingdom | 1600 hrs<br>AIAA-2018-3953<br>**Use of Global Drag Rise Boundaries to Investigate Ill-Posed Transonic Airfoil Optimization**<br>J. Doherty, H. Wang, Y. Jin, University of Surrey, Guildford, United Kingdom | 1630 hrs<br>AIAA-2018-3954<br>**Aerodynamic Conceptual Design of Boundary Layer Ingestion Propulsor Systems: Hybrid Wingbody Aircraft with Propulsion-Airframe-Integration**<br>B. Lee, M. Liou, NASA Glenn Research Center, Cleveland, OH; H. Kim, Kyunghee University, Suwon, South Korea | |

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| **298-APA-35** | **Airfoil/Wing/Configuration Aerodynamics II** | | | | | **Fairlie** |
| Chaired by: B. MCGRATH, The Johns Hopkins University Applied Physics Laboratory and K. GERZINA, Orbital ATK Organization | | | | | | |
| 1400 hrs<br>AIAA-2018-3955<br>**Numerical Study of the Effects of Leading Edge Tubercles on Transonic Performance of Airfoils**<br>R. Perez, A. Asghar, Royal Military College of Canada, Kingston, Canada | 1430 hrs<br>AIAA-2018-3956<br>**Aspect-Ratio Effects for Low-Order Modeling of Swept-Wing Stall**<br>A. Jamwal, P. Hosangadi, A. Gopalarathnam, North Carolina State University, Raleigh, NC | 1500 hrs<br>AIAA-2018-3957<br>**Chordwise Actuation Effects on NACA 0012 Morphing Airfoils**<br>A. Rocha dos Santos, G. Caselato de Sousa, A. Sanches, O. Santos, D. Rade, A. de Paula, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1530 hrs<br>AIAA-2018-3958<br>**Slotted Airfoil with Control Surface**<br>N. Pfeiffer, Pfeiffer Consulting, Wichita, KS | 1600 hrs<br>AIAA-2018-3959<br>**Reducing the Effects of Wakes in a Flapped wing**<br>A. Matpadi Raghavendra, Alliance University, Bangalore, India | 1630 hrs<br>AIAA-2018-3960<br>**Study on a Camber Adaptive Winglet**<br>J. Eguea, F. Catalano, A. Abdalla, University of São Paulo, São Carlos, Brazil; L. de Santana, C. Venner, University of Twente, Enschede, The Netherlands; A. Fontes Silva, Embraer, São José dos Campos, Brazil | |

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| **299-APA-36** | **Innovative Aerodynamic Concepts and Designs** | | | | | **Courtland** |
| Chaired by: S. SAXENA, General Electric Company and R. DOWGWILLO, Boeing Engineering Operations & Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-3961<br>**Aerodynamic Study on Efficiency Improvement of a Wing Embedded Lifting Fan Remaining Open in Cruise Flight**<br>B. Hoeveler, Aachen University of Applied Sciences, Aachen, Germany; C. Wolf, M. Raffel, German Aerospace Center (DLR), Göttingen, Germany; F. Janser, Aachen University of Applied Sciences, Aachen, Germany | 1430 hrs<br>AIAA-2018-3962<br>**Boundary layer Blockage, Venturi Effect and Cavitation Causing Aerodynamic Choking and Shock Waves in Human Artery Leading to Hemorrhage and Massive Heart Attack – A New Perspective**<br>V. Sanal Kumar, Indian Space Research Organisation, Trivandrum, India; V. Sankar, N. Chandrasekaran, Indian Institute of Science, Bangalore, India; V. Saravanan, Kumaraguru College of Technology, Coimbatore, India; S. Mani, Georgia Institute of Technology, Atlanta, GA; A. Krishnan, Elliot Hospital, Manchester, NH; et al. | 1500 hrs<br>AIAA-2018-3963<br>**High Altitude Aerodynamic Reflectors To Counter Climate Change**<br>M. Smith-Pierce, Y. Charoenboonvivat, D. Shukla, N. Komerath, Georgia Institute of Technology, Atlanta, GA | 1530 hrs<br>AIAA-2018-3964<br>**Experimental Investigation of Drag Reduction on Automobiles With an Inflatable Boat-Tail**<br>K. McNamara, J. Jacob, B. Loh, Oklahoma State University, Stillwater, OK; R. Tsuruta, T. Tsukada, E. Itakura, Toyota Motor Corporation, Ann Arbor, MI; et al. | | | |

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| **300-APA-37** | **Unsteady Aerodynamics II** | | | | | **Greenbriar** |
| Chaired by: P. JOHNSON, The Boeing Company | | | | | | |
| 1400 hrs<br>AIAA-2018-3965<br>**Indicial Aerodynamic Modeling For Arbitrary Gust Responses**<br>M. Ghoreyshi, A. Jirasek, U.S. Air Force Academy, Colorado Springs, CO; I. Greisz, University of Colorado, Colorado Springs, Colorado Springs, CO; M. Satchell, U.S. Air Force Academy, Colorado Springs, CO | 1430 hrs<br>AIAA-2018-3966<br>**Rapid Prediction Method for Extreme Aerodynamics**<br>D. Nixon, Self, Los Altos, CA | 1500 hrs<br>AIAA-2018-3967<br>**Thrust Extraction from Vorticity Fields in Steady and Unsteady Flows**<br>L. Russo, M. Ostieri, R. Tognaccini, University of Naples "Federico II", Naples, Italy | 1530 hrs<br>AIAA-2018-3968<br>**Self-Induced Roll Characteristics of Low-Aspect-Ratio Flat-Plate Wings Improved by Sinusoidal Edge**<br>C. Cheng, T. Hu, P. Liu, Z. Zhang, Q. Qu, Beihang University, Beijing, China; R. Akkermans, Technical University of Braunschweig, Braunschweig, Germany | | | |

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| **301-ASE-13** | **Update on Recent Ice Crystal Icing Facilities and Research (Invited)** | | | | | **Hanover C** |
| Chaired by: J. FISHER, Federal Aviation Administration and J. MACLEOD, National Research Council Canada | | | | | | |
| 1400 hrs<br>AIAA-2018-3969<br>**Update on the NASA Glenn Propulsion Systems Lab Icing and Ice Crystal Cloud Characterization - 2017 (Invited)**<br>J. Van Zante, T. Ratvasky, NASA Glenn Research Center, Cleveland, OH; T. Bencic, C. Challis, HX5, LLC, Cleveland, OH; E. Timko, Jacobs, Cleveland, OH | 1430 hrs<br>Oral Presentation<br>**An Aero-Thermal Analysis for the Propulsion Systems Laboratory at NASA Glenn Research Center (Invited)**<br>M. Oliver, NASA Glenn Research Center, Cleveland, OH; A. Johnson, E. Hubbard, Jacobs, Cleveland, OH; P. Struk, NASA Glenn Research Center, Cleveland, OH | 1500 hrs<br>AIAA-2018-3970<br>**Total Temperature Measurements Using a Rearward Facing Probe in Supercool Liquid Droplet and Ice Crystal Clouds (Invited)**<br>J. Agui, P. Struk, T. Bartkus, NASA Glenn Research Center, Cleveland, OH | 1530 hrs<br>AIAA-2018-3971<br>**Particle Size Calibration Testing in the NASA Propulsion System Laboratory (Invited)**<br>M. King, NASA Glenn Research Center, Cleveland, OH; J. Manin, Artium Technologies, Inc., Sunnyvale, CA; J. Van Zante, NASA Glenn Research Center, Cleveland, OH | 1600 hrs<br>Oral Presentation<br>**Expanded Test Capability at NRC Research Altitude Test Facility (Invited)**<br>D. Fuleki, J. Chalmers, S. Shahryari Fard, M. Neuteboom, National Research Council Canada, Ottawa, Canada | 1630 hrs<br>AIAA-2018-3972<br>**Characterization of an Engine Icing Tunnel and Comparison to Liquid Water Content from an Evaporation Model**<br>C. Davison, J. MacLeod, National Research Council Canada, Ottawa, Canada | |

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| **302-ATIO.ACD-12/MDO-21** | **Aircraft Design Optimization III** | | | | | **Hanover F** |
| Chaired by: C. BIL, RMIT University | | | | | | |
| 1400 hrs<br>AIAA-2018-3973<br>**Assessment of a Boundary Layer Ingesting Turboelectric Aircraft Configuration using Signomial Programming**<br>D. Hall, A. Dowdle, J. Gonzalez, Massachusetts Institute of Technology, Cambridge, MA; L. Trollinger, W. Thalheimer, Aurora Flight Sciences, Cambridge, MA | 1430 hrs<br>AIAA-2018-3974<br>**Sizing and Optimization of Novel General Aviation Vehicles and Propulsion System Architectures**<br>G. Cinar, Y. Cai, I. Chakraborty, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-3975<br>**A Decision Support System for the Mission-Based Evaluation of Aerial Platforms: Advancements and Final Validation Results**<br>S. Morawietz, M. Strohal, P. Stütz, University of the German Federal Armed Forces, Munich, Germany | 1530 hrs<br>AIAA-2018-3976<br>**Aero-propulsive Design Optimization of a Turboelectric Boundary Layer Ingestion Propulsion System**<br>J. Gray, NASA Glenn Research Center, Cleveland, OH; G. Kenway, NASA Ames Research Center, Moffett Field, CA; J. Martins, University of Michigan, Ann Arbor, Ann Arbor, MI | | | |

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| **303-ATIO.ATM-15** | **Data Science in ATC/ATM II** | | | | | **Hanover G** |
| Chaired by: H. ARNESON, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3977<br>**Automatic Classification of Roof Shapes for Multicopter Emergency Landing Site Selection**<br>J. Castagno, E. Atkins, University of Michigan, Ann Arbor, Ann Arbor, MI | 1430 hrs<br>AIAA-2018-3978<br>**Similarity Search of Spatiotemporal Scenario Data for Strategic Air Traffic Management**<br>J. Xie, H. Nguyen, Texas A&M University, Corpus Christi, TX; Y. Wan, University of Texas, Arlington, Arlington, TX | 1500 hrs<br>AIAA-2018-3979<br>**Custom IBM Watson Speech-to-text Model for Anomaly Detection using ATC-pilot Voice Communication**<br>S. Subramanian, P. Kostiuk, Robust Analytics, Inc., Crofton, MD; G. Katz, IBM, Washington, D.C. | 1530 hrs<br>AIAA-2018-3980<br>**A Comparative Study of Machine Learning Techniques for Aviation Applications**<br>A. Maheshwari, D. DeLaurentis, Purdue University, West Lafayette, IN | 1600 hrs<br>AIAA-2018-3981<br>**Field Testing of Vision-Based Surveillance System for Ramp Area Operations**<br>H. Lu, J. Kwan, A. Fong, V. Cheng, Optimal Synthesis, Inc., Los Altos, CA | 1630 hrs<br>AIAA-2018-3982<br>**A Hierarchical Bayesian Network Methodology to Analyze Aviation Incident Reports**<br>X. Zhang, S. Nannapaneni, S. Mahadevan, Vanderbilt University, Nashville, TN | |

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| **304-ATIO.ATM-16** | **Advanced Operational Concepts** | | | | | **Embassy G** |
| Chaired by: D. THIPPHAVONG, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-3983<br>**Design of a Control Law for an Autonomous Approach and Landing Spacing System**<br>L. Sherry, J. Shortle, O. Snisarevska, George Mason University, Fairfax, VA | 1430 hrs<br>AIAA-2018-3984<br>**System Automation of a DA42 General Aviation Aircraft**<br>C. Krause, F. Holzapfel, Technical University of Munich, Munich, Germany | 1500 hrs<br>AIAA-2018-3985<br>**Laboratory Evaluation of Dynamic Routing of Air Traffic in a En Route Arrival Metering Environment**<br>D. Isaacson, M. Hayashi, C. Gong, G. Wong, H. Tang, NASA Ames Research Center, Moffett Field, CA | 1530 hrs<br>AIAA-2018-3986<br>**Research on Trajectory Generation and Optimization in Continuous Descent Operations**<br>J. Liu, J. Zhang, X. Dai, H. Zu, Nanjing University of Aeronautics and Astronautics, Nanjing, China | 1600 hrs<br>AIAA-2018-3987<br>**UTM and D-NET: NASA and JAXA's Collaborative Research on Integrating Small UAS with Disaster Response Efforts**<br>J. Homola, M. Johnson, P. Kopardekar, NASA Ames Research Center, Moffett Field, CA; A. Andreeva-Mori, D. Kubo, K. Kobayashi, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan; et al. | 1630 hrs<br>AIAA-2018-3988<br>**Impact of Early Verification and Validation on Successful Delivery of Aviation Systems**<br>W. Felder, K. Thomas, Stevens Institute of Technology, Hoboken, NJ | 1700 hrs<br>AIAA-2018-3989<br>**Integrated Modeling of Dynamic Airline Behavior in the Air Transport System**<br>M. Urban, K. Ploetner, M. Hornung, Bauhaus Luftfahrt e.V., Munich, Germany |

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| **305-ATIO.ATM-17** | **Environmental Impact Mitigation** | | | | | **Embassy F** |
| Chaired by: K. MARAIS, Purdue University and N. FALA | | | | | | |
| 1400 hrs<br>AIAA-2018-3990<br>**Fulfilling long-term emission reduction goals in aviation by alternative fuel options: An evolutionary approach**<br>K. Ploetner, M. Urban, A. Roth, Bauhaus Luftfahrt e.V., Taufkirchen, Germany; G. Tay, Technical University of Munich, Garching, Germany; A. Habersetzer, Bauhaus Luftfahrt e.V., Taufkirchen, Germany | 1430 hrs<br>AIAA-2018-3991<br>**Enhancing Aircraft Fuel Burn Modeling on the Airport Surface**<br>E. Clemons, T. Reynolds, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; S. Badrinath, Y. Chati, H. Balakrishnan, Massachusetts Institute of Technology, Cambridge, MA | 1500 hrs<br>AIAA-2018-3992<br>**Stochastic and Dynamic Optimization of Area Navigation Noise Abatement Arrival and Approach Procedures**<br>A. Kendall, J. Clarke, Georgia Institute of Technology, Atlanta, GA | 1530 hrs<br>AIAA-2018-3993<br>**Quantification of Error for Rapid Fleet-Level Noise Computation Model Assumptions**<br>M. LeVine, Lafayette College, Easton, PA; D. Lim, Y. Li, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1600 hrs<br>AIAA-2018-3994<br>**Demonstration of a Framework for Comparing Aviation Environmental Impact Mitigation Strategies**<br>M. LeVine, Lafayette College, Easton, PA; J. Bernardo, H. Pfaender, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1630 hrs<br>AIAA-2018-3995<br>**Placement of Runways at Capacity Constrained Airports to Minimize Population Exposure to Noise**<br>M. LeVine, Lafayette College, Easton, PA; J. Bernardo, P. Zanella, M. Kirby, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1700 hrs<br>AIAA-2018-3996<br>**Noise mitigation optimization of A-RNP /RNP AR approaches**<br>F. Morscheck, German Aerospace Center (DLR), Braunschweig, Germany |

