PROPULSION ENERGY 2015

27–29 JULY 2015

ORLANDO, FL

FINAL PROGRAM

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Shaping the Future of Aerospace

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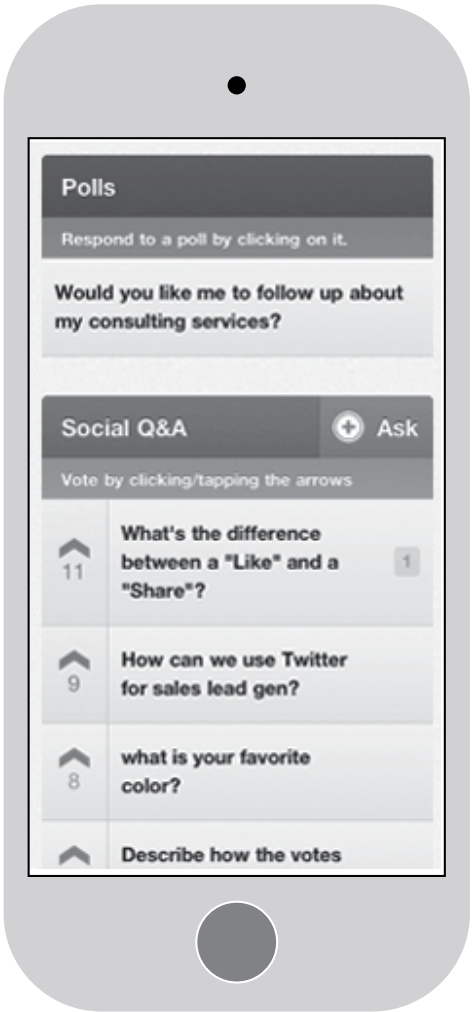

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** Some Poll results may be hidden*

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John Kinney
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Orbital ATK

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PROPULSION ENERGY 2015

Welcome

The members of the Executive Steering Committee welcome you to the AIAA Propulsion and Energy Forum and Exposition 2015 (AIAA Propulsion and Energy 2015) with excitement and anticipation. Our community has made great strides over the past several years in alternative fuels, renewable energy, and sustainable energy programs. As we move forward in our exploration of the world and the universe, discussions about continually increasing the efficiency, reliability, and sustainability of energy systems are critical.

While here in Orlando for AIAA Propulsion and Energy 2015, we encourage you to engage with your colleagues from government, industry, and academia, and discuss the national and international outlook for energy and propulsion systems, global economic interdependence, the cost and affordability of future systems, technology development trends, workforce development, and much more. All of these conversations will rest on the foundation of our theme for the week: "Energize Innovation. Boost Value. Propel The Future."

You will find the plenary themes woven into our panel and technical discussions, allowing deeper examination of all aspects of energy and propulsion systems, including: electric propulsion, ground test capability, in-space propulsion, the need for effective communication with the media, and how STEM professionals can achieve a healthy work/life balance. In three intense days, AIAA Propulsion and Energy 2015 will help you gain knowledge in these important areas, while also allowing you to build contacts and do the networking necessary for future innovative collaborations and partnerships.

Thank you for making the choice to attend this year's event, and for your continued enthusiasm to advance the boundaries of the known in energy and propulsion systems. We trust that the conversations and information shared this week will continue to drive cost savings, efficiency, and responsiveness of energy systems ever forward. And, more importantly, remember that the forum is a testament to how your work fuels the collective human drive to better humanity's technological capabilities and to be part of something bigger than ourselves. This is your forum, and we hope that you will enjoy it and take full advantage of its offerings.

Sincerely,

Executive Steering Committee

AIAA Propulsion and Energy 2015

AIAA Propulsion and Energy 2015 is proud to feature the following conferences:

51st AIAA/SAE/ASEE Joint Propulsion Conference

13th International Energy Conversion Engineering Conference

Organizing Committee

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John Robinson (retired)

Advanced Vehicle Systems
Frank Chandler, The Boeing Company

Aerospace Power Systems
Abbas Salim, Lockheed Martin Corporation (retired)

Air Breathing Propulsion Systems Integration
Neal Herring, United Technologies Research Center

Aircraft Electric Propulsion
Charles Beard, The Boeing Company

Electricity Delivery and Grid Reliability Technologies and Energy Conversion Device Technology
Scott Duncan, Georgia Institute of Technology

Electric Propulsion
John Dankanich, NASA Marshall Space Flight Center

Energetic Components and Systems
Brian Smith, Pacific Scientific Energetic Materials Company

Energy Storage Technology
Joe Troutman, EnerSys/ABSL Space Products

Energy Conversion Device Technology
Edward Lewandowski, NASA Glenn Research Center

Fossil-Fuel Power Technologies
Bhupendra Khandelwal, University of Sheffield

Gas Turbine Engines
Jay Kapat, University of Central Florida

Robert Thacker-Dey, Naval Air Systems Command (NAVAIR)

Green Engineering/Green Energy
Valerie Lyons, NASA Glenn Research Center (retired)

High Speed Air Breathing Propulsion
Faure "Joel" Malo-Molina, Air Force Research Laboratory

Hybrid Rockets
Bala (Han) Madhan, SPG Liquid Propulsion

Liquid Propulsion
David Ransom, Southwest Research Institute

Nuclear and Future Flight Propulsion
Greg Meholic, The Aerospace Corporation

Nuclear Power Technologies
Pavel Tsvetkov, Texas A&M University

Propellants and Combustion
M. Anand, Rolls-Royce Corporation

Propulsion and Power Systems of Unmanned Systems
Lea-Der Chen, University of Iowa

Propulsion Education and ASEE Representative
Robert Frederick, University of Alabama in Huntsville

SAE Representative
Richard Millar, Naval Postgraduate School

Solid Rockets
David Poe, Aerojet Rocketdyne

Space and Earth-to-Orbit Vehicles Systems
Miroslav Sir, The Aerospace Corporation

System Concepts and Supporting Propulsion Technologies
Corinne Gatto, Jet Propulsion Laboratory

Contents

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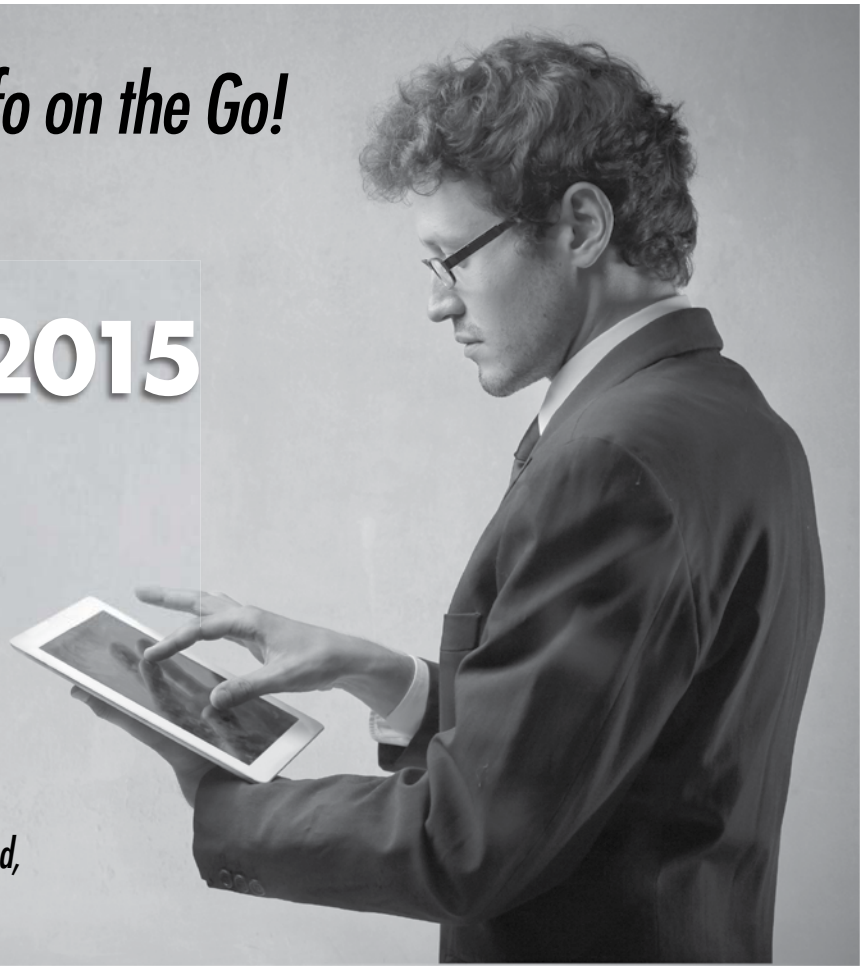
Forum Overview

	MONDAY 27 July	TUESDAY 28 July	WEDNESDAY 29 July
0730hrs	Speakers' Briefing in Technical Session Rooms (both am & pm sessions)	Speakers' Briefing in Technical Session Rooms (both am & pm sessions)	Speakers' Briefing in Technical Session Rooms (both am & pm sessions)
0800 hrs	Opening Plenary Keynote	Plenary Panel	Plenary Panel
0830 hrs			
0900 hrs	Technical Sessions; Networking Coffee Break in Exposition Hall	Technical Sessions; Networking Coffee Break in Exposition Hall	Technical Sessions; Networking Coffee Break in Exposition Hall
0930 hrs	Forum 360; Exposition Hall Open	Forum 360; Exposition Hall Open	Forum 360; Exposition Hall Open
1000 hrs			
1030 hrs			
1100 hrs			
1130 hrs			
1200 hrs	Luncheon on Own	Box Lunch in Exposition Hall (ticket required)	Forum Recognition Luncheon
1230 hrs			
1300 hrs		Plenary Panel; Exposition Hall Open	
1330 hrs	Plenary Panel; Exposition Hall Open		Closing Plenary Keynote
1400 hrs			
1430 hrs		Networking Ice Cream Break in Exposition Hall	
1500 hrs	Technical Sessions; Networking Popcorn Break in Exposition Hall	Technical Sessions; Exposition Hall Open	Technical Sessions; Forum 360
1530 hrs	Forum 360; Exposition Hall Open	Forum 360; Rising Leaders in Aerospace Leadership Exchange/ Speed Mentoring	
1600 hrs			
1630 hrs			
1700 hrs			
1730 hrs			
1800 hrs	Reception in Exposition Hall (ticket required)	Propulsion and Energy Lecture	
1830 hrs			
1900 hrs			
1930 hrs	Rising Leaders in Aerospace Lecture		
2000 hrs			
2030 hrs			

Get Your Conference Info on the Go!



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FEATURES

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HOW TO DOWNLOAD

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Keynote Speakers and Plenary Sessions

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

Monday, 27 July

0800–0900 hrs **Orange Ballroom D**

Keynote Address

Aviation Innovation

Christopher (Chris) Lorence, General Manager, Engineering Technologies, GE Aviation

1330–1500 hrs **Orange Ballroom D**

Global Cooperation and Economic Development Panel

The current international environment has introduced significant challenges to global cooperation, particularly in the propulsion community. This panel will examine the implications of the changing geopolitical landscape and the importance of international cooperation in our industry. How do partners cooperate without becoming overly dependent on any one player?

Moderator: **James Maser,** Vice President, Strategy, Marketing, & Business Development, Pratt & Whitney

Panelists:

Jean-Paul Ebanga, President and CEO, CFM International

Les Kovacs, Director, Washington Ops, United Launch Alliance (ULA)

Richard "Ric" Parker, Director of Research & Technology, Rolls-Royce plc

Marc Vales, Head of Future Programs, Airbus Safran Launchers

Bernard Zimmerman, Vice President, Group Strategy and Development, Pratt & Whitney

Tuesday, 28 July

0800–0900 hrs **Orange Ballroom D**

Cost and Affordability of Future Systems Panel

Panelists will discuss the key issues and approaches associated with making future systems less costly and more affordable, and how to manage the balance between customer and seller needs.

Moderator: **Michael Griffin,** Chairman and CEO, Schafer Corporation

Panelists:

Frank Culbertson, President, Space Systems Group, Orbital ATK

Michael Hawes, Vice President, Orion Program Manager, Lockheed Martin Corporation

Lee Monson, The Boeing Company (retired)

Mark Sirangelo, Corporate Vice President, Space Systems, Sierra Nevada Corporation

1300–1430 hrs **Orange Ballroom D**

Technology Development and Trends in Propulsion and Energy Panel

Panelists will discuss the major technology challenges and opportunities that will shape the future of propulsion and energy, and how those challenges and opportunities should be addressed.

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

Panelists:

Jean Botti, Chief Technical Officer, Airbus

Neil Garrigan, Executive Manager, Energy Systems and Technology, GE Aviation

Doug Juul, Manager, Systems Technology, Lockheed Martin Corporation

Tom Williams, Director, Propulsion Systems Department, NASA Marshall Space Flight Center

1800–1900 hrs **Orange Ballroom D**

Propulsion and Energy Lecture

The Transformation of the Kennedy Space Center

An informational presentation on the transformation of the Kennedy Space Center from a single, program-dependent launch complex, to a diverse, multi-user spaceport of the future enabling both government and commercial operations to and from low Earth orbit and beyond. The presentation will discuss the planning and execution of the Center's transition from the 30-year Shuttle program; the modernization of launch and ground processing infrastructure to support NASA's evolving Space Launch System and Orion multi-purpose crew vehicle; and the turnover of facilities and assets left underutilized by the retirement of the space shuttles to private industry and other government agencies. Challenges related to downsizing of workforce, budget constraints, and contract and agreement strategies will be discussed, as well as overcoming barriers to change. In addition, the presentation will describe NASA's journey to Mars and the critical work taking place at Kennedy Space Center to enable it.

Robert Cabana, Center Director, NASA Kennedy Space Center

(continued)

Keynote Speakers and Plenary Sessions

Wednesday, 29 July

0800–0900 hrs **Orange Ballroom D**

Workforce Development Panel

Discover how the makeup of the workforce will change over the next decade, how we need to adapt, and how to attract the necessary talent.

Moderator: **Mark Lewis,** Director, IDA Science and Technology Policy Institute

Panelists:

Steve Gorrell, Associate Professor, Brigham Young University

Michael Hawes, Vice President, Orion Program Manager, Lockheed Martin Corporation

Carole Hedden, Executive Editorial Director, Aviation Week Executive Intelligence

Yvette Weber, Engineering Manager, Air Force Material Command, U.S. Air Force

1330–1500 hrs **Orange Ballroom D**

Keynote

Developing Creative Storytelling Using Model-Based Design

Michael Tschanz, Director, Technology & Analysis, Design and Engineering, Walt Disney World

FORUM 360°

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

Monday, 27 July

0930–1200 hrs **Orlando IV**

Aircraft Electric Propulsion – Bridging the Gap

New aircraft electric and hybrid electric propulsion (EP/HEP) systems are of increasing excitement in the industry and represent an area of worldwide growth. This panel will focus on the EP/HEP evolutionary path and the challenge to bridge between emerging small aircraft concepts and future commercial aircraft all-electric and hybrid gas-electric concepts.

Moderator: **Ruben Del Rosario,** NASA Glenn Research Center

Panelists:

Frank Anton, Siemens
Michael Armstrong, Rolls-Royce Corporation
Marty Bradley, The Boeing Company
Andrew Gibson, ESAero
Charles Lents, United Technologies Research Center
Johannes Stuhlberger, Airbus

1530–1800 hrs **Orlando IV**

Government Investments Enabling Advancement of In-Space Propulsion

The competition in the global space propulsion market continues to increase as nontraditional entities develop and demonstrate space propulsion devices. In this environment, U.S. industry continues to invest in strategy, concepts, and technology to maintain a healthy share of the market beyond the delivery of government assets. Simultaneously, U.S. government agencies continue to infuse multiple programs to push the boundary of technical capabilities. The challenge is to align the focus of government-funded technology with the needs, requirements, and commercial opportunities of industry. These issues are critical for the commercial infusion and eventual sustainability of technology developed under government funding. Panelists will discuss the leverage of advanced in-space propulsion technology, examples of the successful infusion of government-funded technology development, and opportunities for government in-space propulsion investments that will enable emerging markets. A panel composed of leaders within government and industry, including spacecraft operators, will discuss the leverage of advanced in-space propulsion technology, examples of the successful infusion of government-funded technology development, and opportunities for government investments in-space propulsion to enable emerging markets.

Moderator: **Mitchell Walker II,** Georgia Institute of Technology

Panelists:

Jonny Dyer, Google+Skybox Imaging
Mark Lewis, IDA Science and Technology Institute
Peter Lord, Space Systems Loral
Roger Myers, Aerojet Rocketdyne
Jeff Sheehy, Space Technology Mission Directorate, NASA

(continued)

Tuesday, 28 July (continued)

0930–1200 hrs **Orlando IV**

Evolution of Our National Ground Test Capability

As budgets continue to tighten, ground test infrastructure is a common area to look for savings. This session aims to explore how organizations balance operation and maintenance of test facilities against budget reality to accomplish their missions. Key questions that will be explored include: What are the primary factors and metrics influencing sustainability of ground test infrastructure? Is there a general tendency for programs to treat facilities as commodities, and how does this impact our ability to retain national assets? How is our maturing computational capability influencing testing? It has long been the expectation that computational analysis might replace test; are we on the verge of seeing this goal realized or are we reaching a codependent steady state between test and computations? Has the industry's technical risk posture changed as a result of flat to shrinking budgets and the present balance between computations and test?

Moderator: **David Schuster,** NASA Langley Research Center

Panelists:

Doug Garrard, Arnold Air Force Base
Michael Horton, CUBRC
Michael Mastaler, NASA
Michael McWithey, Lockheed Martin Corporation
Roger Simpson, NASA Stennis Space Flight Center

1500–1630 hrs **Orlando IV**

Integrated Roles of Experimental Fluid Dynamics and Computational Fluid Dynamics

For years, the computational and experimental fluid dynamics communities have had separate advocacies with mixed results. Many stakeholders and decision makers may not understand the integrated roles of experimental and computational fluid dynamics (EFD/CFD) in the RDT&E process for new aero products. Do we need an integrated RDT&E map going forward for capability needs in terms of ground testing, computational methods, and flight testing?

Moderator: **James Heidmann,** NASA Glenn Research Center

Panelists:

Keith Blodgett, GE Aviation
Michael Mastaler, NASA
Richard Scharnhorst, The Boeing Company
Roy Schulz, Mira Facilities, 2 Inc.
Paul Van Slooten, United Technologies Research Center

Wednesday, 29 July

0930–1200 hrs **Orlando IV**

Work/Life Balance Challenges for the 21st Century

The costs for educating and training a worker in the aerospace profession are extremely high. In today's environment, a good number of households are dual income, and the incoming workforce of millennials value family, personal connection, and loyalty. Panelists will explore policies and methods for creating an environment that will enable individuals to balance work and life needs to maintain a reliable, diverse, and effective workforce.

Moderator: **Barbara Esker,** NASA

Panelists:

Elizabeth Bierman, Honeywell Aerospace
Amanda Billot, Pratt & Whitney
Jim Free, NASA Glenn Research Center
Klod Kokini, Purdue University

1500–1800 hrs **Orlando IV**

Advancing Engineering Through Effective Communication with the Media

Sooner or later, most engineers will end up talking to a reporter. Learn how to interact more effectively with and through the media, how to make engineering more relevant to the general public, how public perception through the media affects the aerospace industry and why interacting with the media matters. Learn how to make the most of this opportunity to help yourself and your profession. Bring your hardest-hitting questions to this panel of media experts as they discuss their trade.

Moderator: **Vic Beck,** Northrop Grumman Corporation

Panelists:

William Allen, Florida Southern College
Michael Curie, NASA Kennedy Space Center
Marcia Dunn, Associated Press
William Harwood, CBS News
Scott Powers, Orlando Sentinel

Forum 360

RISING LEADERS in AEROSPACE

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

Sponsored by: LOCKHEED MARTIN AVIATION WEEK NETWORK

Sunday, 26 July

1800–1900 hrs **Mizell A**

Reception

The reception will kick off the Rising Leaders in Aerospace events and is a perfect opportunity for young leaders to mingle with others who will be participating in AIAA Propulsion and Energy 2015 as attendee, presenter, or veteran professional. Come meet other participants in a casual environment. You're bound to see them again at the Speaker, Networking, or Young Professional Panel event.

Monday, 27 July

1930–2100 hrs **Orlando IV**

How to Avoid a Career Catastrophe: Historic Aerospace Safety Lessons Lecture

This session is intended for students and early career aerospace engineers. It is intended to be a dialogue, illustrated with recent space flight safety issues, that explores the role that safety plays in the development and operation of space systems, and also to show how proper attention to safety can be beneficial to a career in aerospace.

We invite all forum attendees to attend this session.

Tuesday, 28 July

1600–1730 hrs **Orange G**

Leadership Exchange/Speed Mentoring

The Leadership Exchange is an event for students and young professionals to meet and interact with established professionals. The Leadership Exchange is organized akin to a Speed Networking event.

The attendees (mentees) will sit down at tables. The established professionals (mentors) will then go to a table. After 8–10 minutes of interaction, we ask the mentors to move to the next table. This allows for about 8 or 9 interactions during the event.

Get your questions answered!

Mentors include:

Joe Anselmo, Editor-in-Chief, Aviation Week Network

Jean Botti, Chief Technical Officer, Airbus

Juliett Davitian, Engineering Specialist, The Aerospace Corporation

Jean-Paul Ebanga, President and CEO, CFM International

Jeff Hakes, Manager - Fort Worth Aero, Acoustic, Propulsion, and Airframe Integration, Advanced Development Programs, Skunk Works

Bhupendra Khandelwal, Lecturer—Low Carbon Combustion Center, University of Sheffield

Mark Lewis, Director, IDA Science and Technology Policy Institute

Sandy Magnus, Executive Director, AIAA

Guy Norris, Technology Editor, Aviation Week Network

Richard "Ric" Parker, Director of Research & Technology, Rolls-Royce plc

Rosemary Robles-Culbreth, Propulsion Branch Manager, White Sands Test Facility

Abbas Salim, Lockheed Martin Space Systems Company (retired)

Graham Warwick, Managing Editor, Technology, Aviation Week Network

Special Events

Monday, 27 July

1200-1230 hrs **Orlando IV**

Special Lunchtime Information Session: The Air Force Turbine Prize

The Air Force has just announced a $2 million technology prize designed to motivate independent development of a small, lightweight, fuel-efficient engine. The turbine power plant will be highly efficient over a range of power settings, have a high power density, and use a logistically available battlefield fuel (Jet A). The first engine to meet specific performance criteria in a verification test in the Air Force Research Laboratory will receive the prize. Full details are available at **www.airforceprize.com.**

Please join us to learn specifics about the Air Force Turbine Prize, what it is, how to get involved, timelines, ask questions, etc.

Exposition Hall

AIAA Region II

While you are at AIAA Propulsion and Energy 2015, don't forget to stop by the AIAA Central Florida Section booth in the Exposition Hall. The booth will display activities going on in the Section. We hope you stop by to check it out.

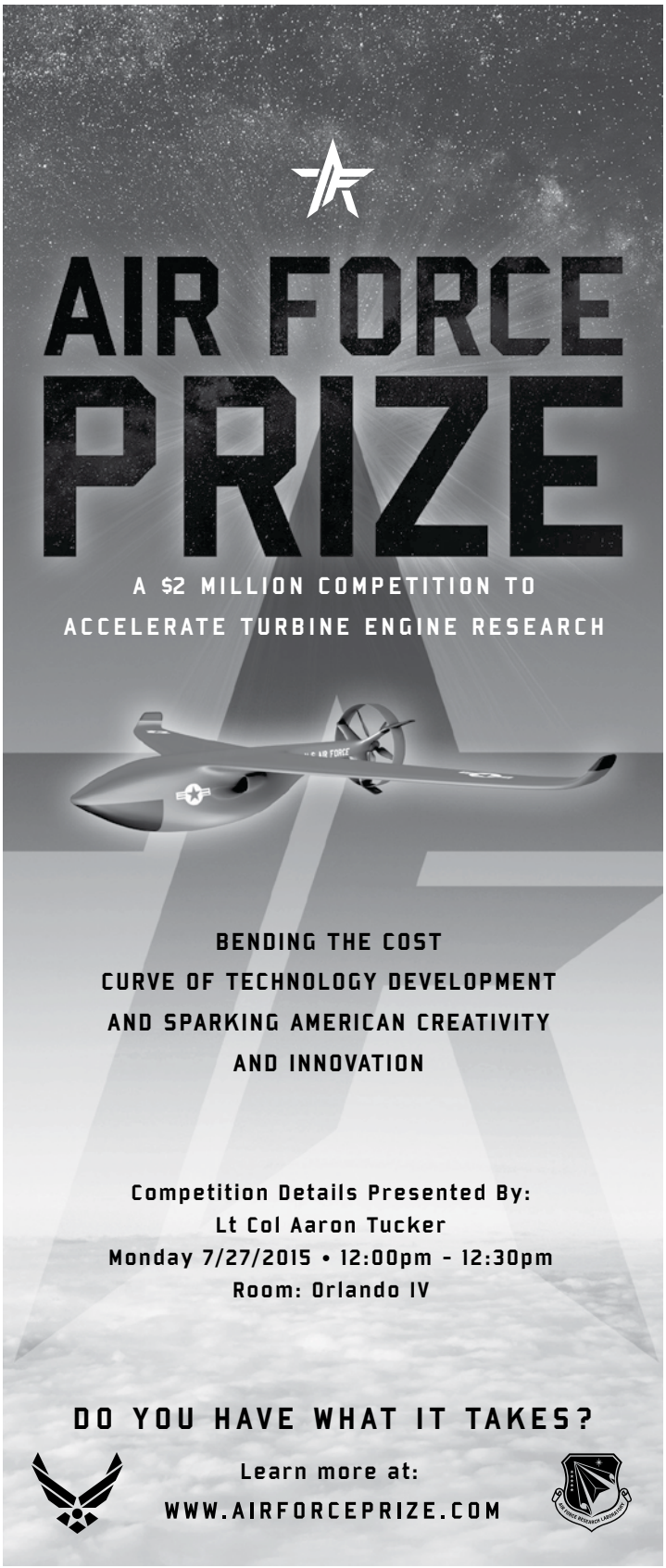
Wednesday, 29 July

1500–1800 hrs **Lake Highland B**

AIAA Undergraduate Engine Design Competition

The AIAA Foundation and the Gas Turbine Engine Technical Committee have teamed up again to sponsor a design competition. Undergraduate students from universities all over the world were asked to prepare a design report to respond to a Request for Proposal (RFP). This RFP asked students to design an ultra-high bypass turbofan engine.

All of the responses have been reviewed and ranked by technical experts, and the authors of the top three proposals have been invited to AIAA Propulsion and Energy 2015 to make an oral presentation to a panel of judges. These judges will assess the design, presentation, and responses to questions. They will add their scores to those provided by the technical judges to come up with a final 1st–3rd place ranking. The final rankings will be announced at the conclusion of the session.



Networking Events

As the old adage says, "It's not just what you know, it's who you know." Connect with those who may become your future colleagues and collaborators, employers or employees. Exchange ideas with the companies you want to partner with, and interact with the leaders who are shaping the future of aerospace.

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. Networking coffee breaks will be at the following times and locations:

Monday, 27 July	
0730–0800 hrs	**Orange Ballroom Foyer**
0900–0930 hrs	**Exposition Hall**
1500–1530 hrs	**Exposition Hall**
Tuesday, 28 July	
0730–0800 hrs	**Orange Ballroom Foyer**
0900–0930 hrs	**Exposition Hall**
1430–1500 hrs	**Exposition Hall**
Wednesday, 29 July	
0730–0800 hrs	**Orange Ballroom Foyer**
0900–0930 hrs	**Exposition Hall**

Welcome Reception

A welcome reception will be held on Monday, 27 July, 1800–1930 hrs, in the Exposition Hall. Take this opportunity to engage new contacts and refresh old ones. A ticket for the reception is required, and is included in the registration fee where indicated. Additional tickets may be purchased on site, as space is available.

Continuing Education

AIAA is committed to keeping aerospace professionals at their technical best, and provides an ongoing source of learning, community, professional connections, and career development. Gain the knowledge you need to excel in your field or to move confidently into a new one. Learn how to interact with students and teachers, and help inspire the next generation of aerospace leaders.

Saturday–Sunday, 25–26 July

0800–1700 hrs **Clear Lake**

Advanced High Speed Air Breathing Propulsion

This course will introduce students to the design and development processes of high speed propulsion, including ramjet/scramjets and TBCC concepts. Receive a comprehensive overview of the state of the art, including highlights of current high speed propulsion programs in the world. Topics will include:

- Mission Requirements
- Combined Cycle Propulsion Concepts
- Ramjet/Scramjet Inlet Design
- Ram/Scramjet Combustion Structural Design
- Fuels and Thermal Management Engine/Airframe Integration, TBCC Integration
- Advanced Materials
- CFD Modeling and Simulation of High Speed Reacting Flow
- Propulsion Multidisciplinary Design Optimization (MDO)
- High Speed Propulsion Ground Testing
- High Speed Flight Testing

Thursday–Friday, 30–31 July

0800–1700 hrs **Spring Lake**

Hybrid Rocket Propulsion

This course reviews the fundamentals of hybrid rocket propulsion with special emphasis on application-based design and system integration, propellant selection, flow field and regression rate modeling, solid fuel pyrolysis, scaling effects, transient behavior, and combustion instability. Advantages and disadvantages of both conventional and unconventional vortex hybrid configurations are examined and discussed. Topics will include:

- Introduction, Classification, Challenges, and Advantages of Hybrids
- Similarity and Scaling Effects in Hybrid Rocket Motors
- Flowfield Modeling of Classical and Nonclassical Hybrid Rockets
- Solid Fuel Pyrolysis Phenomena and Regression Rate: Mechanisms & Measurement Techniques
- Combustion Instability and Transient Behavior in Hybrid Rocket Motors
- Metals, Other Energetic Additives, and Special Binders Used in Solid Fuels for Hybrid Rocket Applications

New Editor-in-Chief Sought for Journal of Propulsion and Power (JPP)

AIAA is seeking an outstanding candidate with an international reputation to assume the responsibilities of Editor-in-Chief of the Journal of Propulsion and Power. JPP is devoted to the advancement of the science and technology of aerospace propulsion and power through the dissemination of original archival papers contributing to advancements in airbreathing, electric, and advanced propulsion; solid and liquid rockets; fuels and propellants; power generation and conversion for aerospace vehicles; and the application of aerospace science and technology to terrestrial energy devices and systems. The chosen candidate will assume the editorship at an exciting time as new features and functionality intended to enhance journal content are added to Aerospace Research Central, AIAA's platform for electronic publications.

The full position description and Editor-in-Chief search announcement can be found on the JPP landing page in Aerospace Research Central: **http://arc.aiaa.org/loi/jpp**

To receive full consideration, applications and all required materials must submitted by **1 Oct. 2015**, but applications will be accepted until the position is filled.

ARC
AEROSPACE RESEARCH CENTRAL

Recognition Events

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

Join AIAA in celebrating achievements in propulsion and energy at the AIAA Recognition Luncheon on Wednesday, 29 July, 1200–1330 hrs, in the Florida Ballroom. A ticket for the luncheon is required, and is included in the registration fee where indicated. Additional tickets may be purchased on site, as space is available.

The following awards will be presented:

Aerospace Power Systems Award

Theodore G. Stern
Director, Solar Power Solutions
Alliance Spacesystems, LLC
El Cajon, California

"For over 30 years of developing advanced photovoltaic power systems for spacecraft; for providing exceptional leadership and innovation in the aerospace power system community; and for significant contributions to AIAA and AIAA professional education."

Air Breathing Propulsion Award

Jan C. Schilling
Advanced Products Chief Engineer (retired)
GE Aviation
Cincinnati, Ohio

"For innovation in gas turbine engine design and safety, especially in composite fan blading, low NOx combustion, and high pressure ratio compressor airfoils."

Engineer of the Year Award

William J. Emrich
Senior Engineer
NASA Marshall Space Flight Center
Huntsville, Alabama

"For conceiving of, designing, and bringing to operational status the megawatt-class Nuclear Thermal Rocket Element Environment Simulator."

Energy Systems Award

Tom I-Ping Shih
Professor, School of Aeronautics and Astronautics
Purdue University
West Lafayette, Indiana

"For outstanding contributions to computational tool development and improvement for use in design, analysis and examination of complex engineering problems involving aerodynamics, propulsion, and energy."

Propellants and Combustion Award

Mitchell Smooke
Strathcona Professor of Mechanical Engineering
& Materials Science & Applied Physics
Yale University
New Haven, Connecticut

"For fundamental and substantive contributions to combustion and propellant science and the advancement of numerical combustion."

Wyld Propulsion Award

R. Carl Stechman
Consultant
Formally Chief Engineer and Technical Principal
Aerojet (Redmond, WA)/The Marquardt Company (Van Nuys, CA)

"For over 50 years of development and integration of storable rocket engines into space systems from Apollo, to the Space Shuttle, to Orion."

Certificates of Merit:

Aerospace Power Systems Best Paper

AIAA 2014-3640, "High Power Density Modular Electric Power System for Aerospace Applications," Scott Steffan and Gregory Semrau, Moog Inc.

Aerospace Power Systems Best Student Paper

AIAA 2014-3459, "Non-Cooled Power System for Venus Lander," Denise Salazar, The University of Texas at Austin; Geoffrey Landis, NASA Glenn Research Center; and Anthony Colozza, Vantage Partners, LLC.

(continued)

Recognition Events

Certificates of Merit (continued)

Air Breathing Propulsion Systems Integration Best Papers

AIAA-2014-0722, "Numerical and Experimental Investigations on Highly Integrated Subsonic Air Intakes," Thomas Berens, Luis Ruiz-Calavera, and David Funes-Sebastian, AIRBUS Defence and Space; Anne-Laure Delot, ONERA; Magnus Tormalm, Swedish Defense Research Agency (FOI); Martin Rein, German Aerospace Center (DLR); Michael Säterskog, Saab; Nicola Ceresola, Alenia Aermacchi, and Ludovic Zurawski, MBDA.

AIAA-2014-3684, "Propulsion System Dynamic Modeling of the NASA Supersonic Concept Vehicle for AeroPropulsoServoElasticity," George Kopasakis, Joseph W. Connolly, and Jonathan A. Seidel, NASA Glenn Research Center.

