48th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit (JPC)
www.aiaa.org/jpc2012

10th International Energy Conversion Engineering Conference (IECEC)
www.iecec.org
AIAA, ASME, SAE, ASEE, and their industry partners proudly invite you to Atlanta, Georgia, for the 48th Joint Propulsion Conference (JPC). The design of our next generation flight and space systems will be dependent more than ever on innovative technologies providing high performance, increasingly efficient, sustainable, reliable, and affordable propulsion systems. Our ability to design, test, and fly new aircraft and spacecraft propulsion technologies will have far-reaching impacts on the revolutionary roles these complex systems play in our everyday lives.

Come to Atlanta and be part of the exciting future of the aerospace propulsion industry.

The objective of JPC 2012 is to identify and highlight how innovative aerospace propulsion technologies powering both new and evolving systems are being designed, tested, and flown. Flight applications include next generation commercial aircraft, regional, and business jets, military applications, supersonic/hypersonic high speed propulsion applications, commercial and government-sponsored launch systems, and orbital insertion, satellite, and interstellar propulsion. Special panel sessions to be announced will focus on advanced system applications that can be used to showcase propulsion systems and components, and the technologies that enable them.

**JPC Organizing Committee**

*Executive Chair (Government)*

Robert Lightfoot  
Center Director  
NASA Marshall Space Center

*Executive Chair (Industry)*

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Vice President, Business Development  
ATK Missile Products Group

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Gary Flinchbaugh  
VP Programs  
ATK Propulsion and Controls

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Dale Thomas  
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ATK Propulsion and Controls

*Deputy Technical Chair (Government)*

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The Boeing Company (Retired)

*SAE Technical Program Chair*

Ramon Chase  
ANSER

*ASEE Technical Program Chair*

Robert A. Frederick Jr.  
University of Alabama in Huntsville

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For the full conference program, including all paper titles, authors, and panel speakers, visit [www.aiaa.org/jpc2012](http://www.aiaa.org/jpc2012) or [www.iececc.org](http://www.iececc.org).
The 10th International Energy Conversion Engineering Conference (IECEC) provides a forum to present and discuss engineering aspects of energy conversion technology, advanced energy and power systems, devices for terrestrial energy systems, and aerospace applications, along with the policies, programs, and environmental impacts associated with the development and utilization of these technologies.

IECEC is hosted by AIAA, which is joined this year by four Participating Organizations. These organizations are:

- The Heat Transfer Society of Japan (HTSJ)
- The IEEE Aerospace & Electronic Systems Society (AESS)
- The Egyptian Society of Mechanical Engineers (ESME)
- The Japan Society of Mechanical Engineers (JSME)

IECEC Organizing Committee

General Chair
Ramon Lugo
Director, NASA Glenn Research Center

Deputy General Chair
Robert “Joe” Shaw
NASA Glenn Research Center

Technical Program Chair
Michael Choi
NASA Goddard Space Flight Center

Deputy Technical Program Chair
Kenneth “Mark” Bryden
Iowa State University
Benefits of Attendance

Who Should Attend?
- Engineering managers and industry executives
- Engineers, researchers, and scientists
- Young aerospace professionals
- Educators and students

Why Attend?
Nowhere else will you get the depth and breadth of sessions on Propulsion and Energy Conversion.
- Expand your knowledge, as expert engineers and scientists share their latest research and development findings.
- Find out what lies ahead, as senior leaders in industry discuss their programs and business challenges during plenary and interactive panel sessions.
- Network, discuss challenges, and share ideas during technical sessions, luncheons, networking breaks, and social activities.