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| **306-ATIO.ATM-18** | **Operations Management II** | | | | | **Embassy D** |
| Chaired by: T. REYNOLDS, Massachusetts Institute of Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-3997<br>**Operational Deployment and Evaluation of the NAS Constraint Evaluation and Notification Tool**<br>P. Borchers, K. Sheth, S. Sahlman, A. Clymer, F. Shih, NASA Ames Research Center, Moffett Field, CA; T. Niznik, American Airlines, Fort Worth, TX; et al. | 1430 hrs<br>AIAA-2018-3998<br>**Proximity versus dynamicity – an initial analysis at four European airports**<br>P. Pasutto, K. Zeghal, E. Hoffman, EUROCONTROL, Brétigny, France | 1500 hrs<br>AIAA-2018-3999<br>**Cooperative Automation Supporting Pilot-Dispatch Negotiation of Enroute Trajectory Change Requests**<br>H. Idris, NASA Ames Research Center, Moffett Field, CA; S. Harrison, D. Wing, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-4000<br>**How the geometry of arrival routes can influence sequencing?**<br>B. Favennec, A. Trzmiel, K. Zeghal, EUROCONTROL, Brétigny, France | 1600 hrs<br>AIAA-2018-4001<br>**An Analysis of Flight Time at Lower-than-Optimal Cruise Altitude**<br>J. Foster, J. DeArmon, H. Bateman, MITRE Corporation, McLean, VA | | |

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| **307-ATIO.DE-2** | **Design Optimization and Model Based Design I** | | | | | **Hanover D** |
| Chaired by: J. QUINLAN, NASA Langley Research Center and C. DAVIES, Lockheed Martin Aeronautics | | | | | | |
| 1400 hrs<br>AIAA-2018-4002<br>**Stochastic Modeling of Preliminary Wing Box Structural Design for Stiffness**<br>D. Miskin, T. Takahashi, Arizona State University, Tempe, AZ | 1430 hrs<br>AIAA-2018-4003<br>**Developing a Digital Thread / Digital Twin Aerodynamic Performance Authoritative Truth Source**<br>E. Kraft, University of Tennessee, Tullahoma, Tullahoma, TN | 1500 hrs<br>AIAA-2018-4004<br>**Aero-structural optimization of the HIRENASD Model configuration**<br>Y. Wang, Xi'an Jiaotong University, Xi'an, China; Z. Yuan, Northwestern Polytechnical University, Xi'an, China; D. Li, G. Chen, Xi'an Jiaotong University, Xi'an, China; J. Bai, Northwestern Polytechnical University, Xi'an, China | 1530 hrs<br>AIAA-2018-4005<br>**Development of a Modular Knowledge-Based Model Generator for the Preliminary Aircraft Design Process of the Future**<br>A. Zamfir, J. Jepsen, E. Moerland, B. Nagel, German Aerospace Center (DLR), Hamburg, Germany | 1600 hrs<br>AIAA-2018-4006<br>**Model Based Collaborative Design & Optimization of Blended Wing Body Aircraft Configuration : AGILE EU Project**<br>P. Prakasha, German Aerospace Center (DLR), Hamburg, Germany; P. Della Vecchia, University of Naples "Federico II", Naples, Italy; P. Ciampa, German Aerospace Center (DLR), Hamburg, Germany; D. Ciliberti, University of Naples "Federico II", Naples, Italy; D. Charbonnier, A. Jungo, CFS Engineering SA, Lausanne, Switzerland; et al. | 1630 hrs<br>AIAA-2018-4007<br>**Modeling Airlift Operations for Humanitarian Aid and Disaster Relief to Support Acquisition Decision-Making**<br>C. Weit, S. Chetcuti, L. Wei, M. Muehlberg, C. Chan, H. Gilani, Georgia Institute of Technology, Atlanta, GA; et al. | 1700 hrs<br>AIAA-2018-4008<br>**Enabling the Digital Thread in Commercial Aircraft Companies**<br>A. Gharbi, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA |

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| **308-ATIO.TF-11** | **Structuring for Rapid Innovation in Aeronautics in the CAS Project** | | | | | **Hanover B** |
| Chaired by: A. MCGOWAN, NASA-Langley Research Center | | | | | | |
| 1400 hrs<br>Oral Presentation<br>**Structuring for Rapid Innovation in Aeronautics in the NASA Convergent Aeronautics Solution Project**<br>I. Lopez, NASA Glenn Research Center, Cleveland, OH; M. Waszak, A. McGowan, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>Oral Presentation<br>**Exploring and Experiencing Different Approaches to Innovation in the NASA Aeronautics CAS Project**<br>M. Waszak, NASA Langley Research Center, Hampton, VA; I. Lopez, NASA Glenn Research Center, Cleveland, OH; A. McGowan, K. Freidt, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-4009<br>**Working at the Speed of Innovation: Impedance Mismatch in Rapid and Innovation Projects**<br>C. Crain, N. Tashima, LTG Associates, Inc., Turlock, CA; E. Briody, CulturalKeys, Troy, MI; A. McGowan, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-4010<br>**Reflections on an NRA: Recommendations for Strengthening the NASA ARMD CAS Project's Culture of Innovation**<br>L. Yu, Booz Allen Hamilton, Washington, D.C. | 1600 hrs<br>Oral Presentation<br>**Working with the Long-Tail of Innovation – a Two Year Study of the Convergent Aeronautics Solutions project's Quest to Boost Transformative Concepts**<br>C. Haley, S. Qua, Back Loop Consulting, Seattle, WA | | |

| Thursday, 28 June 2018 | | | | | | |
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| **309-ATIO.TF-12** | **ATTRACTOR: Toward Justifiable Trust in Autonomous Systems II** | | | | | **Hanover A** |
| Chaired by: B. ALLEN, NASA Langley Research Center and N. ALEXANDROV, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-4011<br>**Towards Explainability of UAV-Based Convolutional Neural Networks for Object Classification**<br>C. Dolph, L. Tran, B. Allen, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-4012<br>**Goal Detection via Mental Representation**<br>J. Ecker, B. Allen, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-4013<br>**Towards Informing an Intuitive Mission Planning Interface for Autonomous Multi-Asset Teams via Image Descriptions**<br>L. Le Vie, M. Last, B. Barrows, B. Allen, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-4014<br>**Trusted Communication: Utilizing Speech Communication to Enhance Human-Machine Teaming Success**<br>E. Meszaros, University of Chicago, Chicago, IL; L. Le Vie, B. Allen, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>AIAA-2018-4015<br>**A Persistent Simulation Environment for Autonomous Systems**<br>B. Kelley, R. Williams, NASA Langley Research Center, Hampton, VA; J. Holland, O. Schnarr, NASA Armstrong Flight Research Center, Edwards, CA; B. Allen, NASA Langley Research Center, Hampton, VA | | |

| Thursday, 28 June 2018 | | |
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| **310-F360-8**<br>**1400 - 1600 hrs** | **Thursday Forum 360: Europe - Open to the World to Transform Aviation** | **Centennial IV** |

Moderator : David Hills, Vice President, Research & Technology, Airbus Americas Inc.

Panelists:

**Pier-Davide Ciampa**
Team Lead, Multidisciplinary Design and Optimization
German Aerospace Center (DLR)

**Sebastiano Fumero**
Head of Unit - Aeronautics, Research and Innovation
Directorate General, European Commission

**Pablo Perez-Illana**
Programme Officer, Research and Innovation
Directorate General, European Commission

**Igor Perkon**
Research and Development Program Manager
Pipistrel Vertical Solutions

**Joeri De Ruytter**
Research and Technology Business Development and Partnerships
Honeywell Aerospace Europe

| Thursday, 28 June 2018 | | | | | | |
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| **311-FC-18** | **Flow Separation Control** | | | | | **Vinings** |
| Chaired by: A. GROSS, New Mexico State University and M. AMITAY, Rensselaer Polytechnic Institute | | | | | | |
| 1400 hrs<br>AIAA-2018-4016<br>**Steady and Unsteady Excitation of Separated Flow over the NASA Hump Model**<br>M. Koklu, NASA Langley Research Center, Hampton, VA | 1430 hrs<br>AIAA-2018-4017<br>**Numerical Simulation of Flow Control Over NASA Hump with Uniform Blowing Jet and Synthetic Jet**<br>G. Tang, R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1500 hrs<br>AIAA-2018-4018<br>**Response of a Laminar Separation Bubble to Zero-Net Mass Flux Actuation**<br>W. Wu, J. Seo, C. Meneveau, R. Mittal, Johns Hopkins University, Baltimore, MD | 1530 hrs<br>AIAA-2018-4019<br>**The Flow Physics of Synthetic Jets Interaction with Flow over a Flapped Airfoil**<br>A. Lindstrom, M. Monastero, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY | 1600 hrs<br>AIAA-2018-4020<br>**The Effect of Angle of Attack on the Formation and Evolution of the Flow Associated with a Synthetic Jet Actuator**<br>T. Rice, M. Amitay, Rensselaer Polytechnic Institute, Troy, NY | 1630 hrs<br>AIAA-2018-4021<br>**A Numerical Simulation Method of Co-Flow Jet Airfoil with Energy System inside the Duct**<br>K. Li, W. Song, J. Xu, Z. Han, Northwestern Polytechnical University, Xi'an, China | 1700 hrs<br>AIAA-2018-4022<br>**Numerical studies of three and four HAWT array using LES and IDDES**<br>C. Dao, M. Ilie, Georgia Southern University, Statesboro, GA |

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| **312-FC-19/APA-38** | **Flow Control Applications: Experimental** | | | | | **Kennesaw** |
| Chaired by: N. WEBB, The Ohio State University | | | | | | |
| 1400 hrs<br>AIAA-2018-4023<br>**Comparison of Different Vortex Generating Devices for Flow Control on a Vertical Tail**<br>V. Singh, P. Scholz, Technical University of Braunschweig, Braunschweig, Germany | 1430 hrs<br>AIAA-2018-4024<br>**Flow Dynamics Effected by Active Flow Control in an Offset Diffuser**<br>T. Burrows, B. Vukasinovic, A. Glezer, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-4025<br>**Joint Computational/Experimental Analysis of a Controlled Supersonic Cavity Flow for Scramjet Applications**<br>N. Alspach, N. Webb, D. Omari, D. Gaitonde, M. Samimy, Ohio State University, Columbus, OH | 1530 hrs<br>AIAA-2018-4026<br>**Re-Orienting the Flow on a Swept-Back and Yawed Circular Cylinder**<br>H. Kalyankar, L. Taubert, I. Wygnanski, University of Arizona, Tucson, Tucson, AZ | 1600 hrs<br>AIAA-2018-4027<br>**Externally Mounted Active Flow Control for External Stores Support System Drag Reduction**<br>M. Ouellette, T. Gorman, M. Blom, A. Voronovich, T. Ashcraft, B. Fisk, U.S. Military Academy, West Point, NY; et al. | 1630 hrs<br>AIAA-2018-4028<br>**Experimental investigation of DBD plasma actuators on a BWB aerial vehicle model**<br>P. Kaparos, S. Koltsakidis, P. Panagiotou, K. Yakinthos, Aristotle University of Thessaloniki, Thessaloniki, Greece | |

| Thursday, 28 June 2018 | | | | | | |
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| **313-FD-53** | **Shock-Wave/Boundary-Layer Interactions III** | | | | | **Lenox** |
| Chaired by: S. LELE, Stanford University and J. POGGIE, Purdue University- Sch of Aero and Astro | | | | | | |
| 1400 hrs<br>AIAA-2018-4029<br>**Numerical Simulation of Sidewall Influence on Supersonic Compression Ramp Interactions**<br>J. Poggie, K. Porter, Purdue University, West Lafayette, IN | 1430 hrs<br>AIAA-2018-4030<br>**Simulation of a Canonical Shock Wave-Boundary Layer Interaction Using an LBM-VLES Approach**<br>A. Jammalamadaka, Y. Li, P. Gopalakrishnan, R. Zhang, H. Chen, Exa Corporation, Burlington, MA | 1500 hrs<br>AIAA-2018-4031<br>**Large-Eddy Simulation of Axisymmetric Compression Corner Flow**<br>P. Iyer, National Institute of Aerospace, Hampton, VA; M. Malik, NASA Langley Research Center, Hampton, VA | 1530 hrs<br>AIAA-2018-4032<br>**Effects of Reynolds Number on Laminar Boundary Layer Shock-Interaction Hypersonic Flows on a Double Cone**<br>O. Tumuklu, D. Levin, University of Illinois, Urbana-Champaign, Urbana, IL; V. Theofilis, University of Liverpool, Liverpool, United Kingdom | 1600 hrs<br>AIAA-2018-4033<br>**Numerical Analysis of Laminar and Turbulent Shock-Wave Boundary Layer Interactions**<br>A. Gross, S. Lee, New Mexico State University, Las Cruces, NM | 1630 hrs<br>AIAA-2018-4034<br>**Temporal Evolution of Dynamical Structures in a Swept Compression Ramp**<br>D. Gonzalez, Naval Surface Warfare Center, Indian Head, MD; M. Adler, D. Gaitonde, Ohio State University, Columbus, OH | |

| Thursday, 28 June 2018 | | | | | | |
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| **314-FD-54** | **Low Re and Bio-Inspired III: Low Re Flows and Flows with Instabilities** | | | | | **Dunwoody** |
| Chaired by: D. RAGNI, Delft University of Technology and C. KANG, University of Alabama in Huntsville | | | | | | |
| 1400 hrs<br>AIAA-2018-4035<br>**Large-Eddy Simulation and Particle-Image Velocimetry of single-vortex ring instabilities**<br>Z. Yu, J. Chapelier, C. Scalo, P. Vlachos, Purdue University, West Lafayette, IN | 1430 hrs<br>AIAA-2018-4036<br>**Effects of Tripping on the Flow over an NACA-0012 Airfoil at a Moderate Reynolds Number**<br>P. Balakumar, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-4037<br>**The influence of the cavity in the flow structures of a zero-net-mass-flux jet**<br>M. Viturro, University of Toulouse, Toulouse, France; S. Le Clainche Martinez, J. Vega, Technical University of Madrid, Madrid, Spain; J. Soria, Monash University, Melbourne, Australia | 1530 hrs<br>AIAA-2018-4038<br>**CFD Simulations of Two Rectangular Water Jets Impinging on a Water Pool**<br>H. Gao, X. Han, Washington University in St. Louis, St. Louis, MO; Q. Liu, Harbin Institute of Technology, Harbin, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1600 hrs<br>AIAA-2018-4039<br>**Inter-Component Transfer of Reynolds Stress in a Compressible Turbulent Channel Flow**<br>X. Chen, Zhejiang Sci-Tech University, Hangzhou, China; F. Fei, Huazhong University of Science and Technology, Wuhan, China; Y. Li, Zhejiang Sci-Tech University, Hangzhou, China | | |

**Thursday, 28 June 2018**

**315-FD-55** — **Turbulence Models: Development and Validation** — **Auburn**

Chaired by: B. SMITH, Lockheed Martin Aeronautics and M. DENISON, NASA Ames Research Center

| 1400 hrs | 1430 hrs | 1500 hrs | 1530 hrs | 1600 hrs | | |
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| AIAA-2018-4040 | AIAA-2018-4041 | AIAA-2018-4042 | AIAA-2018-4043 | AIAA-2018-4044 | | |
| **Partially-Averaged Navier-Stokes Formulation of Two-Layer Turbulence Model** | **A Modified $k$-$\omega$ Turbulence Model for Finite-Element CFD** | **Modeling Passive Scalar Dynamics in Wall-Bounded Turbulence using Resolvent Analysis** | **Approximating space-time flow statistics from a limited set of known correlations** | **Wall-Distance Free Wray-Agarwal Turbulence Model with Elliptic Blending** | | |
| C. Kamble, S. Girimaji, Texas A&M University, College Station, TX | D. Stefanski, R. Glasby, J. Erwin, University of Tennessee, Knoxville, Knoxville, TN; S. Allmaras, Massachusetts Institute of Technology, Cambridge, MA; J. Coder, University of Tennessee, Knoxville, Knoxville, TN; N. Burgess, Independent, San Jose, CA | S. Dawson, California Institute of Technology, Pasadena, CA; T. Saxton-Fox, Princeton University, Princeton, NJ; B. McKeon, California Institute of Technology, Pasadena, CA | A. Towne, X. Yang, A. Lozano-Duran, Stanford University, Stanford, CA | X. Han, Washington University in St. Louis, St. Louis, MO; M. Rahman, Aalto University, St. Louis, MO; R. Agarwal, Washington University in St. Louis, St. Louis, MO | | |

**Thursday, 28 June 2018**

**316-FD-56** — **Future of Fluids: Big Data and Big Computation** — **International North**

**1400 - 1730 hrs**

Chaired by: Q. WANG, Massachusetts Institute of Technology and H. LUO, Vanderbilt University

Speakers:

**Data, Models and Extrapolation in the Physical Sciences**
Robert Moser, University of Texas, Austin

**Data-Driven Discovery of Governing Physical Laws and their Parametric Dependencies in the Engineering and Physical Sciences**
Nathan Kutz, University of Washington

**Trends and Paradigm Shifts in Computational Fluid Dynamics**
Jay Boris, Naval Research Laboratory

**Data-Driven Discovery of Closure Models**
Karthik Duraisamy, University of Michigan

**Modeling Systems in the Post-Dennard Era**
V. Balaji, Princeton University

A panel discussion will follow these presentations.