Electric Propulsion Best Paper

AIAA 2014-3710, "The Effect of Background Pressure on SPT-100 Hall Thruster Performance," Kevin D. Diamant, The Aerospace Corporation; and Raymond Liang and Ron L. Corey, Space Systems/Loral, LLC.

High Speed Air Breathing Propulsion Best Paper

AIAA Paper 2014-3743, "A Priori Analysis of Flamelet-Based Modeling for a Dual-Mode Scramjet Combustor," Jesse R. Quinlan and James McDaniel, University of Virginia; Tomasz Drozda, NASA Langley Research Center; and Guilhem Lacaze and Joseph Oefelein, Sandia National Laboratories.

Hybrid Rockets Best Paper

AIAA 2014-3646, "Evaluation of Para-n-based Fuels for Hybrid Rocket Engines," Mario Kobald, C. Schmierer, Helmet Ciezki, and Stefan Schlechtriem, German Aerospace Center (DLR); and Elena Toson and Luigi De Luca, Politecnico di Milano.

Hybrid Rockets Best Student Paper

AIAA 2014-3868, "Effects of Injector Design on Combustion Stability in Hybrid Rockets Using Self-Pressurizing Oxidizers," Benjamin S. Waxman, Jonah E. Zimmerman, Brian J. Cantwell, Stanford University; and Gregory G. Zilliac, NASA Ames Research Center.

Liquid Propulsion Best Paper

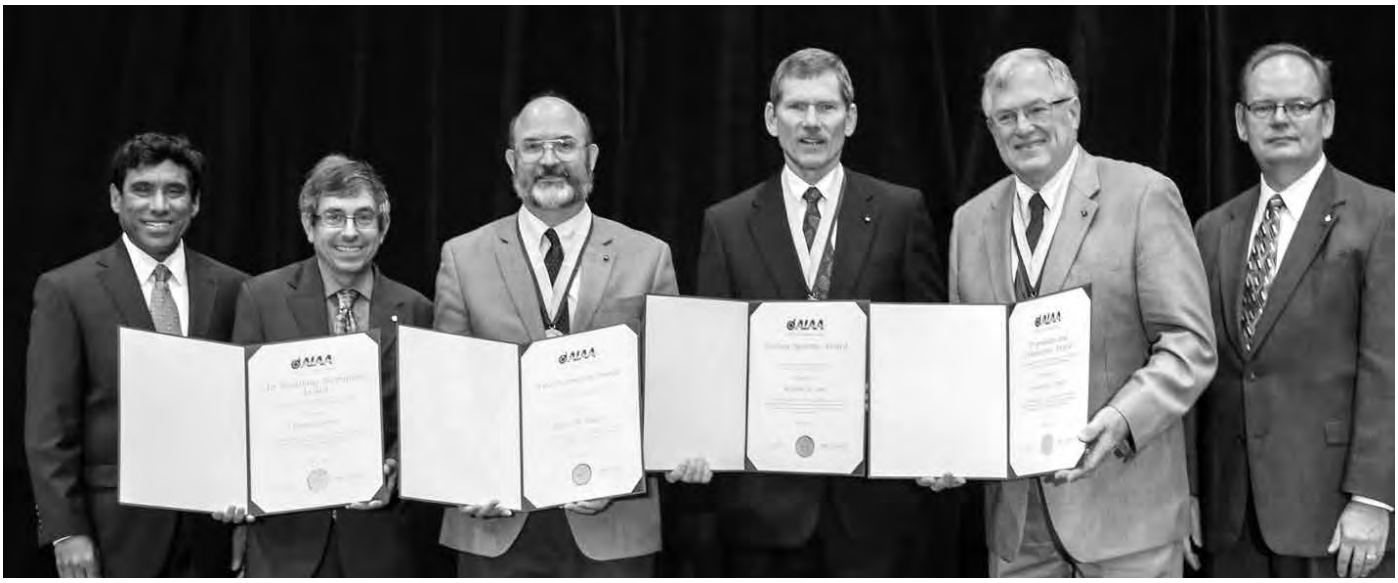
AIAA 2014-3681 "Combustion Stability Characteristics of the Project Morpheus Liquid Oxygen / Liquid Methane Main Engine," John C. Melcher and Robert L. Morehead, NASA Johnson Space Center.

Nuclear and Future Flight Propulsion Best Paper

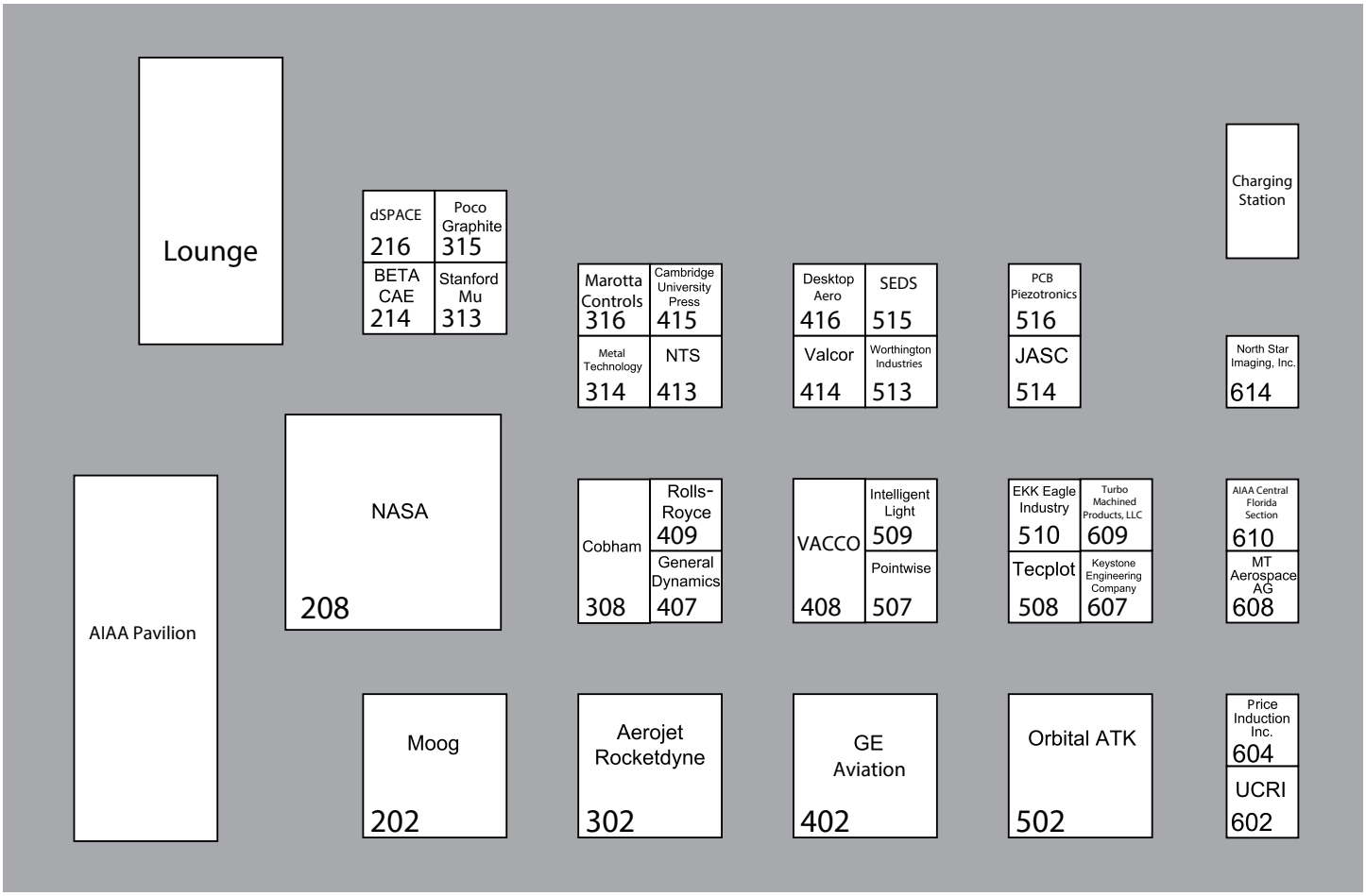
AIAA 2014-3520, "Developing the Pulsed Fission-Fusion (PuFF) Engine," Robert Adams, NASA Marshall Space Flight Center; Jason Cassibry, University of Alabama-Huntsville; David Bradley, Yetispace, Inc.; Leo Fabisinski, International Space Systems Inc.; and Geoffrey Statham, ERC Inc.

Propellants and Combustion Best Paper

AIAA 2014-0647, "Microspheres Composite of Nano-Al and Nanothermite: An Approach to Better Utilization of Nanomaterials," Haiyang Wang, Guoqiang Jian, Jeffery Delisio, and Michael Zachariah, University of Maryland.



Exposition Hall



Exhibitors by Booth Number (★indicates AIAA Corporate Members)

302	Aerojet Rocketdyne ★
610	AIAA Central Florida Section
214	BETA CAE Systems
415	Cambridge University Press
308	Cobham
416	Desktop Aeronautics
216	dSPACE, Inc. ★
510	EKK Eagle Industry, Co. Ltd
402	GE Aviation ★
407	General Dynamics - OTS
509	Intelligent Light ★
514	JASC-CONTROLS
607	Keystone Engineering Company
316	Marotta Controls, Inc.
314	Metal Technology
202	Moog, Inc.
608	MT Aerospace AG
208	NASA
413	National Technical Systems (NTS) ★
614	North Star Imaging Inc.
502	Orbital ATK ★
516	PCB Piezotronics
315	Poco Graphite
507	Pointwise, Inc. ★
604	Price Induction Inc.
409	Rolls-Royce Corporation ★
313	Stanford Mu Corporation
515	Students for the Exploration and Development of Space (SEDS)—UC San Diego
508	Tecplot, Inc.
609	Turbo Machined Products LLC
602	University of Cincinnati Research Institute (UCRI)
408	VACCO Industries
414	Valcor Engineering Corporation
513	Worthington Industries (SCI)

Exposition Hall

The Exposition Hall is the hub of activity during this event. Networking coffee breaks, luncheons, receptions, poster sessions, poster presentation sessions, and exhibitor presentations are all held in the Exposition Hall to give attendees and exhibitors an opportunity to connect with partners, industry thought leaders, and collaborators who can help move your business forward.

Exposition Hall Hours

Monday, 27 July	**0900–1200 hrs**
	1330–1600 hrs
Reception*	**1800–1930 hrs**
Tuesday, 28 July	**0900–1200 hrs**
Networking Luncheon*	**1200–1300 hrs**
	1300–1600 hrs
Wednesday, 29 July	**0900–1200 hrs**

*A ticket is required to attend the reception and the networking luncheon

New this year! Charging Stations

Stay connected at Propulsion and Energy: charge your laptop, tablet or phone at our complimentary charging stations. Conveniently located in the Exposition Hall at the end of the 600 aisle.

AIAA Pavilion

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

30% Off All Books at Propulsion and Energy 2015

AIAA Publications is offering a special discount on all titles featured at AIAA Propulsion and Energy 2015. Attendees can take advantage of a 30% discount off the list price of all books for sale at the AIAA Bookstore located in the AIAA Pavilion. This special offer will only be available during the forum! Take advantage of these super savings and visit the AIAA Bookstore!

Special Events

Monday, 27 July	**1500–1530 hrs**
Popcorn Break	
Tuesday, 28 July	**1430–1500 hrs**
Ice Cream Break	

Exhibitors

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Aerojet Rocketdyne, is a world-recognized aerospace and defense leader providing propulsion and energetics to the space, missile defense, strategic, tactical missile, and armaments areas in support of domestic and international markets. Additional information about Aerojet Rocketdyne is available online at **www.Rocket.com.**

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The Central Florida Section of the American Institute of Aeronautics and Astronautics is dedicated to furthering the interested, activities, and technical programs of local professional, students and educators within the Central Florida aerospace community.

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Exhibitors

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Exhibitors

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richard.d.rinehart@nasa.gov

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Price Induction is a turbine engine manufacturer, designer of the world's smallest turbofan.

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La Jolla, CA 92092
seds.ucsd.edu
seds.ucsd@gmail.com

Students for the Exploration and Development of Space (SEDS) at the UC San Diego is a team of undergraduate students with the vision of advancing space technologies by researching 3D-printed metal rocket engines. Following their success in 2013 with the Tri-D engine, SEDS UCSD intends to be one of the first people to successfully recover a rocket powered by their latest 3D-printed engine, Vulcan-I, in early August.

Exhibitors

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General Information

AIAA Registration and Information Center Hours

The AIAA Registration and Information Center will be located on the ballroom level of the Convention Center.

Sunday, 26 July	**1500–1900 hrs**
Monday, 27 July	**0700–1800 hrs**
Tuesday, 28 July	**0700–1700 hrs**
Wednesday, 29 July	**0700–1700 hrs**

Wi-Fi Internet Access On Site

Wi-Fi service for attendees is available in the foyer space of the hotel outside session rooms and the Exposition Hall (see page 5). To keep this service available and optimized for all attendees, please do not download files larger than 2MB, create multiple sessions across multiple devices, or download multiple files in one session. If you receive an error message that an AIAA server is blocking your current IP address, please inform the AIAA Registration and Information Center.

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 27 July 2015. Attendees who register in advance for the online proceedings will be provided with instructions on how to access them. Those registering on site will be provided with instructions at that time.

Proceedings:

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

Manuscript Revisions

1. Manuscript revision is open for all presenting authors from 0900 hrs Eastern Time, 28 July, through 2000 hrs Eastern Time, 7 August 2015.
2. Revisions submitted for manuscripts already online will not refresh until after the proceedings have been updated, which may take up to 15 business days after the last day of the conference.

General Information

Certificate of Attendance

Certificates of Attendance are available for attendees who request documentation at the forum itself. The Certificates of Attendance will be available for attendees to print at a self-service station at the registration desk starting Monday afternoon, 27 July 2015. AIAA offers this service to better serve the needs of the professional community. Claims of hours or applicability toward professional education requirements are the responsibility of the participant.

Employment Opportunities

AIAA assists members who are searching for employment by providing a bulletin board at forums. This bulletin board is solely for "open position" and "available for employment" postings. Employers are encouraged to have personnel who are attending an AIAA forum bring "open position" job postings. Individual AIAA members may post "available for employment" notices. AIAA cannot assume responsibility for notices forwarded to AIAA Headquarters. AIAA reserves the right to remove inappropriate notices. AIAA members can post and browse resumes, browse job listings, and access other online employment resources by visiting the AIAA Career Center at **http://careercenter.aiaa.org.**

Membership

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

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Young Professional Guide for Gaining Management Support

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

Nondiscriminatory Practices

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

Restrictions

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

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

General Information

Author and Session Chair Information

Speakers' Briefings in Session Rooms

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

Monday, 27 July	**0730–0800 hrs**
Tuesday, 28 July	**0730–0800 hrs**
Wednesday, 29 July	**0730–0800 hrs**

Speakers' Practice Room

Speakers who wish to practice their presentations may do so in Spring Lake. A sign-up sheet will be posted on the door. In consideration of others, please limit practice time to 30-minute increments.

Session Chair Reports

All session chairs are asked to complete a session chair report to evaluate their session for future planning. AIAA has partnered with Canvas Solutions to provide an electronic Session Chair Report form. You can download the FREE mobile app in your App Store, AppWorld, or Marketplace by searching for "Canvas Solutions, Inc." The mobile app is free, so please be sure to download it. Detailed instructions will be provided in the session rooms. If you do not have a tablet or a smartphone, simply use the report form as a guide and enter your session chair report information at the session chair reporting computer station located on site near the AIAA registration area. Report data will be collected and used for future planning purposes, including session topics and room allocations. Please submit your session chair report **electronically** by 30 July 2015.

Audiovisual

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

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

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

Journal Publication

AIAA has prior publication rights to any paper presented at its conferences. Authors who are seeking the opportunity for peer-reviewed publication are encouraged to submit their papers for consideration by one of the Institute's archival journals: *AIAA Journal; Journal of Aircraft; Journal of Guidance, Control, and Dynamics; Journal of Propulsion and Power; Journal of Spacecraft and Rockets; Journal of Thermophysics and Heat Transfer;* or *Journal of Aerospace Information Systems*. Journal scopes and author guidelines and instructions can be found in Aerospace Research Central at **http://arc.aiaa.org/page/authorresources.** You may now submit your paper to a journal for review before the conference presentation date: **http://mc.manuscriptcentral.com/aiaa.**

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ITAR Information

ITAR-Restricted Sessions

On Tuesday, a limited number of papers will be presented in "U.S.-Only" technical sessions. In addition to your forum registration, a separate registration process is required to attend these restricted sessions. Please see the detailed information on the ITAR Registration Grid to determine your individual requirements.

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

Admittance to the restricted technical papers is controlled by the U.S. International Traffic in Arms Regulations (ITAR). All attendees, presenters, and session chairs will need to register for the conference and then visit the ITAR Registration Desk to complete additional registration procedures. Anyone wishing to enter the restricted session room MUST abide by the procedures and submittal of verification documents mandated by the DoD. No Exceptions!

Availability of Manuscripts from ITAR-Restricted Sessions

A DVD containing the manuscripts from the ITAR sessions will be available for purchase on site at the forum**,** by those who are registered to attend the ITAR sessions, for $25. There will be no sale or distribution of these papers after the event.

ITAR Electronics Policy

No phones, computers (other than the presenter), iPads, cameras, and other electronic devices with cameras or recording capabilities will be permitted into the ITAR session room. There will be a check-in desk in front of the room where you can check these devices during the time you are in the sessions.

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

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

Several papers scheduled to be presented at this conference will be restricted papers governed by ITAR (U.S. International Traffic in Arms Regulations). If you plan to attend any presentations restricted by ITAR, you must bring proof of citizenship PLUS the other verification documents as shown below. Please note that only U.S. Citizens and U.S. Resident Aliens can be considered for attendance at these restricted presentations. Admittance to restricted sessions and access to restricted technical papers is implemented and controlled by ITAR .

All restricted session attendees (including speakers and session chairs for these sessions) MUST abide by the procedures and submittal of verification documents as noted below – NO EXCEPTIONS:

ATTENDEE CLASSIFICATION	IDENTIFICATION & PROOF OF EMPLOYMENT REQUIREMENTS
U.S. Government Employees **NOTE: CAC Cards are NOT proof of citizenship.**	1. Proof of U.S. Citizenship (for example, passport, birth certificate, voters registration card, naturalization papers), **AND** 2. Personal **photographic** identification: U.S. Government/Military Photo ID badge, such as CAC card
U.S. Citizens	1. Proof of U.S. Citizenship (for example, passport, birth certificate, voters registration card, naturalization papers), **AND** 2. Personal **photographic** identification (passport, driver's license, etc.), **AND** 3. Certification credentials based on DD Form 2345 (see below for details)
Resident Aliens (U.S.)	1. Resident Alien Card, **AND** 2. Personal **photographic** identification (passport, driver's license, etc.), **AND** 3. Certification credentials based on DD Form 2345 (see below for details)

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

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

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

How to get your ITAR Clearance:

Bring all of the above listed identification, proof of employment and certification credentials to the AIAA ITAR Registration Desk in the AIAA Registration area.

Your documents will be verified and you will be provided with a stamp indicating your ITAR clearance. Photo ID will be checked against your ITAR badge before admittance is granted to any ITAR presentation.

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

Committee Meetings

Time	Title	Location
	Sunday, 26 July 2015	
1500-1700 hrs	**SRTC Awards and Communications Subcommittee**	Sand Lake
1500-1700 hrs	**SRTC Education and History Subcommittee**	Pocket Lake
1530-1630 hrs	**TAC P&E Rocket, Space & Advanced Propulsion Group**	Ruby Lake
1700-2000 hrs	**Propulsion and Energy Group Meeting**	Lake Eola
1900-2100 hrs	**LPTC Steering Committee**	Pocket Lake
	Monday, 27 July 2015	
0800-0900 hrs	**HSABPTC Steering Committee**	Ruby Lake
0900-1000 hrs	**ABPTCs Steering Committee**	Clear Lake
1000-1030 hrs	**ABPTCs New Member Orientation**	Ruby Lake
1030-1100 hrs	**GTETC Membership Upgrade**	Clear Lake
1100-1200 hrs	**ABPSI TC Meeting**	Ruby Lake
1100-1200 hrs	**GTE TC Meeting**	Pocket Lake
1100-1200 hrs	**HSABP TC Meeting**	Conway Lake
1100-1200 hrs	**2016 P&E Forum Technical Program Committee**	Clear Lake
1200-1500 hrs	**Nuclear and Future Flight Propulsion TC**	Turkey Lake
1300-1400 hrs	**ABPTCs Conference Subcommittee**	Pocket Lake
1400-1500 hrs	**Aircraft Electric Propulsion Path Forward**	Ruby Lake
1400-1500 hrs	**ABPTCs Honors and Awards Subcommittee**	Pocket Lake
1500-1600 hrs	**TAC P&E Operations Group**	Pocket Lake
1500-1600 hrs	**ABPTCs Education Subcommittee**	Ruby Lake
1600-1700 hrs	**ABPTCs Communications Subcommittee**	Conway Lake
1700-1800 hrs	**PAW Committee**	Ruby Lake
1700-1800 hrs	**ABP Working Groups**	Pocket Lake
1700-1900 hrs	**GEPC Leadership & Conference Team**	Conway Lake
1900-2200 hrs	**Terrestrial Energy Systems TC**	Sand Lake
1900-2130 hrs	**Propellants and Combustion TC**	Lake George A
1900-2200 hrs	**Energetic Components and Systems TC**	Clear Lake
1900-2200 hrs	**Solid Rockets TC**	Lake George B
1900-2200 hrs	**ABPTCs Committee Meeting**	Lake Mizell B
	Tuesday, 28 July 2015	
1500-1600 hrs	**TAC P&E Products Group**	Pocket Lake
1700-1930 hrs	**Green Engineering PC**	Turkey Lake
1800-2200 hrs	**Moog Reception**	Ruby Lake
1800-2000 hrs	**Pressure Gain Combustion PC**	Clear Lake
1830-2100 hrs	**Electric Propulsion TC**	Pocket Lake
1900-2300 hrs	**Liquid Propulsion TC**	Orlando V
1900-2200 hrs	**Aerospace Power Systems TC**	Conway Lake
1900-2200 hrs	**Hybrid Rockets TC**	Lake Florence
	Wednesday, 29 July 2015	
1400-1500 hrs	**TAC P&E Energy Group**	Pocket Lake

All meetings held on the lobby level at the Hilton Orlando, unless otherwise specified.

Sessions at a Glance

Sessions at a Glance Overview

Energy-Focused Topic Areas
Advanced Engine Controls (AEC)
Electricity Delivery and Grid Reliability (ED)
Energy Conversion Device Technology (ECD)
Energy Efficiency (EE)
Fossil-Fuel Power (FFP)
Green Engineering/Green Energy (GE)
ITAR (ITAR)
Propulsion and Power Systems of Unmanned Systems (PP)
Thermal Management Technology (TM)

Propulsion-Focused Topic Areas
Advanced Engine Controls (AEC)
Advanced Propulsion Systems (APS)
Air Breathing Propulsion Systems Integration (ABPSI)
Electric Propulsion (EP)
Energetic Components and Systems (ECS)
Gas Turbine Engines (GTE)
Green Engineering/Green Energy (GE)
High Speed Air Breathing Propulsion (HSABP)
Hybrid Rockets (HR)
ITAR (ITAR)
Liquid Propulsion (LP)
Nuclear and Future Flight Propulsion (NFF)
Pressure Gain Combustion (PGC)
Propellants and Combustion (PC)
Propulsion Aerodynamics Workshop Report Out (PAW)
Propulsion Education (EDU)
Solid Rocket (SR)
Space Transportation (ST)
System Concepts and Supporting Propulsion Technology (SC)
Vehicle Systems (VS)

Abbreviation	Title	Date	Start Time	Location
	Advanced Engine Controls (AEC)			
86-AEC-1	**Advanced Engine Controls & Intelligent Systems**	28-Jul	1430 hrs	Lake Concord B
	Aircraft Electric Propulsion (AEP)			
59-AEP-1	**Aircraft Electric/Hybrid Propulsion**	28-Jul	0900 hrs	Orange E
115-ABPSI-4/AEP-2	**Emerging Propulsion System Technologies**	29-Jul	0900 hrs	Orange E
	Advanced Propulsion Concepts (APC)			
60-APC-1	**Advanced Space Transportation Concepts**	28-Jul	0900 hrs	Lake Highland A
87-APC-2	**Advanced Propulsion Concepts**	28-Jul	1430 hrs	Lake Nona B
	Advanced Propulsion Systems (APS)			
5-APS-1	**The Next Step in Human Exploration - Orion & Space Launch Systems**	27-Jul	0900 hrs	Lake Eola
61-APS-2	**Space Solar Power System Architectures and Concepts / Solar Electric Propulsion Power Management and Distribution**	28-Jul	0900 hrs	Lake Highland B
116-APS-3	**Power Generation for Planetary Missions**	29-Jul	0900 hrs	Lake Highland B
	Air Breathing Propulsion Systems Integration (ABPSI)			
4-ABPSI-1	**Inlets**	27-Jul	0900 hrs	Lake Sheen A
32-ABPSI-2	**Integrated Propulsion**	27-Jul	1500 hrs	Lake Sheen A
58-ABPSI-3	**Nozzles**	28-Jul	0900 hrs	Lake Sheen A
115-ABPSI-4/AEP-2	**Emerging Propulsion System Technologies**	29-Jul	0900 hrs	Orange E
	Electricity Delivery and Grid Reliability (ED)			
34-ED-1	**Gulf Coast Energy Future**	27-Jul	1500 hrs	Lake Eola
89-ED-2/EE-4	**Systems-Level Analysis for Energy Efficiency and Renewable Energy / Electrical Components**	28-Jul	1430 hrs	Lake Down B

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Energetic Components and Systems (ECS)			
6-ECS-1	**Energetic Components & System Analysis**	27-Jul	0900 hrs	Lake Nona B
63-ECS-2	**Energetic Applications, Technology & Education**	28-Jul	0900 hrs	Lake Nona B
141-ECS-3	**Energetic Components & Systems Educational Series**	29-Jul	1500 hrs	Lake Eola
	Energy Conversion Device Technology (ECD)			
33-ECD-1	**Stirling Engines and Systems**	27-Jul	1500 hrs	Lake Highland B
62-ECD-2	**Stirling Components**	28-Jul	0900 hrs	Lake Lucerne
88-ECD-3	**Dual Use Technology: Challenges and Opportunities**	28-Jul	1430 hrs	Lake Eola
140-ECD-4	**Magnetohydrodynamic, Brayton, AMTEC, and Other Advanced Concepts**	29-Jul	1500 hrs	Lake Nona B
	Energy Efficiency (EE)			
7-EE-1	**Solar and Wind Energy for Terrestrial Applications**	27-Jul	0900 hrs	Lake Down B
36-EE-2	**Efficient Ventilation and Moisture Control**	27-Jul	1500 hrs	Lake Down B
64-EE-3	**Fuel Cells, Energy Storage, and Combustion**	28-Jul	0900 hrs	Lake Down B
89-ED-2/EE-4	**Systems-Level Analysis for Energy Efficiency and Renewable Energy / Electrical Components**	28-Jul	1430 hrs	Lake Down B
118-EE-5	**Renewable and Sustainable Energy in Florida**	29-Jul	0900 hrs	Lake Eola
	Electric Propulsion (EP)			
8-EP-1	**Flight Operations and Annular Ion Development**	27-Jul	0900 hrs	Lake Mizell A
9-EP-2	**Technology Maturation and Innovative Concepts**	27-Jul	0900 hrs	Lake Mizell B
37-EP-3	**SmallSat Systems and Thruster Diagnostics**	27-Jul	1500 hrs	Lake Mizell A
65-EP-5	**Near-Term Higher Power Systems and Application**	28-Jul	0900 hrs	Lake Mizell A
66-EP-6	**Resistojets and Arcjets**	28-Jul	0900 hrs	Lake Mizell B
90-EP-7	**Hall Modeling and Cathodes**	28-Jul	1430 hrs	Lake Mizell A
142-EP-10	**Pulsed and Micro Thrusters**	29-Jul	1500 hrs	Lake Mizell A
	Fossil-Fuel Power (FFP)			
10-FFP-1	**Fossil-Fuel Power Technologies I**	27-Jul	0900 hrs	Lake Highland B
92-FFP-2	**Fossil-Fuel Power Technologies II**	28-Jul	1430 hrs	Lake Down A
	Gas Turbine Engines (GTE)			
11-GTE-1	**Turbine I**	27-Jul	0900 hrs	Lake Monroe
12-GTE-2	**Compressors I**	27-Jul	0900 hrs	Lake Florence
67-GTE-4	**Turbine II**	28-Jul	0900 hrs	Lake Monroe
68-GTE-5	**Compressors II**	28-Jul	0900 hrs	Lake Florence
93-GTE-6	**Combustors**	28-Jul	1430 hrs	Lake George B
94-GTE-7	**Engine Design I**	28-Jul	1430 hrs	Lake Monroe
95-GTE-8	**Engine Design II**	28-Jul	1430 hrs	Lake Florence
121-GTE-9	**Turbine III**	29-Jul	0900 hrs	Lake Monroe
125-HSABP-5/GTE-10	**High-Speed Pressurized Systems**	29-Jul	0900 hrs	Lake George A
143-GTE-11/HSABP-6	**Detonation Engines**	29-Jul	1500 hrs	Lake Florence
144-GTE-12	**Turbine Durability**	29-Jul	1500 hrs	Lake Monroe
145-GTE-13	**AIAA Undergraduate Engine Design Competition**	29-Jul	1500 hrs	Lake Highland B
	Green Engineering/Green Energy (GE)			
120-GE-1	**Green Engineering**	29-Jul	0900 hrs	Lake Florence