What to Expect?
Discussions with distinguished government and industry speakers.
- Robert Lightfoot, Center Director, NASA Marshall Space Flight Center
- David Thompson, CEO, Orbital Sciences Corp.
- David Parekh, Vice President of Research, Director, United Technologies Research Center
- Wes Harris, MIT
- David Garrison, Managing Director, Engine and Component Maintenance for Delta Tech Ops
- Ronald Sega, Vice President of Energy and Environment, Institute of Energy and Environment, The Ohio State University

Networking and interaction with your peers during:
- Exhibits and Coffee Breaks
- Continuing Education Courses
- Sunday Evening Reception
- Awards Luncheon

JPC Special Sessions

Monday, 30 July
Space and High Speed Systems

0800–0900 hrs
JPC/IECEC Joint Opening Keynote
Overview of NASA Major Program Thrusts and Technology Development Opportunities
Speaker: Robert Lightfoot, Center Director, NASA Marshall Space Flight Center

1000–1200 hrs
NASA MSFC National Institute for Rocket Propulsion Systems
Moderator: Dale Thomas

1300–1400 hrs
Commercial Space: Past, Present, and Future
Speaker: David Thompson, CEO, Orbital Sciences Corporation

1400–1600 hrs
Next Steps in Hypersonics – Turning Research into Reality
Moderator: Mark Lewis, University of Maryland

Tuesday, 31 July
Military and Commercial Aircraft Systems

0800–0900 hrs
JPC Keynote
Current and Future Airline Propulsion Challenges
Speaker: David Garrison, Managing Director, Engine and Component Maintenance for Delta Tech Ops

1000–1200 hrs
Challenges for Future Commercial Aircraft Propulsion
Moderator: Richard A. Wahls, Project Scientist, Subsonic Fixed Wing Project, NASA

1300–1500 hrs
Advanced Aircraft Propulsion Technology
Moderator: James Kenyon, OSD

1600–1800 hrs
Challenges for future rotorcraft propulsion
Moderator: Susan Gorton, NASA LaRC, Project Manager, Subsonic Rotary Wing

Wednesday, 1 August
Commercial Aviation and Space Public Policy and Education

0800–0900 hrs
JPC Keynote
State of Aeronautical Research
Speaker: Wes Harris, MIT

0930–1200 hrs
Clipped Wings: Assessing U.S. Aeronautical Flight Research
Moderator: Victor Lebacqz, Principal, VICC Associates
Panelists: Rich Christiansen, Doug Bowers (AFRL), Navy, Airframer, Dale Carlson (GE)

1200–1400 hrs
Awards Luncheon
Speaker: Wayne Roberts, Lockheed Martin Fellow, Chief Test Pilot
IECEC Special Sessions

**Monday, 30 July**

**0800–0900 hrs**
*JPC/IECEC Joint Opening Keynote*
Overview of NASA Major Program Thrusts and Technology Development Opportunities  
**Speaker:** Robert Lightfoot, Center Director, NASA Marshall Space Flight Center

**1000–1200 hrs**
*Shuttle Space Transportation Replacement Options and Progress*
**Chaired by:** Paul M. Anderson, Lockheed Martin Space Systems Company

**1400–1600 hrs**
*Micro/Nano Thermal Management Technology for Aerospace, Energy, and Environment*
**Speakers:** Timothy Fisher, Purdue University; Rama Venkatasubramanian, RTI International; Theodorian Borca-Tasciuc, Rensselaer Polytechnic Institute; Gerald Mahan, Pennsylvania State University

**1630–1830 hrs**
*Combustion Characteristics of High Hydrogen Content Fuels*

**Tuesday, 31 July**

**0800–0900 hrs**
*IECEC Keynote*
Aerospace Capabilities Applied To Solving Terrestrial Energy Problems ... A University View  
**Speaker:** Ronald Sega, Vice President of Energy and Environment, Institute of Energy and Environment, The Ohio State University

**1000–1200 hrs**
*Robust and Resilient System Design Approaches for Next Generation Terrestrial Nuclear Energy Systems*
**Chaired by:** Piyush Sabharwall, Idaho National Laboratory

**1400–1600 hrs**
*Solar Assisted Absorption and Desiccant Cooling Technologies for Air Conditioning in Sunny Countries*
**Speakers:** Omar Abdelaziz, Oak Ridge National Laboratory; Arifeen Wahed, Solar Energy Research Institute of Singapore (SERIS); Eduardo A. Rincón, Autonomous University of the State of Mexico; Ming Qu, Purdue University; Jo Darkwa, University of Nottingham-Ningbo, China; Nesreen Ghaddar, Associate Provost, Qatar Chair in Energy Studies, Professor of Mechanical Engineering, American University of Beirut