**Thursday, 28 June 2018**

**317-FD-67** — **Super- and Hypersonic Roughness Effects** — **Inman**

Chaired by: T. JULIANO, University of Notre Dame

| 1400 hrs | 1430 hrs | 1500 hrs | | | | |
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| AIAA-2018-4045 | AIAA-2018-4046 | AIAA-2018-4047 | | | | |
| **Sensitivity of hypersonic flows to distributed surface roughness using input-output analysis** | **Direct Numerical Simulations of roughness-induced transition in the boundary layer of a hypersonic spherical forebody under consideration of high-temperature gas effects** | **Investigation of the Streamwise Development of Distributed Surface Roughness Effects on Supersonic Flows** | | | | |
| D. Cook, J. Thome, J. Brock, J. Nichols, G. Candler, University of Minnesota, Twin Cities, Minneapolis, MN | A. Di Giovanni, C. Stemmer, Technical University of Munich, Munich, Germany | B. Kocher, C. Combs, P. Kreth, J. Schmisseur, University of Tennessee, Tullahoma, Tullahoma, TN | | | | |

**Thursday, 28 June 2018**

**318-GT-11** — **AEDC: Improved Optical Measurement Techniques at the AEDC** — **Embassy E**

Chaired by: B. MILLS, AEDC/ ATA and K. BUTLER, Arnold Engineering Development Complex

| 1400 hrs | 1430 hrs | 1500 hrs | 1530 hrs | 1600 hrs | | |
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| AIAA-2018-4048 | AIAA-2018-4049 | AIAA-2018-4050 | AIAA-2018-4051 | AIAA-2018-4052 | | |
| **Advances in Infrared Imaging Analysis Techniques for AEDC PWT/ VKF Wind Tunnel Applications (Invited)** | **Uncertainty Analysis of the Optical Model Attitude and Deformation System in the AEDC PWT 16T Facility (Invited)** | **Uncertainty Quantification in Steady State PSP Using Monte Carlo Simulations at AEDC (Invited)** | **Development of Unsteady Pressure Sensitive Paint Measurement Capability at Arnold Air Force Base (Invited)** | **Boundary Layer Transition- and Heat Transfer-Imaging of the AEDC Materials Wedge in the VKF Tunnel B Using Infrared Thermography (Invited)** | | |
| C. Hall, Arnold Engineering Development Complex, Arnold AFB, TN | C. Morris, M. Nelson, R. Rought, Arnold Engineering Development Complex, Tullahoma, TN | M. Nelson, Arnold Engineering Development Complex, Arnold AFB, TN | M. Sellers, M. Nelson, Quantitech, Inc., Arnold AFB, TN | J. Wehrmeyer, A. Alexander, C. Hall, J. Hopf, Arnold Engineering Development Complex, Arnold AFB, TN | | |

| Thursday, 28 June 2018 | | | | | | |
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| **319-MDO-22** | **Shape and Topology Optimization III** | | | | | **Hanover E** |
| Chaired by: H. KIM, University of California, San Diego | | | | | | |
| 1400 hrs<br>AIAA-2018-4053<br>**Topology Optimization of Active Structures using a Higher-Order Level-Set-XFEM-Density Approach**<br>M. Geiss, K. Maute, University of Colorado, Boulder, Boulder, CO | 1430 hrs<br>AIAA-2018-4054<br>**Multimaterial Thermoelastic Stress-constrained Topology Optimization of Structures with Adaptive Mesh Refinement**<br>T. Chin, G. Kennedy, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-4055<br>**Aeroelastic Tailoring using Additively Manufactured Lattice Structures**<br>M. Opgenoord, K. Willcox, Massachusetts Institute of Technology, Cambridge, MA | 1530 hrs<br>AIAA-2018-4056<br>**High Resolution Topology Optimization of Aerospace Structures with Stress and Frequency Constraints**<br>M. Leader, T. Chin, G. Kennedy, Georgia Institute of Technology, Atlanta, GA | 1600 hrs<br>AIAA-2018-4057<br>**Optimal Design of Multi-Body Mechanisms Using Layered Connectivity Parameterization (LCP)**<br>K. Swartz, D. Tortorelli, K. James, University of Illinois, Urbana-Champaign, Urbana, IL | 1630 hrs<br>AIAA-2018-4058<br>**On the Combined Effect of Design-space Dimensionality Reduction and Optimization Methods on Shape Optimization Efficiency**<br>D. D'Agostino, University of Rome "La Sapienza", Rome, Italy; A. Serani, M. Diez, National Research Council (CNR), Rome, Italy | 1700 hrs<br>AIAA-2018-4059<br>**Bidirectional Evolutionary Structural Optimization with Stationary Steps**<br>V. Vu, Ho Chi Minh City University of Transport, Ho Chi Minh City, Viet Nam |

| Thursday, 28 June 2018 | | | | | | |
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| **320-MST-9** | **Modeling and Simulation of Navigation and Communication Systems** | | | | | **Embassy H** |
| Chaired by: C. ATKINSON, Lockheed Martin Corporation and J. KRUEP, Engility Corporation | | | | | | |
| 1400 hrs<br>AIAA-2018-4060<br>**Simulation of Radar Signal Propagation via Multipath**<br>A. Sudol, S. Gordon, H. Ford, E. Inclan, D. Mavris, M. Miller, Georgia Institute of Technology, Atlanta, GA | 1430 hrs<br>AIAA-2018-4061<br>**A Component-Level Model of Automatic Dependent Surveillance - Broadcast (ADS-B)**<br>M. Madden, NASA Langley Research Center, Hampton, VA | 1500 hrs<br>AIAA-2018-4062<br>**Physics-based Radio Frequency Visualization for Operational Analysis**<br>M. Miller, E. Searles, Georgia Institute of Technology, Atlanta, GA | | | | |

| Thursday, 28 June 2018 | | | | | | |
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| **321-MST-10** | **Data Analysis Techniques Applied to Simulation** | | | | | **Embassy H** |
| Chaired by: P. ZAAL, NASA Ames Research Center and G. CHATTERJI, NASA Ames Research Center | | | | | | |
| 1400 hrs<br>**No Presentations** | | | | 1600 hrs<br>AIAA-2018-4063<br>**Machine Learning Algorithms To Improve Model Accuracy and Latency, and Human-Autonomy Teaming**<br>V. Houston, B. Barrows, W. Manuel, L. Le Vie, NASA Langley Research Center, Hampton, VA | 1630 hrs<br>AIAA-2018-4064<br>**Progress Toward Efficient Compression Algorithms for Application in Flight Simulation Environments**<br>J. Thomas, E. Dowell, Duke University, Durham, NC; M. Anderson, G. McGowan, Corvid Technologies, Inc., Mooresville, NC | 1700 hrs<br>AIAA-2018-4065<br>**An Adaptive Sequential Experiment Design Method for Metamodeling**<br>Y. Zhou, K. Fang, P. Ma, M. Yang, Harbin Institute of Technology, Harbin, China |

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| **322-TP-13** | **Aerothermodynamics and Thermal Protection Systems III** | | | | | **Embassy A** |
| Chaired by: X. WANG, The University of Alabama | | | | | | |
| 1400 hrs<br>AIAA-2018-4066<br>**Wall Boundary Conditions in Hypersonic Thermochemical Nonequilibrium Flows**<br>E. Josyula, C. Suchyta, III, K. Vogiatzis, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1430 hrs<br>AIAA-2018-4067<br>**Temperature and CO Number Density Measurements in Shocked CO and CO2 via Tunable Diode Laser Absorption Spectroscopy**<br>M. MacDonald, Jacobs, Moffett Field, CA; A. Brandis, B. Cruden, Analytical Mechanics Associates, Inc., Moffett Field, CA | 1500 hrs<br>AIAA-2018-4068<br>**Thermal performance simulation of combined saucer-shaped stratospheric airship**<br>J. Cai, Chinese Academy of Sciences, Beijing, China | 1530 hrs<br>AIAA-2018-4069<br>**Flow/Surface-Reaction Interaction and Heat Transfer Characteristics for High-Enthalpy and Dissociated Gaseous Carbon-Oxygen Mixture**<br>X. Yang, W. Tang, Y. Du, L. Liu, Y. Gui, China Aerodynamics Research and Development Center (CARDC), Mianyang, China | 1600 hrs<br>AIAA-2018-4070<br>**Experimental and numerical study of gas giant entry radiation in an expansion tube**<br>Y. Liu, C. James, R. Morgan, T. McIntyre, University of Queensland, Brisbane, Australia | 1630 hrs<br>AIAA-2018-4071<br>**Aerothermodynamic Shape Optimization of Reentry Capsule**<br>H. Kutkan, S. Eyi, Middle East Technical University, Ankara, Turkey | |

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| **323-TP-14** | **Theoretical, Analytical, and Computational Heat Transfer: Conduction, Convection, Radiation, and Phase Change I** | | | | | **Embassy C** |
| Chaired by: P. YEE, The Aerospace Corporation and W. TSAI, California State University, Maritime Academy | | | | | | |
| 1400 hrs<br>AIAA-2018-4072<br>**Computational Heat Transfer Characteristics and Flow Regimes inside a Heat Exchanger Tube Fitted With Swirl Inserts**<br>E. Khalil, W. Abdelmaksoud, A. Mahfouz, Cairo University, Cairo, Egypt; A. Fahim, Housing and Building National Research Center, Cairo, Egypt | 1430 hrs<br>AIAA-2018-4073<br>**Generalized Solution for Two-Dimensional Transient Heat Conduction Problems with Partial Heating**<br>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<br>AIAA-2018-4074<br>**Study of Film Cooling Performance for Turbine Blade Trailing Edge with Different V-Shaped Rib Orientation**<br>L. Ye, C. Liu, H. Liu, G. Xie, Northwestern Polytechnical University, Xi'an, China | 1530 hrs<br>Oral Presentation<br>**Near-Field Thermal Radiation between Hyperbolic Topological Insulators**<br>R. Zhang, University of North Texas, Denton, TX | 1600 hrs<br>AIAA-2018-4075<br>**Calculation of the Spectral Hemispherical Emissivity of an Arbitrarily Orientated Uniaxial Crystal**<br>X. Wu, C. Fu, Peking University, Beijing, China; Z. Zhang, Georgia Institute of Technology, Atlanta, GA | 1630 hrs<br>AIAA-2018-4076<br>**Radiative Heating Prediction of Hyper-Velocity Re-entry Vehicles based on Finite Volume Method**<br>J. Lyu, J. Hao, W. Miao, X. Cheng, J. Yu, China Aerospace Science and Technology Corporation (CASC), Beijing, China | 1700 hrs<br>AIAA-2018-4077<br>**A Numerical Model of the Blade Element Momentum Method for Rotating Airfoils with Heat Transfer Calculation**<br>A. Samad, F. Morency, University of Québec, Montréal, Canada; C. Volat, University of Québec, Chicoutimi, Canada |

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| **324-TP-15** | **Heat Transfer in Heating, Cooling and Power Generation Systems II** | | | | | **Embassy B** |
| Chaired by: M. PATE, Texas A&M University and W. FLAHERTY, MIT Lincoln Laboratory | | | | | | |
| 1400 hrs<br>AIAA-2018-4078<br>**Thermodynamic Analysis of a Two-Stage Cascade Refrigeration Cycle for Application to Venus Lander Payload Electronics Cooling**<br>K. Anderson, T. Gross, California State Polytechnic University, Pomona, CA; C. McNamara, A. Gatti, Ingenium Technical Services, Inc., Cupertino, CA | 1430 hrs<br>AIAA-2018-4079<br>**The Effect of Turbine Blade Pre-Design on Three-Dimensional Thermal and Mechanical Stress Distribution Resulting in Component Creep Life**<br>N. Schmidt, F. Grauer, A. Simon, P. Geers, MTU Aero Engines, Munich, Germany; S. Staudacher, University of Stuttgart, Stuttgart, Germany; K. Vogeler, Technical University of Dresden, Dresden, Germany | 1500 hrs<br>Oral Presentation<br>**Impact of Geometrical Characteristics on the Condensate Retention and Frost Formation on Metal Foams**<br>K. Nawaz, Oak Ridge National Laboratory, Oak Ridge, TN; A. Jacobi, University of Illinois, Urbana-Champaign, Urbana, IL | 1530 hrs<br>AIAA-2018-4080<br>**Aerothermal Optimization of Internal Cooling Passages Using a Discrete Adjoint Method**<br>P. He, C. Mader, J. Martins, K. Maki, University of Michigan, Ann Arbor, Ann Arbor, MI | 1600 hrs<br>AIAA-2018-4081<br>**Optimization of round-to-slot hole to improve film cooling performance**<br>H. Ying, J. Zhang, C. Wang, Nanjing University of Aeronautics and Astronautics, Nanjing, China | | |

| Thursday, 28 June 2018 | | |
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| **325-NW-10**<br>**1600 - 1630 hrs** | **Networking Coffee Break** | **Exposition Hall** |

| Thursday, 28 June 2018 | | |
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| **326-RL-5**<br>**1630 - 1800 hrs** | **Rising Leaders Keynote Session** | **Centennial IV** |

## Friday

| Friday, 29 June 2018 | | |
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| **327-SB-5**<br>**0730 - 0800 hrs** | **Speakers' Briefing** | **Session Rooms** |

| Friday, 29 June 2018 | | |
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| **328-PLNRY-5**<br>**0800 - 0900 hrs** | **Friday Plenary: Drone Technology - Leading the Data Revolution** | **Centennial I, II, III** |
| Keynote Speaker<br>**Anil Nanduri**<br>Vice President and General Manager, Drone Group<br>Intel Corporation | | |

| Friday, 29 June 2018 | | |
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| **329-NW-11**<br>**0900 - 0930 hrs** | **Networking Coffee Break** | **Centennial Foyer** |

| Friday, 29 June 2018 | | | | | | |
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| **330-AA-50** | **Integration Effects and Flight Acoustics III** | | | | | **Techwood** |
| Chaired by: R. THOMAS, NASA Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-4082<br>**Aeroacoustics of High-Fidelity URANS Simulations of a Model Contra-Rotating Open Rotor with Mounting Pylon**<br>J. Kleinert, L. Dürrwächter, M. Kessler, E. Kraemer, University of Stuttgart, Stuttgart, Germany | 1000 hrs<br>AIAA-2018-4083<br>**Sound Quality Assessments of Over-the-Wing Engine Configurations Applied to Continuous Descent Approaches**<br>M. Pereda Albarran, F. Schültke, E. Stumpf, RWTH Aachen University, Aachen, Germany | 1030 hrs<br>AIAA-2018-4084<br>**Investigating the Effect of Anisotropy in Amiet's Analytical Leading-Edge Noise Model - An Extended Abstract**<br>R. Karve , D. Angland, University of Southampton, Southampton, United Kingdom; T. Node-Langlois, Airbus, Toulouse, France | 1100 hrs<br>AIAA-2018-4085<br>**Noise Reduction Design for Flap Side-edges toward FQUROH Second Flight Demonstration**<br>M. Murayama, Y. Yokokawa, Y. Ito, T. Takaishi, R. Sakai, K. Yamamoto, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan; et al. | 1130 hrs<br>AIAA-2018-4086<br>**Acoustic Wind Tunnel Test with 18% Scale Half-span Model toward FQUROH Second Flight Demonstration**<br>Y. Yokokawa, M. Murayama, T. Takaishi, H. Ura, M. Kohzai, Y. Ito, Japan Aerospace Exploration Agency (JAXA), Mitaka, Japan; et al. | 1200 hrs<br>AIAA-2018-4087<br>**FQUROH: A Flight Demonstration Project for Airframe Noise Reduction Technology – the 2nd Flight Demonstration**<br>K. Yamamoto, T. Takaishi, M. Murayama, Y. Yokokawa, Y. Ito, M. Kohzai, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; et al. | |