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	High Speed Air Breathing Propulsion (HSABP)			
14-HSABP-1	**Advances in Hypersonic Air-Breathers**	27-Jul	0900 hrs	Lake George A
41-HSABP-2	**Computational Analysis of Supersonic Combustors**	27-Jul	1500 hrs	Lake George A
70-HSABP-3	**Design and Development of Innovative High-Speed Air Breathing System**	28-Jul	0900 hrs	Lake George A
124-HSABP-4	**Experimental and Computational Research in Supersonic Injection Including Predictive Capability**	29-Jul	0900 hrs	Lake Mizell B
125-HSABP-5/GTE-10	**High-Speed Pressurized Systems**	29-Jul	0900 hrs	Lake George A
156-SR-6/HSABP-8	**Solid Propellant Ducted Rockets**	29-Jul	1500 hrs	Lake Mizell B
147-HSABP-7	**High Fidelity Simulations of High-Speed Air Breathing System**	29-Jul	1500 hrs	Lake George A
	Hybrid Rockets (HR)			
13-HR-1	**Internal Ballistics Analysis and Modeling I**	27-Jul	0900 hrs	Lake Sheen B
39-HR-2	**Combustion Dynamics and Mixing Efficiencies I**	27-Jul	1500 hrs	Lake Sheen B
40-HR-3	**Internal Ballistics Analysis and Modeling II**	27-Jul	1500 hrs	Lake Florence
69-HR-4	**Design Studies Including Cost and Feasibility Analysis I**	28-Jul	0900 hrs	Lake Sheen B
96-HR-5	**Design and Development of Novel Hybrid Rocket Concepts**	28-Jul	1430 hrs	Lake Sheen B
97-HR-6	**Development and Evaluation of Novel Oxidizer and Fuel Formulations**	28-Jul	1430 hrs	Lake Highland B
98-HR-7	**Hybrid Rockets – Current Programs Objectives and Updates**	28-Jul	1430 hrs	Lake Sheen A
122-HR-8	**Combustion Stability, Motor Performance, and Related Issues**	29-Jul	0900 hrs	Lake Sheen B
123-HR-9	**Combustion Dynamics and Mixing Efficiencies II**	29-Jul	0900 hrs	Lake Sheen A
146-HR-10	**Design Studies Including Cost and Feasibility Analysis II**	29-Jul	1500 hrs	Lake Sheen B
	ITAR Restricted Sessions * see page 29 for more details			
71-ITAR-1	**Air Breathing Propulsion Systems: Nozzles and Diffusers**	28-Jul	0900 hrs	Orlando VI
99-ITAR-2	**Advanced Rocket and Space Technology: Propellants, Docking and Additive Manufacturing**	28-Jul	1430 hrs	Orlando VI
	Liquid Propulsion (LP)			
15-LP-1	**Green Propellant Infusion Mission (GPIM) and Green Propulsion**	27-Jul	0900 hrs	Orange E
16-LP-2	**Combustion Chamber Heat Transfer**	27-Jul	0900 hrs	Orange F
17-LP-3	**Injectors I**	27-Jul	0900 hrs	Lake Lucerne
18-LP-4	**Modelling and Simulation of Engines and Propulsion Systems I**	27-Jul	0900 hrs	Lake Highland A
42-LP-5	**Combustion Dynamics I**	27-Jul	1500 hrs	Orange E
43-LP-6	**Injectors II**	27-Jul	1500 hrs	Orange F
44-LP-7	**Modelling and Simulation of Engines and Propulsion Systems II**	27-Jul	1500 hrs	Lake Lucerne
45-LP-8	**Propellant Storage & Management I**	27-Jul	1500 hrs	Lake Nona B
72-LP-10	**Spacecraft Propulsion Systems I**	28-Jul	0900 hrs	Orange F
73-LP-11	**Liquid Propulsion History: Lessons Learned from Canceled Programs**	28-Jul	0900 hrs	Lake Eola
100-LP-12	**Green Propulsion**	28-Jul	1430 hrs	Orange E
101-LP-13	**Liquid Rocket Engines**	28-Jul	1430 hrs	Orange F
102-LP-14	**Materials & Manufacturing**	28-Jul	1430 hrs	Lake Lucerne
103-LP-15	**Propellant Slosh**	28-Jul	1430 hrs	Lake Highland A
126-LP-16	**Propellant Storage & Management II**	29-Jul	0900 hrs	Orange F
127-LP-17	**Rocket Nozzles I**	29-Jul	0900 hrs	Lake Lucerne

continued

Sessions at a Glance

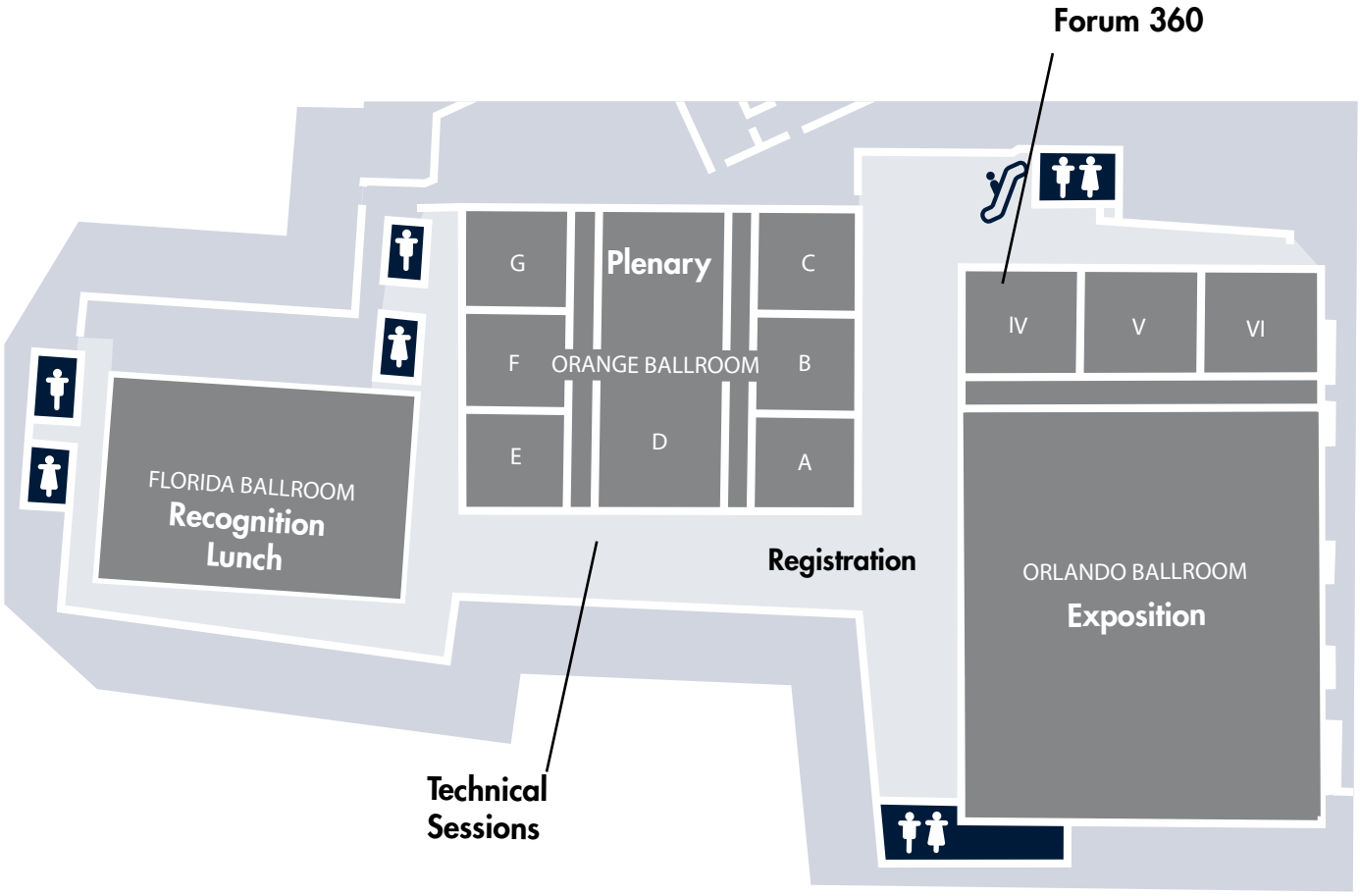
Abbreviation	Title	Date	Start Time	Location
Liquid Propulsion (LP) (continued)				
128-LP-18	**Spacecraft Propulsion Systems II**	29-Jul	0900 hrs	Lake Nona B
148-LP-19	**Combustion Dynamics II**	29-Jul	1500 hrs	Lake Lucerne
149-LP-20	**Propellant Feed Systems & Fluid Machinery**	29-Jul	1500 hrs	Lake Highland A
150-LP-21	**Rocket Nozzles II**	29-Jul	1500 hrs	Orange E
151-LP-22/ PGC-1/ PC-12	**Pressure Gain Combustion for Liquid Propulsion**	29-Jul	1500 hrs	Orange F
Nuclear and Future Flight Propulsion (NFF)				
19-NFF-1	**Nuclear Thermal Propulsion: Technology Development and Programmatics**	27-Jul	0900 hrs	Lake Nona A
46-NFF-2	**Fusion and Alternative Nuclear Concepts**	27-Jul	1500 hrs	Lake Nona A
74-NFF-3	**Nuclear Thermal Propulsion: Missions, Vehicles and Architectures**	28-Jul	0900 hrs	Lake Nona A
104-NFF-4	**Future Flight Propulsion Systems**	28-Jul	1430 hrs	Lake Nona A
129-NFF-5	**Conversations in Breakthrough Propulsion Physics: Gravity**	29-Jul	0900 hrs	Lake Nona A
Pressure Gain Combustion (PGC)				
151-LP-22/ PGC-1/ PC-12	**Pressure Gain Combustion for Liquid Propulsion**	29-Jul	1500 hrs	Orange F
Propellants and Combustion (PC)				
22-PC-1	**Advanced and Novel Concepts**	27-Jul	0900 hrs	Lake Louise
23-PC-2	**Combustion Modeling and Simulation I**	27-Jul	0900 hrs	Lake Virginia
48-PC-3	**Spray Injection and Combustion**	27-Jul	1500 hrs	Lake Louise
49-PC-4	**Propellants and Fuels I**	27-Jul	1500 hrs	Lake Virginia
77-PC-5	**Modeling of Combustion Dynamics, Instabilities and Noise I**	28-Jul	0900 hrs	Lake Louise
78-PC-6	**Propellants and Fuels II**	28-Jul	0900 hrs	Lake Virginia
105-PC-7	**Combustion Diagnostics and Experiments**	28-Jul	1430 hrs	Lake George A
106-PC-8	**Combustion Modeling and Simulation II**	28-Jul	1430 hrs	Lake Louise
107-PC-9	**Deflagrations and Detonations**	28-Jul	1430 hrs	Lake Virginia
131-PC-10	**Modeling of Combustion Dynamics, Instabilities and Noise II**	29-Jul	0900 hrs	Lake Louise
132-PC-11	**Scramjets, Supersonic Combustion**	29-Jul	0900 hrs	Lake Virginia
151-LP-22/ PGC-1/ PC-12	**Pressure Gain Combustion for Liquid Propulsion**	29-Jul	1500 hrs	Orange F
152-PC-13	**Propellants and Fuels III**	29-Jul	1500 hrs	Lake Louise
153-PC-14	**Rocket Motor Studies**	29-Jul	1500 hrs	Lake Concord B
154-PC-15	**Combustion Dynamics Experiments and Control**	29-Jul	1500 hrs	Lake Virginia
Propulsion Aerodynamics Workshop Report Out (PAW)				
21-PAW-1	**Nozzle Section I**	27-Jul	0900 hrs	Lake Concord B
47-PAW-2	**Nozzle Section II**	27-Jul	1500 hrs	Lake Concord B
76-PAW-3	**S-Duct Inlet Section**	28-Jul	0900 hrs	Lake Concord B
Propulsion Education (EDU)				
35-EDU-1	**Propulsion Education I**	27-Jul	1500 hrs	Lake George B
117-EDU-2	**Propulsion Education II**	29-Jul	0900 hrs	Lake George B
Propulsion and Power Systems of Unmanned Systems (PP)				
133-PP-1	**Propulsion and Power Systems of Unmanned Systems**	29-Jul	0900 hrs	Lake Highland A

Sessions at a Glance

Abbreviation	Title	Date	Start Time	Location
	Solid Rocket (SR)			
24-SR-1	**Solid Rocket Motor Combustion Flow Fields and Instability I**	27-Jul	0900 hrs	Lake Concord A
50-SR-2	**Solid Rocket Motor Historical and Current Developments**	27-Jul	1500 hrs	Lake Concord A
79-SR-3	**Solid Rocket Motor Combustion Flow Fields and Instability II**	28-Jul	0900 hrs	Lake Concord A
108-SR-4	**Solid Rocket Motor Propellant Characteristics Analysis**	28-Jul	1430 hrs	Lake Concord A
135-SR-5	**Solid Rocket Motor Nozzles, Thrust Management, and Ignition**	29-Jul	0900 hrs	Lake Concord A
156-SR-6/HSABP-8	**Solid Propellant Ducted Rockets**	29-Jul	1500 hrs	Lake Mizell B
157-SR-7	**Solid Rocket Motor Propellant Modeling and Simulation**	29-Jul	1500 hrs	Lake Concord A
	Space Transportation (ST)			
25-ST-1	**Space Transportation I**	27-Jul	0900 hrs	Lake George B
80-ST-2	**Space Transportation II**	28-Jul	0900 hrs	Lake George B
	System Concepts and Supporting Propulsion Technology (SC)			
134-SC-1	**Engineering and Analysis for Propulsion System Design**	29-Jul	0900 hrs	Lake Down B
155-SC-2	**Seal Material Advancements and Advanced Seal Technology**	29-Jul	1500 hrs	Lake George B
	Thermal Management Technology (TM)			
51-TM-2	**Heat Transfer and Transport Modeling and Analysis II**	27-Jul	1500 hrs	Lake Down A
81-TM-3	**Thermal System Applications and Unique Environments I**	28-Jul	0900 hrs	Lake Down A
136-TM-4	**Future Demands for Thermal Management: Opportunities and Challenges**	29-Jul	0900 hrs	Lake Down A
158-TM-5	**Thermal System Applications and Unique Environment II**	29-Jul	1500 hrs	Lake Down A
	Vehicle Systems (VS)			
159-VS-1	**Advanced Vehicle System Concepts**	29-Jul	1500 hrs	Lake Down B

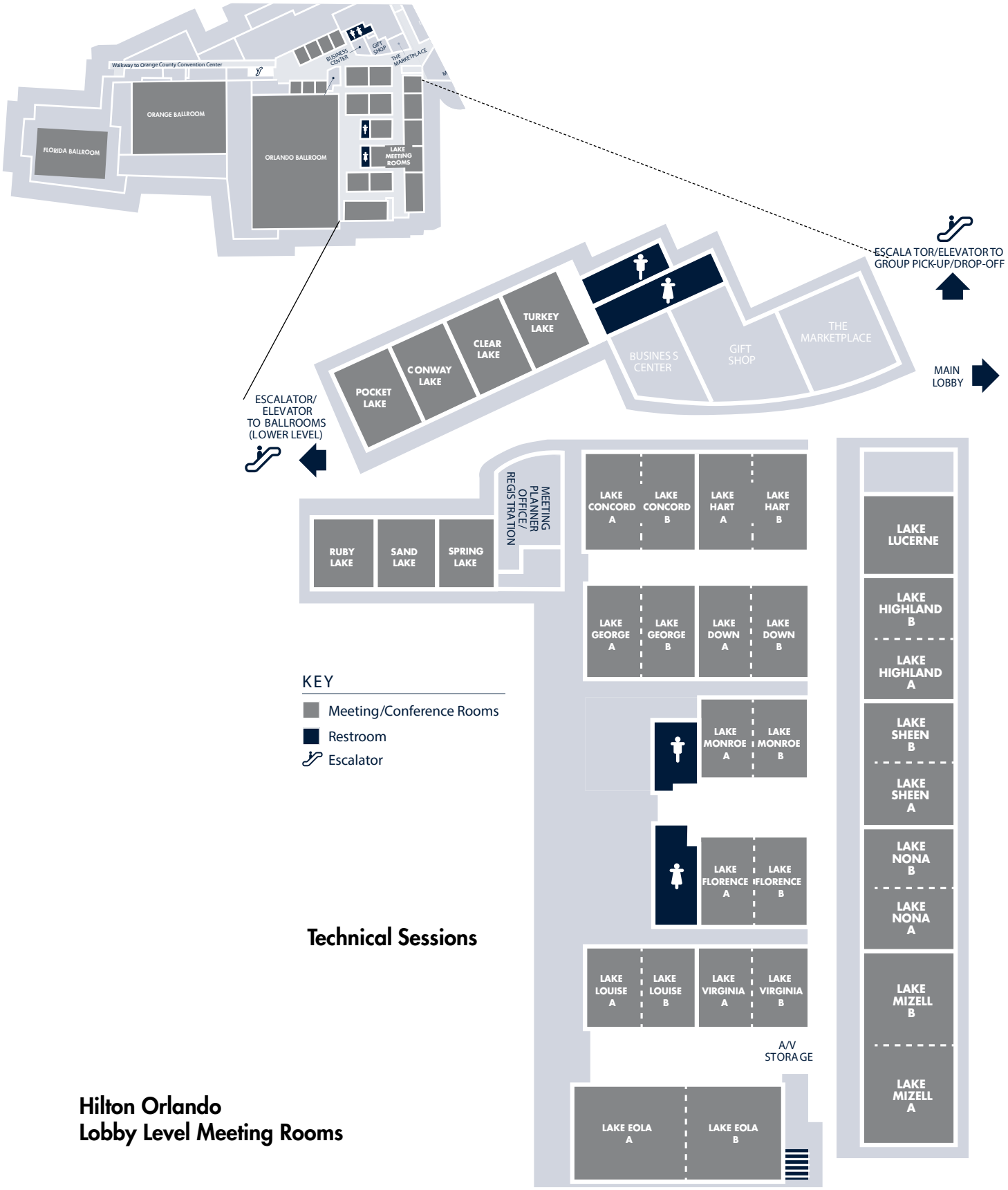
Notes

Venue Map



Hilton Orlando
Lower Level Meeting Rooms

Venue Map



Hilton Orlando
Lobby Level Meeting Rooms

Monday, 27 July 2015		
1-NW-1 0730 - 0800 hrs	Networking Coffee Break	Ballroom Foyer

Monday, 27 July 2015		
2-SB-1 0730 - 0800 hrs	Monday Speakers' Briefing	In Session Room
Speakers, presenters and session chairs for both the morning and afternoon technical sessions, please meet in your session room to load presentations and discuss the flow of your session.		

Monday, 27 July 2015		
3-PLNRY-1 0800 - 0900 hrs	Opening Keynote	Orange D
Aviation Innovation **Christopher (Chris) Lorence** General Manager, Engineering Technologies GE Aviation		

Monday, 27 July 2015						
4-ABPSI-1	Inlets					Lake Sheen A
Chaired by: L. LEAVITT, NASA						
0900 hrs AIAA-2015-3700 **Inward-Turning Streamline-Traced Supersonic Inlet Design Method for Low-Boom, Low-Drag Applications** S. Otto, C. Trefny, J. Slater, NASA Glenn Research Center, Cleveland, OH	0930 hrs AIAA-2015-3701 **Experimental Study of Flow Field in Rectangular Sectioned 90 Degree Bend of an APU Style Inlet** F. Lou, F. John, N. Key, Purdue University, West Lafayette, IN	1000 hrs AIAA-2015-3702 **Numerical Calibration of Mass Flow Plug for Inlet Testing** J. Sasson, Case Western Reserve University, Cleveland, OH; D. Davis, NASA Glenn Research Center, Cleveland, OH; P. Barnhart, Case Western Reserve University, Cleveland, OH	1030 hrs AIAA-2015-3703 **Effects of Distortion on Mass Flow Plug Calibration** J. Sasson, Case Western Reserve University, Cleveland, OH; D. Davis, NASA Glenn Research Center, Cleveland, OH; P. Barnhart, Case Western Reserve University, Cleveland, OH			

Monday, 27 July 2015		
5-APS-1 0900 - 1200 hrs	The Next Step in Human Exploration - Orion & Space Launch Systems	Lake Eola

It will be a panel where the panel members will talk about the overall space exploration program strategy and progress, and most importantly, highlight the very successful EFT-1 flight on 5 December 2014. Each panel member will also make a short presentation where they will highlight the scope of their involvement, accomplishments and milestone progress. The panel will also highlight the performance of propulsion and power subsystems on the very first, highly successful and history making Orion Flight.

Moderator: Paul Anderson, Lockheed Martin Space Systems

Panelists:

Joe Mayer	Larry Price / Roger McNamara	Brent Hughes	Keith Reiley	Philip Weber	Donald Sauvageau	Tom Martin
Lockheed Martin Space Systems	Lockheed Martin Space Systems	Lockheed Martin Space Systems	The Boeing Company	NASA Kennedy	Orbital ATK	Aerojet Rocketdyne

Monday, 27 July 2015						
6-ECS-1	**Energetic Components & System Analysis**					**Lake Nona B**
Chaired by: K. GONTHIER, Louisiana State University and J. BAGLINI, Exodynamics Technology Incorporated						
0900 hrs AIAA-2015-3704 **Correlation between Ignition Time and Thermal Time Constant in 1W-1A HBW EED's** L. Yang, Self, La Canada Flintridge, CA	0930 hrs AIAA-2015-3705 **A Heuristic Model for Estimating Ignition Delays for Pressure Cartridges with Loosely Packed Energetic Materials** H. Lee, Chemring Energetic Devices, Downers Grove, IL	1000 hrs AIAA-2015-3706 **A Detailed Numerical Calibration Of Shock Pressure In The Gap Test Configuration For Characterizing Non-Ideal Energetic Materials** B. Kim, J. Yoh, Seoul National University, Seoul, Korea (the Republic of)	1030 hrs AIAA-2015-3707 **Shock Source Assessment of a Separation Nut** J. Kozmic, H. Lee, Chemring Energetic Devices, Downers Grove, IL	1100 hrs AIAA-2015-3708 **Analysis of Dissipation Induced by Successive Planar Shock Loading of Granular Explosive** K. Gonthier, P. Rao, Louisiana State University, Baton Rouge, LA	1130 hrs AIAA-2015-3709 **Analysis of Linear Shaped Charge Igniting Rapid Deflagration Cord using Explicit Dynamics Method** R. Hsiao, Pacific Scientific EMC, Hollister, CA	

Monday, 27 July 2015						
7-EE-1	**Solar and Wind Energy for Terrestrial Applications**					**Lake Down B**
Chaired by: E. OGEDENGBE, ENERGHX Consulting/University of Lagos and S. AYAD						
0900 hrs AIAA-2015-3710 **An Introduction to the University of KwaZulu-Natal's Solar Energy Research Amplified Flux Facility - SERAFF** P. Perumall, M. Brooks, J. Pitot, University of KwaZulu-Natal, Durban, South Africa	0930 hrs AIAA-2015-3711 **Design of a CSP-Based Heat Tracking System for Combustion of Food Waste in a Downdraft Bio-digester** A. Oshilalu, E. Ogedengbe, University of Lagos, Akoka-Yaba, Nigeria	1000 hrs AIAA-2015-3712 **Heat-Pipe PV-T System with Phase Change Thermal Storage to Enhance the Energy Efficiency** N. Ghaddar, A. Sweidan, K. Ghali, American University of Beirut, Beirut, Lebanon	1030 hrs AIAA-2015-3713 **Optimization via "De - Turbulating" Spoked Wheels of a Solar Car** K. Veale, C. Bemont, C. Lawrence, University of KwaZulu-Natal, Durban, South Africa	1100 hrs AIAA-2015-3714 **An Experimental Study of the Near Wake of Horizontal Axis Wind Turbines** M. Mourad, S. Ayad, O. Abd Elatif, Benha University, Cairo, Egypt	1130 hrs AIAA-2015-3715 **In-Cloud Ice Accretion Modeling on Wind Turbine Blades Using an Extended Messinger Model** L. Sankar, M. Ali, Georgia Institute of Technology, Atlanta, GA	

Monday, 27 July 2015						
8-EP-1	**Flight Operations and Annular Ion Development**					**Lake Mizell A**
Chaired by: J. WILLIAMS, Colorado State University and N. ARTHUR						
0900 hrs AIAA-2015-3716 **Electric Propulsion Electronics Activities in Europe - 2015** M. Gollor, A. Franke, ESA, Noordwijk, The Netherlands; W. Dechent, U. Schwab, Advance Space Power Equipment GmbH, Salem, Germany; G. Glorieux, Airbus, Elancourt, France; M. Boss, Airbus, Immenstaad, Germany; et al.	0930 hrs AIAA-2015-3717 **In-Flight Operation of the Dawn Ion Propulsion System Through Early Orbit Operations at Ceres** C. Garner, M. Rayman, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1000 hrs AIAA-2015-3718 **In-Flight Operation of the Hayabusa2 Ion Engine System in the EDVEGA Phase** K. Nishiyama, S. Hosoda, R. Tsukizaki, H. Kuninaka, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1030 hrs AIAA-2015-3719 **High Thrust-to-Power Annular Engine Technology** M. Patterson, R. Thomas, NASA Glenn Research Center, Cleveland, OH; M. Crofton, J. Young, The Aerospace Corporation, El Segundo, CA; J. Foster, University of Michigan, Ann Arbor, Ann Arbor, MI	1100 hrs AIAA-2015-3721 **Characterization Of Discharge Uniformity And Performance Via Stimulated Beam Extraction Of A 65 Cm Annular Ion Engine** J. Foster, N. Arthur, University of Michigan, Ann Arbor, Ann Arbor, MI; M. Patterson, NASA Glenn Research Center, Cleveland, OH; J. Young, M. Crofton, The Aerospace Corporation, El Segundo, CA	1130 hrs AIAA-2015-3720 **Low-Power Operation and Plasma Characterization of a Qualification Model SPT-140 Hall Thruster** C. Garner, B. Jorns, R. Hofer, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; R. Liang, J. Delgado, Space Systems/Loral, Palo Alto, CA	

Monday, 27 July 2015						
9-EP-2	**Technology Maturation and Innovative Concepts**					**Lake Mizell B**
Chaired by: R. SHASTRY, NASA Glenn Research Center and C. WORDINGHAM, Princeton University						
0900 hrs AIAA-2015-3722 **Downstream Plasma Velocity Measurement and Scaling Law of High-Power Helicon Double Gun Thruster** N. Murakami, R. Winglee, University of Washington, Seattle, Seattle, WA	0930 hrs AIAA-2015-3723 **Initial Thrust Measurements of Marshall's Ion-ioN Thruster** N. Schloeder, T. Scogin, T. Liu, M. Walker, Georgia Institute of Technology, Atlanta, GA; K. Polzin, J. Dankanich, NASA Marshall Space Flight Center, Huntsville, AL; et al.	1000 hrs AIAA-2015-3724 **Status of the Development and Measurement of a Microwave Microplasma Source for Micropropulsion** R. Dextre, University of Alabama, Huntsville, Huntsville, AL	1030 hrs AIAA-2015-3725 **High-Density Electron Cyclotron Resonance Electric Propulsion** A. Reisz, Reisz Engineers, Huntsville, AL	1100 hrs AIAA-2015-3726 **Experimental Measurements of Momentum Transfer in a Direct Wave-Drive Thruster** M. Feldman, E. Choueiri, Princeton University, Princeton, NJ	1130 hrs AIAA-2015-3727 **MHD and Thermal Coupled Simulation of an MPD Thruster** A. Kawasaki, Tokyo Institute of Technology, Yokohama, Japan; K. Kubota, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; I. Funaki, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; Y. Okuno, Tokyo Institute of Technology, Yokohama, Japan	

Monday, 27 July 2015						
10-FFP-1	**Fossil-Fuel Power Technologies I**					**Lake Highland B**
Chaired by: B. KHANDELWAL, The University of Sheffield						
0900 hrs AIAA-2015-3728 **Numerical Study on the Effects of Fuel Injector Cone-Angle on Soot Nano-Particles, CO, and CO_2 Pollutions in a Combustion Chamber Burning Kerosene** M. Darbandi, M. Ghafourizadeh, Sharif University of Technology, Tehran, Iran (the Islamic Republic of); G. Schneider, University of Waterloo, Waterloo, Canada	0930 hrs AIAA-2015-3729 **Influence Of Production Pathways And Sources Of Different Fuels On Combustion Instabilities Of A Gas Turbine Engine** S. Roy, B. Khandelwal, C. Lord, University of Sheffield, Sheffield, United Kingdom	1000 hrs AIAA-2015-3730 **The Use of LNG as Aviation Fuel: Combustion and Emission** M. Yahyaoui, Airbus, Suresnes, France				

Monday, 27 July 2015						
11-GTE-1	**Turbine I**					**Lake Monroe**
Chaired by: M. RICKLICK, Embry Riddle Aeronautical University and G. PANIAGUA						
0900 hrs AIAA-2015-3731 **Computational studies on End-wall Film Cooling from a Single Row of Holes at Different Stream-wise Locations in a Gas Turbine Cascade** K. Parammasivam, D. Ravi, Anna University, Chennai, India	0930 hrs AIAA-2015-3732 **Numerical Simulations of a Rectangular Channel with Symmetric and Non-symmetric Wedge-shaped Turbulators** L. Tran, Z. Little, P. Tran, J. Kapat, University of Central Florida, Orlando, FL	1000 hrs AIAA-2015-3733 **Time Resolved Stereo-PIV Measurements of the Horseshoe Vortex System in a Low Aspect Ratio Pin-Fin Array** C. Anderson, S. Lynch, Pennsylvania State University, State College, PA	1030 hrs AIAA-2015-3734 **CFD Benchmarking of Heat Transfer Predictions in Internal Channel with Rib Turbulators** Y. Mehta, M. Ricklick, Embry-Riddle Aeronautical University, Daytona Beach, FL	1100 hrs AIAA-2015-3735 **Combination of Ribs and Pins for Internal Cooling** M. Otto, J. Hodges, University of Central Florida, Orlando, FL; M. Ricklick, Embry-Riddle Aeronautical University, Altamonte Springs, FL; J. Kapat, University of Central Florida, Orlando, FL	1130 hrs AIAA-2015-3736 **CFD Benchmarking of Heat Transfer and Pressure Drop Predictions in a Pin Fin Channel** R. Fernandes, M. Ricklick, Embry-Riddle Aeronautical University, Daytona Beach, FL	

Monday, 27 July 2015						
12-GTE-2	**Compressors I**					**Lake Florence**
Chaired by: N. KEY, Purdue University						
0900 hrs AIAA-2015-3737 **Numerical Study on the Application of Circumferential Groove Casing Treatment to a Heavy Duty Gas Turbine Compressor at Multi-Operational Conditions** H. Chen, W. Song, Tsinghua University, Beijing, China	0930 hrs AIAA-2015-3738 **Numerical Investigation of Near-stall Behavior of a Transonic Compressor Stage under 80% Nominal Speed Condition** R. Liu, A. Hou, S. Li, X. Song, Q. Ni, Beihang University, Beijing, China	1000 hrs AIAA-2015-3739 **Influence Of Rain Droplets On The Stage Characteristics Of An Axial Multistage Compressor** V. Tasdelen, University of Stuttgart, Stuttgart, Germany	1030 hrs AIAA-2015-3740 **Simulations of the Effect of Velocity Ratios on an Effusion Cooled Combustor Wall with Adaptive Mesh Refinement CFD and Conjugate Heat Transfer** G. Kumar, S. Drennan, Convergent Science, Inc., New Braunfels, TX	1100 hrs AIAA-2015-3741 **A Parametric Shape Optimization Strategy for Compressor Vane Design** Z. Grey, G. Modgil, Rolls-Royce Group plc, Indianapolis, IN		

Monday, 27 July 2015						
13-HR-1	**Internal Ballistics Analysis and Modeling I**					**Lake Sheen B**
Chaired by: A. KARP, Jet Propulsion Laboratory and S. WHITMORE, Utah State University						
0900 hrs AIAA-2015-3742 **Modeling of Saturated and Superheated N2O Heat Transfer Rates, with Experimental Verification** P. Lemieux, California Polytechnic State University, San Luis Obispo, CA; D. Pastrone, P. Sanchez Arribas, Technical University of Turin, Turin, Italy	0930 hrs AIAA-2015-3743 **On the Quadrupole Vortex Motion in a Right-Cylindrical Hybrid Rocket Engine** T. Marquardt, J. Majdalani, O. Cecil, Auburn University, Auburn, AL	1000 hrs AIAA-2015-3744 **Effect of Outflow Boundary Conditions on the Stability of Cylindrically-Shaped Hybrid Rockets** T. Elliott, University of Tennessee, Chattanooga, Chattanooga, TN; J. Majdalani, Auburn University, Auburn, AL	1030 hrs AIAA-2015-3745 **Engineering Model for Hybrid Rocket Regression Rate Amplification by Helical Fuel Ports** S. Whitmore, S. Walker, D. Merkley, Utah State University, Logan, UT			

Monday, 27 July 2015						
14-HSABP-1	**Advances in Hypersonic Air-Breathers**					**Lake George A**
Chaired by: J. WHITE, NASA-Langley Research Center						
0900 hrs AIAA-2015-3746 **Analysis of Hypersonic Nozzles with Newton and Preconditioned Newton-GMRES Methods** Y. Muslubas, S. Eyi, Middle East Technical University, Ankara, Turkey	0930 hrs AIAA-2015-3747 **Mechanism and Prediction for Occurrence of Shock Train Sharp Forward Movement** K. Xu, J. Chang, W. Zhou, D. Yu, Harbin Institute of Technology, Harbin, China	1000 hrs AIAA-2015-3748 **Investigation of the Self-Starting ability of An Internal WaveRider Inlet for Ramjet** F. Zuo, G. Huang, Z. Yu, W. Tang, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1030 hrs AIAA-2015-3749 **A Method to Compute Flameout Limits of Scramjet-Powered Hypersonic Vehicles** C. Mbagwu, J. Driscoll, University of Michigan, Ann Arbor, Ann Arbor, MI	1100 hrs AIAA-2015-3750 **Simulations of Ethylene and Hydrogen Combustions in Scramjet Combustor** R. Rouzbar, S. Eyi, Middle East Technical University, Ankara, Turkey		

Monday, 27 July 2015						
15-LP-1	Green Propellant Infusion Mission (GPIM) and Green Propulsion					Orange E
Chaired by: T. POURPOINT, Purdue University and D. SARGENT, Federal Aviation Administration						
0900 hrs AIAA-2015-3751 **Green Propellant Infusion Mission Program Overview, Status, and Flight Operations** C. McLean, Ball Aerospace & Technologies Corporation, Boulder, CO	0930 hrs AIAA-2015-3752 **Adiabatic Compression Testing of AF-M315E** P. Quach, ERC, Inc., Edwards AFB, CA; A. Brand, Air Force Research Laboratory, Edwards AFB, CA; G. Warmoth, ERC, Inc., Edwards AFB, CA	1000 hrs AIAA-2015-3753 **GPIM AF-M315E Propulsion System** R. Spores, Aerojet Rocketdyne, Redmond, WA	1030 hrs AIAA-2015-3754 **Plume Characterization of a Laboratory Model 22 N GPIM Thruster via High-Frequency Raman Spectroscopy** G. Williams, J. Kojima, Ohio Aerospace Institute, Cleveland, OH; L. Arrington, M. Deans, D. Fischer, B. Reed, NASA Glenn Research Center, Cleveland, OH; et al.	1100 hrs AIAA-2015-3755 **FTIR Analysis of Triethylamine Borane and White Fuming Nitric Acid Gaseous Combustion Products** A. Mugenda, O. Busari, A. Benhidjeb-Carayon, T. Pourpoint, Purdue University, West Lafayette, IN	1130 hrs AIAA-2015-3756 **Fracture Mechanics Testing of Titanium 6Al-4V in AF-M315E** J. Sampson, J. Martinez, NASA Kennedy Space Center, Cape Canaveral, FL	

Monday, 27 July 2015						
16-LP-2	Combustion Chamber Heat Transfer					Orange F
Chaired by: M. PIZZARELLI, University of Rome and M. NARAGHI, Manhattan College						
0900 hrs AIAA-2015-3757 **Convective and Radiative Contributions to Wall Heat Transfer in Liquid Rocket Engine Thrust Chambers** B. Betti, D. Bianchi, G. Leccese, D. Lentini, F. Nasuti, University of Rome "La Sapienza", Rome, Italy	0930 hrs AIAA-2015-3758 **Numerical Analysis of Chamber Wall Heat Fluxes in a LOX/CH4 Single Injector Rocket** A. French, P. Natale, Italian Aerospace Research Center (CIRA), Capua, Italy	1000 hrs AIAA-2015-3759 **Comparison of Heat Transfer Characteristic of Rectangular and Oval Cooling Channels of Regeneratively Cooled Rocket Engines** R. Cavillon, Alstom, Villeurbanne, France; M. Naraghi, Manhattan College, Riverdale, NY; G. Chen, University of Maryland, College Park, College Park, MD	1030 hrs AIAA-2015-3760 **Regenerative Cooling Performance Analysis of the LE-X Engine Combustion Chamber** H. Negishi, Y. Daimon, N. Negoro, A. Kurosu, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan	1100 hrs AIAA-2015-3761 **Extension of the Laminar Flamelet Model to Account for Wall Heat Losses in Rocket Engine Combustor Simulations** A. Zambon, A. Hosangadi, W. Calhoon, Combustion Research and Flow Technology, Inc., Pipersville, PA	1130 hrs AIAA-2015-3762 **Potential Benefits of Pressure Gain Combustion in Liquid Rocket Engine Pre-Burners** S. Coogan, Southwest Research Institute, San Antonio, TX	

Monday, 27 July 2015						
17-LP-3	Injectors I					Lake Lucerne
Chaired by: I. LEYVA and S. CHIANESE, SpaceX						
0900 hrs AIAA-2015-3763 **Impinging Fuel Injector Atomization and Combustion Modeling** K. Brinckman, G. Feldman, A. Hosangadi, Combustion Research and Flow Technology, Inc., Pipersville, PA	0930 hrs AIAA-2015-3764 **Dynamic Characteristics of Open-type Swirl Injector with Varying Geometry** Y. Chung, H. Kim, S. Jeong, Y. Yoon, Seoul National University, Seoul, Korea (the Republic of)	1000 hrs AIAA-2015-3765 **A Cold-flow Experimental Observation of the Two-stage Impinging Type Injector for Rocket Propulsion** B. Huang, T. Yuan, Y. Chen, Y. Su, National Cheng Kung University, Tainan, Taiwan	1030 hrs AIAA-2015-3766 **Characterization of Injector Response in a Hypergolic Pulse Detonation Rocket Engine** B. Kan, S. Heister, Purdue University, West Lafayette, IN	1100 hrs AIAA-2015-3767 **Transient Response of a Liquid Injector to a Transverse Pressure Wave** D. Lim, S. Heister, D. Stechmann, B. Kan, B. Justice, Purdue University, West Lafayette, IN		