**1200–1400 hrs**
*Awards Luncheon*
Aerospace Capabilities Applied to Solving Terrestrial Energy Problems ... A Federal Laboratory View  
**Speaker:** William Harrison III, Technical Advisor for Fuels and Energy, Air Force Research Laboratory

**1630–1830 hrs**
The Future of Smart Grid in the United States and Abroad  
**Speakers:** Scott Duncan, Georgia Institute of Technology; Takashi Hikihara, Kyoto University; Reji Kumar Pillai, President, India Smart Grid Forum

**Wednesday, 1 August**

**0800–0900 hrs**
*IECEC Keynote*
Aerospace Capabilities Applied to Solving Terrestrial Energy Problems ... An Aerospace Industry View  
**Speaker:** David Parekh, Vice President of Research, Director, United Technologies Research Center

**0930–1200 hrs**
The Latest Advances in Radioisotope Power Systems – A Mission Perspective  
Panelists will present their perspectives on Radioisotope Power Systems, including MMRTG, ASRG and RTG, on Mars Science Lab, New Horizons, and ASRG missions.
### Event at a Glance

<table>
<thead>
<tr>
<th>Sunday 29 July 2012</th>
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<th>Tuesday 31 July 2012</th>
<th>Wednesday 1 August 2012</th>
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<td><strong>Commercial Aviation and Space Public Policy and Education</strong></td>
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**Schedule Highlights**
- **0800 hrs**: Introduction and Keynote Speaker
- **1000 hrs**: Panel Discussion
- **1300 hrs**: Keynote Speaker
- **1500 hrs**: Break
- **1600 hrs**: Panel Discussion
- **1900 hrs**: Exhibit Hall Reception

**Attendee Bag Sponsor**
- Lockheed Martin
- JACOBS
- ATK

**General Conference Sponsors**
- JAXA
- Battelle
- The Business of Innovation
General Conference Information

Registration Information
AIAA is committed to sponsoring world-class conferences on current technical issues in a safe and secure environment. Delegates will be required to provide proper identification prior to receiving a conference badge and associated materials. All delegates must provide a valid photo ID (driver’s license or passport) when they check in. For student registrations, a valid student ID is also required.

On-Site Registration Hours
On-site registration will be held at the Hyatt Regency Atlanta as follows:

<table>
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<tr>
<td>Sunday, 29 July</td>
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<td>Wednesday, 1 August</td>
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Airport and Transportation
Hartsfield-Jackson Atlanta International Airport (ATL) is approximately 10 miles from the Hyatt (about a 20-minute drive).

Shuttles, taxis, and private car service are available. The Hyatt is connected by skyway bridge to the Peachtree Center MARTA Station for easy access to Atlanta’s public rail system; one-way tickets are $2.50.

Accompanying Persons Program
Accompanying persons are invited to meet on Monday, 30 July, at 1000 hrs, at the Hyatt Regency Atlanta. Information about local attractions, activities, tours, shows, and restaurants will be available, and coffee and tea will be served.

Delta Accompanying Persons Tour
Tuesday, 31 July
Buses will depart at 0830 hrs.
The Museum’s collections and facilities include The Spirit of Delta, Delta’s first 767, bought by employees, retirees, and friends and donated to Delta in 1982. The Archives maintains over 200,000 images, 1,000 films, and one of the world’s largest airline uniform collections in a museum; a replica of the first Delta station in Monroe, Louisiana; and an 800-square-foot museum shop, housed in a redesigned section of the hull of the first L-1011 ever built. Tickets are $15, include transportation, and are available on a first-come, first-served basis. Limit 50.