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| **331-AA-51** | **Turbomachinery and Core Noise IV** | | | | | **Roswell** |
| Chaired by: J. WINKLER, United Technologies Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-4088<br>**Noise sources of a lean-premixed jet flame**<br>K. Pausch, S. Herff, RWTH Aachen University, Aachen, Germany; H. Nawroth, C. Paschereit, Technical University of Berlin, Berlin, Germany; W. Schroeder, RWTH Aachen University, Aachen, Germany | 1000 hrs<br>AIAA-2018-4089<br>**CFD/CAA coupling strategies for rearward fan noise**<br>T. Node-Langlois, Airbus, Toulouse, France; V. Ficat-Andrieu, Y. Detandt, Free Field Technologies, Mont-Saint-Guibert, Belgium | 1030 hrs<br>AIAA-2018-4090<br>**Development of an Improved Core Noise Prediction Method for Long-cowl Engines**<br>C. Ekoule, B. Tester, University of Southampton, Southampton, United Kingdom; S. Funke, C. Richter, Rolls-Royce Group plc, Blankenfelde, Germany | 1100 hrs<br>AIAA-2018-4091<br>**Numerical investigations of flutter phenomenon in compressor stages of helicopter engines**<br>A. Vallon, M. Herran, Safran Group, Bordes, France; V. Ficat-Andrieu, Y. Detandt, Free Field Technologies, Toulouse, France | 1130 hrs<br>AIAA-2018-4092<br>**Bifurcation Measurement and Analysis of a Nonlinear Rijke-type Thermoacoustic System**<br>D. Zhao, University of Canterbury, Christchurch, New Zealand; X. Li, Nanyang Technological University, Singapore, Singapore | | |

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| **332-AA-52** | **Computational Aeroacoustics V** | | | | | **Marietta** |
| Chaired by: A. PILON, Lockheed Martin Aeronautics | | | | | | |
| 0930 hrs<br>AIAA-2018-4093<br>**A Comparison of Boundary Integral Formulations for Sound Scattered by Moving Bodies**<br>M. Gennaretti, G. Bernardini, C. Poggi, Roma Tre University, Rome, Italy; C. Testa, National Research Council (CNR), Rome, Italy | 1000 hrs<br>AIAA-2018-4094<br>**Noise Prediction of a Transonic Cavity Flow via Shear-Layer-Adapted Delayed Detached-Eddy Simulation**<br>O. Yalcin, K. Cengiz, Y. Ozyoruk, Middle East Technical University, Ankara, Turkey | 1030 hrs<br>AIAA-2018-4095<br>**Towards Direct Computation of Aeroacoustic Noise with the High-Order FR/CPR Method**<br>J. Shi, H. Yan, Northwestern Polytechnical University, Xi'an, China; Z. Wang, University of Kansas, Lawrence, Lawrence, KS | 1100 hrs<br>AIAA-2018-4096<br>**A Hybrid Computational Aeroacoustic Method For Low Speed Flows**<br>A. Tosh, M. Caraeni, D. Caraeni, Siemens, Bellevue, WA | 1130 hrs<br>AIAA-2018-4097<br>**Unsteady coherent surface-pressure fluctuations from time-averaged flow data with given two-point statistics**<br>F. Avallone, D. Casalino, D. Ragni, Delft University of Technology, Delft, The Netherlands | 1200 hrs<br>AIAA-2018-4098<br>**Prediction of Acoustic Radiation from a Co-rotating Vortex Pair Using Two-dimensional Spectral AA**<br>F. Feng, C. Tian, China Aerospace Science and Technology Corporation (CASC), Beijing, China | |

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| **333-AA-53** | **Duct Acoustics V** | | | | | **Spring** |
| Chaired by: R. DOUGHERTY, OptiNav Inc | | | | | | |
| 0930 hrs<br>AIAA-2018-4099<br>**Measurement of Noise Reduction from Acoustic Casing Treatments Installed Over a Subscale High Bypass Ratio Turbofan Rotor**<br>R. Bozak, NASA Glenn Research Center, Cleveland, OH; R. Dougherty, OptiNav, Inc., Bellevue, WA | 1000 hrs<br>AIAA-2018-4100<br>**Experimental assessment of the effect of temperature gradient across an aeroacoustic liner**<br>F. Mery, D. Sebbane, E. Piot, F. Simon, P. Reulet, ONERA, Toulouse, France; A. Carazo-Mendez, Airbus, Toulouse, France | 1030 hrs<br>AIAA-2018-4101<br>**Compact beam liners for low frequency noise**<br>M. Farooqui, Y. Aurégan, University of Le Mans, Le Mans, France | 1100 hrs<br>AIAA-2018-4102<br>**Helmholtz Resonator Liner with Flexible Walls**<br>K. Knobloch, L. Enghardt, F. Bake, German Aerospace Center (DLR), Berlin, Germany | 1130 hrs<br>AIAA-2018-4103<br>**Reflected wave manipulation by varying-depth acoustic liners**<br>J. Guo, X. Zhang, Y. Fang, R. Fattah, Hong Kong University of Science and Technology, Hong Kong, Hong Kong; S. Miao, G. Zhou, AVIC Aerodynamics Research Institute, Harbin, China; et al. | | |

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| **334-AA-54** | **Acoustic/Fluid Dynamics Interactions VII** | | | | | **University** |
| Chaired by: C. BROWN, NASA Glenn | | | | | | |
| 0930 hrs<br>AIAA-2018-4104<br>**Chaotic Analysis of the Thermoacoustic Instabilities of a Trapped Vortex Combustor**<br>R. Hernandez, University of Guanajuato, Salamanca, Mexico; G. Troiani, Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Santa Maria di Galeria, Italy; T. Pagliaroli, Niccolò Cusano University, Rome, Italy; A. Hernandez-Guerrero, University of Guanajuato, Salamanca, Mexico | 1000 hrs<br>AIAA-2018-4105<br>**Effects of Free Stream Disturbance on the Development of the Compressible Flow around a Square Cylinder at Subsonic Mach Numbers**<br>Y. Inoue, T. Kanuma, Y. Tasai, H. Maekawa, University of Electro-Communications, Chofu, Japan | 1030 hrs<br>AIAA-2018-4106<br>**Benchmark Assessment of an Improved Regularization Technique for Generalized Inverse Beamforming**<br>R. Zamponi, N. Van de Wyer, C. Schram, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium | 1100 hrs<br>AIAA-2018-4107<br>**Experimental Investigation on Circular Cylinders with Metal Foam for Noise Reduction**<br>F. Liu, H. Guo, T. Hu, P. Liu, Beihang University, Beijing, China | | | |

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| **335-AA-55**<br>**0930 - 1230 hrs** | **Fan Broadband Noise Panel** | **Piedmont** |

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| **336-AMT-10/GT-12** | **Improved Measurements Techniques in Ground Test I** | | | | | **Embassy G** |
| Chaired by: R. KUMAR, Florida State University | | | | | | |
| 0930 hrs<br>AIAA-2018-4108<br>**Comparative Analysis of Two Cryogenic Force Balance Calibration Systems**<br>K. Toro, D. Burns, P. Parker, NASA Langley Research Center, Hampton, VA | 1000 hrs<br>AIAA-2018-4109<br>**Implementation and Use of a Convergence Test for Iterative Wind Tunnel Balance Load Predictions**<br>N. Ulbrich, Jacobs, Moffett Field, CA | 1030 hrs<br>AIAA-2018-4110<br>**Statistical Analysis of the Results from Experimentation utilizing Wind Tunnel Angle Measurement Systems**<br>H. Glaudel, NASA Langley Research Center, Hampton, VA | 1100 hrs<br>AIAA-2018-4111<br>**Statistical Characteristics of the Influence of an Electronically Scanned Pressure Transducer on Measurement Error and Uncertainty**<br>F. Semmelmayer, M. Reeder, R. Seymour, Air Force Institute of Technology, Wright-Patterson AFB, OH | 1130 hrs<br>AIAA-2018-4112<br>**Sensors for the Measurement of Flow Induced Surface Pressure Fluctuations: Detection of Clipping and Calibration**<br>K. Stahl, F. Manegar, T. Carolus, University of Siegen, Siegen, Germany | | |

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| **337-APA-40** | **Airfoil/Wing Aerodynamics Including Ground Effects** | | | | | **Courtland** |
| Chaired by: C. TILMANN, AFRL/RQV | | | | | | |
| 0930 hrs<br>AIAA-2018-4113<br>**Numerical Study of the Aerodynamic Forces and Flow Physics of a Delta Wing in Mutational Ground Effect**<br>Y. Qin, P. Liu, Q. Qu, Y. Zheng, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1000 hrs<br>AIAA-2018-4114<br>**Numerical Determination of Critical Mach Number of a Three -Element Airfoil in Unbounded Flow and in Ground Effect**<br>B. Hu, Washington University in St. Louis, St. Louis, MO; Q. Qu, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1030 hrs<br>AIAA-2018-4115<br>**Numerical Study of the Aerodynamics of a Rectangular Multi-Element Wing in Ground Effect**<br>N. Deng, Washington University in St. Louis, St. Louis, MO; Q. Qu, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1100 hrs<br>AIAA-2018-4116<br>**Studies on 2D and 3D Boundary layer Blockage and External Flow Choking at Moving Wing in Ground Effect**<br>V. Sanal Kumar, Indian Space Research Organisation, Trivandrum, India; V. Saravanan, Seoul National University, Seoul, South Korea; V. Srinivasan, Virginia Polytechnic Institute and State University, Blacksburg, VA; G. S, Air India Ltd, Chennai, India; S. Mani, Georgia Institute of Technology, Atlanta, GA; V. Sankar, Kumaraguru College of Technology, Coimbatore, India; et al. | 1130 hrs<br>AIAA-2018-4117<br>**Camber Reduction to Mitigate Burst Wakes in Inverted Multi-element Airfoils Operating in Ground Effect**<br>P. Pant, Delhi Technological University, New Delhi, India | | |

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| **338-APA-41** | **Rotorcraft and V/STOL Aerodynamics I** | | | | | **Fairlie** |
| Chaired by: J. MILGRAM and N. HARIHARAN, CREATE-AV | | | | | | |
| 0930 hrs<br>AIAA-2018-4118<br>**Low Reynolds Number Aerodynamics Study on Coaxial and Quad-Rotor**<br>D. Shukla, N. Hiremath, N. Komerath, Georgia Institute of Technology, Atlanta, GA | 1000 hrs<br>AIAA-2018-4119<br>**Efficient Simulation of Multi-rotor Configurations with Low Reynolds Number Propellers**<br>J. Chiew, Stanford University, Stanford, CA; M. Aftosmis, NASA Ames Research Center, Moffett Field, CA | 1030 hrs<br>AIAA-2018-4120<br>**Assessment of Turbulence Modeling and Wake-Grid Resolution for Lift-Offset Coaxial Rotor Simulations**<br>Z. Jia, S. Lee, University of California, Davis, Davis, CA; K. Brentner, Pennsylvania State University, University Park, PA | 1100 hrs<br>AIAA-2018-4121<br>**Experimental Characterization of UAS Flow Fields Through Hotwire Anemometry and PIV**<br>J. Velarde, J. Connors, M. Berry, M. Ali, M. Glauser, Syracuse University, Syracuse, NY | 1130 hrs<br>AIAA-2018-4122<br>**Static Performance Results of Propellers Used on Nano, Micro, and Mini Quadrotors**<br>R. Deters, Embry-Riddle Aeronautical University, Daytona Beach, FL; O. Dantsker, University of Illinois, Urbana-Champaign, Urbana, IL; S. Kleinke, N. Norman, Embry-Riddle Aeronautical University, Daytona Beach, FL; M. Selig, University of Illinois, Urbana-Champaign, Urbana, IL | | |

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| **339-APA-42** | **Weapons Aerodynamics: Missile/Projectile/Guided-Munitions** | | | | | **Greenbriar** |
| Chaired by: J. DOYLE, US Army AMRDEC and K. GERZINA, Orbital ATK Organization | | | | | | |
| 0930 hrs<br>AIAA-2018-4123<br>**Assessment of HPCMP CREATE™-AV Kestrel Version 7.1.2 Accuracy for Store Separation Simulations**<br>M. Prior, S. Kernazhitskiy, B. Jolly, Air Force SEEK EAGLE Office, Eglin AFB, FL | 1000 hrs<br>AIAA-2018-4124<br>**Numerical study on the impact of a maneuver on the Phantom-Yaw-Effect in transonic flow**<br>C. Schnepf, E. Schuelein, German Aerospace Center (DLR), Göttingen, Germany | 1030 hrs<br>AIAA-2018-4125<br>**Aerodynamic Shape Optimization of a Supersonic Bending Body Projectile**<br>J. Paul, J. Vasile, S. Silton, Army Research Laboratory, Aberdeen Proving Ground, MD | 1100 hrs<br>AIAA-2018-4126<br>**Validation of Coupled Computations for Pitching Motions of a Canard-Controlled Body with Dynamic Wind Tunnel Data**<br>J. Sahu, F. Fresconi, Army Research Laboratory, Aberdeen Proving Ground, MD | 1130 hrs<br>AIAA-2018-4127<br>**CFD-Based Planform Design Study of a Low Aspect Ratio Wing**<br>E. Dikbas, H. Atik, TUBITAK, Ankara, Turkey | 1200 hrs<br>AIAA-2018-4128<br>**Drag reduction study of a 2D metal projectile series using SU2 code**<br>S. K, B. K, P. Selvarajan, D. P, P. V, Kumaraguru College of Technology, Coimbatore, India | |