Monday, 27 July 2015						
18-LP-4	**Modelling and Simulation of Engines and Propulsion Systems I**					**Lake Highland A**
Chaired by: T. GIEL, Jacobs Technology and A. LEKEUX, CNES						
0900 hrs AIAA-2015-3768 **Cavitating Venturi Model Using Standard Element and Options in Commercially Available Lumped-Parameter Software** G. Beck, Southwest Research Institute, San Antonio, TX	0930 hrs AIAA-2015-3769 **CFD Modeling of the Multipurpose Hydrogen Test Bed (MHTB) Self-Pressurization and Spray Bar Mixing Experiments in Normal Gravity: Effect of the Accommodation Coefficient on the Tank Pressure** O. Kartuzova, M. Kassemi, NASA Glenn Research Center, Cleveland, OH	1000 hrs AIAA-2015-3770 **Application of Multidisciplinary Analysis and Optimization on AR1 Using ModelCenter®** M. Long, J. Horton, Aerojet Rocketdyne, West Palm Beach, FL	1030 hrs AIAA-2015-3771 **Characterization of Cryogenic Liquid Propellants flashing phenomena under vacuum conditions** M. Luo, B. Vasques, O. Haidn, Technical University of Munich, Munich, Germany			

Monday, 27 July 2015						
19-NFF-1	**Nuclear Thermal Propulsion: Technology Development and Programmatics**					**Lake Nona A**
Chaired by: J. WARREN, NASA Headquarters and C. JOYNER, Aerojet Rocketdyne						
0900 hrs AIAA-2015-3772 **The NASA Advanced Exploration Systems Nuclear Thermal Propulsion Project** M. Houts, D. Mitchell, T. Kim, W. Emrich, R. Hickman, H. Gerrish, NASA Marshall Space Flight Center, Huntsville, AL; et al.	0930 hrs AIAA-2015-3773 **Review of Nuclear Thermal Propulsion Ground Test Options** D. Coote, K. Power, NASA Stennis Space Center, Stennis Space Center, MS; H. Gerrish, G. Doughty, NASA Marshall Space Flight Center, Huntsville, AL	1000 hrs AIAA-2015-3774 **Affordable Development and Demonstration of a Small NTR Engine and Stage: A Preliminary NASA, DOE and Industry Assessment** S. Borowski, R. Sefcik, NASA Glenn Research Center, Cleveland, OH; J. Fittje, Vantage Partners, LLC, Brook Park, OH; A. Qualls, B. Schnitzler, Oak Ridge National Laboratory, Oak Ridge, TN; A. Weitzberg, Self, Woodland Hills, CA; et al.	1030 hrs AIAA-2015-3775 **Subscale Validation of the Subsurface Active Filtration of Exhaust (SAFE) Approach to NTP Ground Testing** W. Marshall, S. Borowski, NASA Glenn Research Center, Cleveland, OH; C. Martin, D. Kelly, National Security Technologies, LLC, Las Vegas, NV; M. Bulman, Aerojet Rocketdyne, Sacramento, CA	1100 hrs AIAA-2015-3776 **Extrusion Development of Graphite-Based Composite Fuel for Nuclear Thermal Propulsion** M. Trammell, B. Jolly, A. Qualls, Oak Ridge National Laboratory, Oak Ridge, TN	1130 hrs AIAA-2015-3777 **Coating Development on Graphite-Based Composite Fuel for Nuclear Thermal Propulsion** B. Jolly, M. Trammell, A. Qualls, Oak Ridge National Laboratory, Oak Ridge, TN	

Monday, 27 July 2015		
20-NW-2 **0900 - 0930 hrs**	**Networking Coffee Break**	**Exposition Hall**

Monday, 27 July 2015						
21-PAW-1	**Nozzle Section I**					**Lake Concord B**
Chaired by: C. CHUCK, Boeing Commercial Airplanes and A. DELOT, ONERA						
0900 hrs AIAA-2015-3778 **Perspectives on Propulsion CFD for Nozzle Applications Relevant to the AIAA Propulsion Aerodynamics Workshop** N. Domel, Lockheed Martin Aeronautics Company, Fort Worth, TX	0930 hrs AIAA-2015-3779 **NSAWET Results of the Dual Separate Flow Reference Nozzle from AIAA PAW02** Z. Li, H. Chen, Y. Zhang, Tsinghua University, Beijing, China	1000 hrs Oral Presentation **Dsfr Nozzle Performance Predictions And CFS Boxermesh Evaluation Using Rolls-Royce In-House Hydra CFD Tool** J. Sokhey, Rolls-Royce North America, Indianapolis, IN; N. Grech, M. Slaby, Rolls-Royce plc, Derby, United Kingdom	1030 hrs Oral Presentation **A Comparative Study on Axisymmetric Dual Flow Reference Nozzle** N. Vijayakumar, D. Wilson, University of Texas at Arlington, Arlington, TX			

Monday, 27 July 2015						
22-PC-1	**Advanced and Novel Concepts**					**Lake Louise**
Chaired by: R. PITZ, Vanderbilt University						
0900 hrs AIAA-2015-3780 **An Innovative Turbo Compound Internal Engine Concept for UAV and Other Applications** J. Taylor, J. Mehta, J. Charneski, M. Lindstrom, K. Launglucknavalai, Belcan Corporation, Cincinnati, OH	0930 hrs AIAA-2015-3781 **Radial Effects on Rotating Detonation Engine Swirl** C. Nordeen, University of Connecticut, Storrs, Storrs, CT; D. Schwer, A. Corrigan, Naval Research Laboratory, Washington, DC; B. Cetegen, University of Connecticut, Storrs, Storrs, CT	1000 hrs AIAA-2015-3782 **Towards Non-premixed Injection Modeling of Rotating Detonation Engines** D. Schwer, K. Kailasanath, Naval Research Laboratory, Washington, DC	1030 hrs AIAA-2015-3783 **Effects Of Thermites On Burning And Radiation Performances Of Foil-Typed Mtv Infrared Decoys** J. Du, H. Guan, J. Li, Nanjing University of Science and Technology, Nanjing, China			

Monday, 27 July 2015						
23-PC-2	**Combustion Modeling and Simulation I**					**Lake Virginia**
Chaired by: M. ANAND, Rolls-Royce Corp and F. DIMARE, DLR						
0900 hrs AIAA-2015-3784 **3D Computation For Torch Jet Ignition Of Premixed Methane-Hydrogen-Air Blends In A Pre-Chamber Constant Volume Combustor At Variable Pre-Chamber Pressure** M. Khan, K. Paik, M. Nalim, Indiana University-Purdue University Indianapolis, Indianapolis, IN	0930 hrs AIAA-2015-3785 **Parametric Design of Injectors for LDI-3 Combustors** K. Ajmani, Vantage Partners, LLC, Cleveland, OH; H. Mongia, Purdue University, West Lafayette, IN; P. Lee, Woodward FST, Inc., Zeeland, MI	1000 hrs AIAA-2015-3786 **Parametric Study of Effect of Geometric Configurations of Microjets in an Axisymmetric Dump Combustor Flow** M. Vellakal, A. Taha, University of Illinois, Urbana-Champaign, Urbana, IL	1030 hrs AIAA-2015-3787 **Investigation Of The Effect Of Co/Counter Configurations Of A Double Swirler Airblast Atomizer In An Annular Turbojet Combustor With Computational Fluid Dynamics** H. Bolat, TUBITAK-SAGE, Ankara, Turkey; S. Uslu, TOBB University of Economics and Technology, Ankara, Turkey			

Monday, 27 July 2015						
24-SR-1	**Solid Rocket Motor Combustion Flow Fields and Instability I**					**Lake Concord A**
Chaired by: J. MAJDALANI, Auburn University and J. HORNICK, Aerojet Rocketdyne						
0900 hrs AIAA-2015-3788 **On Steady Trkalian High Speed Flows: Swirling Compressible Motions in Rockets with Headwall Injection** O. Cecil, J. Majdalani, J. Batterson, Auburn University, Auburn, AL	0930 hrs AIAA-2015-3789 **Transverse Vortico-Acoustic Waves in the Presence of Strong Mean Flow Shear Layers** P. Kovacic, J. Batterson, J. Majdalani, Auburn University, Auburn, AL	1000 hrs AIAA-2015-3790 **Study On The Effects Of Gas Temperature On Cold Flow Test Of Nozzle Damping** B. Sun, J. Li, W. Su, N. Wang, Beijing Institute of Technology, Beijing, China				

Monday, 27 July 2015						
25-ST-1	**Space Transportation I**					**Lake George B**
Chaired by: M. SIR, Aerospace Corp (COMP)						
0900 hrs AIAA-2015-3791 **Rho-Isp Revisited and Basic Stage Mass Estimating for Launch Vehicle Conceptual Sizing Studies** T. Kibbey, Jacobs, Huntsville, AL	0930 hrs AIAA-2015-3792 **Orion EFT-1 Propulsion Test Results** S. Norris, Lockheed Martin Corporation, Denver, CO	1000 hrs AIAA-2015-3793 **Airbus Defence & Space Spacecraft Passivation Initiative** P. Fernando, R. Baldwin, D. Briot, Airbus, Stevenage, United Kingdom	1030 hrs AIAA-2015-3794 **Exploring NASA Human Spaceflight and Pioneering Scenarios** E. Zapata, NASA Kennedy Space Center, Cape Canaveral, FL			

Monday, 27 July 2015						
26-TM-1	**Heat Transfer and Transport Modeling and Analysis I**					**Lake Down A**
Chaired by: C. TARAU, Advanced Cooling Technologies and M. CHOI, NASA-Goddard Space Flight Center						
0900 hrs AIAA-2015-3795 **Validation Of The Thermo-Fluid Characteristics For Laminated Screens Woven Copper Wire Mesh Enhancing The Regenerative Compact Heat Exchanger Heat Transfer Areas** F. Senda, Nuclear Energy Corporation of South Africa, Brits, South Africa; R. Dobson, University of Stellenbosch, Stellenbosch, South Africa	0930 hrs AIAA-2015-3796 **CFD Analysis and Full Scale Wind Tunnel and Flight Testing of a Complex Auxiliary Power Unit Intake System** J. Hernanz, Airbus, Getafe, Spain; B. Bouldin, Honeywell International, Inc., Phoenix, AZ; M. Gallego, Airbus, Getafe, Spain	1000 hrs AIAA-2015-3797 **Diffusion Effect on Hypersonic Flow Using Fick's Law** H. Gur, S. Eyi, Middle East Technical University, Ankara, Turkey	1030 hrs AIAA-2015-3798 **Design of the Ventilation System in an Underground Car Park:The Effect of Jet Fans Configurations** E. Khalil, S. Gomaa, Cairo University, Giza, Egypt	1100 hrs AIAA-2015-3799 **Forced Convective Heat Transfer in AL2O3-air Nanoaerosol** M. Trivedi, C. Johansen, University of Calgary, Calgary, Canada		

Monday, 27 July 2015		
27-F360-1 **0930 - 1200 hrs**	**Aircraft Electric Propulsion: Bridging the Gap**	**Orlando IV**

Aircraft electric and hybrid electric propulsion (EP/HEP) is of increasing excitement in the industry and represents an area of worldwide growth. The focus of this panel will be on the EP/HEP evolutionary path, and the challenge to bridge between emerging small aircraft concepts and future commercial aircraft all-electric and hybrid gas-electric concepts. In this session, content presented in recent forums, will be highlighted and tailored for P&E's propulsion/energy-centric audience, helping to connect the topic between different national and international forums.

Moderator: Ruben Del Rosario, NASA Glenn Research Center

Panelists:

Andrew Gibson	**Charles Lents**	**Frank Anton**	**Michael Armstrong**	**Marty Bradley**	**Johannes Stuhlberger**
ESAero	United Technologies Research Center	Siemens	Rolls-Royce Corporation	The Boeing Company	Airbus

Monday, 27 July 2015		
28-LECT-1 **1200 - 1230 hrs**	**U.S. Air Force Prize Announcement**	**Orlando IV**

The Air Force has just announced a $2 million technology prize designed to motivate independent development of a small, lightweight, fuel-efficient engine. The turbine power plant will be highly efficient over a range of power settings, have a high power density, and use a logistically available battlefield fuel (Jet A). The first engine to meet specific performance criteria in a verification test in the Air Force Research Laboratory will receive the prize. Full details are available at www.airforceprize.com.
Please join us to learn specifics about the Air Force Turbine Prize, what it is, how to get involved, timelines, ask questions, etc.

Monday, 27 July 2015		
29-NW-3 **1200 - 1330 hrs**	**Lunch Break**	

Lunch on your own. Please see the information desk for a list of local restaurants.

Monday, 27 July 2015		
30-PLNRY-2 **1330 - 1500 hrs**	**Global Cooperation & Economic Development**	**Orange D**

The current international environment has introduced significant challenges to global cooperation, particularly in the propulsion community. This panel will examine the implications of the changing geopolitical landscape and the importance of international cooperation in our industry. How do partners cooperate without becoming overly dependent on any one player?

Moderator: Jim Maser, Vice President, Strategy, Marketing and Business Development, Pratt & Whitney

Panelists:

Jean-Paul Ebanga	**Richard "Ric" Parker**	**Marc Vales**	**Les Kovacs**	**Bernard Zimmerman**
President and CEO, CFM International	Director of Research and Technology, Rolls-Royce plc	Head of Future Programmes, Airbus Safran Launches	Director of Washington Operations, United Launch Alliance (ULA)	Vice-President Group Strategy & Development, Pratt & Whitney

Monday, 27 July 2015		
31-NW-4 **1430 - 1500 hrs**	**Networking Coffee Break**	**Exposition Hall**

Monday, 27 July 2015						
32-ABPSI-2	**Integrated Propulsion**					**Lake Sheen A**
Chaired by: T. BERENS, AIRBUS Defence and Space and H. CHEN, Tsinghua University						
1500 hrs AIAA-2015-3800 **CFD-based Analysis of Boundary Layer Ingesting Propulsion** S. Ochs, G. Tillman, J. Joo, D. Voytovych, United Technologies Research Center, Inc., East Hartford, CT	1530 hrs AIAA-2015-3801 **Performance Analysis of a Distributed Propulsion System with Boundary Layer Ingestion** E. Valencia, National Technical University, Quito, Ecuador; C. Liu, L. Panagiotis, R. Singh, D. Nalianda, Cranfield University, Cranfield, United Kingdom	1600 hrs AIAA-2015-3802 **Design Point Analysis of an Hybrid Fuel Cell Gas Turbine Cycle for Advanced Distributed Propulsion Systems** E. Valencia, National Technical University, Quito, Ecuador; V. Hidalgo, Tsinghua University, Beijing, China; L. Panagiotis, D. Nalianda, R. Singh, Cranfield University, Cranfield, United Kingdom; C. Liu, Shanghai Jiao Tong University, Shanghai, China	1630 hrs AIAA-2015-3803 **Passive Flow Control in Boundary Layer Ingesting Semi Submerged Inlet** U. Küçük, TUBITAK-SAGE, Ankara, Turkey; Ö. Baran, TED University, Ankara, Turkey; O. Uzol, Middle East Technical University, Ankara, Turkey	1700 hrs AIAA-2015-3804 **Fan Response to Inlet Swirl Distortions Produced by Boundary Layer Ingesting Aircraft Configurations** D. Frohnapfel, W. O'Brien, Virginia Polytechnic Institute and State University, Blacksburg, VA	1730 hrs AIAA-2015-3805 **Mail-Slot Nacelle Shape Design for N3-X Hybrid Wing-Body Configuration** H. Kim, SAIC, Brookpark, OH; M. Liou, M. Liou, NASA Glenn Research Center, Cleveland, OH	

Monday, 27 July 2015						
33-ECD-1	**Stirling Engines and Systems**					**Lake Highland B**
Chaired by: D. HILL and S. WILSON, NASA Glenn Research Center						
1500 hrs AIAA-2015-3806 **Advanced Stirling Convertor (ASC) Technology Maturation** W. Wong, S. Wilson, NASA Glenn Research Center, Cleveland, OH; J. Collins, K. Wilson, Sunpower, Inc., Athens, OH	1530 hrs AIAA-2015-3807 **Advanced Stirling Convertor Dual Convertor Controller Testing at NASA Glenn Research Center in the Radioisotope Power System Systems Integration Laboratory** G. Dugala, L. Taylor, M. Bell, Vantage Partners, LLC, Cleveland, OH; M. Fraeman, D. Frankford, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1600 hrs AIAA-2015-3808 **Characterization of the Advanced Stirling Radioisotope Generator EU2** E. Lewandowski, S. Oriti, NASA Glenn Research Center, Cleveland, OH	1630 hrs AIAA-2015-3809 **Modular Stirling Radioisotope Generator** P. Schmitz, Power Computing Solutions, Inc., North Ridgeville, OH; L. Mason, NASA Glenn Research Center, Cleveland, OH; J. Schreiber, Ohio Aerospace Institute, Brookpark, OH			

Monday, 27 July 2015		
34-ED-1 **1500 - 1730 hrs**	**Gulf Coast Energy Future**	**Lake Eola**

This is a discussion panel where the panel members will talk about the future of Gulf Coast Energy, with emphasis on challenges and opportunities. Each panel member will also make a short presentation to highlight his/her scope of involvement in Gulf Coast energy and view of the Gulf Coast Energy future. The panel consists of leaders from the Gulf Coast energy sectors.

Moderator: Dave Robau, Executive Director, Gulf Coast Energy Network.
Panelists:

Kelley Smith-Burk
Director, Florida Office of Energy, Executive Office of the Governor

Ervan Hancock
Manager, Renewable and Green Strategies, Georgia Power

Dub Taylor
Director, Texas Energy Conservation Office

Monday, 27 July 2015						
35-EDU-1	**Propulsion Education I**					**Lake George B**
Chaired by: R. TYSON, University of Alabama in Huntsville and M. HITT, The University of Alabama in Huntsville						
1500 hrs AIAA-2015-3810 **Experiments with Pintle Injector Design and Development** R. Nardi, V. Perez, A. Pimenta, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1530 hrs AIAA-2015-3811 **Internal Ballistics Model for a Mixed Hybrid Rocket Motor** M. Mascaro, D. Jones, D. Lineberry, R. Frederick, University of Alabama, Huntsville, Huntsville, AL; M. Moser, K. Mahaffy, Exquadrum, Inc., Adelanto, CA	1600 hrs AIAA-2015-3812 **Sweeping Jet Actuators for Active Flow Control** M. Zamora, B. Pafford, U.S. Military Academy, West Point, NY	1630 hrs AIAA-2015-3813 **Development of a Turbine Engine and Compressor Test Rigs for Graduate Level Education and Research** S. Arnold, P. Anusonti-Inthra, J. Cox, J. Hartman, University of Tennessee Space Institute, Tullahoma, TN	1700 hrs AIAA-2015-3814 **Sky-Infra Project in Mongolia and Aero-Space Engineering Education Project** Y. Obikane, Nagaoka University of Technology, Nagaoka, Japan; B. Choijil, Mongolia University of Science and Technology, Ulaanbaatar, Mongolia	1730 hrs AIAA-2015-3815 **Design of an RF Ion Thruster** J. Botha, T. Jones, J. de Swardt, University of Stellenbosch, Stellenbosch, South Africa	

Monday, 27 July 2015						
36-EE-2	**Efficient Ventilation and Moisture Control**					**Lake Down B**
Chaired by: N. GHADDAR, American University of Beirut and E. KHALIL, Cairo University						
1500 hrs AIAA-2015-3816 **Optimized Operation of Displacement Ventilation Combined with a Novel Evaporative Cooled Ceiling for a Typical Office in the City of Beirut** K. Ghali, M. Itani, N. Ghaddar, American University of Beirut, Beirut, Lebanon	1530 hrs AIAA-2015-3817 **Moisture Buffering Capacity of Hygroscopic Curtains: Theoretical and Experimental Study** K. Ghali, S. Salloum, N. Ghaddar, American University of Beirut, Beirut, Lebanon	1600 hrs AIAA-2015-3818 **The Energy Performance Of A Building Air Conditioning System Integrated With A Basement Cooling Source Driven By Trombe Wall** N. Ghaddar, K. Ghali, M. Badawiyeh, American University of Beirut, Beirut, Lebanon	1630 hrs AIAA-2015-3819 **On The Computations of Air Flow Regimes and Thermal Patterns in an Air-Conditioned Open Sport Facility** M. Sobhi, E. Khalil, Cairo University, Giza, Egypt	1700 hrs AIAA-2015-3820 **Numerical Investigations of Indoor Air Quality in Infection Isolation Rooms** A. Eldegwy, E. Khalil, E. Bially, S. Mourad, Cairo University, Giza, Egypt	1730 hrs AIAA-2015-3821 **Thermal Comfort Through Mixing and Personalized Ventilation Systems** H. Elmaghraby, E. Khalil, Cairo University, Giza, Egypt	

Monday, 27 July 2015						
37-EP-3	**SmallSat Systems and Thruster Diagnostics**					**Lake Mizell A**
Chaired by: E. CARDIFF, NASA and M. GLASCOCK						
1500 hrs AIAA-2015-3822 **Development of a Compact Hall Thruster in the 50-150 Watt Range** M. Tajmar, Technical University of Dresden, Dresden, Germany	1530 hrs AIAA-2015-3823 **Iodine Hall Thruster Feed System Design, Development and Testing** J. Dankanich, K. Polzin, NASA Marshall Space Flight Center, Huntsville, AL	1600 hrs AIAA-2015-3824 **Computational Study of Mass-Less Thruster for Nano-Satellite Applications** G. Font, U.S. Air Force Academy, Colorado Springs, CO	1630 hrs AIAA-2015-3825 **Characterization of Vacuum Facility Background Gas Through Simulation and Considerations for Electric Propulsion Ground Testing** J. Yim, NASA Glenn Research Center, Cleveland, OH; J. Burt, Air Force Research Laboratory, Wright-Patterson AFB, OH	1700 hrs AIAA-2015-3826 **Study of the Discharge Chamber Magnetic Field Configuration Effects on the Electron Cyclotron Resonance (ECR) Microwave Ion Thruster** Y. Kamis, M. Celik, Bogazici University, Istanbul, Turkey		

Monday, 27 July 2015						
39-HR-2	**Combustion Dynamics and Mixing Efficiencies I**					**Lake Sheen B**
Chaired by: S. CLAFLIN, Aerojet Rocketdyne and D. PASTRONE, Politecnico di Torino						
1500 hrs AIAA-2015-3827 **Visualization of Flow Dynamics in the Post Chamber of Hybrid Rocket using Chemiluiminescence Images** G. Choi, Y. Moon, C. Lee, Konkuk University, Seoul, Korea (the Republic of)	1530 hrs AIAA-2015-3828 **Fuel-rich Combustion Characteristics of Hybrid Rocket Engine** D. Lee, C. Lee, Konkuk University, Seoul, Korea (the Republic of)	1600 hrs AIAA-2015-3829 **Parametric Visualization Study of Self-Pressurizing Propellant Tank Dynamics** J. Zimmerman, B. Cantwell, Stanford University, Stanford, CA; G. Zilliac, NASA Ames Research Center, Moffett Field, CA	1630 hrs AIAA-2015-3830 **A Visual Study of the Combustion of High-Regression Rate and Classical Hybrid Rocket Fuels** E. Jens, V. Miller, F. Mechentel, B. Cantwell, S. Hubbard, Stanford University, Stanford, CA	1700 hrs AIAA-2015-3831 **Experimental Tests of Throttleable H_2O_2/PE Hybrid Rocket Motors** S. Zhao, P. Wang, H. Tian, N. Yu, G. Cai, Beihang University, Beijing, China; P. Zeng, Beijing Institute of Electronic System Engineering, Beijing, China		

Monday, 27 July 2015						
40-HR-3	**Internal Ballistics Analysis and Modeling II**					**Lake Florence**
Chaired by: B. MADHANABHARATAM, Aerospace Consultant and B. EVANS, Stanford University						
1500 hrs AIAA-2015-3832 **Flight Performance Simulations of Vertical Launched Sounding Rockets Using Altering-Intensity Swirling-Oxidizer-Flow-Type Hybrid Motors** K. Ozawa, K. Kitagawa, T. Shimada, Institute of Space and Astronautical Sciense, Japan Aerospace Exploration Agency, Sagamihara, Japan	1530 hrs AIAA-2015-3833 **Scaling of Hybrid Rocket Motors with Swirling Oxidizer Injection** E. Paccagnella, University of Padua, Padua, Italy; A. Karabeyoglu, Space Propulsion Group, Inc., Palo Alto, CA; F. Barato, D. Pavarin, University of Padua, Padua, Italy	1600 hrs AIAA-2015-3834 **Hybrid Rocket Engine Transient Internal Ballistic Simulation** D. Greatrix, Ryerson University, Toronto, Canada	1630 hrs AIAA-2015-3835 **Numerical Analysis of Port Diameter Effect on Hybrid Rocket Fuel Regression Rate with Axial Injection** D. Bianchi, F. Nasuti, University of Rome "La Sapienza", Rome, Italy; C. Carmicino, University of Naples "Federico II", Naples, Italy			

Monday, 27 July 2015						
41-HSABP-2	**Computational Analysis of Supersonic Combustors**					**Lake George A**
Chaired by: D. MACINNIS, Raytheon Missile Systems and T. SMITH, Boeing Engineering Operations & Technology						
1500 hrs AIAA-2015-3836 **4D Data Assimilation for Large Eddy Simulation of High Speed Turbulent Combustion** H. Mirgolbabaei, C. Patton, T. Wignall, J. Edwards, T. Echekki, North Carolina State University, Raleigh, NC	1530 hrs AIAA-2015-3837 **Simulation of Kerosene Combustion Sustaining with Cavities in a Strut-Based RBCC Engine** J. Ye, H. Pan, F. Qin, X. Wei, X. Tang, S. Zhang, Northwestern Polytechnical University, Xi'an, China	1600 hrs AIAA-2015-3838 **Understanding Scramjet Combustion Using LES of the HyShot II Combustor: Stable Combustion and Incipient Thermal Choking** K. Nordin-Bates, C. Fureby, Swedish Defense Research Agency (FOI), Stockholm, Sweden	1630 hrs AIAA-2015-3839 **A Coupled Aerodynamic and Propulsive Performance Analysis of the Generic Hypersonic Vehicle** F. Ferguson, N. Dasque, H. Mrema, J. Kizito, North Carolina A&T State University, Greensboro, NC; F. Malo-Molina, Air Force Research Laboratory, Wright-Patterson AFB, OH	1700 hrs AIAA-2015-4251 **An Investigation of Boundary-Layer Separation in the Scramjet Combustor** N. Kubo, Tohoku University, Sendai, Japan; S. Tomioka, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan		

Monday, 27 July 2015						
42-LP-5	**Combustion Dynamics I**					**Orange E**
Chaired by: D. LINEBERRY, UAH Propusion Research Center and S. SCHUMAKER, Air Force Reseach Laboratory						
1500 hrs AIAA-2015-3840 **Response Function Modeling in the Study of Longitudinal Combustion Instability by a Quasi-1D Eulerian Solver** M. Frezzotti, F. Nasuti, University of Rome "La Sapienza", Rome, Italy; C. Huang, C. Merkle, W. Anderson, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-3841 **Determination of Heat Release Response Function from 2D Hybrid RANS-LES Data for the CVRC Combustor** M. Frezzotti, F. Nasuti, University of Rome "La Sapienza", Rome, Italy; C. Huang, C. Merkle, W. Anderson, Purdue University, West Lafayette, IN	1600 hrs AIAA-2015-3842 **Comparison of Laminar and Linear Eddy Model Closures for Combustion Instability Simulations** M. Harvazinski, D. Talley, V. Sankaran, Air Force Research Laboratory, Edwards AFB, CA	1630 hrs AIAA-2015-3843 **Studies on Injection-Coupled Instability for Liquid Propellant Rocket Engines** K. Kobayashi, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; T. Shimizu, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; Y. Daimon, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan; Y. Nunome, T. Tomita, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; A. Kurosu, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan; et al.	1700 hrs AIAA-2015-3844 **Unsteady Energy Transport Applied to Flame Transfer Functions and Reduced Order Models** E. Jacob, GTL Company, Tullahoma, TN; J. Batterson, Auburn University, Auburn, AL		

Monday, 27 July 2015						
43-LP-6	**Injectors II**					**Orange F**
Chaired by: S. CHIANESE, SpaceX and I. LEYVA						
1500 hrs AIAA-2015-3845 **Optical Measurements of Ethanol/ Liquid Oxygen Rocket Engine Combustor with Planar Pintle Injector** K. Sakaki, H. Kakudo, S. Nakaya, M. Tsue, University of Tokyo, Tokyo, Japan; H. Isochi, Uematsu Electric Company, Ltd., Akabira, Japan; K. Suzuki, Intersteller Technologies, Inc., Taiki, Japan; et al.	1530 hrs AIAA-2015-3846 **Experimental Study on the Effects of Varying the Impingement Distance of Like-Doublet Injectors** B. Sweeney, R. Frederick, University of Alabama, Huntsville, Huntsville, AL	1600 hrs AIAA-2015-3847 **Semi-Hypergolic Kerosene/ Hydrogen Peroxide Fuel System and Its Auto-Ignition Injector Design** T. Yuan, Y. Chen, B. Huang, National Cheng Kung University, Tainan, Taiwan				

Monday, 27 July 2015						
44-LP-7	**Modelling and Simulation of Engines and Propulsion Systems II**					**Lake Lucerne**
Chaired by: A. LEKEUX, CNES and M. MASQUELET, GE Global Research Center						
1500 hrs AIAA-2015-3848 **Complex Lamellar Cyclonic Vortex in a Cylindrical Chamber with a Hollow Core** T. Barber, O. Cecil, J. Majdalani, Auburn University, Auburn, AL	1530 hrs AIAA-2015-3849 **Characterization of Particle Trajectories in the Bidirectional Vortex Engine** B. Maicke, Pennsylvania State University, Harrisburg, PA; J. Majdalani, Auburn University, Auburn, AL	1600 hrs AIAA-2015-3850 **Generalized Fluid System Simulation Program (GFSSP) - Version 6** A. Majumdar, A. Leclair, R. Moore, NASA Marshall Space Flight Center, Huntsville, AL; P. Schallhorn, NASA Kennedy Space Center, Cape Canaveral, FL	1630 hrs AIAA-2015-3851 **Chemical And CFD Modelling Of Sub-Scale Bread-Board Igniter Based On Experimental Data Assessment** P. Natale, Italian Aerospace Research Center (CIRA), Capua, Italy	1700 hrs AIAA-2015-3852 **Assessment of a Conjugate Heat Transfer Model for Rocket Engine Cooling Channels Fed with Supercritical Methane** M. Pizzarelli, F. Nasuti, University of Rome "La Sapienza", Rome, Italy; R. Votta, F. Battista, Italian Aerospace Research Center (CIRA), Capua, Italy		

Monday, 27 July 2015						
45-LP-8	**Propellant Storage & Management I**					**Lake Nona B**
Chaired by: V. AHUJA, CRAFT Tech and C. KIRCHBERGER, German Aerospace Center (DLR)						
1500 hrs AIAA-2015-3853 **Preliminary Simulations of Ullage Dynamics in Microgravity during Jet Mixing Portion of the Tank Pressure Control Experiments** J. Moder, K. Breisacher, NASA Glenn Research Center, Cleveland, OH	1530 hrs AIAA-2015-3854 **Comparison of Computational Results with a Low-g, Nitrogen Slosh and Boiling Experiment** M. Stewart, J. Moder, NASA Glenn Research Center, Cleveland, OH	1600 hrs AIAA-2015-3855 **Numerical Modeling of Boiling Flow in a Cryogenic Propulsion System** Y. Umemura, Japan Aerospace Exploration Agency (JAXA), Ibaraki, Japan; T. Himeno, University of Tokyo, Tokyo, Japan; K. Kinefuchi, N. Tani, H. Negishi, H. Kobayashi, Japan Aerospace Exploration Agency (JAXA), Ibaraki, Japan; et al.	1630 hrs AIAA-2015-3856 **CFD Extraction of Heat Transfer Coefficient in Cryogenic Propellant Tanks** H. Yang, CFD Research Corporation, Huntsville, AL; J. West, NASA Marshall Space Flight Center, Huntsville, AL			

Monday, 27 July 2015						
46-NFF-2	**Fusion and Alternative Nuclear Concepts**					**Lake Nona A**
Chaired by: R. SEDWICK, University of Maryland and M. RODRIGUEZ						
1500 hrs AIAA-2015-3857 **Simulation of Hemispherical Nozzles for Pulsed Plasma Propulsion Applications** K. Schillo, J. Cassibry, S. Thompson, University of Alabama, Huntsville, Huntsville, AL	1530 hrs AIAA-2015-3858 **From Laser Pulse Propulsion to Fusion Pulse Propulsion: An Evolutionary Approach** B. Cassenti, University of Connecticut, Storrs, Storrs, CT; R. Budica, Self, Huntington Beach, CA; L. Johnson, NASA Marshall Space Flight Center, Huntsville, AL; T. Kammash, University of Michigan, Ann Arbor, Ann Arbor, MI	1600 hrs AIAA-2015-3859 **A Multiphysics Smoothed Particle Hydrodynamics Model of Erosion in Space-Based Nuclear Fusion Reactor Components** M. Rodriguez, J. Cassibry, University of Alabama, Huntsville, Huntsville, AL	1630 hrs AIAA-2015-3860 **Simulation of an Inertial Electrostatic Confinement Device Using a Hermite N-body Individual Time-step Scheme** A. Chap, R. Sedwick, University of Maryland, College Park, College Park, MD	1700 hrs AIAA-2015-3861 **Progress towards the Development of a Traveling Wave Direct Energy Converter for Aneutronic Fusion Propulsion Applications** A. Chap, University of Maryland, College Park, College Park, MD; J. Scott, NASA Johnson Space Center, Houston, TX; A. Tarditi, Electric Power Research Institute, Inc., Knoxville, TN; J. Wolinski, NASA Johnson Space Center, Houston, TX		

Monday, 27 July 2015						
47-PAW-2	**Nozzle Section II**					**Lake Concord B**
Chaired by: J. SOKHEY, Rolls-Royce Corp and M. CHRISTIANSEN, Aero Systems Engineering						
1500 hrs Oral Presentation **Modeling Empirical Test Data with CFD++ on an Axisymmetric 25 Degree Conical Nozzle** S. Podleski, Innovative Engineering Solutions, Mukilteo, WA; N. Woo, University Preparatory Academy, Seattle, WA; S. Tu, Ingraham High School, Seattle, WA	1530 hrs AIAA-2015-3862 **BCFD Analysis for the 2nd AIAA Propulsion Aerodynamics Workshop: Nozzle Results** C. Winkler, The Boeing Company, Hazelwood, MO	1600 hrs Oral Presentation **A Comparative CFD Study on the Effect of Varying Nozzle Fan to Core Total Pressure Ratio on the DSFR Nozzle** M. Christiansen, K. Mikkelsen, Aero Systems Engineering, St. Paul, MN	1630 - 1730 hrs **Open Discussion**			

Monday, 27 July 2015						
48-PC-3	**Spray Injection and Combustion**					**Lake Louise**
Chaired by: K. MCMANUS, GE Global Research Center and J. GORE, Purdue University						
1500 hrs AIAA-2015-3863 **Impinging Jet Spray Formation Using Viscoelastic Liquids** N. Rodrigues, Purdue University, West Lafayette, IN; J. Mallory, Western New England University, Springfield, MA; P. Sojka, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-3864 **Experimental Study of a Heated Liquid Jet in a Crossflow** H. Wiest, S. Heister, Purdue University, West Lafayette, IN	1600 hrs AIAA-2015-3865 **Effect of Orifice Shape on Cavitation-Induced Injection Characteristics of High-Temperature Aviation Fuel** H. Lee, Y. Jin, H. Choi, K. Hwang, Agency for Defense Development, Daejeon, Korea (the Republic of)	1630 hrs AIAA-2015-3866 **Effects of Droplets on an Exothermic Reacting Supersonic Shear Flow** Z. Ren, Tsinghua University, Beijing, China			

Monday, 27 July 2015						
49-PC-4	**Propellants and Fuels I**					**Lake Virginia**
Chaired by: T. JACKSON, University of Florida Gainesville and V. RAMAN, University of Michigan						
1500 hrs AIAA-2015-3867 **Effect of Water and Humidity on Hypergolic Propellant Ignition Delay** N. Zarbo, T. Pourpoint, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-3868 **Combustion Characteristics of Gaseous CH_4/O_2 Coaxial Jets in a Model combustor** S. Choi, T. Kim, O. Kwon, Sungkyunkwan University, Suwon, Korea (the Republic of)	1600 hrs AIAA-2015-3869 **Enhancement of Ammonium Perchlorate/Hydroxyl-Terminated Polybutadiene Combustion Kinetics Using Ethanol-Doped Air** R. Gonçalves, Federal University of Pará, Belém, Brazil; K. Iha, J. Rocco, Technological Institute of Aeronautics (ITA), São José dos Campos, Brazil	1630 hrs AIAA-2015-3870 **Burning Characteristics of AP/HTPB Propellants Supplemented with Low Thermal Conductivity Powders** M. Kohga, S. Shioya, National Defense Academy, Yokosuka, Japan	1700 hrs AIAA-2015-3871 **The Effect of Iron Metal Ions and Chelating Agents of Iron on the Thermal Decomposition of HAN-Based Liquid Monopropellant** R. Amrousse, K. Hori, K. Hatai, H. Kagawa, H. Ikeda, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1730 hrs AIAA-2015-3872 **Research on NEPE Propellant Life Prediction Model** Y. Xiong, X. Sui, N. Wang, Beijing Institute of Technology, Beijing, China	

Monday, 27 July 2015						
50-SR-2	**Solid Rocket Motor Historical and Current Developments**					**Lake Concord A**
Chaired by: M. LANGHENRY, Raytheon Missile Systems and D. POE, Aerojet Rocketdyne						
1500 hrs AIAA-2015-3873 **Solid Rocket Motor Reliability and Historical Failure Modes Review** T. Sojourner, D. Richardson, B. Allen, S. Hyde, S. McHenry, B. Goldberg, ATK, Brigham City, UT; et al.	1530 hrs AIAA-2015-3874 **SLS Booster Development** J. Redden, Alliant Techsystems, Brigham City, UT	1600 hrs AIAA-2015-3875 **Orion Launch Abort System JETTISON MOTOR Performance on Exploration Flight Test - 1** R. McCauley, NASA Marshall Space Flight Center, Huntsville, AL; J. Davidson, G. Gonzalez, NASA Langley Research Center, Hampton, VA	1630 hrs AIAA-2015-3876 **The Solid Rocket Legacy of Thiokol's Huntsville Division 1949-1996** T. Moore, Defense Systems Information Analysis Center, Belcamp, MD	1700 hrs AIAA-2015-3877 **Zefiro 40 Solid Rocket Motor: From a Technological Demonstrator to Vega Evolution Flight Stage** A. Neri, ESA, Frascati, Italy		

Monday, 27 July 2015						
51-TM-2	**Heat Transfer and Transport Modeling and Analysis II**					**Lake Down A**
Chaired by: M. CHOI, NASA-Goddard Space Flight Center and C. TARAU, Advanced Cooling Technologies						
1500 hrs AIAA-2015-3878 **Analyses of Thermal Comfort and Indoor Air Quality under Stratum, Displacement and Mixing Ventilation Systems** A. ElHaroun, E. Khalil, A. Fahim, E. Bially, Cairo University, Giza, Egypt	1530 hrs AIAA-2015-3879 **Numerical Study of the Heat Transfer and Friction Performance in Channels with a Supercritical Fluid** L. Tran, J. Kapat, University of Central Florida, Orlando, FL	1600 hrs AIAA-2015-3880 **Numerical Study of Convective Heat Transfer of Aviation Kerosene with Consideration of Fuel Pyrolysis and Coking at Supercritical Pressures** K. Xu, H. Meng, Zhejiang University, Hangzhou, China	1630 hrs AIAA-2015-3881 **Hypersonic Flow Analysis of Re-entry Vehicles Using Three Dimensional Navier-Stokes Equations** M. Ozgun, S. Eyi, Middle East Technical University, Ankara, Turkey	1700 hrs AIAA-2015-3882 **Implicit Solution of One-Dimensional Transient Ablation** O. Onay, S. Eyi, Middle East Technical University, Ankara, Turkey		

Monday, 27 July 2015		
52-F360-2 **1530 - 1800 hrs**	**Government Investments Enabling Advancement of In-Space Propulsion**	**Orlando IV**

The competition in the global space propulsion market continues to increases as non-traditional entities develop and demonstrate space propulsion devices. In this environment, U.S. industry continues to invest in strategy, concepts, and technology to maintain a healthy share of the market beyond the delivery of government assets. Simultaneously, U.S. government agencies continue to infuse multiple programs to push the boundary of technical capabilities. The challenge is to align the focus of government-funded technology with the needs, requirements, and commercial opportunities of industry. These issues are critical for the commercial infusion and eventual sustainability of technology developed under government funding. A Panel composed of leaders within government and industry, including spacecraft operators, will discuss: The leverage of advanced in-space propulsion technology, examples of the successful infusion of government-funded technology development, and identify opportunities for government investments in-space propulsion to enable emerging markets.

Moderator: Mitchell Walker II, Georgia Institute of Technology

Panelists:

Roger Myers	**Jeff Sheehy**	**Mark Lewis**	**Peter Lord**	**Jonny Dyer**
Aerojet-Rocketdyne	NASA Headquarters	IDA Science and Technology Policy Institute	Space Systems Loral	Google+Skybox Imaging

Monday, 27 July 2015		
53-NW-5 **1800 - 1930 hrs**	**Welcome Reception**	**Exposition Hall**

Monday, 27 July 2015		
54-RLA-1 1930 - 2100 hrs	How to Avoid a Career Catastrophe: Historic Aerospace Safety Lessons	Orlando IV

Wayne Hale
Director of Human Spaceflight at Special Aerospace Services

This session is intended for students and early career Aerospace Engineers. It is intended to be a dialog, illustrated with recent space flight safety issues, that explores the role that safety plays in the development and operation of space systems. And further, to show how proper attention to safety can be beneficial to a career in aerospace.

Tuesday

Tuesday, 28 July 2015		
55-NW-6 0730 - 0800 hrs	Networking Coffee Break	Ballroom Foyer

Tuesday, 28 July 2015		
56-SB-2 0730 - 0800 hrs	Tuesday Speakers' Briefing	In Session Room

Speakers, presenters and session chairs for both the morning and afternoon technical sessions, please meet in your session room to load presentations and discuss the flow of your session.

Tuesday, 28 July 2015		
57-PLNRY-3 0800 - 0900 hrs	Cost and Affordability of Future Systems Panel	Orange D

Panelists will discuss the key issues and approaches associated with making future systems less costly and more affordable, and how to manage the balance between customer and seller needs.

Moderator: Michael Griffin, Chairman and CEO, Schafer Corporation
Panelists:

Michael Hawes
Vice President and Orion Program Manager, Lockheed Martin Space Systems Company

Lee Monson
Vice President Sales - Middle East and Americas, The Boeing Company (ret.)

Frank Culbertson
President Space Systems Group, Orbital ATK

Mark Sirangelo
Corporate Vice President Space Systems, Sierra Nevada Corporation

Tuesday, 28 July 2015						
58-ABPSI-3	Nozzles					Lake Sheen A
Chaired by: R. NICHOLS, The University of Alabama at Birmingham						
0900 hrs AIAA-2015-3883 **Initial Subscale Performance Measurements of the AIAA Dual Separate Flow Reference (DSFR) Nozzle** K. Mikkelsen, D. Myren, D. Dahl, M. Christiansen, Aero Systems Engineering, Inc., Plymouth, MN	0930 hrs AIAA-2015-3884 **Three-dimensional Jet Acoustic Characterization and Geometry Optimization of Chevron Nozzles** S. Mani, D. Lee, Korea Advanced Institute of Science and Technology, Yuseong-gu, Korea (the Republic of); V. Sanal Kumar, Kumaraguru College of Technology, Coimbatore, India	1000 hrs AIAA-2015-3885 **Experiment-Based Modeling of Flow Fields in Clustered External Nozzles** T. Isono, Tohoku University, Sendai, Japan; S. Tomioka, N. Sakuranaka, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan	1030 hrs AIAA-2015-3886 **An Experimental Study of Subsonic and Sonic Jets Controlled by Air-Tabs** A. Perumal, Amrita University, Coimbatore, India; S. Verma, National Aerospace Laboratories, Bangalore, India; E. Rathakrishnan, Indian Institute of Technology Kanpur, Kanpur, India			

Tuesday, 28 July 2015						
59-AEP-1	**Aircraft Electric/Hybrid Propulsion**					**Orange E**
Chaired by: R. SCHARNHORST, Boeing Defense, Space & Security						
0900 hrs AIAA-2015-3887 **A Parametric Environment for Weight and Sizing Prediction of Motor/Generator for Hybrid Electric Propulsion** Y. Miyairi, C. Perullo, D. Mavris, Georgia Institute of Technology, Atlanta, GA	0930 hrs AIAA-2015-3888 **Investigation of FC/GT Hybrid Core in Electrical Propulsion for Fan Aircraft** K. Okai, T. Himeno, T. Watanabe, University of Tokyo, Tokyo, Japan; H. Nomura, Nihon University, Narashino, Japan; T. Tagashira, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan	1000 hrs AIAA-2015-3889 **Electric-Powered Commercial Aircraft Feasibility** D. Aktas, University of Tennessee Space Institute, Tullahoma, TN	1030 hrs AIAA-2015-3890 **Turboelectric Aircraft Drive Key Performance Parameters and Functional Requirements** R. Jansen, G. Brown, J. Felder, NASA Glenn Research Center, Cleveland, OH; K. Duffy, University of Toledo, Toledo, OH	1100 hrs AIAA-2015-3891 **Electric Motors for Non-Cryogenic Hybrid Electric Propulsion** K. Duffy, University of Toledo, Toledo, OH		

Tuesday, 28 July 2015						
60-APC-1	**Advanced Space Transportation Concepts**					**Lake Highland A**
Chaired by: E. ZAPATA, NASA-Kennedy Space Center and J. ROBINSON, Retired f/Boeing						
0900 hrs AIAA-2015-3892 **Roadmap for Long Term Sustainable Space Exploration and Habitation - Defining the Functional Requirements for Early Phase of Space Habitation** R. Rhodes, NASA Kennedy Space Center, Cape Canaveral, FL; E. Henderson, NASA Johnson Space Center, Houston, TX; J. Robinson, Propellant Supply Technology, Huntington Beach, CA	0930 hrs AIAA-2015-3893 **Multi-purpose Space Tug Vehicle** J. Robinson, Propellant Supply Technology, Seal Beach, CA; R. Rhodes, NASA Kennedy Space Center, Cape Canaveral, FL	1000 hrs AIAA-2015-3894 **Sub-Orbital Passenger Aircraft for Space Launch Operations** D. Thorpe, D. Escher, R. Rhodes, Space Propulsion Synergy Team, Washington, DC	1030 hrs AIAA-2015-3895 **Solar Sail Propulsion for Interplanetary Cubesats** L. Johnson, A. Sobey, K. Sykes, NASA Marshall Space Flight Center, Huntsville, AL			

Tuesday, 28 July 2015						
61-APS-2	**Space Solar Power System Architectures and Concepts / Solar Electric Propulsion Power Management and Distribution**					**Lake Highland B**
Chaired by: M. HUGHES, Lockheed Martin Corporation and A. BAISDEN, The Johns Hopkins University Applied Physics Laboratory						
0900 hrs AIAA-2015-3896 **Lightweight Integrated Solar Array (LISA): Providing Higher Power to Small Spacecraft** C. Johnson, J. Carr, L. Fabisinski, T. Russell, L. Smith, NASA Marshall Space Flight Center, Huntsville, AL	0930 hrs AIAA-2015-3897 **Utilizing a Solar Panel Array Architecture to Support Work on Space Solar Power** B. Kading, J. Straub, University of North Dakota, Grand Forks, Grand Forks, ND	1000 hrs AIAA-2015-3898 **On Orbit Measurement of Next Generation Space Solar Cell Technology on the International Space Station** D. Wolford, M. Myers, N. Prokop, M. Krasowski, NASA Glenn Research Center, Cleveland, OH; D. Parker, J. Cassidy, Lockheed Martin Corporation, Greenbelt, MD; et al.	1030 hrs AIAA-2015-3899 **Advanced Concept of the Space Electric Power System Integrated with the Propulsion** S. Okaya, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1100 hrs AIAA-2015-3900 **High Input Voltage, Silicon Carbide (SiC) Power Processing Unit Performance Demonstration** K. Bozak, L. Pinero, R. Scheidegger, M. Aulisio, M. Gonzalez, NASA Glenn Research Center, Cleveland, OH; A. Birchenough, Vantage Partners, LLC, Cleveland, OH	1130 hrs AIAA-2015-3901 **Modular Power Systems for Aerospace Vehicles** G. Semrau, S. Steffan, Moog, East Aurora, NY	

Tuesday, 28 July 2015						
62-ECD-2	**Stirling Components**					**Lake Lucerne**
Chaired by: L. MASON, NASA Glenn Research Center						
0900 hrs AIAA-2015-3902 **Optimization of the Appendix Gap Design in Stirling Cycle Machines** J. Pfeiffer, H. Kuehl, Technical University of Dortmund, Dortmund, Germany	0930 hrs AIAA-2015-3903 **Design, Qualification and Integration Testing of the High-Temperature Resistance Temperature Device for Stirling Power System** T. Chan, R. Elisii, D. Hill, J. White, Lockheed Martin Corporation, King of Prussia, PA; E. Lewandowski, S. Oriti, NASA Glenn Research Center, Cleveland, OH	1000 hrs AIAA-2015-3904 **Evaluation and Validation of Organic Materials for Advanced Stirling Convertors (ASCs): Overview** E. Shin, Ohio Aerospace Institute, Cleveland, OH	1030 hrs AIAA-2015-3905 **Overview of Stirling Technology Research at NASA Glenn Research Center** S. Wilson, NASA Glenn Research Center, Cleveland, OH	1100 hrs AIAA-2015-3906 **Pressure Loss Predictions of the Reactor Simulator Subsystem at NASA GRC** T. Reid, NASA Glenn Research Center, Cleveland, OH		

Tuesday, 28 July 2015						
63-ECS-2	**Energetic Applications, Technology & Education**					**Lake Nona B**
Chaired by: S. GOLDSTEIN, The Aerospace Corporation and H. LEE, Chemring Energetic Devices						
0900 hrs AIAA-2015-3907 **Comparison of BPN Igniter Compositions Containing Micron- and Nano-Sized Boron Particles** S. Koc, ROKETSAN Missile Industries, Inc., Ankara, Turkey; A. Ulas, Middle East Technical University, Ankara, Turkey	0930 hrs AIAA-2015-3908 **Gains Provided by Opto-pyro Technology in Terms of Safety on Launchers** B. Chamayou, Airbus, Les Mureaux, France	1000 hrs AIAA-2015-3909 **Combustion Performance Improvement of Energetic Thin Films Using Carbon Nanotubes** K. Kappagantula, Ohio University, Athens, OH; J. Cano, M. Pantoya, Texas Tech University, Lubbock, TX	1030 hrs AIAA-2015-3910 **2015 CAD/PAD Technology Roadmap Update** J. Burchett, T. Blachowski, Naval Surface Warfare Center, Indian Head, MD	1100 hrs AIAA-2015-3911 **Educational Preparation for a Career in CAD/PAD Related Industries** J. Burchett, Naval Surface Warfare Center, Indian Head, MD; J. Baglini, Exodynamics Technology, Inc., Phoenix, AZ		

Tuesday, 28 July 2015						
64-EE-3	**Fuel Cells, Energy Storage, and Combustion**					**Lake Down B**
Chaired by: J. MALLORY and F. ZHANG						
0900 hrs AIAA-2015-3912 **Effect of Polyelectrolyte Multilayer Fabrication Method on Conductance for Fuel Cell Applications** J. Mallory, M. Roberts, Western New England University, Springfield, MA	0930 hrs AIAA-2015-3913 **High-speed and Micro-scale Measurements of Flow and Reaction Dynamics for Sustainable Energy Storage** J. Mo, S. Steen, F. Zhang, University of Tennessee Space Institute, Tullahoma, TN	1000 hrs AIAA-2015-3914 **Investigation of Titanium Felt Transport Parameters for Energy Storage and Hydrogen/Oxygen Production** S. Steen, J. Mo, F. Zhang, University of Tennessee Space Institute, Tullahoma, TN	1030 hrs AIAA-2015-3915 **Modeling of Interfacial Resistance Effects on the Performance and Efficiency for Electrolyzer Energy Storage** B. Han, S. Steen, J. Mo, F. Zhang, University of Tennessee Space Institute, Tullahoma, TN	1100 hrs AIAA-2015-3916 **Impact of Oxygen Enrichment on the Performance of Heat-Recirculating Micro-Scale Combustors** P. Yelvington, C. Rodriguez, T. Lasko, Mainstream Engineering Corporation, Rockledge, FL; B. Wise, C. Holicker, D. Kirk, Florida Institute of Technology, Melbourne, FL	1130 hrs AIAA-2015-3917 **Combustion Characteristics of Ammonia as a Renewable Energy Source and Development of Reduced Chemical Mechanisms** H. Nozari, A. Karabeyoglu, KOC University, Istanbul, Turkey	

Tuesday, 28 July 2015						
65-EP-5	**Near-Term Higher Power Systems and Application**					**Lake Mizell A**
Chaired by: J. WALKER and T. SWANSON, AEDC						
0900 hrs AIAA-2015-3921 **Development of High-Power Hall Thruster Power Processing Units at NASA GRC** L. Pinero, R. Scheidegger, K. Bozak, NASA Glenn Research Center, Cleveland, OH; A. Birchenough, Vantage Partners, LLC, Cleveland, OH	0930 hrs AIAA-2015-3919 **Near-Surface Plasma Characterization of the 12.5-kW NASA TDU1 Hall Thruster** R. Shastry, W. Huang, H. Kamhawi, NASA Glenn Research Center, Cleveland, OH	1000 hrs AIAA-2015-3920 **Non-Contact Thermal Characterization of NASA's 12.5-kW Hall Thruster** W. Huang, H. Kamhawi, J. Myers, J. Yim, NASA Glenn Research Center, Cleveland, OH; G. Neff, Western Michigan University, Kalamazoo, MI	1030 hrs AIAA-2015-3922 **Impact of the Magnetic Barrier Extent on the Performance of a Krypton-fuelled Hall Thruster** J. Vaudolon, S. Mazouffre, National Center for Scientific Research (CNRS), Orléans, France	1100 hrs AIAA-2015-3918 **Advancements in the Demonstration of High Thrust to Power Ion Thruster Technology** R. Thomas, M. Patterson, NASA Glenn Research Center, Cleveland, OH; M. Crofton, J. Young, The Aerospace Corporation, El Segundo, CA; J. Foster, University of Michigan, Ann Arbor, Ann Arbor, MI	1130 hrs AIAA-2015-4122 **Numerical Sudies on Plasma Plume Flows with a Hybrid Method** C. Cai, New Mexico State University, Las Cruces, NM	

Tuesday, 28 July 2015						
66-EP-6	**Resistojets and Arcjets**					**Lake Mizell B**
Chaired by: J. POLK, Jet Propulsion Laboratory and M. FELDMAN, Princeton University						
0900 hrs AIAA-2015-3923 **Numerical Optimization of Micro-Nozzle Geomoetries for Low Reynolds Number Resisto-Jets** T. Holman, M. Osborn, Naval Research Laboratory, Washington, DC	0930 hrs AIAA-2015-3924 **Performance Characterization of a Low Reynolds Number Micro-Nozzle Flo** L. Williams, Praxis, Inc., Alexandria, VA; M. McDonald, M. Osborn, Naval Research Laboratory, Washington, DC	1000 hrs AIAA-2015-3925 **Overcoming Low Nozzle Efficiency: A Test-Correlated Numerical Investigation of Low Reynolds Number Micro-Nozzle Flow** M. Osborn, T. Holman, D. Rosenberg, S. Tuttle, Naval Research Laboratory, Washington, DC; L. Williams, Praxis, Inc., Alexandria, VA	1030 hrs AIAA-2015-3926 **Evaluation of Plasma Properties in a Microwave Electrothermal Thruster Resonant Cavity by Using Two Fluid Global Model** M. Yildiz, Turkish Air Force Academy, Istanbul, Turkey; M. Celik, Bogazici University, Istanbul, Turkey	1100 hrs AIAA-2015-4011 **Electrospray of an Energetic Ionic Liquid Monopropellant for Multi-Mode Micropropulsion Applications** S. Berg, J. Rovey, Missouri University of Science and Technology, Rolla, MO; B. Prince, S. Miller, R. Bemish, Air Force Research Laboratory, Kirtland AFB, NM		

Tuesday, 28 July 2015						
67-GTE-4	**Turbine II**					**Lake Monroe**
Chaired by: M. RICKLICK, Embry Riddle Aeronautical University						
0900 hrs AIAA-2015-3927 **Numerical Benchmark of Heat Transfer and Friction in Pipes with Roughness** L. Tran, Z. Little, P. Tran, J. Kapat, University of Central Florida, Orlando, FL	0930 hrs AIAA-2015-3928 **Comparison of Computational and Experimental Results for a Transonic Variable-speed Power-turbine Blade Operating with Low Inlet Turbulence Levels** D. Booth, Army Research Laboratory, Aberdeen Proving Ground, MD; A. Flegel, NASA Glenn Research Center, Cleveland, OH	1000 hrs AIAA-2015-3929 **Aeroacoustics of Flow over Rectangular Cavities** B. Kutlu, University of Central Florida, Orlando, FL; B. Saracoglu, G. Paniagua, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; J. Kapat, University of Central Florida, Orlando, FL	1030 hrs AIAA-2015-3930 **One-Dimensional Assessment of Supersonic Inlet Turbines** J. Sousa, von Kármán Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium; G. Paniagua, Purdue University, West Lafayette, IN			

Tuesday, 28 July 2015						
68-GTE-5	**Compressors II**					**Lake Florence**
Chaired by: K. AHMED						
0900 hrs AIAA-2015-3931 **Three-dimensional Inverse Design of Centrifugal Impeller Blade** L. Sun, J. Chen, G. Huang, Nanjing University of Aeronautics and Astronautics, Nanjing, China	0930 hrs AIAA-2015-3932 **Simulation of Stall Inception of a High Speed Axial Compressor with Rotor-Stator Interaction** J. Gan, University of Miami, Miami, FL; H. Im, Honeywell International, Inc., Torrance, CA; G. Zha, University of Miami, Miami, FL	1000 hrs AIAA-2015-3933 **A Novel Concept with Self-driving Fan for High Bypass Ratio Turbofan engine** W. Lu, G. Huang, X. Xiang, J. Wang, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1030 hrs AIAA-2015-3934 **Turbogas Engines Rotational Speed Estimation Using Acoustic and Vibrational Measurements** R. Bertacin, F. Ponti, V. Ravaglioli, University of Bologna, Bologna, Italy	1100 hrs AIAA-2015-3935 **The Role of CFD Modeling in the Development of the Counter Rotating Open Fan Engine** F. Jiang, R. Griffiths, B. Smith, The Boeing Company, Huntington Beach, CA	1130 hrs AIAA-2015-3936 **Influence of a Tip Blowing Casing Treatment on the Stator Flow** A. Inzenhofer, A. Hupfer, C. Guinet, Technical University of Munich, Garching, Germany; H. Schrapp, V. Gümmer, Rolls-Royce Group plc, Blankenfelde-Mahlow, Germany	

Tuesday, 28 July 2015						
69-HR-4	**Design Studies Including Cost and Feasibility Analysis I**					**Lake Sheen B**
Chaired by: A. KARP, Jet Propulsion Laboratory and S. COOGAN, Southwest Research Institute						
0900 hrs AIAA-2015-3937 **Design and Optimization of Hybrid Propulsion Systems for In-Space Application** E. Toson, Technical University of Milan, Milan, Italy; A. Karabeyoglu, KOC University, Istanbul, Turkey	0930 hrs AIAA-2015-3938 **Low-thrust Hybrid Motor Efficiency Research for Design Optimization Purposes** O. Shynkarenko, A. Andrianov, A. Elias de Morais Bertoldi, University of Brasilia, Brasilia, Brazil	1000 hrs AIAA-2015-3939 **Investigation of Flight Profiles Suitable for Altering-Intensity Swirling-Oxidizer-Flow-Type Hybrid Rocket** U. Tomoaki, T. Shimada, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1030 hrs AIAA-2015-3940 **Throttled Launch-Assist Hybrid Rocket Motor for an Airborne NanoSat Launch Platform** S. Whitmore, S. Merkley, S. Walker, Z. Spurrier, Utah State University, Logan, UT	1100 hrs AIAA-2015-3941 **Concept and Design of the Hybrid Test-motor for Development of a Propulsive Decelerator of SARA Re-entry Capsule** A. Andrianov, O. Shynkarenko, A. Elias de Morais Bertoldi, M. Nascimento Dias Barcelos Junior, University of Brasilia, Brasilia, Brazil; C. Alberto Gurgel Veras, Brazilian Space Agency (AEB), Brasilia, Brazil	1130 hrs AIAA-2015-3942 **Structural Performance of Large Scale Paraffin Wax Based Fuel Grains** K. Veale, M. Brooks, J. Pitot, University of KwaZulu-Natal, Durban, South Africa	

Tuesday, 28 July 2015						
70-HSABP-3	**Design and Development of Innovative High-Speed Air Breathing System**					**Lake George A**
Chaired by: D. MUSIELAK, University of Texas at Arlington and J. FULTON						
0900 hrs AIAA-2015-3943 **Propulsion Efficiency Considerations for Combined Cycle Propulsion Systems** J. Bossard, BSRD, LLC, Huntsville, AL	0930 hrs AIAA-2015-3944 **Influence Factor Analysis of Performance Parameter for a Strut/Cavity Supersonic Combustor** C. Zhang, J. Chang, W. Shi, W. Bao, Harbin Institute of Technology, Harbin, China	1000 hrs AIAA-2015-3945 **Numerical Investigation of the Injection Scheme for One Rectangular RBCC Engine at Scramjet-Mode** S. Zhang, J. Li, F. Qin, X. Wei, J. Ye, X. Tang, Northwestern Polytechnical University, Xi'an, China	1030 hrs AIAA-2015-3946 **3D Flow Visualization and Geometry Optimization of Cavity based Scramjet Combustors using k-ω Model** S. Mani, V. Sanal Kumar, Kumaraguru College of Technology, Coimbatore, India	1100 hrs AIAA-2015-3947 **Passive Optical Combustion Sensors for Scramjet Engine Control** D. Micka, D. Knaus, Creare, LLC, Hanover, NH; J. Temme, J. Driscoll, University of Michigan, Ann Arbor, Ann Arbor, MI		

Tuesday, 28 July 2015						
71-ITAR-1	Air Breathing Propulsion Systems: Nozzles and Diffusers ITAR					Orlando VI
Chaired by: P. SMITH, The Boeing Company						
			1030 hrs AIAA-2015-3948 **Swirl Measurements at the Exit of a Serpentine Diffuser** C. Nessler, W. Copenhaver, M. List, Air Force Research Laboratory, Wright-Patterson AFB, OH	1100 hrs AIAA-2015-3949 **Aeroacoustic Validation of a Simulation for a Rectangular** C. Ruscher, S. Gogineni, Spectral Energies, LLC, Beaver Creek, OH; K. Viswanath, Naval Research Laboratory, Washington, DC; B. Kiel, Air Force Research Laboratory, Wright-Patterson AFB, OH; M. Berry, A. Magstadt, Syracuse University, Syracuse, NY; et al.	1130 hrs AIAA-2015-3950 **Aeroacoustic Experiments on Supersonic Multi-aperture Nozzles** A. Magstadt, M. Berry, P. Shea, M. Glauser, Syracuse University, Syracuse, NY; C. Ruscher, S. Gogineni, Spectral Energies, LLC, Dayton, OH; et al.	

Tuesday, 28 July 2015						
72-LP-10	Spacecraft Propulsion Systems I					Orange F
Chaired by: P. ALLIOT, Snecma S.A. and H. KAGAWA, JAXA						
0900 hrs AIAA-2015-3951 **The Integration and Testing of Four Propulsion Systems for the Magnetospheric MultiScale (MMS) Mission** E. Cardiff, NASA Goddard Space Flight Center, Greenbelt, MD	0930 hrs AIAA-2015-3952 **A Discussion of Two Challenges of Non-cooperative Satellite Refueling** G. Coll, NASA Glenn Research Center, Greenbelt, MD; B. Nufer, T. Aranyos, M. Kandula, D. Tomasic, NASA Kennedy Space Center, Cape Canaveral, FL	1000 hrs AIAA-2015-3953 **Service Life Extension of the ISS Propulsion System Elements** U. Kamath, G. Grant, The Boeing Company, Houston, TX; S. Kuznetsov, S. Shaevich, Khrunichev State Research and Production Space Center, Moscow, Russia; V. Spencer, NASA Johnson Space Center, Houston, TX	1030 hrs AIAA-2015-3954 **NASA Propulsion Sub-System Concept Studies and Risk Reduction Activities for Resource Prospector Lander** H. Trinh, NASA Marshall Space Flight Center, Huntsville, AL	1100 hrs AIAA-2015-3955 **Lessons from the AEHF-1 Bipropellant Maneuver Anomaly with Recurring Themes** M. Mueller, The Aerospace Corporation, El Segundo, CA		

Tuesday, 28 July 2015		
73-LP-11 0900 - 1200 hrs	Liquid Propulsion History: Lessons Learned from Canceled Programs	Lake Eola
Chaired by: K. PUGMIRE, Spincraft and B. AUSTIN, IN Space LLC		

Propulsion elements/systems of note associated with programs which were cancelled or postponed. Presentations include propulsion description and discussion of pros/cons. An interactive forum, moderator with topic presenters.

Moderator: Dan Dumbacher, Purdue University
Panelists:

DC-X/XA Delta Clipper
1. "Stories of Pushing the Limits" by Dan Dumbacher, Purdue
2. "Morpheus Lander" by Jon Olansen, NASA JSC

X-34 Fastrac
1. "Review and Lessons Learned from the Approach to Program Management and System Engineering" by Mark Fisher, Schafer Corp.
2. "Technical Implications of Programmatic Decisions" by Mary Beth Koelbl (presenting) and Katherine Van Hooser, NASA MSFC

RS-88 Bantam
1. "System Technology, Program and Derivatives" by John Vilja. Aerojet Rocketdyne
2. CST-100 Launch Escape System" by Joaquin Castro, Aerojet Rocketdyne.