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| **340-ASE-14** | **Engine Ice-Crystal Icing Modeling and Analysis** | | | | | **Hanover C** |
| Chaired by: D. FULEKI, National Research Council Canada and M. BRAVIN, Boeing Commercial Airplanes | | | | | | |
| 0930 hrs<br>AIAA-2018-4129<br>**Evaluation of a Thermodynamic Ice-Crystal Icing Model Using Experimental Ice Accretion Data**<br>T. Bartkus, Ohio Aerospace Institute, Cleveland, OH; P. Struk, NASA Glenn Research Center, Cleveland, OH; J. Tsao, Ohio Aerospace Institute, Cleveland, OH | 1000 hrs<br>AIAA-2018-4130<br>**Ice Crystals Trajectory Calculations in a Turbofan Engine**<br>G. Aouizerate, V. Charton, M. Balland, Safran Group, Moissy-Cramayel, France; J. Senoner, P. Trontin, C. Laurent, ONERA, Toulouse, France; et al. | 1030 hrs<br>AIAA-2018-4131<br>**Numerical Investigation of Particle Breakup and Ingestion into an Axial Low Pressure Compressor at Engine Icing Operating Points**<br>D. Rigby, W. Wright, Vantage Partners, LLC, Cleveland, OH | 1100 hrs<br>AIAA-2018-4132<br>**Numerical Studies of Altitude Scaling for Ground Level Tests of Aeroengines with Ice Crystals**<br>T. Currie, National Research Council Canada, Ottawa, Canada | 1130 hrs<br>AIAA-2018-4133<br>**Development of a Small Modular Multi-Stage Axial Compressor for Ice Crystal Icing Research**<br>T. Currie, National Research Council Canada, Ottawa, Canada | | |

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| **341-ATIO.ACD-13** | **Aircraft Systems and Subsystems** | | | | | **Hanover A** |
| Chaired by: I. CHAKRABORTY, ASDL, Georgia Tech and D. LEVY, Sierra Nevada Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-4134<br>**High Level Requirements impact on Configuration Trade-Off analyses in a multidisciplinary integrated conceptual design methodology**<br>R. Fusaro, N. Viola, Technical University of Turin, Turin, Italy | 1000 hrs<br>AIAA-2018-4135<br>**Influence of High Level Requirements in Aircraft Design: from scratch to sketch**<br>R. Fusaro, N. Viola, Technical University of Turin, Turin, Italy | 1030 hrs<br>AIAA-2018-4136<br>**Rapid Assessment of Power Requirements and Optimization of Thermal Ice Protection Systems**<br>M. Bendarkar, I. Chakraborty, E. Garcia, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1100 hrs<br>AIAA-2018-4137<br>**Conceptual design framework for an aircraft auxiliary photovoltaic system**<br>S. Liscouet-Hanke, E. Murugesan, Concordia University, Montréal, Canada | 1130 hrs<br>AIAA-2018-4138<br>**Optimization of an Oleo-pneumatic Shock Absorber Suitable for Subscale Aircraft**<br>W. Chenhao, H. Jun, L. Song, F. Jingcheng, Beihang University, Beijing, China | | |

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| **342-ATIO.ATM-19** | **Operations Management III** | | | | | **Embassy D** |
| Chaired by: T. EDWARDS | | | | | | |
| 0930 hrs<br>AIAA-2018-4139<br>**Taxi Event Extraction from ASDE-X Surveillance for Surface Performance Evaluation**<br>N. Mirmohammadsadeghi, S. Hotle, A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA; J. Gulding, Federal Aviation Administration, Washington, D.C. | 1000 hrs<br>AIAA-2018-4140<br>**Identification of Safety Metrics for Airport Surface Operations**<br>W. Okolo, M. Oconnor, L. Spirkovska, NASA Ames Research Center, Moffett Field, CA; H. Soyfer, San Jose State University, San Jose, CA | 1030 hrs<br>AIAA-2018-4141<br>**Predictive Models of Departure and Arrival Occupancy Time and Take-Off Distance**<br>T. Spencer, MITRE Corporation, McLean, VA; A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1100 hrs<br>AIAA-2018-4142<br>**An Assessment of the Terminal Airspace Performance Indicator**<br>O. Alsalous, CSSI, Inc., Washington, D.C.; R. Galaviz-Schomisch, Federal Aviation Administration, Washington, D.C. | | | |

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| **343-ATIO.DE-3/ATIO.ACD-14/ MDO-24** | **Design Optimization and Model-Based Design II** | | | | | **Hanover F** |
| Chaired by: S. KOMADINA, Raytheon Missile Systems | | | | | | |
| 0930 hrs<br>AIAA-2018-4143<br>**Parametric Analysis of Aircraft Wing Weight Using Low-Order Physics-Based Analysis**<br>E. Olson, NASA Langley Research Center, Hampton, VA; Q. Henricks, Ohio State University, Columbus, OH | 1000 hrs<br>AIAA-2018-4144<br>**The Carry-through Tube Spar weight penalty in UAVs**<br>J. Kolli, R. Hale, University of Kansas, Lawrence, Lawrence, KS | 1030 hrs<br>AIAA-2018-4145<br>**Multidisciplinary Design of a Canard**<br>A. Yetgin, B. Acar, ROKETSAN Missile Industries, Inc., Ankara, Turkey | 1100 hrs<br>AIAA-2018-4146<br>**Update on the Development of a Flutter Analysis Capability for Unconventional Aircraft Concepts using HCDstruct**<br>J. Quinlan, F. Gern, NASA Langley Research Center, Hampton, VA | 1130 hrs<br>AIAA-2018-4147<br>**Framework to Access Effects of Structural Flexibility on Dynamic Loads Developed in Maneuvering Aircraft**<br>D. Sarojini, R. Duca, H. Solano, I. Chakraborty, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1200 hrs<br>AIAA-2018-4148<br>**Static Aeroelastic Characteristics of Grid Structure Wing**<br>L. Qiao, Z. Zhou, C. Zhang, Northwestern Polytechnical University, Xi'an, China | |

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| **344-ATIO.TF-13** | **V/STOL Aircraft Design Considerations and Requirements** | | | | | **Hanover B** |
| Chaired by: S. BRICENO, Georgia Institute of Technology and B. BARMORE, NASA-Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-4149<br>**Safety Considerations in Emerging Electric Aircraft Architectures**<br>C. Courtin, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA | 1000 hrs<br>AIAA-2018-4150<br>**Benefit Analysis and System Design Considerations for Drag Reduction of Inactive Hover Rotors on Electric Fixed-Wing VTOL Vehicles**<br>P. Stahl, C. Rössler, M. Hornung, Technical University of Munich, Munich, Germany | 1030 hrs<br>AIAA-2018-4151<br>**Feasibility Study of Short Takeoff and Landing Urban Air Mobility Vehicles using Geometric Programming**<br>C. Courtin, M. Burton, A. Yu, P. Butler, P. Vascik, R. Hansman, Massachusetts Institute of Technology, Cambridge, MA | 1100 hrs<br>AIAA-2018-4152<br>**Dynamic Addressing for On-Demand Mobility**<br>S. Ghayouraneh, S. El-Ghazaly, University of Arkansas, Fayetteville, AR; J. Rankin, South Dakota School of Mines and Technology, Rapid City, SD | | | |

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| **345-F360-9**<br>**0930 - 1130 hrs** | **Friday Forum 360: A Path to Supersonic Commercial Travel** | **Centennial IV** |

Moderator: Robert "Robbie" Cowart, Director, Supersonic Technology Development, Gulfstream Aerospace Corporation

Panelists:

**Mike Hinderberger**
Senior Vice President, Aircraft Development
Aerion Corporation

**David Richardson**
Director for Air Vehicle Design and Technology
Advanced Development Programs
Lockheed Martin Aeronautics Company

**Blake Scholl**
Founder and Chief Executive Officer
Boom Supersonic

**Kevin Welsh**
Executive Director, Office of Environment and Energy
FAA

**Joseph Zelina**
Consulting Engineer
GE Aviation

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| **346-FD-57** | **CFD Modeling and Applications (Applications of CFD, CFD Optimization, Error and Uncertainty, Validation, etc.) V** | | | | | **Vinings** |
| Chaired by: M. UGOLOTTI, University of Cincinnati and A. CONTE, Jet Propulsion Laboratory | | | | | | |
| 0930 hrs<br>AIAA-2018-4153<br>**Mesh adaptation strategies using wall functions and low-Reynolds models**<br>L. Frazza, F. Alauzet, A. Loseille, National Institute for Research in Computer Science and Control (INRIA), Saclay, France | 1000 hrs<br>AIAA-2018-4154<br>**Discrete-Adjoint Solver Tests and Consistency Analysis for Discontinuous Galerkin Discretization**<br>M. Ugolotti, N. Wukie, M. Turner, P. Orkwis, University of Cincinnati, Cincinnati, OH | 1030 hrs<br>AIAA-2018-4155<br>**Implementation of SU² Solver with Cell-Based Data Structure for 3D RANS Equations**<br>M. Mansoor Saatloo, Middle East Technical University, Ankara, Turkey | 1100 hrs<br>AIAA-2018-4156<br>**Assessment of Turbulence Models and Mesh Refinement for Aero-optical Simulations of Large Ground Based Telescopes**<br>K. Das, GMTO Corporation, Pasadena, CA; K. Vogiatzis, Engility Corporation, Washington, D.C.; G. Angeli, GMTO Corporation, Pasadena, CA | | | |

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| **347-FD-58** | **Fundamental Fluid Flows VI: Vortices** | | | | | **Lenox** |
| Chaired by: D. STICH and A. KAZEMI, fau | | | | | | |
| 0930 hrs<br>AIAA-2018-4157<br>**Experimental and Numerical Analysis of a Streamwise Vortex downstream of a Delta Wing**<br>T. Landa, L. Klug, R. Radespiel, Technical University of Braunschweig, Braunschweig, Germany; S. Probst, T. Knopp, German Aerospace Center (DLR), Göttingen, Germany | 1000 hrs<br>AIAA-2018-4158<br>**Effects of Vortex Number and Direction of Rotation on Vortically Dominated Wakes**<br>A. Sydney, Naval Surface Warfare Center, Bethesda, MD; J. Milluzzo, U.S. Naval Academy, Annapolis, MD | 1030 hrs<br>AIAA-2018-4159<br>**Necessity of dimensional support for the reliable calculation of finite-time Lyapunov exponent fields from experimental data**<br>M. Rockwood, Air Force Research Laboratory, Dayton, OH; M. Green, Syracuse University, Syracuse, NY | | | | |

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| **348-FD-59** | **CFD Algorithm Development I** | | | | | **International North** |
| Chaired by: H. NISHIKAWA, National Institute of Aerospace | | | | | | |
| 0930 hrs<br>AIAA-2018-4160<br>**A New Formulation of Hyperbolic Navier-Stokes Solver based on Finite Volume Method on Arbitrary Grids**<br>L. Li, J. Lou, H. Luo, North Carolina State University, Raleigh, NC; H. Nishikawa, National Institute of Aerospace, Hampton, VA | 1000 hrs<br>AIAA-2018-4161<br>**Mach Uniform All-Speed Compressible CFD Solver Unifying the Implicit MUSCL and SMAC**<br>E. Shima, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; K. Kitamura, Yokohama National University, Yokohama, Japan | 1030 hrs<br>AIAA-2018-4162<br>**Immersed Boundary Method as an Inverse Problem**<br>J. Yan, J. Hicken, Rensselaer Polytechnic Institute, Troy, NY | 1100 hrs<br>AIAA-2018-4163<br>**A level set based boundary reconstruction method for 3-D bio-inspired flow simulations with sharp-interface immersed boundary method**<br>X. Deng, P. Han, J. Wang, University of Virginia, Charlottesville, Charlottesville, VA; J. Socha, Virginia Polytechnic Institute and State University, Blacksburg, VA; H. Dong, University of Virginia, Charlottesville, Charlottesville, VA | | | |

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| **349-FD-60** | **High Order Methods** | | | | | **Dunwoody** |
| Chaired by: G. LODATO and P. MORGAN, Ohio Aerospace Institute | | | | | | |
| 0930 hrs<br>AIAA-2018-4164<br>**Toward an improved wall treatment for multiple-correction k-exact schemes**<br>A. Menasria, P. Brenner, ArianeGroup, Les Mureaux, France; P. Cinnella, Paris Institute of Technology, Paris, France; G. Pont, Airbus, Blagnac, France | 1000 hrs<br>AIAA-2018-4165<br>**High-Order Artificial Dissipation Operators Possessing the Summation-By-Parts Property**<br>D. Craig Penner, D. Zingg, University of Toronto, Toronto, Canada | 1030 hrs<br>AIAA-2018-4166<br>**Third-Order Edge-Based Scheme for Unsteady Problems**<br>H. Nishikawa, Y. Liu, National Institute of Aerospace, Hampton, VA | 1100 hrs<br>AIAA-2018-4167<br>**Connectivity-change moving mesh methods for high-order meshes: Toward closed advancing-layer high-order boundary layer mesh generation**<br>R. Feuillet, A. Loseille, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France; D. Marcum, Mississippi State University, Starkville, MS; F. Alauzet, National Institute for Research in Computer Science and Control (INRIA), Palaiseau, France | 1130 hrs<br>AIAA-2018-4168<br>**Development of a Stable High-Order Point-Value Enhanced Finite Volume (PFV) Method Based on Approximate Delta Functions**<br>L. Xuan, J. Majdalani, Auburn University, Auburn, AL | | |

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| **350-FD-65**<br>**0930 - 1230 hrs** | **Transition Open Forum** | **Inman** |

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| **351-FT-6** | **General Flight Testing** | | | | | **Embassy F** |
| Chaired by: A. FREEBORN and D. OWENS, NASA-Langley Research Center | | | | | | |
| 0930 hrs<br>AIAA-2018-4169<br>**Improved Altitude Hold and Hover Stabilization System Flight Testing on the United States Air Force HH-60G Helicopter**<br>D. Koeniguer, D. Spear, U.S. Air Force, Las Vegas, NV | 1000 hrs<br>AIAA-2018-4170<br>**The Application of FAA Handling Qualities Rating Method for Certification of Transport Category Airplane System Failures**<br>K. Alberghini, B. Lee, The Boeing Company, Seattle, WA | 1030 hrs<br>AIAA-2018-4171<br>**Transport Aircraft Certification Testing for Pilot Closed Loop Dynamic Instability**<br>B. Lee, K. Vining, The Boeing Company, Seattle, WA | 1100 hrs<br>Oral Presentation<br>**And the World Turned: Spin Testing the DG-1000S**<br>T. McDonald, U.S. Air Force Test Pilot School, Edwards AFB, CA | | | |

| Friday, 29 June 2018 | | | | | | |
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| **352-MDO-26** | **Metamodeling and Approximation Methods II** | | | | | **Hanover G** |
| Chaired by: A. NING, BYU | | | | | | |
| 0930 hrs<br>AIAA-2018-4172<br>**Multi-response Gaussian Process Regression for Multidisciplinary Design Analysis and Optimization**<br>J. Park, S. Choi, P. Raj, Virginia Polytechnic Institute and State University, Blacksburg, VA | 1000 hrs<br>AIAA-2018-4173<br>**Multidisciplinary Design Optimization of a 3D Composite Hydrofoil via Variable Accuracy Architecture**<br>S. Volpi, University of Iowa, Iowa City, Iowa City, IA; M. Diez, National Research Council (CNR), Rome, Italy; F. Stern, University of Iowa, Iowa City, Iowa City, IA | 1030 hrs<br>AIAA-2018-4174<br>**Constructing Kriging Surrogate Model using Simple Alternative Sampling Approach based on Many Data Points**<br>S. Kim, H. Ha, Agency for Defense Development, Daejeon, South Korea | 1100 hrs<br>AIAA-2018-4175<br>**Efficient robust design optimization using Gaussian process and intelligent sampling**<br>Y. Ling, K. Ryan, I. Asher, J. Kristensen, S. Ghosh, L. Wang, General Electric Company, Niskayuna, NY | 1130 hrs<br>AIAA-2018-4176<br>**Gaussian Process Regression for Bayesian Fusion of Multi-Fidelity Information Sources**<br>S. Ghoreishi, D. Allaire, Texas A&M University, College Station, TX | | |