X-33 Linear Aerospike
1."Aerospike Engine" by Steve Bouley Aerojet Rocketdyne
2. "Theoretical Evaluation and Briefing of Joint Academic/Industry Flight Test" by Eric Besnard, CSU

ISS Electrothermal Engine
"Supplemental Reboost System" Briefing, T Kent Pugmire

Tuesday, 28 July 2015						
74-NFF-3	**Nuclear Thermal Propulsion: Missions, Vehicles and Architectures**					**Lake Nona A**
Chaired by: S. BOROWSKI, NASA Glenn Research Center and G. WILLIAMS, Ohio Aerospace Institute						
0900 hrs AIAA-2015-3956 **Determining Mars Mission NTP Thrust Size and Architecture Impact for Mission Options** C. Joyner, D. Levack, J. Crowley, Aerojet Rocketdyne, Sacramento, CA	0930 hrs AIAA-2015-3957 **Cryogenic Fluid Management Technology Development for Nuclear Thermal Propulsion** B. Taylor, NASA Marshall Space Flight Center, Huntsville, AL; J. Caffrey, Oregon State University, Corvallis, OR; A. Hedayat, J. Stephens, R. Polsgrove, NASA Marshall Space Flight Center, Huntsville, AL	1000 hrs AIAA-2015-3958 **The Nuclear Thermal Turbo Rocket - A Conceptual High-Performance Earth-to-Orbit Propulsion System** J. Bucknell, Self, Royal Oak, MI				

Tuesday, 28 July 2015		
75-NW-7 **0900 - 0930 hrs**	**Networking Coffee Break**	**Exposition Hall**

Tuesday, 28 July 2015						
76-PAW-3	**S-Duct Inlet Section**					**Lake Concord B**
Chaired by: C. CHUCK, Boeing Commercial Airplanes; A. DELOT, ONERA and L. GEA, Boeing Engineering Operations & Technology						
0900 hrs AIAA-2015-3959 **BCFD Simulations of the 2nd AIAA Propulsion and Aerodynamics Workshop: S-Duct with Vortex Generators** D. Babcock, M. Mani, The Boeing Company, Hazelwood, MO	0930 hrs AIAA-2015-3960 **CFD Simulation of Serpentine S-Duct with Flow Control** L. Gea, The boeing Company, Huntington Beach, CA	1000 hrs AIAA-2015-3961 **Perspectives on Propulsion CFD for Inlet Applications Relevant to the AIAA Propulsion Aerodynamics Workshop** N. Domel, Lockheed Martin Aeronautics Company, Fort Worth, TX	1030 hrs AIAA-2015-3962 **Grid Topology Study of the S-duct Inlet with Vortex Generators** A. Batista de Jesus, L. Trapp, D. Abreu, A. Lombardi, L. Tobaldini, Embraer S.A, São José dos Campos, SP, Brazil	1100 hrs AIAA-2015-3963 **Simulation of an S-Duct Inlet Using the Lattice-Boltzmann Method** S. Noelting, S. Gautier, M. Wessels, Exa GmbH, Stuttgart, Germany; I. Gonzalez, Euroxa, Paris, France	1130 hrs AIAA-2015-3964 **Computational and Experimental Results for Flows in a Diffusing S-Duct without and with Flow Control Devices** A. Delot, ONERA, Meudon, France; R. Scharnhorst, The Boeing Company, Hazelwood, MO	

Tuesday, 28 July 2015						
77-PC-5	**Modeling of Combustion Dynamics, Instabilities and Noise I**					**Lake Louise**
Chaired by: C. CADOU, University of Maryland						
0900 hrs AIAA-2015-3965 **Numerical Simulations of Screech** E. Gonzalez, Combustion Science and Engineering, Inc., Columbia, MD	0930 hrs AIAA-2015-3966 **A complex Network Approach to Investigate Combustion Dynamics** M. Murugesan, R. Sujith, Indian Institute of Technology Madras, Chennai, India	1000 hrs AIAA-2015-3967 **Intermittency in Combustion dynamics** M. Murugesan, R. Sujith, Indian Institute of Technology Madras, Chennai, India	1030 hrs AIAA-2015-3968 **Large Eddy Simulation of Self-Excited Combustion Dynamics in a Bluff-Body Combustor** F. Ma, W. Proscia, Pratt & Whitney, East Hartford, CT; V. Ivanov, F. Montanari, ANSYS, Inc., Lebanon, NH	1100 hrs AIAA-2015-3969 **Multifractal Characterization of Combustion Dynamics** V. Unni, R. Sujith, Indian Institute of Technology Madras, Chennai, India	1130 hrs AIAA-2015-3970 **Direct Simulation of the Instability of the Pilot Flame in a Turboengine Combustor** Y. Obikane, Nagaoka University of Technology, Nagaoka, Japan; K. Lochin, Mongolia University of Science and Technology, Ulaanbaatar, Mongolia	

Tuesday, 28 July 2015						
78-PC-6	**Propellants and Fuels II**					**Lake Virginia**
Chaired by: B. CHEHROUDI, European Research Council (ERC) and J. MURPHY, The Aerospace Corporation						
0900 hrs AIAA-2015-3971 **Material Compatibility and Aging Testing for HAN-Based Monopropellants** K. Gaworski, Digital Solid State Propulsion, LLC, Reno, NV; J. Moore, Moog, Niagara Falls, NY; T. Manship, M. McPherson, S. Williams, Digital Solid State Propulsion, LLC, Reno, NV	0930 hrs AIAA-2015-3972 **Multi-Injector Impinging Jet Studies of Ignition Delay for Hydrogen Peroxide and Gelled Hydrocarbon Fuel Containing Reactive or Catalytic Particles** T. Connell, G. Risha, R. Yetter, Pennsylvania State University, State College, PA; B. Natan, Technion-Israel Institute of Technology, Haifa, Israel	1000 hrs AIAA-2015-3973 **Aging Effects of Composite AP/ HTPB Propellants Containing Nano-Sized Additives** T. Sammet, A. Demko, C. Dillier, E. Petersen, Texas A&M University, College Station, TX				

Tuesday, 28 July 2015						
79-SR-3	**Solid Rocket Motor Combustion Flow Fields and Instability II**					**Lake Concord A**
Chaired by: J. SPURLING, Naval Air Warfare Center Weapons Division and E. CAVALLINI, University of Roma "La Sapienza"						
0900 hrs AIAA-2015-3974 **Vortex-Sound Generation and Thrust Unsteadiness in Aft-Finocyl Solid Rocket Motor** A. Di Mascio, Centro Nazionale delle Ricerche, Rome, Italy; E. Cavallini, B. Favini, University of Rome "La Sapienza", Rome, Italy; A. Neri, ESA, Rome, Italy	0930 hrs AIAA-2015-3975 **Q1D Modelling of Vortex-Driven Pressure Oscillations in Aft-Finocyl SRMs with Submersed Nozzle Cavity** E. Cavallini, B. Favini, University of Rome "La Sapienza", Rome, Italy; A. Neri, ESA, Rome, Italy	1000 hrs AIAA-2015-3976 **Using a Semi-Infinite Tube to Measure Pressure Oscillations in Solid Rocket Motors** J. Spurling, Naval Air Warfare Center, China Lake, CA	1030 hrs AIAA-2015-3977 **Experimental Study on Combustion of Aluminum in Composite Propellant** X. Liu, P. Liu, B. Jin, Northwestern Polytechnical University, Xi'an, China			

Tuesday, 28 July 2015						
80-ST-2	**Space Transportation II**					**Lake George B**
Chaired by: M. SIR, Aerospace Corp (COMP)						
0900 hrs AIAA-2015-3978 **Modelling Thermochemical Nonequilibrium during Atmospheric Re-Entry** T. Piskin, S. Eyi, Middle East Technical University, Ankara, Turkey	0930 hrs AIAA-2015-3979 **Assessment of Aerospike Nozzle for Single-Stage to Orbit Flight** E. Lash, T. Moeller, University of Tennessee Space Institute, Tullahoma, TN	1000 hrs AIAA-2015-3980 **Conceptual Design of a Two Stage Runway based Space Launch System** A. Renganathan, D. Mavris, Georgia Institute of Technology, Atlanta, GA				

Tuesday, 28 July 2015						
81-TM-3	**Thermal System Applications and Unique Environments I**					**Lake Down A**
Chaired by: C. TARAU, Advanced Cooling Technologies and M. CHOI, NASA-Goddard Space Flight Center						
0900 hrs AIAA-2015-3981 **Thermal Performance Comparison Between Water-Copper and Water-Stainless Steel Heat Pipes** D. Silva, E. Marcelino, R. Riehl, National Institute for Space Research (INPE), São José dos Campos, Brazil	0930 hrs AIAA-2015-3982 **Water-Titanium Heat Pipes for Spacecraft Fission Power** W. Anderson, R. Hay, Advanced Cooling Technologies, Inc., Lancaster, PA	1000 hrs AIAA-2015-3983 **Optimized Heat Pipe Backup Cooling System Tested with a Stirling Convertor** C. Schwendeman, C. Tarau, Advanced Cooling Technologies, Inc., Lancaster, PA; N. Schifer, NASA Glenn Research Center, Cleveland, OH; W. Anderson, Advanced Cooling Technologies, Inc., Lancaster, PA	1030 hrs AIAA-2015-3984 **Paraffin Phase Change Material for Maintaining Temperature Stability of IceCube Type of CubeSats in LEO** M. Choi, NASA Goddard Space Flight Center, Greenbelt, MD	1100 hrs AIAA-2015-3985 **Low-Cost Radiator for Fission Power Thermal Control** C. Tarau, T. Maxwell, W. Anderson, Advanced Cooling Technologies, Inc., Lancaster, PA	1130 hrs AIAA-2015-3986 **Optimized Undergraduate Thermal Analysis of Cube Satellites** R. Oliver, U.S. Military Academy, West Point, NY; B. Crawford, Quinnipiac, Hamden, CT; G. Burrow, U.S. Military Academy, West Point, NY	

Tuesday, 28 July 2015		
82-F360-3 **0930 - 1200 hrs**	**Evolution of our National Ground Test Capability**	**Orlando IV**

As budgets continue to tighten, ground test infrastructure is a common area to look for savings. This session aims to explore how organizations balance operation and maintenance of test facilities against budget reality to accomplish their missions. Key questions that will be explored include: What are the primary factors and metrics influencing sustainability of ground test infrastructure? Is there a general tendency for programs to treat facilities as commodities, and how does this impact our ability to retain national assets? How is our maturing computational capability influencing testing? It has long been the expectation that computational analysis might replace test; are we on the verge of seeing this goal realized or are we reaching a co-dependent steady state between test and computations? Has the industry's technical risk posture changed as a result of flat to shrinking budgets and the present balance between computations and test?

Moderator: Dave Schuster, NASA Langley Research Center

Panelists:

Roger Simpson	**Michael Mastaler**	**Doug Garrard**	**Michael Horton**	**Michael McWithey**
NASA Stennis Space Flight Center	NASA Headquarters	Aerospace Testing Alliance	CUBRC	Lockheed Martin Corporation

Tuesday, 28 July 2015		
83-NW-8 **1200 - 1300 hrs**	**Box Lunch with the Exhibitors**	**Exposition Hall**

Tuesday, 28 July 2015		
84-PLNRY-4 **1300 - 1430 hrs**	**Technology Development and Trends in Propulsion and Energy Panel**	**Orange D**

Panelists will discuss the major technology challenges and opportunities that will shape the future of propulsion and energy, and how those challenges and opportunities should be addressed.

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

Panelists:

Jean Botti	**Tom Williams**	**Neil Garrigan**	**Doug Juul**
Chief Technical Officer Airbus Group	Director Propulsion Systems Department, Marshall Space Flight Center	Executive Manger, Energy Systems and Technology, GE Aviation	Manger, Systems and Technology, GE Aviation

Tuesday, 28 July 2015		
85-NW-9 **1400 - 1430 hrs**	**Ice Cream Networking Break**	**Exposition Hall**

Tuesday, 28 July 2015						
86-AEC-1	**Advanced Engine Controls & Intelligent Systems**					**Lake Concord B**
Chaired by: A. BEHBAHANI, Air Force Research Laboratory and R. MILLAR, Naval Postgraduate School						
1430 hrs AIAA-2015-3987 **Investigation of Asymmetric Thrust Detection with Demonstration in a Real-Time Simulation Testbed** A. Chicatelli, A. Rinehart, Vantage Partners, LLC, Brook Park, OH; D. Simon, NASA Glenn Research Center, Cleveland, OH; T. Sowers, Vantage Partners, LLC, Brook Park, OH	1500 hrs AIAA-2015-3988 **Reduced Order Modeling of Compressible Flows with Unsteady Normal Shock Motion** C. Marley, K. Duraisamy, J. Driscoll, University of Michigan, Ann Arbor, Ann Arbor, MI	1530 hrs AIAA-2015-3989 **Demonstration of Smart, High-Temperature Pressure Sensors in an Engine Harsh EnvironmentDemonstration of Smart, High-Temperature Pressure Sensors in an Engine Harsh Environment** M. Usrey, B. Knowles, A. Brand, K. Harsh, Sporian Microsystems, Inc., Lafayette, CO; A. Behbahani, Air Force Research Laboratory, Wright-Patterson AFB, OH	1600 hrs AIAA-2015-3990 **Framework for Distributed Engine Control System for Sampled-data Systems with Uncertain Time-varying Sampling Intervals and Delays with State Estimations** R. Yedavalli, Ohio State University, Columbus, OH; S. Zein-Sabatto, Tennessee State University, Nashville, TN; A. Behbahani, Air Force Research Laboratory, Wright-Patterson AFB, OH	1630 hrs AIAA-2015-3991 **Enhanced Engine Performance During Emergency Operation Using a Model-Based Engine Control Architecture** J. Csank, J. Connolly, NASA Glenn Research Center, Cleveland, OH	1700 hrs AIAA-2015-3992 **HMS Developments for the Rocket Engine Demonstrator Mascotte** A. Iannetti, S. Palerm, French Space Agency (CNES), Paris, France; J. Marzat, H. Piet-Lahanier, G. Ordonneau, ONERA, Palaiseau, France	

Tuesday, 28 July 2015						
87-APC-2	**Advanced Propulsion Concepts**					**Lake Nona B**
Chaired by: A. REISZ, Reisz Engineers and J. ROBINSON, Retired f/Boeing						
1430 hrs AIAA-2015-3993 **Film-Evaporation MEMS Tunable Array for Low-Mass SmallSat Propulsion: Design Improvements and Thrust Characterization** A. Cofer, W. O'Neill, S. Heister, A. Alexeenko, Purdue University, West Lafayette, IN; E. Cardiff, NASA Goddard Space Flight Center, Greenbelt, MD	1500 hrs AIAA-2015-3994 **Possible Solution for USAF Materiel Command Requirement for a 75 Ton Payload .8 Mach Cruise Global Freighter with Un-refueled Round the World Range** R. Johnston, KGRS, Inc., Ashland, KY	1530 hrs AIAA-2015-3995 **Aerospace Vehicle Propulsion System Utilizing Enclosed Vortex Pressure Gradients** V. Howard, Northwest Aerospace Systems, Klamath Falls, OR	1600 hrs AIAA-2015-3996 **Shocked Flow Ionization: an Experimental Study** P. Vorobieff, University of New Mexico, Albuquerque, Albuquerque, NM; C. Davidson, Dark Sea Industries, LLC, Albuquerque, NM	1630 hrs Oral Presentation **Metal/N2O Powder Rocket Engine-a New Concept for Controlled Thrust** Z. Deng, C. Hu, Northwestern Polytechnical University, Xi'an, China		

Tuesday, 28 July 2015		
88-ECD-3 **1430 - 1800 hrs**	**Dual Use Technology: Challenges and Opportunities**	**Lake Eola**

Dual-use technology is a term that generally is considered applicable to both military and civilian use. For this panel though, we are broadening the definition of dual use and will be exploring the challenges and opportunities of applying technologies across different markets, whether aerospace or terrestrial, military or commercial. The panel will consider: How can you take a technology that is successful in one market and make the leap to another market? What does it take to successfully spinoff a space or military technology to a commercial application? Or how do you spin-in a technology? Panelists from government and industry will provide case studies of technologies that have been applied to different markets, providing insights into what works and how to be successful. We will then open the floor to questions and discussion with the audience.

Moderators: Edward Lewandowski (NASA Glenn Research Center) and Thomas Sutliff (NASA Glenn Research Center)

Panelists:

Terry Hendricks, Ph.D., P.E.
MMRTG Pyroshock Project Manager, NASA Jet Propulsion Laboratory

Danny Micka, Ph.D.
Engineer, Creare

Michael Piszczor
Deputy Chief, Photovoltaic and Electrochemical Systems Branch, NASA Glenn Research Center

Larry Trager
Director, Advanced Power Systems, Aerojet Rocketdyne

Tuesday, 28 July 2015						
89-ED-2/EE-4	**Systems-Level Analysis for Energy Efficiency and Renewable Energy / Electrical Components**					**Lake Down B**
Chaired by: S. DUNCAN, Aerospace Systems Design Laboratory, Georgia Tech and J. DOMENECH						
1430 hrs AIAA-2015-3997 **A Systems Engineering Approach to Site Selection and an Optimization Model for Sustainable Harvesting of Electricity from Shallow Water Tidal Currents** J. Domenech, T. Eveleigh, George Washington University, Washington, DC	1500 hrs AIAA-2015-3998 **Modeling and Simulation-based Analysis for Large Scale Campus Chilled Water Networks** M. Balchanos, J. Kim, S. Duncan, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1530 hrs AIAA-2015-3999 **Model-based Analysis of the Impact of Adding Chilled Water Thermal Storage to a District Cooling System** M. Jalaleddine, S. Duncan, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1600 hrs AIAA-2015-4000 **Techniques Utilizing Meter Data to Achieve Energy Savings in District Cooling System Operations** L. Zhang, S. Duncan, S. Oh, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1630 hrs AIAA-2015-4001 **On Board Energy Management Analysis Tool** V. de Frutos, Airbus, Getafe, Spain; C. Antequera, M. Sproesser, Airbus, Toulouse, France; F. Alcántara, L. Morant, Airbus, Getafe, Spain	1700 hrs AIAA-2015-4002 **Voltage-Mode Solar Inverter with Active Power Factor Correction** K. Siri, The Aerospace Corporation, El Segundo, CA	1730 hrs AIAA-2015-4003 **Uniform Time Division of Maximum Power Tracking among Distributed Power Sources** K. Siri, The Aerospace Corporation, Torrance, CA

Tuesday, 28 July 2015						
90-EP-7	**Hall Modeling and Cathodes**					**Lake Mizell A**
Chaired by: C. MULLINS and D. MANZELLA, NASA Glenn Research Center						
1430 hrs AIAA-2015-4004 **Investigation Of The Ion Transit Time Instability In A Hall Thruster Combining Time-Resolved LIF Spectroscopy And Analytical Calculations** J. Vaudolon, S. Mazouffre, National Center for Scientific Research (CNRS), Orléans, France	1500 hrs AIAA-2015-4006 **Plasma Perturbations in High-Speed Probing of Hall Thruster Discharge Chambers: Quantification and Mitigation** B. Jorns, D. Goebel, R. Hofer, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1530 hrs AIAA-2015-4008 **Numerical Simulations of the XR-5 Hall Thruster For The Assessment Of Erosion Rates At Different Operating Conditions** A. Lopez Ortega, B. Jorns, I. Mikellides, R. Hofer, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1600 hrs AIAA-2015-4007 **Optimization Of Magnetic Field Topology And Anode Geometry For A Wall-Less Hall thruster** S. Mazouffre, J. Vaudolon, S. Tsikata, National Center for Scientific Research (CNRS), Orléans, France; C. Henaux, University of Toulouse, Toulouse, France; D. Harribey, National Center for Scientific Research (CNRS), Orléans, France; A. Rossi, University of Toulouse, Toulouse, France; et al.	1630 hrs AIAA-2015-4005 **Non-Invasive Hall Current Distribution Measurement in a Hall Effect Thruster** C. Mullins, R. Martinez, J. Williams, Colorado State University, Fort Collins, CO; C. Farnell, C. Farnell, Plasma Controls, LLC, Fort Collins, CO; D. Liu, Air Force Institute of Technology, Wright-Patterson AFB, OH; et al.	1700 hrs AIAA-2015-4009 **Hollow Cathodes for Electric Propulsion Utilizing Scandate Cathodes** W. Ohlinger, Self, Babson Park, FL; B. Vancil, eBeam, Inc., Beaverton, OR; J. Polk, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; V. Schmidt, J. Lorr, eBeam, Inc., Beaverton, OR	1730 hrs AIAA-2015-4010 **Novel Microwave-Thermionic Hollow Cathode Ignition Methods** C. Wordingham, P. Taunay, E. Choueiri, Princeton University, Princeton, NJ

Tuesday, 28 July 2015						
92-FFP-2	**Fossil-Fuel Power Technologies II**					**Lake Down A**
Chaired by: B. KHANDELWAL, The University of Sheffield						
1430 hrs AIAA-2015-4012 **Blowout Limits of Partially Premixed Methyl Ester and Jet-A Flames** K. Willingham, R. Parthasarathy, S. Gollahalli, University of Oklahoma, Norman, Norman, OK	1500 hrs AIAA-2015-4013 **Characteristics of Spray Flames of Palm Methyl Ester/Diesel Blends at an Injector Exit Equivalence Ratio of 0.6** M. Richichi, R. Parthasarathy, S. Gollahalli, University of Oklahoma, Norman, Norman, OK	1530 hrs AIAA-2015-4014 **Comparison of Gaseous Emissions between Jet A-1 and Severely Hydro-Processed Jet Fuel from Conventional sources** S. Roy, B. Khandelwal, University of Sheffield, Sheffield, United Kingdom	1600 hrs AIAA-2015-4015 **Experimental Investigation Of Particle Distributions In Particle-Laden Coaxial Jets** J. Yoon, Y. Yoon, Seoul National University, Seoul, Korea (the Republic of)	1630 hrs AIAA-2015-4016 **Investigation on Ultrasonic Fuel Vaporizaiton and Oxygen Enhanced Combustion Cycles** N. Kurisko, J. Mallory, Western New England University, Springfield, MA	1700 hrs AIAA-2015-4017 **New Induction Manifold Designs for High Performance and Low Emission Diesel Engine Running on Alternative Fuels** A. Sadeq, M. Elgergawi, M. Bassiony, S. Ahmed, Qatar University, Doha, Qatar	

Tuesday, 28 July 2015						
93-GTE-6	**Combustors**					**Lake George B**
Chaired by: K. AHMED						
1430 hrs AIAA-2015-4018 **Experimental Investigation on Flame Stabilization with V Gutters for Afterburner Applications** K. Parammasivam, S. Subramanian, S. Baskaran, S. Ahamed, Anna University, Chennai, India; J. Venkatesan, Notion Robotics, Bangalore, India	1500 hrs AIAA-2015-4019 **Determination of Combustion Stability Margin Using the Filter Diagonalization Method** A. Damiao, J. Quinlan, B. Zinn, Georgia Institute of Technology, Atlanta, GA	1530 hrs AIAA-2015-4020 **Combustion LES of a Multi-Burner Annular Aeroengine Combustor using a Skeletal Reaction Mechanism for Jet-A Air Mixtures** N. Zettervall, E. Fedina, K. Nordin-Bates, Swedish Defense Research Agency (FOI), Stockholm, Sweden; E. Heimdal Nilsson, Lund University, Lund, Sweden; C. Fureby, Swedish Defense Research Agency (FOI), Stockholm, Sweden				

Tuesday, 28 July 2015						
94-GTE-7	**Engine Design I**					**Lake Monroe**
Chaired by: S. RAGHAVAN, University of Central Florida						
1430 hrs AIAA-2015-4021 **Three-dimensional Full Annulus Unsteady RANS Simulation of an Integrated Propulsion System** D. Guegan, M. Schvallinger, F. Julienne, Safran Group, Moissy-Cramayel, France; N. Gourdain, University of Toulouse, Toulouse, France; M. Gazaix, ONERA, Châtillon, France	1500 hrs AIAA-2015-4022 **High Bypass Ratio Turbofan Engine with Additional Tip-Driving Fan: a Design Innovation** X. Xin, G. Huang, W. Lu, J. Wang, Nanjing University of Aeronautics and Astronautics, Nanjing, China	1530 hrs AIAA-2015-4023 **A Methodology To Assess The Capability Of Engine Designs To Meet Closed-Loop Performance And Operability Requirements** A. Zinnecker, N&R Engineering, Inc., Parma Heights, OH; J. Csank, NASA Glenn Research Center, Cleveland, OH	1600 hrs AIAA-2015-4024 **Techno-economic and Environmental Risk Assessment of a Blended Wing Body with Distributed Propulsion** C. Goldberg, D. Nalianda, R. Singh, Cranfield University, Cranfield, United Kingdom	1630 hrs AIAA-2015-4025 **Common Core Engine Design Using Bayesian Networks for Design Uncertainty Analysis** R. Treubig, C. Perullo, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1700 hrs AIAA-2015-4026 **A Multi-Stage Method for the Evaluation of the Performance Impact of Manufacturing Variations for Steam Turbines** J. Yang, Peking University, Beijing, China; J. Xiong, University of Califonia, Irvine, Irvine, CA; I. Mcbean, Alstom, Baden, Switzerland; F. Liu, University of Califonia, Irvine, Irvine, CA; S. Havakechian, Alstom, Baden, Switzerland; J. Luo, Peking University, Beijing, China	1730 hrs AIAA-2015-4027 **Development of Velocity Profile Generating Screens for Gas Turbine Components** J. Tate, M. Medina, D. Gonzalez, W. Wang, J. Kapat, University of Central Florida, Orlando, FL; J. Rodriguez, Siemens, Orlando, FL; et al.

Tuesday, 28 July 2015						
95-GTE-8	**Engine Design II**					**Lake Florence**
Chaired by: D. FOUTCH, The Boeing Company						
1430 hrs AIAA-2015-4028 **A Composite Cycle Engine Concept with Hecto-Pressure Ratio** S. Kaiser, Bauhaus Luftfahrt e.V., Munich, Germany; S. Donnerhack, MTU Aero Engines AG, Munich, Germany; A. Lundbladh, GKN Aerospace Engine Systems, Trollhättan, Sweden	1500 hrs AIAA-2015-4029 **Assessment of Distributed Propulsion Systems Used with Different Aircraft Configurations** P. Laskaridis, Cranfield University, Cranfield, United Kingdom	1530 hrs AIAA-2015-4030 **A Parametric Gas Turbine Modeling Approach for Assessing Transient Technologies in the Conceptual Design Phase** M. Ozcan, C. Perullo, J. Tai, D. Mavris, Georgia Institute of Technology, Atlanta, GA	1600 hrs AIAA-2015-4031 **Nonlinear Dynamic Modeling of a Supersonic Commerical Transport Turbo-Machinery Propulsion System for Aero-Propulso-Servo-Elasticity Reserach** J. Connolly, G. Kopasakis, NASA Glenn Research Center, Cleveland, OH; J. Carlson, NASA Langley Research Center, Hampton, VA; K. Woolwine, University of Colorado, Boulder, Boulder, CO	1630 hrs AIAA-2015-4032 **Preliminary Design of a Gas Turbine to Drive a South African Commercial Booster Engine** D. Fitzgerald, G. Smith, M. Brooks, University of KwaZulu-Natal, Durban, South Africa; G. Snedden, Council for Scientific and Industrial Research, Durban, South Africa		

Tuesday, 28 July 2015						
96-HR-5	**Design and Development of Novel Hybrid Rocket Concepts**					**Lake Sheen B**
Chaired by: T. SHIMADA, Japan Aerospace Exploration Agency and Y. CHEN, National Space Organization Taiwan						
1430 hrs AIAA-2015-4033 **Performance Characterisation of a Hybrid Propulsion System for Cubesat Missions** O. Ahmed, University of Surrey, Guildford, United Kingdom	1500 hrs AIAA-2015-4034 **A Survey of Additively Manufactured Propellant Materials for Arc-Ignition of Hybrid Rockets** S. Whitmore, Z. Spurrier, J. Fuller, J. Desain, Utah State University, Logan, UT	1530 hrs AIAA-2015-4035 **Testing and Evaluation of a Double-Tube Hybrid Rocket Motor** A. Pons Lorente, N. Yu, B. Zhao, Beihang University, Beijing, China	1600 hrs AIAA-2015-4036 **Design and Testing of an Additively Manufactured Advanced Hybrid Rocket Motor Propulsion Unit for CubeSats (PUC)** B. McKnight, J. Boyer, P. Nardozzo, A. Cortopassi, Pennsylvania State University, State College, PA	1630 hrs AIAA-2015-4037 **Study on a Plasma Jet Igniter for a Hybrid Rocket** R. Kimura, I. Nakagawa, Tokai University, Kanagawa, Japan	1700 hrs AIAA-2015-4038 **Testing and Modeling of a Porous Polyethylene Axial-Injection, End-Burning Hybrid Rocket Motor** M. Hitt, R. Frederick, University of Alabama, Huntsville, Huntsville, AL	

Tuesday, 28 July 2015						
97-HR-6	**Development and Evaluation of Novel Oxidizer and Fuel Formulations**					**Lake Highland B**
Chaired by: G. STORY, NASA Marshall Space Flight Center and J. DAVITIAN, The Aerospace Corporation						
1430 hrs AIAA-2015-4039 **Manufacturing Processes of Paraffin Grains as Fuel for Hybrid Rocket Engines** F. Piscitelli, G. Saccone, A. Gianvito, G. Cosentino, L. Mazzola, Italian Aerospace Research Center (CIRA), Capua, Italy	1500 hrs AIAA-2015-4040 **Thermal Decomposition of Aqueous Hydroxyl-Ammonium Nitrate Solutions Using a Hybrid Propellant Gas Generator** S. Whitmore, D. Merkley, S. Walker, Z. Spurrier, Utah State University, Logan, UT	1530 hrs AIAA-2015-4041 **Hybrid Rocket Enhancement by Micro- and Nano-Scale Additives in HTPB Fuel Grains** J. Thomas, E. Petersen, Texas A&M University, College Station, TX; J. Desain, B. Brady, The Aerospace Corporation, El Segundo, CA	1600 hrs AIAA-2015-4042 **Paraffin-based Fuels and Energetic Additives for Hybrid Rocket Propulsion** M. Boiocchi, F. Maggi, C. Paravan, L. Galfetti, Technical University of Milan, Milan, Italy			

Tuesday, 28 July 2015						
98-HR-7	**Hybrid Rockets - Current Programs Objectives and Updates**					**Lake Sheen A**
Chaired by: S. WHITMORE, Utah State University and A. KARABEYOGLU, Space Propulsion Group Inc.						
1430 hrs AIAA-2015-4043 **Multifunction Sounding Rocket System Development with Advanced Hybrid Propulsion** Y. Chen, R. Cheng, H. Chang, National Space Organization, Hsinchu Science Park, Taiwan; G. Lai, J. Lin, T. Chou, National Chiao Tung University, Hsinchu, Taiwan; et al.	1500 hrs AIAA-2015-4044 **Hybrid Rocket Motor Upscaling and Development Test Campaign at Nammo Raufoss** A. Boiron, O. Verberne, M. Faenza, B. Haemmerli, Nammo Raufoss, Raufoss, Norway	1530 hrs AIAA-2015-4045 **Development of the North Star Sounding Rocket: Getting ready for the first demonstration Launch** O. Verberne, A. Boiron, M. Faenza, B. Haemmerli, Nammo Raufoss, Raufoss, Norway	1600 hrs AIAA-2015-4046 **Preliminary Design of a 30kN Paraffin-Based Hybrid Rocket Engine** R. Votta, M. Di Clemente, Italian Aerospace Research Center (CIRA), Capua, Italy	1630 hrs AIAA-2015-4047 **Flight Test of the Phoenix-1A Hybrid Rocket** B. Genevieve, J. Pitot, M. Brooks, S. Chowdhury, K. Veale, U. Balmogim, University of KwaZulu-Natal, Durban, South Africa; et al.	1700 hrs AIAA-2015-4048 **Preliminary Design of the Phoenix-1B Hybrid Rocket** U. Balmogim, M. Brooks, J. Pitot, K. Veale, L. Roberts, B. Genevieve, University of KwaZulu-Natal, Durban, South Africa	

Tuesday, 28 July 2015						
99-ITAR-2	**Advanced Rocket and Space Technology: Propellants, Docking and Additive Manufacturing** ITAR					**Orlando VI**
Chaired by: P. SMITH, Boeing						
1430 hrs AIAA-2015-4049 **Performance Evaluation of a Candidate Full-scale Dynamic Interface Seal for the International Low Impact Docking System** S. Taylor, University of Toledo, Toledo, OH; J. Mather, University of Akron, Akron, OH; N. Penney, Ohio Aerospace Institute, Cleveland, OH; H. Oravec, C. Daniels, University of Akron, Akron, OH	1500 hrs AIAA-2015-4050 **Vapor Containment and Mitigation of Monomethylhydrazine and Nitrogen Tetroxide** B. Austin, IN Space, LLC, West Lafayette, IN; T. Voskuilen, J. Gabl, T. Pourpoint, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-4254 **Enabling Beyond Earth Exploration with the Space Launch System** B. Donahue, The Boeing Company, Huntsville, AL	1600 hrs AIAA-2015-4052 **Investigation of a Dual Bell Nozzle for the MR-104G Monopropellant Thruster on the Orion Capsule** S. Stanley, M. Walker, Aerojet Rocketdyne, Sacramento, CA	1630 hrs AIAA-2015-4055 **Destructive Removal of Candidate Subscale Two-Piece Silicone Elastomer Docking Seals** H. Oravec, C. Daniels, University of Akron, Akron, OH; N. Penney, Ohio Aerospace Institute, Cleveland, OH	1700 hrs AIAA-2015-4053 **Flame Studies of LMP-103S Decomposition Products** J. Barragan, University of Texas, El Paso, El Paso, TX	1730 hrs AIAA-2015-4054 **Catalytic Studies of LMP-103S Decomposition** J. Barragan, A. Vazquez, A. Choudhuri, University of Texas, El Paso, El Paso, TX

Tuesday, 28 July 2015						
100-LP-12	**Green Propulsion**					**Orange E**
Chaired by: T. POURPOINT, Purdue University and D. SARGENT, Federal Aviation Administration						
1430 hrs AIAA-2015-4056 **Test Bench for the Unsteady Characterization of a Pulsed Green Monopropellant Thruster** G. Pace, A. Pasini, L. Torre, Alta S.p.A., Pisa, Italy	1500 hrs AIAA-2015-4057 **Pulse Mode Operation of a 1 N 98% Hydrogen Peroxide Thruster** L. Torre, A. Pasini, G. Pace, Alta S.p.A., Pisa, Italy	1530 hrs AIAA-2015-4058 **PulCheR-Pulsed Chemical Rocket with Green High Performance Propellants: Second Year Project Overview** A. Pasini, L. Torre, G. Pace, Alta S.p.A., Pisa, Italy	1600 hrs AIAA-2015-4059 **Propulsive Performance of a 1 N 98% Hydrogen Peroxide Thruster** A. Pasini, L. Torre, G. Pace, Alta S.p.A., Pisa, Italy	1630 hrs AIAA-2015-4060 **A Light Unsaturated Hydrocarbon and Hydrogen Peroxide as Future Green Propellants for Bipropellant Thrusters** A. Pasini, G. Pace, L. Torre, Alta S.p.A., Pisa, Italy	1700 hrs AIAA-2015-4061 **Experimental and Numerical Analysis of the Heat Flux Occurring in a Nitrous Oxide/Ethene Green Propellant Combustion Demonstrator** L. Werling, B. Hochheimer, A. Baral, A. Gernoth, S. Schlechtriem, German Aerospace Center (DLR), Lampoldshausen, Germany	1730 hrs AIAA-2015-4062 **Development of 500 N Scale Green Hypergolic Bipropellant Thruster using Hydrogen Peroxide as an Oxidizer** H. Kang, S. Kwon, Korea Advanced Institute of Science and Technology, Daejeon, Korea (the Republic of)

Tuesday, 28 July 2015						
101-LP-13	**Liquid Rocket Engines**					**Orange F**
Chaired by: J. SCHNACKEL, United Launch Alliance, LLC and J. MOORE, MOOG Inc, ISP Division						
1430 hrs AIAA-2015-4063 **VINCI, the European Reference For Ariane 6 Upper Stage Cryogenic Propulsive System** P. Alliot, Safran Group, Paris, France; J. Delange, Airbus, Paris, France; A. Lekeux, French Space Agency (CNES), Paris, France	1500 hrs AIAA-2015-4064 **False Positive and False Negative Analysis for Enhancing Liquid Propulsion System Reliability and Safety** Z. Huang, Aerojet Rocketdyne, Los Angeles, CA	1530 hrs AIAA-2015-4065 **Development of a Reusable LOX/LH2 Rocket Engine - Firing Tests and Lifetime Evaluation Analysis** T. Kimura, T. Hashimoto, M. Sato, S. Takada, S. Moriya, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; T. Yagishita, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan; et al.	1600 hrs AIAA-2015-4066 **A Liquid Rocket Engine Conceptual Design Tradeoff Methodology Using An A Priori Articulation Of Preference Information With Epistemic Uncertaintie** S. Krueger, R. Strunz, Airbus, Munich, Germany; J. Herrmann, University of Maryland, College Park, College Park, MD	1630 hrs AIAA-2015-4067 **CNES Future Preparation For Liquid Propulsion** S. Palerm, C. Bonhomme, S. Petitot, French Space Agency (CNES), Paris, France; J. Chopinet, Snecma, Vernon, France		

Tuesday, 28 July 2015						
102-LP-14	Materials & Manufacturing					Lake Lucerne
Chaired by: D. GUADAGNOLI, Orbital ATK and M. MEYER, NASA Glenn Research Center						
1430 hrs AIAA-2015-4252 **Results Of Material Compatibility Investigation Of Hydrogen Peroxide** C. Scharlemann, University of Applied Sciences, Wiener Neustadt, Austria	1500 hrs AIAA-2015-4068 **Use of Additive Manufacturing to Model and Develop Advanced Liquid Propulsion Designs** J. Catina, K. Castonguay, U.S. Naval Academy, Annapolis, MD	1530 hrs AIAA-2015-4069 **Thermo-Structural Enhancement of Liquid-Propellant Rocket Engine Thrust Chambers Using Functionally Graded Alloys** M. Knight, K. Adriany, S. Guerin, A. Kieatiwong, E. Bayat, University of California, San Diego, La Jolla, CA	1600 hrs AIAA-2015-4070 **Comparison Of Damage Parameter Based Finite Element Fatigue Life Analysis Results To Combustion Chamber Type TMF Panel Test Results** G. Thiede, E. Zametaev, J. Riccius, German Aerospace Center (DLR), Lampoldshausen, Germany; S. Reese, RWTH Aachen University, Aachen, Germany	1630 hrs AIAA-2015-4071 **A TMF Panel Optimization Strategy Applied To The FLPP Storable Engine Hot Gas Wall Geometry** J. Riccius, B. Jayaganesan, German Aerospace Center (DLR), Lampoldshausen, Germany	1700 hrs AIAA-2015-4051 **Designing and Testing Liquid Engines for Additive Manufacturing** D. Atyam, N. Nguyen, University of California, San Diego, La Jolla, CA	

Tuesday, 28 July 2015						
103-LP-15	Propellant Slosh					Lake Highland A
Chaired by: G. COLL, Orbital ATK and E. JACOB, GTL						
1430 hrs AIAA-2015-4072 **Modeling of Non-isothermal Cryogenic Fluid Sloshing** J. Agui, J. Moder, NASA Glenn Research Center, Cleveland, OH	1500 hrs AIAA-2015-4073 **Preliminary Design Tools for Axisymmetric Propellant Tanks: Geometry and Liquid Slosh** S. Coogan, Southwest Research Institute, San Antonio, TX	1530 hrs AIAA-2015-4074 **Design Of A Liquid Sloshing Experiment To Operate In The International Space Station** G. Lapilli, Florida Institute of Technology, Melbourne, FL	1600 hrs AIAA-2015-4075 **Characterization of Elastomeric Diaphragm Motion within a Spacecraft Propellant Tank** G. Lapilli, Florida Institute of Technology, Melbourne, FL	1630 hrs AIAA-2015-4076 **Validation and Rules-of-Thumb for Computational Predictions of Liquid Slosh Dynamics** G. Musgrove, S. Coogan, Southwest Research Institute, San Antonio, TX	1700 hrs AIAA-2015-4077 **Experimental, Numerical and Analytical Characterization of Slosh Dynamics Applied to In-Space Propellant Storage and Management** J. Storey, D. Kirk, H. Gutierrez, Florida Institute of Technology, Melbourne, FL; B. Marsell, P. Schallhorn, NASA Kennedy Space Center, Cape Canaveral, FL	

Tuesday, 28 July 2015						
104-NFF-4	Future Flight Propulsion Systems					Lake Nona A
Chaired by: G. MEHOLIC, The Aerospace Corporation and H. FEARN, California State University, Fullerton						
1430 hrs AIAA-2015-4078 **Atmospheric Mining in the Outer Solar System: Aerial Vehicle Mission and Design Issues** B. Palaszewski, NASA Glenn Research Center, Cleveland, OH	1500 hrs AIAA-2015-4079 **Space-to-Space Power Beaming Enabling High Performance Rapid Geocentric Orbit Transfer** J. Dankanich, NASA Marshall Space Flight Center, Huntsville, AL; C. Vassallo, University of Texas, Austin, Austin, TX; M. Tadge, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-4080 **Design and First Measurements of a Superconducting Gravity-Impulse-Generator** I. Lörincz, M. Tajmar, Technical University of Dresden, Dresden, Germany	1600 hrs AIAA-2015-4081 **Replication and Experimental Characterization of the Wallace Dynamic Force Field Generator** M. Tajmar, Technical University of Dresden, Dresden, Germany	1630 hrs AIAA-2015-4082 **New Theoretical Results for the Mach Effect Thruster** H. Fearn, California State University, Fullerton, CA	1700 hrs AIAA-2015-4083 **Direct Thrust Measurements of an EMDrive and Evaluation of Possible Side-Effects** M. Tajmar, Technical University of Dresden, Dresden, Germany	

Tuesday, 28 July 2015						
105-PC-7	**Combustion Diagnostics and Experiments**					**Lake George A**
Chaired by: J. GORD, Air Force Reseach Laboratory and W. KULATILAKA, Texas A & M Univrsity						
1430 hrs AIAA-2015-4084 **Dynamics of Flame Lift-Off in Biogas Swirl Flames** Q. An, B. Geraedts, A. Steinberg, University of Toronto, Toronto, Canada	1500 hrs AIAA-2015-4085 **Simultaneous Kerosene/OH LIF Visualization Inside The Pre-Mixing Duct And Combustion Chamber Of A Lean Staged Aero-Engine Combustor Under Combustion Oscillations At Elevated Pressure And Temperature** K. Matsuura, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; T. Eguchi, S. Oide, Hosei University, Koganei, Japan; H. Yamada, Y. Kurosawa, T. Yamamoto, Japan Aerospace Exploration Agency (JAXA), Chofu, Japan; et al.	1530 hrs AIAA-2015-4086 **An Experimental and Computational Study of Turbulent Lean Premixed Flames** D. Han, V. Hasti, J. Gore, Purdue University, West Lafayette, IN	1600 hrs AIAA-2015-4087 **Measurement Of Local Flame Speeds In The Thickened Flamelet Regime Using Simultaneous 10 kHz TPIV and OH/CH2O PLIF** J. Osborne, A. Steinberg, University of Toronto, Toronto, Canada; C. Carter, Air Force Research Laboratory, Wright-Patterson AFB, OH; S. Ramji, University of Toronto, Toronto, Canada; S. Peltier, Wright Patterson Air Force Base, Wright Patterson AFB, OH; S. Hammack,	1630 hrs AIAA-2015-4088 **Methane Ignition Delay Times in CO2 Diluted Mixtures in a Shock Tube** B. Koroglu, O. Pryor, J. Lopez, L. Nash, S. Vasu, University of Central Florida, Orlando, FL	1700 hrs AIAA-2015-4089 **Measurements to Determine the Regimes of Turbulent Premixed Flames** A. Skiba, T. Wabel, J. Temme, J. Driscoll, University of Michigan, Ann Arbor, Ann Arbor, MI	1730 hrs AIAA-2015-4090 **Experimental Studies on Behaviour of Flame Structure due to Vortex in V-Gutter Combustors** K. Parammasivam, K. Kirubhakaran, Anna University, Chennai, India

Tuesday, 28 July 2015						
106-PC-8	**Combustion Modeling and Simulation II**					**Lake Louise**
Chaired by: J. OEFELEIN, Sandia National Laboratories and R. HAUSEN, Honeywell						
1430 hrs AIAA-2015-4091 **Optimized Ethylene Skeletal Chemical Kinetic Mechanisms For Diluted Turbulent Flames** B. Liu, F. Qin, D. Cao, Northwestern Polytechnical University, Xi'an, China	1500 hrs AIAA-2015-4092 **Velocity-Induced Flame Extinction Dynamics of Lean Premixed Bluff-Body Stabilized Flames** M. Geikie, K. Ahmed, University of Central Florida, Orlando, FL	1530 hrs AIAA-2015-4093 **On the Computations of NOx and CO Formation in A 200 kW Swirl Burner** E. Khalil, A. Ahmed, M. Aly Hassan, H. Hariedy, Cairo University, Giza, Egypt	1600 hrs AIAA-2015-4094 **Heat Transfer and Flow Chrecterictics in a Gas Turbine Can Combustor: Turbulent Interaction** S. Mohammed, E. Khalil, H. Hariedy, E. Bially, Cairo University, Giza, Egypt	1630 hrs AIAA-2015-4095 **One Dimensional Network Model for a Reverse Flow Combustor** O. Tuncer, G. Sarikaya, G. Varol, Istanbul Technical University, Istanbul, Turkey		

Tuesday, 28 July 2015						
107-PC-9	**Deflagrations and Detonations**					**Lake Virginia**
Chaired by: C. LI, Air Force Office of Scientific Research						
1430 hrs AIAA-2015-4096 **Laminar Deflagrated Flame Interaction with a Fluidic Jet Flow for Deflagration-to-Detonation Flame Acceleration** J. McGarry, K. Ahmed, University of Central Florida, Orlando, FL	1500 hrs AIAA-2015-4097 **Detonation Initiation with Thermal Deposition due to Pore Collapse in Energetic Materials - Towards the Coupling between Micro- and Macro-scale** J. Zhang, Florida Institute of Technology, Melbourne, FL; T. Jackson, University of Florida, Gainesville, Gainesville, FL	1530 hrs AIAA-2015-4098 **A New Packing Code for Creating Mirostructures of Propellants and Explosives** G. Amadio, University of Illinois, Urbana-Champaign, Urbana, IL; T. Jackson, University of Florida, Gainesville, Gainesville, FL	1600 hrs AIAA-2015-4099 **A Computational Method for the Simulation of Hot Spot Formations and Detonation in Polymer-Bonded Explosives** T. Gallagher, M. Akiki, S. Menon, Georgia Institute of Technology, Atlanta, GA	1630 hrs AIAA-2015-4100 **An Isoconversional Method for Extracting Reaction Kinetics of Aluminized Cyclotrimethylene-Trinitramine for Propulsion** Y. Kim, J. Yoh, Seoul National University, Seoul, Korea (the Republic of)	1700 hrs AIAA-2015-4101 **On The Elasto-Plastic Response Of Combustion Tube Subjected To Kerosene-Air Detonation Loading** J. Yoh, Seoul National University, Seoul, Korea (the Republic of)	1730 hrs AIAA-2015-4102 **Schlieren-System-Visualization of Combustion Phenomena in a Two-Parallel-Plane Combustor** S. Nakagami, K. Matsuoka, J. Kasahara, Nagoya University, Nagoya, Japan; A. Matsuo, Keio University, Yokohama, Japan; I. Funaki, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan

Tuesday, 28 July 2015						
108-SR-4	**Solid Rocket Motor Propellant Characteristics Analysis**					**Lake Concord A**
Chaired by: B. LEARY, The Johns Hopkins University Applied Physics Laboratory and A. GERARDS, US Army AMRDEC						
1430 hrs AIAA-2015-4103 **An Advanced Digital Cross Correlation Method for Solid Propellant Burning Rate Determination** D. Jones, M. Mascaro, D. Lineberry, R. Frederick, University of Alabama, Huntsville, Huntsville, AL; M. Moser, Exquadrum, Inc., Adelanto, CA	1500 hrs AIAA-2015-4104 **Using Real-Time Radioscopy to Measure the Burning Rate of Solid Rocket Propellant** M. Denny, R. Frederick, University of Alabama, Huntsville, Huntsville, AL	1530 hrs AIAA-2015-4105 **Surface Temperature of Agglomerated Aluminum Particle in the Reaction Zone of AP/HTPB Composite Propellants** R. Doi, M. Nakagaki, T. Kuwahara, Nihon University, Funabashi, Japan; K. Yamamoto, A. Fukuchi, IHI Corporation, Tomioka, Japan	1600 hrs AIAA-2015-4106 **Ignition Delay Times of Composite Solid Propellants Using Novel Nano-Additive Catalysts** A. Demko, C. Dillier, E. Petersen, Texas A&M University, College Station, TX; D. Reid, S. Seal, University of Central Florida, Orlando, FL	1630 hrs AIAA-2015-4107 **Time-Temperature Superposition Principle Applied to Thermally Aged Composite Propellant** L. Villar, L. Rezende, Aeronautics and Space Institute (IAE), São José dos Campos, Brazil		

Tuesday, 28 July 2015		
109-F360-4 **1500 - 1730 hrs**	**Integrated Roles of Experimental Fluid Dynamics and Computational Fluid Dynamics**	**Orlando IV**

For years, the computational and experimental fluid dynamic communities have had separate advocacies with mixed results. Many stakeholders and decision-makers may not understand the integrated roles of experimental and computational fluid dynamics (EFD/CFD) in the RDT&E process for new aero products. Do we need an integrated RDT&E map going forward for capability needs in terms of ground testing, computational methods, and flight testing?

Moderator: James Heidmann, NASA Glenn Research Center

Panelists:

Richard "Dick" Scharnhost	**Keith Blodgett**	**Mike Mastaler**	**Paul Van Slooten**	**Roy Schulz**
The Boeing Company	GE Aviation	NASA Headquarters	United Technologies Research Center	MiraFacilities2 Inc.

Tuesday, 28 July 2015		
110-RLA-2 **1600 - 1730 hrs**	**Leadership Exchange/Speed Mentoring**	**Orange G**

Tuesday, 28 July 2015		
111-LECT-2 **1800 - 1900 hrs**	**Propulsion and Energy Lecture: The Transformation of the Kennedy Space Center**	**Orange D**

An informational presentation on the transformation of the Kennedy Space Center from a single, program-dependent launch complex, to a diverse, multi-user spaceport of the future enabling both Government and commercial operations to and from low Earth orbit and beyond. The presentation will discuss the planning and execution of the Center's transition from the 30-year Shuttle program; the modernization of launch and ground processing infrastructure to support NASA's evolving Space Launch System and Orion multi-purpose crew vehicle; and the turnover of facilities and assets left underutilized by the retirement of the space shuttles to private industry and other Government agencies. Challenges related to downsizing of workforce, budget constraints, and contract and agreement strategies will be discussed, as well as overcoming barriers to change. In addition, the presentation will describe NASA's journey to Mars and the critical work taking place at Kennedy Space Center to enable it.

Speaker:

Robert Cabana
Center Director, NASA Kennedy Space Center

Wednesday

Wednesday, 29 July 2015		
112-NW-10 **0730 - 0800 hrs**	**Networking Coffee Break**	**Ballroom Foyer**

Wednesday, 29 July 2015		
113-SB-3 0730 - 0800 hrs	Wednesday Speaker's Briefing	In Session Room
Speakers, presenters and session chairs for both the morning and afternoon technical sessions, please meet in your session room to load presentations and discuss the flow of your session.		

Wednesday, 29 July 2015		
114-PLNRY-5 0800 - 0900 hrs	Workforce Development Panel	Orange D

Discover how the make-up of the workforce will change over the next decade, how we need to adapt, and how to attract the necessary talent.

Moderator: Mark Lewis, Director, IDA Science and Technology Policy Institute

Panelists:

Carole Hedden
Executive Editorial Director, Aviation Week and Executive Intelligence

Yvette Weber
Engineering Manager, U.S. Air Force Material Command

Michael Hawes
Vice President and Orion Program Manager, Lockheed Martin Space Systems Company

Steve Gorrell
Associate Professor, Brigham Young University

Wednesday, 29 July 2015						
115-ABPSI-4/AEP-2	Emerging Propulsion System Technologies					Orange E
Chaired by: S. HIRT, NASA Glenn Research Center and I. CHAKRABORTY						
0900 hrs AIAA-2015-4108 **Airvolt Aircraft Electric Propulsion Test Stand** A. Samuel, Y. Lin, NASA Armstrong Flight Research Center, Edwards, CA	0930 hrs AIAA-2015-4109 **Influence of Flow Path Configuration on the Performance of Hybrid Turbine - Solid Oxide Fuel Cell Systems for Aircraft Propulsion and Power** D. Waters, S. Vannoy, C. Cadou, University of Maryland, College Park, College Park, MD	1000 hrs AIAA-2015-4110 **Model Identification Applied To Temperature Extrapolations of Aircraft Propulsion System Items** O. Verseux, Airbus, Toulouse, France; F. Uriz, Altran, Blagnac, France	1030 hrs AIAA-2015-4111 **Team of Unmanned Aircraft Systems (UAS) and Unmanned Ground Vehicles (UGV) for Emergency Response in Mining Applications** P. Gill, M. Hatfield, D. Randle, R. Wies, R. Ganguli, S. Rosetti, University of Alaska, Fairbanks, Fairbanks, AK; et al.	1100 hrs AIAA-2015-4112 **A Preliminary Database for Low Reynolds Number Propeller Performance Validations** A. Ghoddoussi, Wichita State University, Wichita, KS		

Wednesday, 29 July 2015						
116-APS-3	Power Generation for Planetary Missions					Lake Highland B
Chaired by: M. PATEL, US Merchant Marine Academy and J. HAINES, Retired - formerly ESA/ESTEC						
0900 hrs AIAA-2015-4113 **A Martian Technology Demonstration Mission and Subsequent Human Mission Support Use for a Space Solar Power Wireless Power Transfer System** J. Straub, University of North Dakota, Grand Forks, Grand Forks, ND	0930 hrs AIAA-2015-4114 **General Atomics Radioisotope Fueled Thermophotovoltaic Power Systems for Space Applications** J. Strauch, A. Klein, P. Charles, General Atomics, San Diego, CA; C. Murray, L3 Power Paragon, Anaheim, CA; M. Du, Oak Ridge National Laboratory, Oak Ridge, TN	1000 hrs AIAA-2015-4115 **Reestablishing the Supply of Plutonium-238** R. Wham, L. Felker, E. Collins, D. Benker, R. Owens, R. Hobbs, Oak Ridge National Laboratory, Oak Ridge, TN; et al.	1030 hrs AIAA-2015-4116 **NASA's Radioisotope Power Systems - Plans** J. Hamley, P. McCallum, C. Sandifer, T. Sutliff, J. Zakrajsek, NASA Glenn Research Center, Cleveland, OH			

Wednesday, 29 July 2015						
117-EDU-2	**Propulsion Education II**					**Lake George B**
Chaired by: R. NARDI, Inotech LTDA and J. BENNEWITZ						
0900 hrs AIAA-2015-4117 **LSU Launch and Glide Program Development of a Solid and Hybrid Powered Rocket Glider: "Khaos"** A. Baran, C. Blanchard, P. de la Vergne, P. Spyridon, C. Medick, J. Zimmer, Louisiana State University, Baton Rouge, LA; et al.	0930 hrs AIAA-2015-4118 **An Improved Nozzle Performance Laboratory Using Schlieren Flow Visualization** C. Thorn, D. Olmstead, K. Tucker, U.S. Air Force Academy, Colorado Springs, CO	1000 hrs AIAA-2015-4119 **Computed Tomography Characterization of a Porous Hybrid Motor Grain** J. Buckley, M. Denny, G. Nelson, University of Alabama, Huntsville, Huntsville, AL	1030 hrs AIAA-2015-4120 **Use of Generalized Fluid System Simulation Program (GFSSP) for Teaching and Performing Senior Design Projects at the Educational Institutions** A. Majumdar, A. Hedayat, NASA Marshall Space Flight Center, Huntsville, AL	1100 hrs AIAA-2015-4121 **Dynamic Calibration and Analysis of Crack Tip Propagation in Energetic Materials using Real-Time Radiography** A. Butt, R. Frederick, UAH Propulsion Research Center, Huntsville, AL		

Wednesday, 29 July 2015		
118-EE-5 **0900 - 1130 hrs**	**Renewable and Sustainable Energy in Florida**	**Lake Eola**

This is a discussion panel where the panel members will talk about renewable and sustainable energy in Florida. Each panel member will also make a short presentation to highlight his/her scope of involvement in renewable and sustainable energy. The panel consists of leaders from the renewable and sustainable energy sectors in Florida.

Moderator: Dr. S.A. Sherif, Professor of Mechanical and Aerospace Engineering, University of Florida.

Panelists:

Jon Ippel Sustainability Director and Senior Aide to the CAO, City of Orlando, Florida.	Jennifer S. Szaro Manager, Renewables, Orlando Utilities Commission, Orlando, Florida.	Dr. Prabir Barooah Department of Mechanical and Aerospace Engineering, University of Florida.	Dr. Saeed Moghaddam Department of Mechanical and Aerospace Engineering, University of Florida

Wednesday, 29 July 2015						
120-GE-1	**Green Engineering**					**Lake Florence**
Chaired by: E. KHALIL, Cairo University						
0900 hrs AIAA-2015-4123 **A Flight Control System for the Rocket-Propelled and Ballistic Flight Phases for a SubOrbital SpacePlane Application** D. Welberg, M. Werner, Airbus, Bremen, Germany; J. Dutheil, Airbus, St. Medard-en-Jalles, France	0930 hrs AIAA-2015-4124 **Flashing Behavior of Ionic Liquid Propellants under Vacuum Conditions** C. Hendrich, S. Schlechtriem, German Aerospace Center (DLR), Lampoldshausen, Germany	1000 hrs AIAA-2015-4125 **Personalized Air Conditioning Of Air Craft Cabins For Passengers Comfort And Efficient Energy Use** A. Farag, E. Khalil, Cairo University, Giza, Egypt	1030 hrs AIAA-2015-4126 **Flow Modelling of Excess Carrier between the Microchannels of an Organic Photovoltaic Solar Cell** M. Shitta, E. Ogedengbe, University of Lagos, Akoka-Yaba, Nigeria			

Wednesday, 29 July 2015						
121-GTE-9	**Turbine III**					**Lake Monroe**
Chaired by: S. VASU, University of Central Florida						
0900 hrs AIAA-2015-4127 **Experimental Research of Reducing Turbine Tip Leakage Flow Using Backward Vortex Generators** C. Xia, G. Huang, Nanjing University of Aeronautics and Astronautics, Nanjing, China	0930 hrs AIAA-2015-4128 **Exploring an LBM-VLES Based CFD Approach for Predictions of Aero-Thermal Flows in Generic Turbo-machinery Devices** Y. Li, A. Jammalamadaka, Exa Corporation, Burlington, MA	1000 hrs AIAA-2015-4129 **Workflow Optimization of Multistage Axial Turbine** V. Matveev, G. Popov, O. Baturin, E. Goryachkin, D. Kolmakova, Samara State Aerospace University, Samara, Russia	1030 hrs AIAA-2015-4130 **Multi-row Turbine Blade Aerothermal Optimization Using Evolution Strategies with Viscous Flow Analysis** C. Thorn, R. Hartfield, Auburn University, Auburn, AL	1100 hrs AIAA-2015-4131 **Investigation of Pressure Drop and Heat Transfer Behavior of a Square Channel with 45° Angle Ribs at Wide Range of Reynolds Numbers** L. Ahmed, C. Vergos, P. Tran, W. Wang, J. Kapat, University of Central Florida, Orlando, FL		

Wednesday, 29 July 2015						
122-HR-8	**Combustion Stability, Motor Performance, and Related Issues**					**Lake Sheen B**
Chaired by: P. LEMIEUX, California State Polytechnic University and S. COOGAN, Southwest Research Institute						
0900 hrs AIAA-2015-4132 **Indirect Heat Flux Measurements at the Nozzle Throat of a Hybrid Rocket Motor** P. Narsai, E. Momanyi, K. Venkataraman, B. Evans, B. Cantwell, Stanford University, Stanford, CA	0930 hrs AIAA-2015-4133 **Failure Mode Investigation of a Sorbitol-based Hybrid Rocket Flight Motor for the Stratos II Sounding Rocket** T. Knop, J. Wink, R. Huijsman, R. Werner, J. Ehlen, S. Powell, Delft University of Technology, Delft, The Netherlands; et al.	1000 hrs AIAA-2015-4134 **Applicability of a LOx Vaporization Preburner for Swirling-Flow Hybrid Rocket Engines** T. Sakurai, T. Tomizawa, Tokyo Metropolitan University, Hino, Japan				

Wednesday, 29 July 2015						
123-HR-9	**Combustion Dynamics and Mixing Efficiencies II**					**Lake Sheen A**
Chaired by: J. DAVITIAN, The Aerospace Corporation and T. SHIMADA, Japan Aerospace Exploration Agency						
0900 hrs AIAA-2015-4135 **Numerical and Experimental Investigation of HDPE Hybrid Propulsion with Dual Vortical-Flow Chamber Designs** G. Lai, S. Wei, T. Chou, J. Lin, J. Wu, National Chiao Tung University, Hsinchu, Taiwan; Y. Chen, National Space Organization, Hsinchu, Taiwan	0930 hrs AIAA-2015-4136 **Combustion Characteristics of Gas Hybrid Rocket using H_2O/HNO_3 as Oxidizer** I. Suzuki, T. Kuwahara, Nihon University, Funabashi, Japan	1000 hrs AIAA-2015-4137 **Combustion Visualization and Characterization of Liquefying Hybrid Rocket Fuels** M. Kobald, A. Petrarolo, S. Schlechtriem, German Aerospace Center (DLR), Lampoldshausen, Germany	1030 hrs AIAA-2015-4138 **A Fundamental Study of a End-Burning Swirling-Flow Hybrid Rocket Engine using Low Melting Temperature Fuels** T. Sakurai, D. Hayashi, Tokyo Metropolitan University, Hino, Japan	1100 hrs AIAA-2015-4139 **Effect of Nano Particle Addition on the Regression Rate of Liquefying Fuels** O. Dermanci, BLIS, Ankara, Turkey; A. Karabeyoglu, KOC University, Istanbul, Turkey		

Wednesday, 29 July 2015						
124-HSABP-4	**Experimental and Computational Research in Supersonic Injection Including Predictive Capability**					**Lake Mizell B**
Chaired by: R. MOEHLENKAMP, Aerojet Rocketdyne and E. AXDAHL, NASA Langley Research Center						
0900 hrs AIAA-2015-4140 **The Interaction of Variable Duty Cycle Pulsed Injection and a Supersonic Shear Layer in a Scramjet Combustor** L. Smith, S. Farokhi, University of Kansas, Lawrence, Lawrence, KS	0930 hrs AIAA-2015-4141 **Investigation of Large-Scale Structures in Supersonic Planar non-reactive Shear Layer with a Base Flow Region** J. Wu, H. Zhang, J. Chen, Y. Zhao, National University of Defense Technology, Changsha, China	1000 hrs AIAA-2015-4142 **On Mode-transition within Diverging Dual-mode Combustors** S. Tomioka, K. Kobayashi, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; K. Nojima, S. Ishizaki, Tohoku University, Sendai, Japan				

Wednesday, 29 July 2015						
125-HSABP-5/GTE-10	**High-Speed Pressurized Systems**					**Lake George A**
Chaired by: V. TANGIRALA, General Electric and R. STARKEY, University of Colorado Boulder						
0900 hrs AIAA-2015-4143 **Stage-by-Stage and Parallel Flow Path Compressor Modeling for a Variable Cycle Engine** G. Kopasakis, NASA Glenn Research Center, Cleveland, OH; L. Cheng, University of Washington, Seattle, Seattle, WA; J. Connolly, NASA Glenn Research Center, Cleveland, OH	0930 hrs AIAA-2015-4144 **Numerical Investigation of Expanded and Stepped Centerbodiless RDE Designs** W. Stoddard, E. Gutmark, University of Cincinnati, Cincinnati, OH	1000 hrs AIAA-2015-4145 **A New Method to Predict Flow Rates of Gaseous Fuels Injected Intermittently for Pulse Detonation Engines** D. Joshi, F. Lu, University of Texas, Arlington, Arlington, TX	1030 hrs AIAA-2015-4146 **Performance Evaluation of a Turbine driven by a Pulse Detonation Combustor for Micro Gas Turbines** T. Sakurai, Tokyo Metropolitan University, Hino, Japan	1100 hrs AIAA-2015-4147 **Understanding the Effects of Fractal Blockage Geometries on Flame Acceleration in Propane-Air Flames** J. Knapton, S. Blakey, F. Nicolleau, University of Sheffield, Sheffield, United Kingdom		

Wednesday, 29 July 2015						
126-LP-16	**Propellant Storage & Management II**					**Orange F**
Chaired by: V. AHUJA, CRAFT Tech and M. DEANS						
0900 hrs AIAA-2015-4148 **Transient Capillary Vane Analysis** R. Manning, I. Ballinger, Keystone Engineering Company, Long Beach, CA; M. Dowdy, Angeles Crest Engineering, Inc., Pasadena, CA; Y. Chen, Portland State University, Portland, OR	0930 hrs AIAA-2015-4149 **Microgravity PMD investigations by miniaturization of the test sample** A. De Quero, International Air Transport Association, Geneva, Switzerland; P. Pontelandolfo, R. Putzu, Hepia, Geneva, Switzerland	1000 hrs AIAA-2015-4150 **Satellite Fuel Estimation Algorithm and Application to the Defense Satellite Communication System III (DSCS III)** B. Rhodes, M. Mueller, The Aerospace Corporation, El Segundo, CA	1030 hrs AIAA-2015-4151 **Simulated Propellant Loading System: A test bed for launch systems research and development** J. Toro Medina, J. Sass, J. Youney, NASA Kennedy Space Center, Cape Canaveral, FL			

Wednesday, 29 July 2015						
127-LP-17	Rocket Nozzles I					Lake Lucerne
Chaired by: P. GLOYER, Gloyer-Taylor Laboratory and S. BARSI, NASA						
0900 hrs AIAA-2015-4152 **Simulation of Cold Flow in a Truncated Ideal Nozzle with Film Cooling** K. Braman, Tuskegee University, Huntsville, AL; J. Ruf, NASA Marshall Space Flight Center, Huntsville, AL	0930 hrs AIAA-2015-4153 **Flow Separation Study In Stiff Ovalized Rocket Nozzles, Part I: Experimental Approach** C. Genin, S. Jack, German Aerospace Center (DLR), Lampoldshausen, Germany	1000 hrs AIAA-2015-4154 **Flow Separation Study in Stiff Ovalized Rocket Nozzles, Part II: Numerical Approach** S. Jack, German Aerospace Center (DLR), Braunschweig, Germany; C. Genin, German Aerospace Center (DLR), Lampoldshausen, Germany	1030 hrs AIAA-2015-4155 **LOX/CH4 Hot Firing Dual Bell Nozzle Testing: Part I -Transitional Behavior-** C. Genin, D. Schneider, German Aerospace Center (DLR), Lampoldshausen, Germany; H. Takahashi, T. Tomita, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan	1100 hrs AIAA-2015-4156 **LOX/CH4 Hot Firing Dual Bell Nozzle Testing: Part II -Characteristics of Combustion Instability and Heat Flux-** H. Takahashi, T. Tomita, Japan Aerospace Exploration Agency (JAXA), Kakuda, Japan; C. Genin, D. Schneider, German Aerospace Center (DLR), Lampoldshausen, Germany		

Wednesday, 29 July 2015						
128-LP-18	Spacecraft Propulsion Systems II					Lake Nona B
Chaired by: E. BESNARD, California State University-Long Beach and H. KAGAWA, JAXA						
0900 hrs AIAA-2015-4157 **Development of the MPCV ESM propellant tanks** P. Behruzi, D. Gaulke, J. Klatte, N. Fries, Airbus, Bremen, Germany	0930 hrs AIAA-2015-4158 **Density Fit for MON Oxidizer Blends Including Accuracy** M. Mueller, The Aerospace Corporation, El Segundo, CA	1000 hrs AIAA-2015-4159 **Vapor Pressure Fit for MON Oxidizer Blends Including Accuracy** M. Mueller, The Aerospace Corporation, El Segundo, CA	1030 hrs AIAA-2015-4160 **Empirical Relations for Assessing the Formation of Iron Nitrate in Nitrogen Tetroxide Systems** M. Mueller, The Aerospace Corporation, El Segundo, CA	1100 hrs AIAA-2015-4161 **Development and Test of a 3D printed Hydrogen Peroxide Flight Control Thruster** U. Gotzig, Airbus, Lampoldshausen, Germany	1130 hrs AIAA-2015-4162 **Performance Evaluation of a 70 N Hydrazine Thruster According to the Variation of Characteristic Length** J. Kim, H. Jung, S. Bae, D. Bae, Pukyong National University, Busan, Korea (the Republic of); J. Kim, Hanwha Corporation, Daejeon, Korea (the Republic of)	

Wednesday, 29 July 2015		
129-NFF-5 0900 - 1200 hrs	Conversations in Breakthrough Propulsion Physics: Gravity	Lake Nona A
Round table members: **Dr. George J. Williams** Senior Scientist, Ohio Aerospace Institute, NASA Glenn Research Center **Prof. Martin Tajmar** Dresden Univ. of Technology, Dresden, Germany **Dr. Bryan A. Palaszewsk** Senior Scientist, NASA Glenn Research Center, Cleveland, OH		