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| **353-TP-16** | **Aerothermodynamics and Thermal Protection Systems IV** | | | | | **Embassy A** |
| Chaired by: K. ANDERSON, CAL POLY POMONA and K. NAWAZ, ORNL and M. PATE, Texas A&M University | | | | | | |
| 0930 hrs<br>AIAA-2018-4177<br>**Refitting of detailed $CO_2$ IR databases to vibrationally specific databases tailored for aerothermodynamic flows**<br>J. Vargas, Institute for Plasmas and Nuclear Fusion, Lisbon, Portugal; B. Lopez, M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL; M. Lino Da Silva, Institute for Plasmas and Nuclear Fusion, Lisbon, Portugal | 1000 hrs<br>AIAA-2018-4178<br>**Methodology for Optimal Design of a Conformal Ablative Heatshield**<br>A. Sidor, Georgia Institute of Technology, Atlanta, GA; R. Braun, University of Colorado, Boulder, Boulder, CO; G. Kennedy, Georgia Institute of Technology, Atlanta, GA | 1030 hrs<br>AIAA-2018-4179<br>**Calculation of Thermochemical Properties of Carbon-cluster Ablation Species**<br>M. Sharma Priyadarshini, University of Illinois, Urbana-Champaign, Urbana, IL; R. Jaffe, NASA Ames Research Center, Moffett Field, CA; A. Munafò, M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL | 1100 hrs<br>AIAA-2018-4180<br>**Aerothermodynamic modelling of meteor entry flows in the rarefied regime**<br>F. Barišelli, Vrije Universiteit Brussel, Brussel, Belgium; S. Boccelli, Technical University of Milan, Milan, Italy; T. Magin, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; A. Frezzotti, Technical University of Milan, Milan, Italy; A. Hubin, Vrije Universiteit Brussel, Brussels, Belgium | 1130 hrs<br>AIAA-2018-4181<br>**One-dimensional modeling methodology for shock tubes: Application to the EAST facility**<br>M. Sharma Priyadarshini, A. Munafò, University of Illinois, Urbana-Champaign, Urbana, IL; A. Brandis, B. Cruden, Analytical Mechanics Associates, Inc., Mountain View, CA; M. Panesi, University of Illinois, Urbana-Champaign, Urbana, IL | | |

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| **354-TP-17** | **Multiphase, Droplets, Jets, Sprays, Heat Pipes, and Two-Phase Heat Transfer** | | | | | **Embassy B** |
| Chaired by: P. YEE, The Aerospace Corporation and K. WEED, Ball Aerospace & Technologies Corporation | | | | | | |
| 0930 hrs<br>AIAA-2018-4182<br>**A Near-space-oriented Large-space Spray Cooling System: Temperature Uniformity Analysis and Performance Prediction Using Neural Network**<br>J. Wang, Y. Li, G. Li, Beihang University, Beijing, China; X. Yu, Aviation Industry Corporation of China (AVIC), Shenyang, China; X. Ji, China Academy of Space Technology (CAST), Beijing, China | 1000 hrs<br>AIAA-2018-4183<br>**Helical Droplet Heat Exchanger: A Novel Thermal Management Device**<br>W. Flaherty, R. Fontaine, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA | 1030 hrs<br>AIAA-2018-4184<br>**Molecular and Continuum Simulations of Binary Gas Mixture Flow Through Curved Micronozzles**<br>M. Darbandi, M. Sabouri, Sharif University of Technology, Tehran, Iran; G. Schneider, University of Waterloo, Waterloo, Canada | 1100 hrs<br>AIAA-2018-4185<br>**Computational Investigation of Aerodynamic and Heat Transfer Characteristics of a Confined Offset Turbulent Jet Impinging on a Flat Surface**<br>S. Manoharan, W. Mokhtar, Grand Valley State University, Grand Rapids, MI | | | |

| Friday, 29 June 2018 | | | | | | |
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| **355-AA-56** | **Turbomachinery and Core Noise V** | | | | | **Roswell** |
| Chaired by: T. LOWE | | | | | | |
| 1400 hrs<br>AIAA-2018-4186<br>**Statistics and structure of turbulence in fan/FEGV interstage and their aeroacoustic implications**<br>S. Grace, A. Gupta, Boston University, Boston, MA; I. Gonzalez-Martino, Exa GmbH, Stuttgart, Germany; D. Casalino, Delft University of Technology, Delft, The Netherlands | 1430 hrs<br>AIAA-2018-4187<br>**Implementation of a Quasi-Three-Dimensional Nonreflecting Blade Row Interface for Steady and Unsteady Analysis of Axial Turbomachines**<br>D. Lindblad, Chalmers University of Technology, Göteborg, Sweden; N. Wukie, University of Cincinnati, Cincinnati, OH; G. Montero Villar, N. Andersson, Chalmers University of Technology, Göteborg, Sweden | 1500 hrs<br>AIAA-2018-4188<br>**The Effect of Steady Intake Distortion on Fan Mpt Noise Under Sideline Flight Conditions**<br>K. Milidonis, T. Hynes, University of Cambridge, Cambridge, United Kingdom; M. Doherty, H. Namgoong, Rolls-Royce Group plc, Derby, United Kingdom | 1530 hrs<br>AIAA-2018-4189<br>**Numerical Analysis of a Linear Cascade Model for Rotor-Stator Interaction Aeroacoustics**<br>C. Teruna, D. Casalino, D. Ragni, F. Avallone, Delft University of Technology, Delft, The Netherlands | 1600 hrs<br>AIAA-2018-4190<br>**Numerical prediction of rotor-stator interaction noise using 3D CAA with synthetic turbulence injection**<br>A. Cader, C. Polacsek, T. Le Garrec, R. Barrier, F. Benjamin, ONERA, Châtillon, France; M. Jacob, ISAE-SUPAERO - Institut Supérieur de l'Aéronautique et de l'Espace, Toulouse, France | | |

**Friday, 29 June 2018**

**356-AA-60** — **Active Control of Noise, Vibration and Flows** — **Piedmont**

Chaired by: C. DOOLAN, The University of New South Wales

1400 hrs
AIAA-2018-4191
**Control of Acoustic Impedance of a Resonant Liner by Varying Orifice Geometry through Multi-Layer Sliding Perforates**
V. Kumar, S. Lympany, G. Loohuis, K. Ahuja, Georgia Institute of Technology, Atlanta, GA

1430 hrs
AIAA-2018-4192
**Characterization of Liners using a Lattice-Boltzmann Solver**
P. Manjunath, F. Avallone, D. Casalino, D. Ragni, M. Snellen, Delft University of Technology, Delft, The Netherlands

1500 hrs
AIAA-2018-4193
**Active Control of Fan Tones by Means of Wake Filling: Variation of Partial Trailing Edge Blowing**
L. Enghardt, A. Moreau, S. Koschel, S. Oertwig, U. Tapken, German Aerospace Center (DLR), Berlin, Germany

1530 hrs
AIAA-2018-4194
**Noise Reductions on a Pusher Propeller Configuration through Pylon Tangential Blowing**
L. Rego, L. Lima Pereira, F. Catalano, University of São Paulo, São Carlos, Brazil

**Friday, 29 June 2018**

**357-AMT-11/GT-14** — **Improved Measurements Techniques in Ground Test II** — **Embassy G**

Chaired by: G. JONES, NASA-Langley Research Center

1400 hrs
AIAA-2018-4195
**Shadow UAV Wind Tunnel Testing using a Design of Experiments Approach**
M. McDaniel, Z. Hall, Army Aviation and Missile Research Development and Engineering Center, Redstone Arsenal, AL

1430 hrs
AIAA-2018-4196
**Testing of an Autonomous Boundary Layer Data System Device in the Transonic Flight Regime**
K. Mejia, C. Uik, The Boeing Company, Seattle, WA; A. Antunes, R. Cosin, Embraer, São José dos Campos, Brazil; R. Westphal, California Polytechnic State University, San Luis Obispo, CA

1500 hrs
AIAA-2018-4197
**Experimental Investigation of Image Distortion in a Mach 6 Hypersonic Flow**
M. Winter, R. Green, C. Borchetta, University of Kentucky, Lexington, Lexington, KY; E. Josyula, J. Hayes, J. Jewell, Air Force Research Laboratory, Wright-Patterson AFB, OH; et al.

**Friday, 29 June 2018**

**358-APA-43** — **Aerodynamic Design: Analysis Methodologies** — **Chicago A**

Chaired by: C. HUMMER, USAF and B. MCGRATH, The Johns Hopkins University Applied Physics Laboratory

1400 hrs
AIAA-2018-4198
**A General Multiphase Library and Integration into the Kestrel CSI**
G. Power, C. Robinson, D. Lankford, K. Tatum, National Aerospace Solutions, Arnold AFB, TN

1430 hrs
AIAA-2018-4199
**Adaptive sampling techniques for surrogate modeling to create high-dimension aerodynamic loading response surfaces**
A. Kaminsky, University of Tennessee, Knoxville, Knoxville, TN; Y. Wang, University of South Carolina, Columbia, Columbia, SC; K. Pant, CFD Research Corporation, Huntsville, AL; W. Hashii, A. Atachbarian, 412th Test Wing, Edwards AFB, CA

1500 hrs
AIAA-2018-4200
**On the development of a highly integrated aircraft aerodynamic design process**
R. de Souza, M. Mestriner, M. Ferrari, Embraer, São José dos Campos, Brazil

1530 hrs
AIAA-2018-4201
**Aerodynamic sensitivity to geometry parameters of an aircraft forward fuselage**
M. Mestriner, R. de Souza, M. Ferrari, Embraer, São José dos Campos, Brazil

**Friday, 29 June 2018**

**359-APA-44** — **Aerodynamics of Propulsion Systems** — **Techwood**

Chaired by: M. GHOREYSHI, United States Air Force Academy and B. MARPLES

1400 hrs
AIAA-2018-4202
**Using Numerical Simulations to Explore Top-Mounted Propulsion on a Conceptual Commercial Supersonic Transport Aircraft**
D. Friedlander, NASA Glenn Research Center, Cleveland, OH

1430 hrs
AIAA-2018-4203
**Computational Simulations of the Low-Noise SDT2-R4 Configuration Using Tenasi**
K. Sreenivas, R. Webster, M. Collao, University of Tennessee, Chattanooga, Chattanooga, TN

1500 hrs
AIAA-2018-4204
**Method Comparison for Fan Performance in Short Intake Nacelle**
A. Burlot, F. Sartor, M. Vergez, M. Méheut, R. Barrier, ONERA, Meudon, France

1530 hrs
AIAA-2018-4205
**Design and Performance Analysis of Double-Flux Supersonic Air Ejector**
B. Bozkir, Middle East Technical University, Ankara, Turkey; H. Alemdaroğlu, Atilim University, Ankara, Turkey

1600 hrs
AIAA-2018-4206
**Geometry Optimization of a Pintle Nozzle for Augmented Thrust Vectoring and Steering using Expansion Waves**
R. Baskaran, U. Harisrinivasan, Kumaraguru College of Technology, Coimbatore, India; V. Sanal Kumar, Indian Space Research Organisation, Trivandrum, India

| Friday, 29 June 2018 | | | | | | |
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| **360-APA-45** | **High Angle of Attack and High Lift Aerodynamics** | | | | | **Greenbriar** |
| Chaired by: J. DOYLE, US Army AMRDEC | | | | | | |
| 1400 hrs<br>AIAA-2018-4207<br>**High Lift Design and Aerodynamic Assessment for an Over-the-Wing Pylon-Mounted Engines Configuration with STOL Capabilities**<br>L. Savoni, R. Rudnik, A. Ronzheimer, German Aerospace Center (DLR), Braunschweig, Germany; C. Heykena, Technical University of Braunschweig, Braunschweig, Germany | 1430 hrs<br>AIAA-2018-4208<br>**Numerical Simulation of Super-Lift Coefficient of Co-Flow Jet Electric Aircraft**<br>Y. Yang, G. Zha, University of Miami, Coral Gables, FL | 1500 hrs<br>AIAA-2018-4209<br>**Numerical Study of Transitional Flows Over Aerospace Configurations**<br>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 | 1530 hrs<br>AIAA-2018-4210<br>**Partially-averaged Navier-Stokes Simulations of Unsteady Flow around a NACA0021 Airfoil at 60 Degrees Angle of Attack**<br>Y. Wang, B. Song, W. Song, Z. Han, Northwestern Polytechnical University, Xi'an, China | | |

| Friday, 29 June 2018 | | | | | | |
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| **361-APA-46** | **Rotorcraft and V/STOL Aerodynamics II** | | | | | **Fairlie** |
| Chaired by: J. RAULEDER, Technical University of Munich | | | | | | |
| 1400 hrs<br>AIAA-2018-4211<br>**Using Computational Fluid Dynamics to Generate Complex Aerodynamic Database for VTOL Aircraft**<br>J. Reel, N. Baltadjiev, Aurora Flight Sciences, Manassas, VA | 1430 hrs<br>AIAA-2018-4212<br>**Benchmarking a Robust Panel Code for Ducted Fan VTOL Aircraft Design**<br>P. Sargent, W. Anemaat, Design, Analysis and Research Corporation, Lawrence, KS | 1500 hrs<br>AIAA-2018-4213<br>**Dynamics and Modeling of a Quadrotor with a Suspended Payload**<br>N. Johnson, W. Singhose, Georgia Institute of Technology, Atlanta, GA | 1530 hrs<br>AIAA-2018-4214<br>**Experimental Study of the Interaction between Rotor Wake and a Cylinder in Hover**<br>L. Jiao, D. Peng, X. Wen, Y. Liu, Shanghai Jiao Tong University, Shanghai, China; J. Gregory, Ohio State University, Columbus, OH | 1600 hrs<br>AIAA-2018-4215<br>**Linear stability analysis in rotating frames and its application to fan blade transition prediction**<br>L. Pascal, R. Barrier, G. Billonet, J. Marty, ONERA, Toulouse, France | | |

| Friday, 29 June 2018 | | | | | | |
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| **362-APA-47** | **Unmanned and Solar Powered Aerial Vehicles** | | | | | **Baker** |
| Chaired by: R. RAMAMURTI, Naval Research Laboratory and S. SAXENA, General Electric Company | | | | | | |
| 1400 hrs<br>AIAA-2018-4216<br>**CFD Analysis and Experimental Validation of an Unmanned Aerial Vehicle.**<br>H. Shah, R. Pampala, G. Olivares, Wichita State University, Wichita, KS | 1430 hrs<br>AIAA-2018-4217<br>**Design, Development, and Initial Testing of a Computationally-Intensive, Long-Endurance Solar-Powered Unmanned Aircraft**<br>O. Dantsker, M. Theile, M. Caccamo, University of Illinois, Urbana-Champaign, Urbana, IL; R. Mancuso, Boston University, Boston, MA | 1500 hrs<br>AIAA-2018-4218<br>**Measurement of Unsteady Gusts in an Urban Wind Field using a UAV-based Anemometer**<br>R. Thorpe, M. McCrink, J. Gregory, Ohio State University, Columbus, OH | 1530 hrs<br>AIAA-2018-4219<br>**High Fidelity Moment of Inertia Testing of Unmanned Aircraft**<br>O. Dantsker, M. Vahora, S. Imtiaz, M. Caccamo, University of Illinois, Urbana-Champaign, Urbana, IL | 1600 hrs<br>AIAA-2018-4220<br>**A CFD-aided investigation of the morphing winglet concept for the performance optimization of fixed-wing MALE UAVs**<br>P. Panagiotou, M. Efthymiadis, D. Mitridis, K. Yakinthos, Aristotle University of Thessaloniki, Thessaloniki, Greece | | |

| Friday, 29 June 2018 | | | | | | |
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| **363-ASE-15** | **Engine Ice-Crystal Icing Physics** | | | | | **Hanover C** |
| Chaired by: A. FLEGEL, NASA Glenn Research Center and D. DISCHINGER, Honeywell International, Inc. | | | | | | |
| 1400 hrs<br>AIAA-2018-4221<br>**Partially Melting of a Suspended Ice Particle under Forced Advection-Diffusion**<br>Y. Han, S. Kala, Clemson University, Clemson, SC; S. Yan, J. Palacios, Pennsylvania State University, State College, PA | 1430 hrs<br>AIAA-2018-4222<br>**Experimental Measurement of Ice Accretion Rate in Mixed-phase Icing Cloud**<br>S. Yan, J. Palacios, Pennsylvania State University, University Park, PA | 1500 hrs<br>AIAA-2018-4223<br>**Experimental Studies of Ice Crystal Accretion on an Axisymmetric Body at Engine-Realistic Conditions**<br>A. Bucknell, M. McGilvray, D. Gillespie, University of Oxford, Oxford, United Kingdom; G. Jones, A. Reed, B. Collier, Rolls-Royce Group plc, Derby, United Kingdom | 1530 hrs<br>AIAA-2018-4224<br>**Ice Crystal Icing Physics Study using a NACA 0012 Airfoil at the National Research Council of Canada's Research Altitude Test Facility**<br>P. Struk, M. King, NASA Glenn Research Center, Cleveland, OH; T. Bartkus, J. Tsao, Ohio Aerospace Institute, Cleveland, OH; D. Fuleki, M. Neuteboom, National Research Council Canada, Ottawa, Canada; et al. | 1600 hrs<br>AIAA-2018-4225<br>**Fragment Size Distribution for Ice Particle Impacts on a Glass Plate**<br>M. Vargas, C. Ruggeri, M. Pereira, D. Revilock, NASA Glenn Research Center, Cleveland, OH | 1630 hrs<br>AIAA-2018-4226<br>**Improved Electromagnetic Sensor for Detection of Ice Accretion inside Turbofan Engine Axial Compressor Stages**<br>C. Faulkner, B. Herrera, B. Jean, S. McClain, Baylor University, Waco, TX | |