Wednesday, 29 July 2015		
130-NW-11 0900 - 0930 hrs	Networking Coffee Break	Exposition Hall

Wednesday, 29 July 2015						
131-PC-10	**Modeling of Combustion Dynamics, Instabilities and Noise II**					**Lake Louise**
Chaired by: R. SUJITH, IHI Marine United Inc.						
0900 hrs AIAA-2015-4163 **Global POD-Based Adaption Scheme for Reduced Order Models of the Reaction-Advection Equation** C. Huang, W. Anderson, C. Merkle, Purdue University, West Lafayette, IN	0930 hrs AIAA-2015-4164 **Development and Analysis of a Novel Two-Dimensional Flame Transfer Function** V. Rani, S. Rani, University of Alabama, Huntsville, Huntsville, AL	1000 hrs AIAA-2015-4165 **Development of Combustion Instability Analysis Tool by Incorporating Combustion Response Models** G. Tamanampudi, W. Anderson, Purdue University, West Lafayette, IN				

Wednesday, 29 July 2015						
132-PC-11	**Scramjets, Supersonic Combustion**					**Lake Virginia**
Chaired by: E. LYNCH, Aerojet Rocketdyne						
0900 hrs AIAA-2015-4166 **Quasi-One-Dimensional and Two-Dimensional Numerical Simulation of Scramjet Combustors** R. Seleznev, All-Russian Scientific Research Institute of Automatics, Moscow, Russia; S. Surzhikov, Russian Academy of Science, Moscow, Russia	0930 hrs AIAA-2015-4167 **Numerical Investigation Of The Effect Of Reaction Models On The Supersonic Combustion Of Liquid Kerosene** L. Gang, Z. Hua, T. Liang, L. Yu, X. Xu, Beihang University, Beijing, China					

Wednesday, 29 July 2015						
133-PP-1	**Propulsion and Power Systems of Unmanned Systems**					**Lake Highland A**
Chaired by: L. CHEN, TAMUCC						
0900 hrs AIAA-2015-4168 **Development of a Series Hybrid Propulsion System for Unmanned Aerial Vehicles** D. Trawick, D. Moroniti, D. Mavris, Georgia Institute of Technology, Atlanta, GA	0930 hrs AIAA-2015-4169 **Performance Characteristics of Fluidic-Based Thrust Augmentation Using a Slot Jet for Unmanned Aerial Vehicle Propulsion** B. Wiedow, Old Dominion University, Norfolk, VA; K. Ahmed, University of Central Florida, Orlando, FL					

Wednesday, 29 July 2015						
134-SC-1	**Engineering and Analysis for Propulsion System Design**					**Lake Down B**
Chaired by: T. GIEL, Jacobs Technology and C. GATTO, Jet Propulsion Laboratory						
0900 hrs AIAA-2015-4170 **Lotus: Standardized ESPA Propulsion System** C. singh-derewa, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; S. Fisher, A. Vora, Surrey Satellite Technology, Ltd., Surrey, United Kingdom; S. Raviprasad, Manipal Institute of Technology, Manipal, India; C. Iwata, International Space University, Illkirch-Graffenstaden, France; M. Seymour, Asteria Space Consulting, Rochester, NY	0930 hrs AIAA-2015-4171 **Effects of Gravity on Cryogenic Flow Boiling and Chilldown Efficiency** S. Darr, H. Hu, J. Chung, University of Florida, Gainesville, Gainesville, FL; J. Hartwig, NASA Glenn Research Center, Cleveland, OH; A. Majumdar, NASA Marshall Space Flight Center, Huntsville, AL	1000 hrs AIAA-2015-4172 **Fuel Pump Trade Study for a Conceptual Design of an Integrated Air Vehicle System** A. Donovan, R. Roberts, M. Wolff, Wright State University, Dayton, OH	1030 hrs AIAA-2015-4173 **"Resurrected" DSCOVR Propulsion System - Challenges and Lessons Lesson Learned** A. Varia, A. Scroggins, NASA Goddard Space Flight Center, Greenbelt, MD			

Wednesday, 29 July 2015						
135-SR-5	**Solid Rocket Motor Nozzles, Thrust Management, and Ignition**					**Lake Concord A**
Chaired by: M. BERDOYES, Herakles and D. BIANCHI, Sapienza University of Rome						
0900 hrs AIAA-2015-4174 **Evaluation of Quasi-One-Dimensional Modeling for Nozzle Flow Separation** B. Maicke, Pennsylvania State University, Middletown, PA	0930 hrs AIAA-2015-4175 **Numerical Simulation of Chemical Erosion in VEGA Launcher Solid-Propellant Rocket Motor Nozzles** D. Bianchi, University of Rome "La Sapienza", Rome, Italy; A. Neri, ESA, Rome, Italy	1000 hrs AIAA-2015-4176 **Investigation of Dual-Thrust Rocket Motor with Subsonic Intermediate Nozzle** A. El-Nady, M. Ahmed, M. ALsenbawy, Military Technical College, Cairo, Egypt; A. Sarhan, Modern Academy in Maadi, Cairo, Egypt	1030 hrs AIAA-2015-4177 **Active Interruption of Solid-Propellant Combustion in a Choked Chamber** M. Tanaka, G. Shibasawa, National Defense Academy, Yokosuka, Japan	1100 hrs AIAA-2015-4178 **Influence of Starting Chamber Dynamics on Nozzle Flow Choking Time and the Liftoff Time of Dual-thrust Rockets** S. Mani, R. Tharikaa, S. Ajith, N. Naveen, R. Vignesh, J. John, Kumaraguru College of Technology, Coimbatore, India; et al.		

Wednesday, 29 July 2015		
136-TM-4 **0900 - 1130 hrs**	**Future Demands for Thermal Management: Opportunities and Challenges**	**Lake Down A**

This is a discussion panel where the panel members will talk about the future demand of thermal management technologies, with emphasis on challenges and opportunities. Each panel member will also make a short presentation to highlight his/her scope of involvement in thermal management technologies and view of the future demands for these technologies.

Moderator: Michael Choi, NASA Goddard Space Flight Center

Panelists:

Steven M. Iden
OPTIMUS Program Manager, MDO Systems, AFRL/RQVC, Wright Patterson Air Force Base.

Dr. Louis Chow
Professor & Univ. Chair of Department of Mechanical and Aerospace Engineering, University of Central Florida.

Guy Wagner
Director, Electronic Cooling Solution, Inc.

Tapan Desai
R&D manager, Defense-Aerospace, Advanced Cooling Technologies, Inc., Lancaster, PA

Wednesday, 29 July 2015		
137-F360-5 0930 - 1200 hrs	Work Life Balance	Orlando IV

The costs for educating and training a worker in the aerospace profession are extremely high. In today's environment, a good number of households are dual income; and the incoming workforce of Millennials value family, personal connection, and loyalty. Panelists will explore policies and methods for creating an environment that will enable individuals to balance work and life needs in order to maintain a reliable, diverse, and effective workforce.

Moderator: Barbara Esker, NASA ARMD

Panelists:

Amanda Billot	Jim Free	Elizabeth Bierman	Klod Kokini
Pratt and Whitney	NASA Glenn Research Center	Honeywell Aerospace	Purdue University

Wednesday, 29 July 2015		
138-NW-12 1200 - 1330 hrs	Recognition Luncheon	Florida Ballroom

Wednesday, 29 July 2015		
139-PLNRY-6 1330 - 1500 hrs	Closing Keynote	Orange D

Developing Creative Storytelling Using Model Based Design
Michael Tschanz
Director, Technology and Analysis, Design and Engineering, Walt Disney World®

Wednesday, 29 July 2015		
140-ECD-4	Magnetohydrodynamic, Brayton, AMTEC, and Other Advanced Concepts	Lake Nona B

Chaired by: M. PISZCZOR, NASA Glenn Research Center and E. LEWANDOWSKI, NASA Glenn Research Center

1500 hrs AIAA-2015-4179 **Effects of Magnetohydrodynamic Energy Generation on Planetary Entry Vehicle Flight Dynamics** H. Ali, R. Braun, Georgia Institute of Technology, Atlanta, GA	1530 hrs AIAA-2015-4180 **Numerical Simulation of Performance of a High Temperature Inert Gas Plasma Faraday-type MHD Generator with various working gases** M. Tanaka, Y. Okuno, Tokyo Institute of Technology, Yokohama, Japan	1600 hrs AIAA-2015-4181 **Characteristic Investigation on Flow and Heat Transfer of Capillary Pump in AMTEC** C. Zhou, Harbin Engineering University, Harbin, China	1630 hrs AIAA-2015-4182 **Numerical Research on Combustion Flow Field in Li/SF6 Surface Injection Reactor** C. Zhou, Harbin Engineering University, Harbin, China			

Wednesday, 29 July 2015		
141-ECS-3 **1500 - 1800 hrs**	**Energetic Components & Systems Educational Series**	**Lake Eola**

Chaired by: J. SCOTT, United Launch Alliance, LLC

Have you ever wondered how the world of explosives and propellants crosses over into the Aerospace world? Come join the Energetic Components Subcommittee expert panel as we discuss the world of aerospace pyrotechnics. We will review the history of our technology, how we cross over into all disciplines of chemistry, strength of materials, thermodynamics, statistics etc.

Moderator / Participant - John G. Scott, ULA Launch Systems, Ordnance Engineer
Panelists:

Selma Goldstein	**Lien Yang**	**Thomas Blachowski**	**John Burchett**	**Hobin S. Lee**	**John G. Scott**
Aerospace Corporation, Ordnance Engineering	Consultant	Navy (NSWCIHEODTD) - Ordnance Engineer	Navy (NSWCIHEODTD) - System Safety / Ordnance Engineer	Chemring Energetics Devices, Director of Engineering	ULA Launch Systems, Ordnance Engineer

Wednesday, 29 July 2015						
142-EP-10	**Pulsed and Micro Thrusters**					**Lake Mizell A**
Chaired by: K. POLZIN, NASA Marshall Space Flight Center and S. BERG, Missouri University of Science and Technology						
1500 hrs AIAA-2015-4186 **Dynamic Modeling and Experimental Validation of Thrust-stand for Micropropulsion Testing** D. Lee, W. O'Neill, A. Cofer, A. Alexeenko, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-4184 **Using Additive Manufacturing to Print a CubeSat Propulsion System** W. Marshall, J. Stegeman, M. Zemba, NASA Glenn Research Center, Cleveland, OH; E. MacDonald, C. Shemelya, R. Wicker, University of Texas, El Paso, El Paso, TX; et al.	1600 hrs AIAA-2015-4183 **A Short-Pulse Laser-Assisted Pulsed Plasma Thruster** K. Matsubara, H. Hosokawa, N. Akashi, Y. Oigawa, H. Horisawa, Tokai University, Hiratsuka, Japan	1630 hrs Oral Presentation **High Frequency Operation of a Low-power Short-pulse Plasma Thruster** Y. Nakamura, H. Hosokawa, H. Horisawa, Tokai University, Hiratsuka, Japan	1700 hrs AIAA-2015-4185 **Plasma Plume Characterization of Electric Solid Propellant Micro Pulsed Plasma Thrusters** M. Glascock, J. Rovey, Missouri University of Science and Technology, Rolla, MO; S. Williams, J. Thrasher, Digital Solid State Propulsion, LLC, Reno, NV	1730 hrs AIAA-2015-4187 **Development of Long-Lifetime Pulsed Gas Valves for Pulsed Electric Thrusters** W. Burkhardt, J. Crapuchettes, WASK Engineering, Inc., Cameron Park, CA; B. Addona, K. Polzin, NASA Marshall Space Flight Center, Huntsville, AL	

Wednesday, 29 July 2015						
143-GTE-11/HSABP-6	**Detonation Engines**					**Lake Florence**
Chaired by: S. VASU, University of Central Florida						
1500 hrs AIAA-2015-4188 **Wave Rotor Combustor Turbine Model Development** R. Jagannath, S. Bane, Purdue University, West Lafayette, IN; M. Nalim, Indiana University-Purdue University Indianapolis, Indianapolis, IN	1530 hrs AIAA-2015-4189 **Numerical Study of Pulse Detonation Engine Nozzle and Exhaust Flow Phenomena** J. Peace, F. Lu, University of Texas, Arlington, Arlington, TX	1600 hrs AIAA-2015-4190 **Parametric Study of Pulse-Combustor-Driven Ejectors at High-Pressure** S. Yungster, Ohio Aerospace Institute, Brookpark, OH; D. Paxson, H. Perkins, NASA Glenn Research Center, Cleveland, OH	1630 hrs AIAA-2015-4191 **Unsteady Heat Transfer Analysis to Predict Combustor Wall Temperature in Rotating Detonation Engine** A. Roy, P. Strakey, T. Sidwell, D. Ferguson, National Energy Technology Laboratory, Morgantown, WV	1700 hrs AIAA-2015-4192 **Numerical Investigation of Effects of Fuel Injection on Rotating Detonation Engine** S. Yao, J. Wang, Peking University, Beijing, China		

Wednesday, 29 July 2015						
144-GTE-12	**Turbine Durability**					**Lake Monroe**
Chaired by: S. RAGHAVAN, University of Central Florida						
1500 hrs AIAA-2015-4193 **Blade Surface-Particle Interaction and Multifunctional Coatings For Gas Turbine Engine** M. Murugan, A. Ghoshal, B. Barnett, M. Pepi, Army Research Laboratory, Aberdeen Proving Ground, MD; K. Kerner, Army Aviation and Missile Research Development and Engineering Center, Fort Eustis, VA; D. Booth, Army Research Laboratory, Aberdeen Proving Ground, MD	1530 hrs AIAA-2015-4194 **Using Gas Turbine Engine Casing Accelerometer Measurements for Rotor Blade Health Monitoring** J. Cox, P. Anusonti-Inthra, S. Arnold, University of Tennessee Space Institute, Tullahoma, TN	1600 hrs AIAA-2015-4195 **Material Properties of Hard Coatings Developed for High Damping** P. Torvik, Self, Kettering, OH; B. Langley, Universal Technology Corporation, Dayton, OH	1630 hrs AIAA-2015-4196 **Identification of Material Damage Precursors using Nonlinear Ultrasonics** G. Bunget, Luna Innovations, Inc., Charlottesville, VA; A. Ghoshal, M. Pepi, Army Research Laboratory, Aberdeen Proving Ground, MD; Y. Liu, A. Chattopadhyay, Arizona State University, Tempe, AZ; A. Goff, Luna Innovations, Inc., Charlottesville, VA; et al.	1700 hrs AIAA-2015-4197 **High Accuracy Total Temperature Measurements in a Turbine Powered Simulator Unit** D. Murakami, NASA Ames Research Center, Moffett Field, CA; S. Schery, K. Long, Aerospace Computing, Inc., Mountain View, CA	1730 hrs AIAA-2015-4198 **The Effect of Inclination Angle on Turbulent Quantities of a Single Row of Cylindrical Jets in Crossflow** J. Hodges, Z. Little, C. Fernandes, G. Natsui, J. Kapat, University of Central Florida, Orlando, FL	

Wednesday, 29 July 2015		
145-GTE-13 **1500 - 1800 hrs**	**AIAA Undergraduate Engine Design Competition**	**Lake Highland B**
Chaired by: J. TAI, Georgia Institute of Technology		
AIAA Foundation and the Gas Turbine Engine Technical Committee have again teamed up to sponsor a design competition. Undergraduate students from universities all over the world were asked to prepare a design report to respond to a Request for Proposal (RFP). This RFP asked students to design an ultra-high bypass turbofan engine. All of the responses have been reviewed and ranked by technical experts, and this session features the top three proposals, who have been invited to the AIAA Propulsion and Energy Forum to make an oral presentation to a panel of judges. These judges will assess the design, presentation, and responses to questions. They will add their scores to those provided by the technical judges to come up with a final 1st-3rd place ranking. The final rankings will be announced at the conclusion of the session.		

Wednesday, 29 July 2015						
146-HR-10	**Design Studies Including Cost and Feasibility Analysis II**					**Lake Sheen B**
Chaired by: B. MADHANABHARATAM, Aerospace Consultant and B. EVANS, Stanford University						
1500 hrs AIAA-2015-4199 **Verification Firings of End-burning Type Hybrid Rockets** H. Nagata, H. Teraki, Y. Saito, R. Kanai, Hokkaido University, Sapporo, Japan; H. Yasukochi, University of Tokyo, Tokyo, Japan; M. Wakita, Hokkaido University, Sapporo, Japan; et al.	1530 hrs AIAA-2015-4200 **Hybrid Propulsion In-Situ Resource Utilization Test Facility Results** A. Karp, B. Nakazono, D. Vaughan, W. Warner, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA	1600 hrs AIAA-2015-4201 **Continued Testing of the High Performance Hybrid Propulsion System for Small Satellites** L. Simurda, Stanford University, Stanford, CA; G. Zilliac, NASA Ames Research Center, Moffett Field, CA	1630 hrs AIAA-2015-4202 **A Straightfotward Approach for Robust Design of Hybrid Rocket Engine Upper Stage** L. Casalino, D. Pastrone, Technical University of Turin, Turin, Italy	1700 hrs AIAA-2015-4203 **Genetic Algorithm Optimization of a Cost Competitive Hybrid Rocket Booster** G. Story, NASA Marshall Space Flight Center, Huntsville, AL		

Wednesday, 29 July 2015						
147-HSABP-7	**High Fidelity Simulations of High-Speed Air Breathing System**					**Lake George A**
Chaired by: T. OBRIEN, Aerojet and V. TANGIRALA, General Electric						
1500 hrs AIAA-2015-4204 **Modeling of Turbulence in a Supersonic Wall Cavity** D. Peterson, Innovative Scientific Solutions, Inc., Dayton, OH; E. Hassan, Air Force Research Laboratory, Wright-Patterson AFB, OH	1530 hrs AIAA-2015-4205 **Turbulence Model Modification for Fake Amplification of Turbulence Kinetic Energy by Shock-Turbulence Interation** Z. Zhang, Z. Gao, C. Jiang, C. Lee, Beihang University, Beijing, China	1600 hrs AIAA-2015-4206 **Preliminary Investigation of Unstart-Related Transients in a Dual-Mode Scramjet** L. Riley, D. Gaitonde, Ohio State University, Columbus, OH; J. Donbar, Air Force Research Laboratory, Wright-Patterson AFB, OH	1630 hrs AIAA-2015-4207 **LES Model Assessment for High Speed Combustion using Mesh-Sequenced Realizations** C. Patton, T. Wignall, H. Mirgolbabaei, J. Edwards, T. Echekki, North Carolina State University, Raleigh, NC			

Wednesday, 29 July 2015						
148-LP-19	**Combustion Dynamics II**					**Lake Lucerne**
Chaired by: D. LINEBERRY, UAH Propusion Research Center and S. SCHUMAKER, Air Force Reseach Laboratory						
1500 hrs AIAA-2015-4208 **System Analysis of Low Frequency Combustion Instabilities in Liquid Rocket Engines** M. Leonardi, University of Rome "La Sapienza", Rome, Italy; F. Di Matteo, J. Steelant, ESA, Noordwijk, The Netherlands; F. Nasuti, M. Onofri, University of Rome "La Sapienza", Rome, Italy	1530 hrs AIAA-2015-4209 **Investigation of Combustion Control in a Dump Combustor Using the Feedback Free Fluidic Oscillator** E. Meier, Purdue University, West Lafayette, IN; M. Casiano, NASA Marshall Space Flight Center, Huntsville, AL; W. Anderson, S. Heister, Purdue University, West Lafayette, IN	1600 hrs AIAA-2015-4210 **Transverse Combustion Instability in a Rectangular Rocket Motor** P. Popov, W. Sirignano, University of California, Irvine, Irvine, CA	1630 hrs AIAA-2015-4211 **Triggering and Re-Stabilization of Combustion Instability with Rocket Motor Acceleration** P. Popov, A. Sideris, W. Sirignano, University of California, Irvine, Irvine, CA			

Wednesday, 29 July 2015						
149-LP-20	**Propellant Feed Systems & Fluid Machinery**					**Lake Highland A**
Chaired by: B. MARCU, Space Exploration Technologies Corporation and J. LOCKE, United Technologies Research Center						
1500 hrs AIAA-2015-4212 **Simulation of Rocket-Grade Kerosene Flowing In An Electrically Heated Experimental Apparatus** A. Himansu, M. Billingsley, Air Force Research Laboratory, Edwards AFB, CA	1530 hrs AIAA-2015-4213 **Sounding Rocket Experiment on Chill-down Process with Liquid Nitrogen in a Complex Channel** W. Sarae, K. Kinefuchi, D. Yabusaki, D. Sugimori, T. Fujita, K. Okita, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan; et al.	1600 hrs AIAA-2015-4214 **Two-Phase Flow Modelling Of The Cryogenic Propellant Loading System** D. Luchinsky, Mission Critical Technologies, Inc., El Segundo, CA; E. Ponizovskaya-Devine, M. Khasin, Stinger Ghaffarian Technologies, Inc., Greenbelt, MD; A. Kodali, NASA Goddard Space Flight Center, Greenbelt, MD; J. Perotti, J. Sass, NASA Kennedy Space Center, Cape Canaveral, FL; et al.	1630 hrs AIAA-2015-4215 **Towards Physics Based Autonomous Control Of The Cryogenic Propellant Loading System** E. Ponizovskaya-Devine, Stinger Ghaffarian Technologies, Inc., Greenbelt, MD; D. Luchinsky, Mission Critical Technologies, Inc., El Segundo, CA; M. Khasin, Stinger Ghaffarian Technologies, Inc., Greenbelt, MD; J. Perotti, J. Sass, B. Brown, NASA Kennedy Space Center, Cape Canaveral, FL	1700 hrs AIAA-2015-4216 **Design and Analysis of a High-Pressure Turbopump at Purdue University** D. Stechmann, C. Sese, R. Duvvur, Y. Huang, M. Bilyeu, D. Goldberg, Purdue University, West Lafayette, IN; et al.		

Wednesday, 29 July 2015						
150-LP-21	**Rocket Nozzles II**					**Orange E**
Chaired by: P. GLOYER, Gloyer-Taylor Laboratory and S. BARSI, NASA						
1500 hrs AIAA-2015-4217 **A Complete and Robust Approach to Axisymmetric Method of Characteristics for Nozzle Design** R. Hartfield, J. Burkhalter, Auburn University, Auburn, AL	1530 hrs AIAA-2015-4218 **Separation Shock Cutoff Frequency in Dual Bell Nozzles** E. Martelli, Second University of Naples, Aversa, Italy; B. Betti, F. Nasuti, University of Rome "La Sapienza", Rome, Italy	1600 hrs AIAA-2015-4219 **Numerical Investigation of Flow Transition Behavior in Cold Flow Dual Bell Rocket Nozzles** D. Schneider, C. Genin, German Aerospace Center (DLR), Lampoldshausen, Germany	1630 hrs AIAA-2015-4220 **Suppressing Restricted Shock Separation in Thrust-Optimized Rocket Nozzles Using Contour Geometry** K. Schomberg, J. Olsen, University of New South Wales, Sydney, Australia; A. Neely, University of New South Wales at the Australian Defence Force Academy, Canberra, Australia; G. Doig, California Polytechnic State University, San Luis Obispo, CA			

Wednesday, 29 July 2015		
151-LP-22/ PGC-1/ PC-12 1500 - 1800 hrs	Pressure Gain Combustion for Liquid Propulsion	Orange F

In this session, speakers are invited to provide the results of their studies and recommendations regarding Pressure Gain Combustion (PGC) for rocket applications. The covered topics include university level research and industry level development from domestic and international efforts.

Moderators: Steven Stanley, Aerojet Rocketdyne and Shane Coogan, Southwest Research Institute

Panelists:

Prof. Steven Heister	Dr. Greg Meholic	Prof. J.P. Wang	Dr. Scott Claflin	Prof. Jiro Kasahara	Dr. Richard D. Smith
Purdue University, USA	The Aerospace Corporation	Peking University	Aerojet-Rocketdyne, USA	Nagoya University, Japan	GHKN Engineering, USA
"Rocket Applications of PGC- An Introduction."	"Potential Applications of RDE Technology in Liquid Rocket Engines".	"Recent Progress on Continuously Rotating Detonation Engine at Peking University".	"Development of Rotating Detonation Engine Technology for Rocket Propulsion Systems at Aerojet Rocketdyne"	"500-N Class Rotating Detonation Rocket Engine Experiment and Sounding Rocket Flight Test Program."	"Experimental Investigation of CDRE's for In Space Propulsion."

Wednesday, 29 July 2015						
152-PC-13	Propellants and Fuels III					Lake Louise
Chaired by: T. NGUYEN, Aerojet Rocketdyne and C. BROPHY, Naval Postgraduate School						
1500 hrs AIAA-2015-4221 **Enhancing Micrometric Aluminum Reactivity by Mechanical Activation** S. Dossi, C. Paravan, F. Maggi, L. Galfetti, Technical University of Milan, Milan, Italy	1530 hrs AIAA-2015-4222 **Characterization of Solid Propellants Based On ADN and GAP** N. Wingborg, Swedish Defense Research Agency (FOI), Stockholm, Sweden	1600 hrs AIAA-2015-4223 **Combustion Behavier of a High Burning Rate AP-HTPB Solid Propellant under Transient Pressure Condition** L. Shipeng, N. Wang, Beijing Institute of Technology, Beijing, China				

Wednesday, 29 July 2015						
153-PC-14	Rocket Motor Studies					Lake Concord B
Chaired by: M. COIL, Orbital Technologies Corporation						
1500 hrs AIAA-2015-4224 **An Experimental Investigation of Sheet Velocity and Jet Diameter Assumptions of Non-Newtonian Impinging Jets** P. Collins, J. Mallory, Western New England University, Springfield, MA	1530 hrs AIAA-2015-4225 **Study of Alunima Flow in a propulsion Chamber** R. Amano, University of Wisconsin, Milwaukee, Glendale, WI	1600 hrs AIAA-2015-4226 **Diagnostic Investigation of Flame Spread Mechanism in Dual-thrust Solid Propellant Rocket Motors** S. Ajith, S. Mani, R. Tharikaa, H. Nagaraju Doddi, V. Sanal Kumar, Kumaraguru College of Technology, Coimbatore, India				

Wednesday, 29 July 2015						
154-PC-15	**Combustion Dynamics Experiments and Control**					**Lake Virginia**
Chaired by: A. STEINBERG, University of Toronto						
1500 hrs AIAA-2015-4227 **Concurrent Experimental and Computational Study of Combustion Dynamics in a Single-Element Lean Direct Injection (LDI) Gas Turbine Combustor** R. Gejji, C. Huang, R. Lucht, W. Anderson, Purdue University, West Lafayette, IN	1530 hrs AIAA-2015-4228 **Oxidizer Post Resonance Response of a High Pressure Combustor** M. Wierman, W. Hallum, W. Anderson, Purdue University, West Lafayette, IN; B. Austin, IN Space, LLC, West Lafayette, IN	1600 hrs AIAA-2015-4229 **Effect of Acoustic Oscillations on the Upstream Mixing Layer of Triple Flames** M. Saito, N. Sugiu, K. Motohashi, M. Tanabe, Nihon University, Funabashi, Japan				

Wednesday, 29 July 2015						
155-SC-2	**Seal Material Advancements and Advanced Seal Technology**					**Lake George B**
Chaired by: N. SARAWATE, GE Global Research and P. DUNLAP, NASA Glenn Research Center						
1500 hrs AIAA-2015-4230 **Aspects of Brush Seal Design** A. Bowsher, P. Crudgington, T. Kirk, R. Chupp, Cross Manufacturing Company, Ltd., Devizes, United Kingdom	1530 hrs AIAA-2015-4231 **Leak Rate Quantification Method for Gas Pressure Seals with Controlled Pressure Differential** C. Daniels, M. Braun, H. Oravec, J. Mather, University of Akron, Akron, OH; S. Taylor, University of Toledo, Toledo, OH					

Wednesday, 29 July 2015						
156-SR-6/HSABP-8	**Solid Propellant Ducted Rockets**					**Lake Mizell B**
Chaired by: K. NAUMANN, Bayern-Chemie GmbH and F. MALO-MOLINA, Raytheon Missile Systems						
1500 hrs AIAA-2015-4232 **Development and Testing of a C/SiC Combustion Chamber for High Speed Throttleable Ducted Rocket Applications** G. Kurth, C. Bauer, T. Meyer, J. Ramsel, A. Thumann, Bayern-Chemie, Aschau am Inn, Germany	1530 hrs AIAA-2015-4233 **Air Intake Development for a Mach 5+ Throttleable Ducted Rocket Propelled Lower Tier Interceptor** G. Kurth, C. Bauer, Bayern-Chemie, Aschau am Inn, Germany	1600 hrs AIAA-2015-4234 **Performance Assessment for a Throttleable Ducted Rocket Powered Lower Tier Interceptor** G. Kurth, C. Bauer, N. Hopfe, Bayern-Chemie, Aschau am Inn, Germany	1630 hrs AIAA-2015-4235 **Effects of Mg-Al Particle Additions on Combustion Characteristics of Ducted Rockets** N. Negishi, T. Kuwahara, Nihon University, Funabashi, Japan	1700 hrs AIAA-2015-4236 **Gas Generator Pressure Control in Throttleable Ducted Rockets: A Classical and Adaptive Control Approach** A. Alan, Y. Yildiz, Bilkent University, Ankara, Turkey; U. Poyraz, ROKETSAN Missile Industries, Inc., Ankara, Turkey		

Wednesday, 29 July 2015						
157-SR-7	**Solid Rocket Motor Propellant Modeling and Simulation**					**Lake Concord A**
Chaired by: A. NERI and H. CIEZKI, DLR - German Aerospace Center						
1500 hrs AIAA-2015-4237 **Random Close Packing Modeling and evaluation of a Castability Margin for Solid Propellants** D. Fedele, F. Ponti, R. Bertacin, University of Bologna, Forlì, Italy	1530 hrs AIAA-2015-4238 **Lifetime Numerical Prediction of Solid Rocket Motors with HTPB Binder Based Propellants Using a Multiscale Model** B. Dalby, A. Caraës, DGA, Saint-Médard-en-Jalles, France	1600 hrs AIAA-2015-4239 **Numerical Simulation Of Luminous Flame Around Ignited Aluminum Particle Near Burning Surface Of Composite Propellant With Changing Pressure** K. Takahashi, Nihon University, Funabashi, Japan; T. Shimada, Japan Aerospace Exploration Agency (JAXA), Sagamihara, Japan	1630 hrs AIAA-2015-4240 **Accelerated Aging and Structural Integrity Analysis Approach to Predict the Service Life of Solid Rocket Motor** D. Zhou, X. Liu, X. Sui, Z. Wei, N. Wang, Beijing Institute of Technology, Beijing, China	1700 hrs AIAA-2015-4241 **Feasibility Analysis for Long-term Non-turnover Storage of Solid Rocket Motors** W. Ma, X. Sui, R. Lei, L. Shipeng, N. Wang, Beijing Institute of Technology, Beijing, China	1730 hrs AIAA-2015-4242 **Impact of Phase transitions on the Flow Structure of Gaseous Jets Injected into Water** X. Zhang, Y. Tang, Beijing Institute of Technology, Beijing, China; J. Tang, China North Industries Group Corporation, Beijing, China; L. Shipeng, N. Wang, Beijing Institute of Technology, Beijing, China	

Wednesday, 29 July 2015						
158-TM-5	**Thermal System Applications and Unique Environment II**					**Lake Down A**
Chaired by: E. KHALIL, Cairo University and C. TARAU, Advanced Cooling Technologies						
1500 hrs AIAA-2015-4243 **Design of the Ventilation System in an Underground Car Park: Local Mean Age of Air** S. Gomaa, M. Fouad, Cairo University, Giza, Egypt; A. Fahim, Housing and Building National Research Center, Giza, Egypt; E. Khalil, Cairo University, Giza, Egypt	1530 hrs AIAA-2015-4244 **Experimental study on effect of pyrolysis on heat transfer of n-decane at different pressure** W. Zhou, W. Yu, Z. Jia, S. Lin, Harbin Institute of Technology, Harbin, China	1600 hrs AIAA-2015-4245 **Various Integrated Aerospace Systems for a Cryogenic Based Directed Energy Weapon** S. Nuzum, R. Roberts, M. Wolff, Wright State University, Dayton, OH	1630 hrs AIAA-2015-4246 **Experiment Design for Measuring Accommodation Coefficients for Modeling of Long-Duration Spaceflight Cryogenic Propellants** S. Alberts, P. Srikanth, S. Collicott, S. Heister, Purdue University, West Lafayette, IN	1700 hrs AIAA-2015-4247 **Liquefied Natural Gas as the Next Aviation Fuel** R. Roberts, S. Nuzum, M. Wolff, Wright State University, Dayton, OH	1730 hrs AIAA-2015-4248 **Developing an All-speed Finite Volume Method to Predict Short Duration Pressure Peaks of Water Column Separation** M. Darbandi, A. Beige, Sharif University of Technology, Tehran, Iran (the Islamic Republic of); G. Schneider, University of Waterloo, Waterloo, Canada	

Wednesday, 29 July 2015						
159-VS-1	**Advanced Vehicle System Concepts**					**Lake Down B**
Chaired by: F. CHANDLER, Boeing Defense, Space & Security and T. CHEN, NASA						
1500 hrs AIAA-2015-4249 **Design and Construction of an Astronaut Assistance Martian Rover for the University Rover Challenge** T. Bernard, A. Alvarez Rolins, S. Chintalapati, Florida Institute of Technology, Melbourne, FL	1530 hrs AIAA-2015-4250 **Heliopause Electrostatic Rapid Transit System (HERTS) [Electric Sail]** B. Wiegmann, NASA Marshall Space Flight Center, Huntsville, AL					

Wednesday, 29 July 2015		
160-F360-6 1530 - 1800 hrs	**Advancing Engineering Through Effective Communication with the Media**	**Orlando IV**

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Moderator: Victor Beck, Northrop Grumman Corporation

Panelists:

Marcia Dunn	**Michael Curie**	**Scott Powers**	**William Harwood**	**William Allen**
Cape Canaveral Correspondent, Associated Press	NASA Kennedy Space Center	Orlando Sentinel	CBS News	Florida Southern College

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