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| **364-ATIO.ACD-15/ATIO.TF-14** | **Electric Aircraft Design** | | | | | **Hanover D** |
| Chaired by: R. MCDONALD, Self and M. LOGAN, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-4227<br>**Electrified Aircraft Trade-Space Exploration**<br>M. Kruger, S. Byahut, A. Uranga, University of Southern California, Los Angeles, CA; J. Gonzalez, D. Hall, A. Dowdle, Massachusetts Institute of Technology, Cambridge, MA | 1430 hrs<br>AIAA-2018-4228<br>**A Preliminary Sizing Method for Hybrid-Electric Aircraft Including Aero-Propulsive Interaction Effects**<br>R. de Vries, M. Brown, R. Vos, Delft University of Technology, Delft, The Netherlands | 1500 hrs<br>AIAA-2018-4229<br>**An Initial Sizing Methodology for Hybrid-Electric Light Aircraft**<br>D. Finger, C. Braun, Aachen University of Applied Sciences, Aachen, Germany; C. Bil, RMIT University, Melbourne, Australia | 1530 hrs<br>AIAA-2018-4230<br>**Optimized Control Algorithms for Serial Hybrid-electric Aircraft Propulsion Systems**<br>I. Geiss, S. Notter, University of Stuttgart, Stuttgart, Germany | 1600 hrs<br>AIAA-2018-4231<br>**Design and Development of Voice Control System for Micro Unmanned Aerial Vehicles**<br>C. Thomas, R. Bharadwaj, A. Mondal, University of Petroleum and Energy Studies, Dehradun, India; A. Sharma, Ariel University, Ariel, Israel; O. S N, Indian Institute of Science, Bangalore, India; V. Devalla, University of Petroleum and Energy Studies, Dehradun, India | | |

| Friday, 29 June 2018 | | | | | | |
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| **365-ATIO.ATM-20** | **ATM Cost Benefit Analysis** | | | | | **Embassy C** |
| Chaired by: J. POST, Federal Aviation Administration | | | | | | |
| 1400 hrs<br>AIAA-2018-4232<br>**Reducing Airspace Constraints via Advanced Flight-Specific Trajectories (AFST)**<br>J. DeArmon, M. Hokit, K. Jaranson, D. Chaloux, MITRE Corporation, McLean, VA | 1430 hrs<br>AIAA-2018-4233<br>**A Quantitative Scenario-Based Fleet Evolutionary Framework for the Assessment of the Global Air Transportation Network**<br>G. Tay, J. Michelmann, H. Ross, M. Hornung, Technical University of Munich, Munich, Germany | 1500 hrs<br>AIAA-2018-4234<br>**Airport Capacity Assessment of the Air Transportation Network in Selected Global Regions**<br>G. Tay, R. Karpstein, M. Hornung, Technical University of Munich, Munich, Germany | 1530 hrs<br>AIAA-2018-4235<br>**Measuring the Benefits of NextGen Metroplex in Convective Weather: Case Study of North Texas Metroplex**<br>Y. Zhang, H. Tang, University of South Florida, Tampa, FL; D. Knorr, A. Ramadani, Federal Aviation Administration, Washington, D.C. | 1600 hrs<br>AIAA-2018-4236<br>**Measuring Fuel and Travel Time Benefits for the Caribbean Oceanic Flights Through Computer Simulations**<br>A. Izadi, N. Hinze, A. Trani, Virginia Polytechnic Institute and State University, Blacksburg, VA; A. Gunnam, GRA, Incorporated, Jenkintown, PA | 1630 hrs<br>AIAA-2018-4237<br>**Design Principles for a Separation Support Tool Allowing Optimized Runway Delivery**<br>V. Cappellazzo, V. Treve, EUROCONTROL, Brussels, Belgium; I. De Visscher, Wake Prediction Technologies, Louvain-la-Neuve, Belgium; C. Chalon, EUROCONTROL, Brussels, Belgium | |

| Friday, 29 June 2018 | | | | | | |
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| **366-ATIO.ATM-21** | **Operations Management IV** | | | | | **Embassy D** |
| Chaired by: K. MARAIS, Purdue University and N. FALA | | | | | | |
| 1400 hrs<br>AIAA-2018-4238<br>**Autonomous Integrated Terminal and Enroute Operations with Wind Errors**<br>T. Lauderdale, NASA Ames Research Center, Moffett Field, CA; C. Bosson, Y. Chu, H. Erzberger, Universities Space Research Association, Moffett Field, CA | 1430 hrs<br>AIAA-2018-4239<br>**Adaptive Network Design for Dynamic Rerouting**<br>C. Taylor, D. Larsen, P. Coats, S. Liu, C. Wanke, MITRE Corporation, McLean, VA | 1500 hrs<br>AIAA-2018-4240<br>**Reenacting the History of the U.S. Air Transportation Network Evolution**<br>K. Song, J. Lewe, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1530 hrs<br>AIAA-2018-4241<br>**Effects of Pushback Accuracy On Static Apron Capacity**<br>N. Tange, P. Roling, R. Curran, Delft University of Technology, Delft, The Netherlands | 1600 hrs<br>AIAA-2018-4242<br>**Evaluating the Impact of Uncertainty on Airport Surface Operations**<br>S. Badrinath, H. Balakrishnan, Massachusetts Institute of Technology, Cambridge, MA; E. Clemons, T. Reynolds, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA | | |

| Friday, 29 June 2018 | | | | | | |
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| **367-ATIO.TF-15** | **UAS Concepts and Operations** | | | | | **Hanover B** |
| Chaired by: C. JUSTIN, Georgia Institute of Technology and M. HASSAN, Georgia Institute of Technology | | | | | | |
| 1400 hrs<br>AIAA-2018-4243<br>**Autonomous Quadcopter Navigation Using Vision-Based Landmark Recognition**<br>S. Raj, M. Dreyer, S. Gururajan, Saint Louis University, St. Louis, MO | 1430 hrs<br>AIAA-2018-4244<br>**A Framework for Unmanned Aerial Systems Selection and Trajectory Generation for Imaging Service Missions**<br>Y. Choi, A. Payan, S. Briceno, D. Mavris, Georgia Institute of Technology, Atlanta, GA | 1500 hrs<br>AIAA-2018-4245<br>**Multi-UAV Control and Supervision with ROS**<br>A. Lamping, J. Ouwerkerk, K. Cohen, University of Cincinnati, Cincinnati, OH | 1530 hrs<br>AIAA-2018-4246<br>**Comparing Solar Arrays for Autonomous, Fixed-Wing HALE Aircraft using the Metric of Absolute Ceiling**<br>A. Vijh, Alta Devices, Inc., Sunnyvale, CA | 1600 hrs<br>AIAA-2018-4247<br>**Detailed Analysis of the Implications of Implementing a Hybrid-Electric Power System on Multi-Rotor UAVs**<br>K. McKinney, J. Feight, R. Gaeta, J. Jacob, Oklahoma State University, Stillwater, OK | 1630 hrs<br>AIAA-2018-4248<br>**UAS Neural Net based Formation Flight**<br>J. Bertram, A. McLean, B. Wolford, A. Roup, Rockwell Collins, Inc., Cedar Rapids, IA; T. Schnell, University of Iowa, Iowa City, Iowa City, IA | |

| Friday, 29 June 2018 | | | | | | |
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| **368-FC-20** | **Bio-Inspired Flow Control** | | | | | **Courtland** |
| Chaired by: J. SEIDEL, USAF Academy and A. MEDINA | | | | | | |
| 1400 hrs<br>AIAA-2018-4249<br>**Control of separated flows over membrane wings**<br>J. Bohnker, K. Breuer, Brown University, Providence, RI | 1430 hrs<br>AIAA-2018-4250<br>**Biomimetic Tubercle Leading-Edge Airfoils in Transitional Reynolds Number Regime**<br>K. Vedula, Academy of Aerospace and Engineering, Windsor, CT; B. Cetegen, University of Connecticut, Storrs, Storrs, CT; J. Madore, M. Bellinger, Academy of Aerospace and Engineering, Windsor, CT | 1500 hrs<br>AIAA-2018-4251<br>**Effects of shark head morphology on the wake structure**<br>A. Kazemi, S. M. Warren, S. L. Hoffmann, O. Manuel Curet, M. E. Porter, Florida Atlantic University, Boca Raton, FL | 1530 hrs<br>AIAA-2018-4252<br>**The span length efficiency of tubercles on Swept wings**<br>A. Rios Cruz, P. Ferreira, A. de Paula, V. Kleine, R. da Silva, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1600 hrs<br>AIAA-2018-4253<br>**Swept wing effects on Wavy Leading Edge Phenomena**<br>A. Rios Cruz, P. Ferreira, A. de Paula, V. Kleine, R. da Silva, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1630 hrs<br>AIAA-2018-4254<br>**Wavy Leading Edge Phenomena on Transonic Flow Regime**<br>V. Sepetauskas, B. Massucatto, A. de Paula, R. da Silva, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil | 1700 hrs<br>AIAA-2018-4255<br>**Evaluation of Wavy Leading Edge for Rotary-Wing Applications**<br>P. Ferreira, L. Brondani, J. Scarpari, F. Corrêa, A. de Paula, R. da Silva, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil |

| Friday, 29 June 2018 | | | | | | |
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| **369-FD-61** | **Multiphysics and Cross-Disciplinary Fluid Dynamics VI** | | | | | **Lenox** |
| Chaired by: W. DZIEDZIC and A. MISHRA, University of Maryland, College Park | | | | | | |
| 1400 hrs<br>AIAA-2018-4256<br>**Experiment study of bleed air contaminant transport in aircraft cabin**<br>X. Chen, Z. Wang, B. Ma, S. Yang, X. Sun, Civil Aviation University of China, Tianjin, China | 1430 hrs<br>AIAA-2018-4257<br>**Numerical Study of Round Jet Impingement in Proximity of Ground and a Water Surface**<br>H. Gao, Washington University in St. Louis, St. Louis, MO; Q. Liu, Harbin Institute of Technology, Harbin, China; Q. Qu, Beihang University, Beijing, China; R. Agarwal, Washington University in St. Louis, St. Louis, MO | 1500 hrs<br>AIAA-2018-4258<br>**Performance Analysis of Flapping Foil Flow Energy Harvester Subjected to Non-Sinusoidal Pitching Motion**<br>A. Javed, M. Jamil, B. Ali, National University of Sciences and Technology, Islamabad, Pakistan; K. Djidjeli, University of Southampton, Southampton, United Kingdom; T. Shams, National University of Sciences and Technology, Islamabad, Pakistan | 1530 hrs<br>AIAA-2018-4259<br>**Application of ray tracing method in analyzing the electromagnetic scattering of different nozzles**<br>X. Gao, H. Zhou, Aviation Industry of China (AVIC), Xi'an, China; Q. Yang, Northwestern Polytechnical University, Xi'an, China; W. Deng, Aviation Industry of China (AVIC), Xi'an, China | 1600 hrs<br>AIAA-2018-4260<br>**An Investigation of a Swirling Jet Exiting a Cyclone Chamber**<br>O. Khan, Auburn University, Auburn, AL; A. Medina, Air Force Research Laboratory, Wright-Patterson AFB, OH; A. Ahmed, Auburn University, Auburn, AL | | |

| Friday, 29 June 2018 | | | | | | |
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| **370-FD-62** | **CFD Algorithm Development II** | | | | | **International North** |
| Chaired by: J. HICKEN, Rensselaer Polytechnic Institute and M. GALBRAITH | | | | | | |
| 1400 hrs<br>AIAA-2018-4261<br>**A Simple Flux Reconstruction Approach to Solving a Poisson Equation to Find Wall Distances for Turbulence Modelling**<br>R. Watson, W. Trojak, P. Tucker, University of Cambridge, Cambridge, United Kingdom | 1430 hrs<br>AIAA-2018-4262<br>**A High-Order Gas-Kinetic CPR Method for Navier-Stokes Equations**<br>C. Zhang, Q. Li, Tsinghua University, Beijing, China | 1500 hrs<br>AIAA-2018-4263<br>**Temporal Stabilisation of Flux Reconstruction on Linear Problems**<br>W. Trojak, R. Watson, P. Tucker, University of Cambridge, Cambridge, United Kingdom | 1530 hrs<br>AIAA-2018-4264<br>**Data Compression and Modeling of Fluid Dynamics Using Generalized Finite Elements**<br>T. Shilt, R. Deshmukh, J. McNamara, Ohio State University, Columbus, OH; P. O'Hara, Air Force Research Laboratory, Wright-Patterson AFB, OH | 1600 hrs<br>AIAA-2018-4265<br>**A Neumann pressure outlet boundary condition for compressible flows**<br>N. Wukie, M. Turner, P. Orkwis, University of Cincinnati, Cincinnati, OH | 1630 hrs<br>AIAA-2018-4266<br>**An Explicit Variable-Density Projection Method for Low-Mach Reacting Flows on Structured Uniform Grids**<br>T. Saad, M. Karam, J. Sutherland, University of Utah, Salt Lake City, Salt Lake City, UT | |

| Friday, 29 June 2018 | | | | | | |
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| **371-FD-63** | **Discontinuous Galerkin** | | | | | **Dunwoody** |
| Chaired by: D. WILLIAMS, Pennsylvania State University and H. LUO, North Carolina State University | | | | | | |
| 1400 hrs<br>AIAA-2018-4267<br>**Comparative Fourier Analysis of DG, FD and Compact Difference schemes**<br>M. Alhawwary, Z. Wang, University of Kansas, Lawrence, Lawrence, KS | 1430 hrs<br>AIAA-2018-4268<br>**Implementation of an Arbitrary Lagrangian-Eulerian Moving Mesh Capability in the ChiDG Discontinuous Galerkin Code with Applications to Fluid-Structure Interaction**<br>E. Wolf, C. Schrock, Air Force Research Laboratory, Wright-Patterson AFB, OH; N. Wukie, University of Cincinnati, Cincinnati, OH | 1500 hrs<br>AIAA-2018-4269<br>**A comparative study of 2 different momentum discretizations in context of Lagrangian discontinuous Galerkin hydrodynamic method for RZ axisymmetric coordinates**<br>X. Liu, Los Alamos National Laboratory, Los Alamos, NM | 1530 hrs<br>AIAA-2018-4270<br>**Explicit Hyperbolic Reconstructed Discontinuous Galerkin Methods for Time-Dependent Problems**<br>J. Lou, L. Li, H. Luo, North Carolina State University, Raleigh, NC; H. Nishikawa, National Institute of Aerospace, Hampton, VA | | | |

| Friday, 29 June 2018 | | | | | | |
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| **372-FD-64** | **Shocks and Under Resolved Flow Features** | | | | | **Vinings** |
| Chaired by: C. SCALO and N. AHMAD, NASA Langley Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-4271<br>**Post Limiters and Simple Dirty-Cell Detection for 3D, Unstructured, (Unlimited) Aerodynamic Simulations**<br>K. Kitamura, T. Aogaki, A. Inatomi, K. Fukumoto, T. Takahama, Yokohama National University, Yokohama, Japan; A. Hashimoto, Japan Aerospace Exploration Agency (JAXA), Tokyo, Japan | 1430 hrs<br>AIAA-2018-4272<br>**Application of the Moving Discontinuous Galerkin Method with Interface Condition Enforcement to Shocked Compressible Flows**<br>A. Corrigan, A. Kercher, D. Kessler, D. Wood-Thomas, Naval Research Laboratory, Washington, D.C. | 1500 hrs<br>AIAA-2018-4273<br>**Assessment of spurious numerical oscillations in high-order spectral difference solvers for supercritical flows**<br>M. Migliorino, J. Chapelier, C. Scalo, Purdue University, West Lafayette, IN; G. Lodato, CORIA, Rouen, France | 1530 hrs<br>AIAA-2018-4274<br>**Simpler Method of Shock Wave Detection by Using Canny Method**<br>T. Fujimoto, T. Kawasaki, K. Kitamura, Yokohama National University, Yokohama, Japan | | | |

| Friday, 29 June 2018 | | | | | | |
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| **373-FT-7** | **Flight Testing Unmanned Aircraft Systems** | | | | | **Embassy F** |
| Chaired by: K. GARMAN, Federal Aviation Administration and S. KESHMIRI, The University of Kansas | | | | | | |
| 1400 hrs<br>AIAA-2018-4275<br>**In-flight Verification of an Automatic Take-off and Landing System on the Maiden Flight of a Novel Fixed-Wing UAV**<br>M. Kügler, M. Heller, F. Holzapfel, Technical University of Munich, Munich, Germany | 1430 hrs<br>AIAA-2018-4276<br>**In-Flight Verification of a model-based designed Ground Controller for an innovative Unmanned Air Vehicle (UAV)**<br>D. Seiferth, M. Kügler, M. Heller, Technical University of Munich, Garching, Germany | 1500 hrs<br>AIAA-2018-4277<br>**Development of the UH-1 Autonomy Testbed: A robust testbed for autonomy research**<br>F. Langford, J. Fine, A. Hopkins, Aurora Flight Sciences, Manassas, VA | 1530 hrs<br>AIAA-2018-4278<br>**Design and Flight Tests of Fixed Wing UAS With Embedded Sensors, and Custom DAQ Hardware for Long Term Monitoring of Structural Health**<br>S. Gururajan, K. Mitchell, M. Dreyer, J. Glowacki, Saint Louis University, St. Louis, MO | 1600 hrs<br>AIAA-2018-4279<br>**Validation and Verification Flight Testing of UAS Morphing Potential Field Collision Avoidance Algorithms**<br>D. Skukla, A. Kim, A. Blevins, S. Keshmiri, M. Ewing, University of Kansas, Lawrence, KS | 1630 hrs<br>AIAA-2018-4280<br>**Validation and Verification Flight Tests of Fixed-Wing Collaborative UASs with High Speeds and High Inertias**<br>A. Blevins, A. Kim, D. Shukla, S. Keshmiri, W. Huang, University of Kansas, Lawrence, Lawrence, KS | 1700 hrs<br>AIAA-2018-4281<br>**Detecting, Tracking, and Localizing a Moving Quadcopter Using Two External Cameras**<br>M. Dreyer, S. Gururajan, S. Raj, J. Glowacki, Saint Louis University, St. Louis, MO |

| Friday, 29 June 2018 | | | | | | |
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| **374-GT-15** | **Analysis and Results of Novel Experiments** | | | | | **Embassy E** |
| Chaired by: M. RHODE, NASA-Langley Research Center and S. SIMERLY, NASA Glenn Research Center | | | | | | |
| 1400 hrs<br>AIAA-2018-4282<br>**Mistakes Made in Store Separation Wind Tunnel Testing During the Last 4 Decades**<br>A. Cenko, AIWS, LLC, Huntingdon Valley, PA | 1430 hrs<br>AIAA-2018-4283<br>**Free-Flight Testing of Hypersonic Edney Shock Interactions**<br>T. Fisher, M. Quinn, K. Smith, University of Manchester, Manchester, United Kingdom | 1500 hrs<br>AIAA-2018-4284<br>**Arcjet Ablation of Stony and Iron Meteorites**<br>P. Agrawal, NASA Ames Research Center, Moffett Field, CA; P. Jenniskens, SETI Institute, Mountain View, CA; E. Stern, J. Arnold, Y. Chen, NASA Ames Research Center, Moffett Field, CA | 1530 hrs<br>AIAA-2018-4285<br>**Experimental Investigations of the NASA Common Research Semi-Span Model in the NRC 5-ft Trisonic Wind Tunnel**<br>C. Broughton, A. Benmeddour, Y. Mebarki, National Research Council Canada, Ottawa, Canada; M. Rivers, NASA Langley Research Center, Hampton, VA | 1600 hrs<br>AIAA-2018-4286<br>**A Novel Supersonic Injection Scheme for Laser Induced Breakdown Ignition**<br>G. Lee, Q. Liu, D. Baccarella, G. Elliott, T. Lee, University of Illinois, Urbana-Champaign, Urbana, IL | | |

| Friday, 29 June 2018 | | | | | | |
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| **375-TP-19** | **Theoretical, Analytical, and Computational Heat Transfer: Conduction, Convection, Radiation, and Phase Change II** | | | | | **Embassy B** |
| Chaired by: P. YEE, The Aerospace Corporation and W. TSAI, California State University, Maritime Academy and R. ZHANG, University of North Texas | | | | | | |
| 1400 hrs<br>AIAA-2018-4287<br>**LES of an Asymmetrically Heated High Aspect Ratio Duct at High Reynolds Number at Different Wall Temperatures**<br>T. Kaller, Technical University of Munich, Garching, Germany; S. Hickel, Delft University of Technology, Delft, The Netherlands; N. Adams, Technical University of Munich, Garching, Germany | 1430 hrs<br>AIAA-2018-4288<br>**Simulation of Radiative Heat Transfer in a Particle Laden Flow**<br>K. Hansson, I. Boyd, University of Michigan, Ann Arbor, Ann Arbor, MI | 1500 hrs<br>AIAA-2018-4289<br>**Direct Simulation of Internal Flow Transient Liquid Crystal Experiments**<br>P. Forsyth, M. McGilvray, R. Pearce, D. Gillespie, University of Oxford, Oxford, United Kingdom | 1530 hrs<br>AIAA-2018-4290<br>**A Numerical Study of Bayesian Inference of Surface Catalycity in Low Speed Reacting Flow using Laser Absorption Spectroscopy**<br>T. Adowski, P. Bauman, University at Buffalo, Buffalo, NY | 1600 hrs<br>AIAA-2018-4291<br>**Wind Turbine Performance Losses Due to the Ice Accretion on the Turbine Blades**<br>O. Yirtici, T. Sevine, I. Tuncer, S. Ozgen, Middle East Technical University, Ankara, Turkey | | |

| Friday, 29 June 2018 | | |
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| **376-NW-12**<br>**1600 - 1630 hrs** | **Networking Coffee Break** | **Centennial Foyer** |

# GENERAL INFORMATION

## AIAA Registration and Information Center Hours

The AIAA Registration and Information Center will be located in the Grand Hall Foyer, Exhibit Level – LL2.

**SUNDAY, 24 JUNE**

**1500–1900 HRS**

**MONDAY, 25 JUNE–FRIDAY, 29 JUNE**

**0700–1730 HRS**

## ITAR Registration Hours

| | | |
|---|---|---|
| Sunday, 24 June | 1500–1900 hrs | Grand Hall Foyer |
| Monday, 25 June | 0900–1730 hrs | Grand Hall Foyer |
| Tuesday, 26 June | 0700–1630 hrs | Kennesaw Room Foyer |
| Wednesday, 27 June | 1200–1600 hrs | Kennesaw Room Foyer |

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## 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 25 June 2018. Please follow the instructions below to access the proceedings:

1. To view proceedings visit **aiaa.org** >ARC>Meeting Papers.
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      i. By paper number: Click the "Paper Number" link, select the conference year, and enter the paper number.
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1. The manuscript in the proceedings is the version of record and may not be replaced with a different version. **NEW FOR 2018:** Corrections to manuscripts will be available through the Crossmark feature. To view any corrections made to a manuscript click the Crossmark icon, located on every article's webpage and PDF.
2. Corrections will be available online approximately 15 business days after the last day of the conference.

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All attendees will receive a Certificate of Attendance on the last day of the AIAA forum via email. Claims of hours or applicability toward professional education requirements are the responsibility of the participant.

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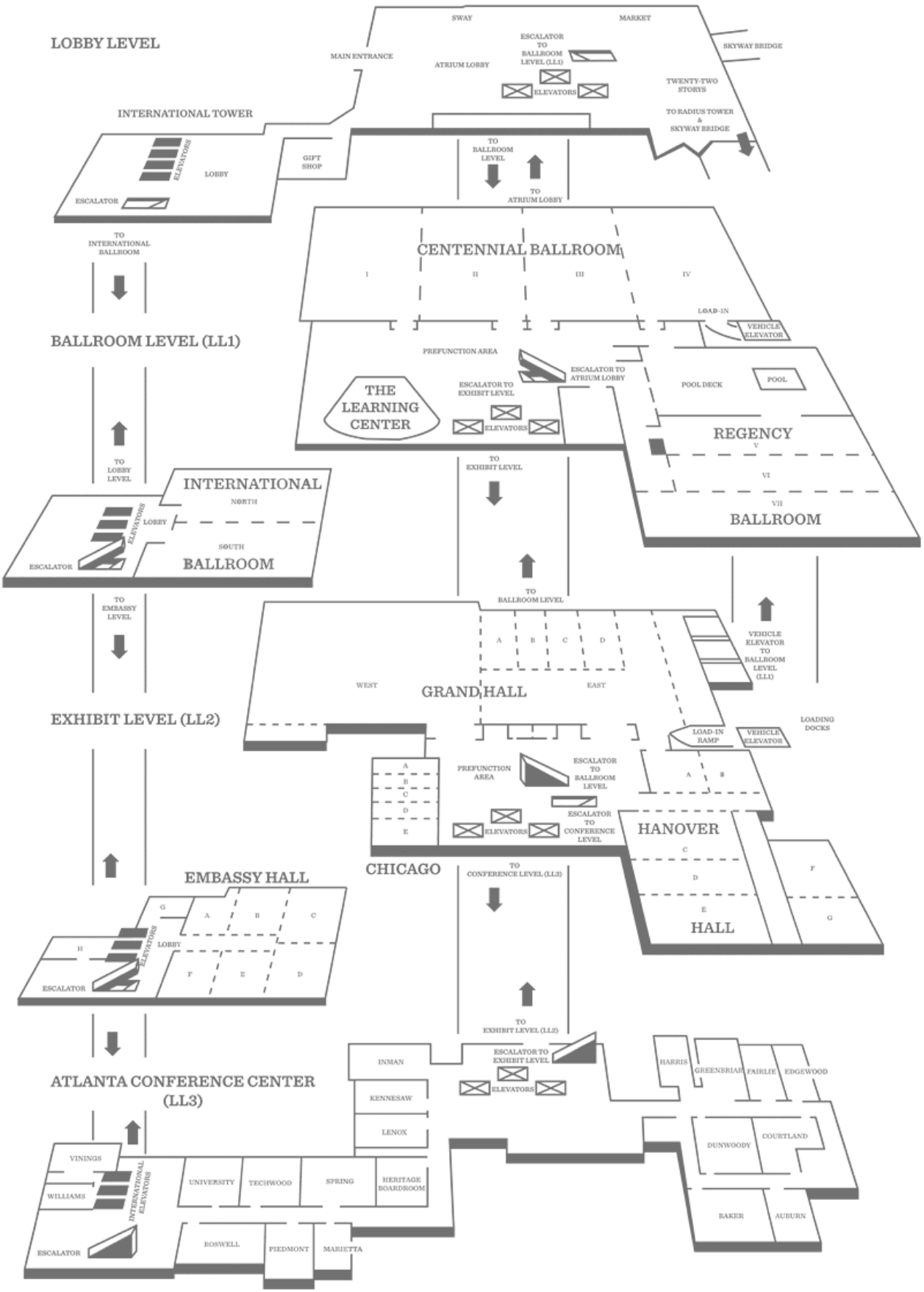
# VENUE MAP


LOBBY LEVEL
SWAY
MARKET
MAIN ENTRANCE
ATRIUM LOBBY
ESCALATOR TO BALLROOM LEVEL (LL1)
ELEVATORS
SKYWAY BRIDGE
TWENTY-TWO STORYS
TO RADIUS TOWER & SKYWAY BRIDGE
INTERNATIONAL TOWER
ELEVATORS
LOBBY
ESCALATOR
GIFT SHOP
TO BALLROOM LEVEL
TO ATRIUM LOBBY
TO INTERNATIONAL BALLROOM
CENTENNIAL BALLROOM
I
II
III
IV
LOAD-IN
VEHICLE ELEVATOR
BALLROOM LEVEL (LL1)
PREFUNCTION AREA
ESCALATOR TO ATRIUM LOBBY
POOL DECK
POOL
THE LEARNING CENTER
ESCALATOR TO EXHIBIT LEVEL
ELEVATORS
REGENCY
V
VI
VII
BALLROOM
TO LOBBY LEVEL
INTERNATIONAL
NORTH
ELEVATORS
LOBBY
ESCALATOR
SOUTH
BALLROOM
TO EXHIBIT LEVEL
TO BALLROOM LEVEL
TO EMBASSY LEVEL
A
B
C
D
WEST
GRAND HALL
EAST
VEHICLE ELEVATOR TO BALLROOM LEVEL (LL1)
EXHIBIT LEVEL (LL2)
LOAD-IN RAMP
VEHICLE ELEVATOR
LOADING DOCKS
PREFUNCTION AREA
ESCALATOR TO BALLROOM LEVEL
ESCALATOR TO CONFERENCE LEVEL
ELEVATORS
HANOVER
CHICAGO
EMBASSY HALL
TO CONFERENCE LEVEL (LL3)
HALL
ELEVATORS
LOBBY
ESCALATOR
TO EXHIBIT LEVEL (LL2)
ESCALATOR TO EXHIBIT LEVEL
ELEVATORS
INMAN
KENNESAW
LENOX
HARRIS
GREENBRIAR
FAIRLIE
EDGEWOOD
DUNWOODY
COURTLAND
ATLANTA CONFERENCE CENTER (LL3)
VININGS
WILLIAMS
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