Lockheed Martin Facility Tour
Wednesday, 1 August
Buses will depart at 0830 hrs.
The tour will be conducted at the Lockheed Martin Marietta facility, home of the C-130J Super Hercules advanced tactical aircraft production line and the C-5 Super Galaxy modernization production line. Visitors will get to see both production lines. Additionally, visitors will get an overview of the site history and see the F35 JSF mid fuselage and P-3 wing production areas. Tickets are $15, include transportation, and are available on a first-come, first-served basis. Limit 50.

Networking Coffee Breaks
Networking coffee breaks for all attendees will take place in the exhibit hall. Times are designated in the program. Coffee and other beverages will be served.

For those registration types that include Award Luncheon tickets, those registrants who selected IECEC as their primary conference receive the Tuesday IECEC Awards Luncheon ticket, and those who selected JPC as their primary conference will receive the Wednesday JPC Awards Luncheon ticket. Tickets are not exchangeable or refundable. The cost is included in the registration fee where indicated. Additional tickets may be purchased upon registration or at the on-site registration desk while supplies last.

Awards Presentation
The following AIAA awards are scheduled to be presented:

IECEC Awards Luncheon, Tuesday, 31 July
- Aerospace Power Systems Award
- Energy Systems Award

JPC Awards Luncheon, Wednesday, 1 August
- Air Breathing Propulsion Award
- Ground Testing Award
- Engineer of the Year Award
- Propellants and Combustion Award
- Sustained Service Award
- Wyld Propulsion Award

Opening Reception
The opening reception will be held Sunday, 29 July, 1830–2000 hrs, in the exhibit hall. The cost is included in the registration fee where indicated. Additional tickets may be purchased upon registration or at the on-site registration desk, while supplies last.
Exhibits
The Exhibit will feature an impressive exhibit showcasing leading industry products and services relating to air breathing, liquid, solid, nuclear, electric, and other forms of propulsion for aerospace.

Monday, 30 July 0900–1600 hrs
Tuesday, 31 July 0900–1600 hrs
Wednesday, 1 August 0700–1400 hrs

To reserve your exhibit space, contact Fernanda Swan, AIAA Exhibit Business Manager, at 703.264.7622, 800.739.4422, or fernandas@aiaa.org.

Presentation Stage
AIAA is excited to provide this additional complimentary marketing opportunity for exhibitors. The presentation stage in the exhibit hall will give exhibitors the opportunity to showcase their company and products by giving a short presentation (15 minutes) to conference attendees during one of the show days. Seating and AV will be provided by AIAA. As space is limited, the available slots will be confirmed on a first-come, first-served basis.

For more information, or to secure your spot, email Carmela Brittingham at carmelab@aiaa.org.

Cyber Café
Computers with complimentary Internet access for conference attendees will be available at the AIAA Cyber Café, located in the exhibit hall. Hours of operation are as follows:

Monday, 30 July 0700–1800 hrs
Tuesday, 31 July 0700–1800 hrs
Wednesday, 1 August 0700–1400 hrs

To reserve your exhibit space, contact Fernanda Swan, AIAA Exhibit Business Manager, at 703.264.7622, 800.739.4422, or fernandas@aiaa.org.

Conference Proceedings
Proceedings for these conferences will be available in an online format. The cost is included in the registration fee where indicated. The online proceedings will be available on 23 July 2012.

“No Paper, No Podium” and “No Podium, No Paper” Policies
If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the conference. Also, if the paper is not presented at the conference, it will be withdrawn from the conference 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 conference for attendees.

Speakers’ Briefing
Authors who are presenting papers, keynote speakers, panelists, and session chairs will meet for a short briefing on the day of their presentation(s) at 0700 hrs in Centennial Ballroom at the Hyatt Regency Atlanta.

Young Professional Networking Reception
The AIAA Young Professional Committee is hosting a networking reception for early career professionals on Monday, 30 July at the Hyatt Regency Atlanta. This is a great opportunity for young professionals age 35 and under to meet and make new contacts. Join the Young Professional Committee for food, drinks, and relaxed socializing.

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, provides a sample letter for seeking management support and funding, and shows you how to get the most out of your participation. The online guide is on the AIAA website at www.aiaa.org/YPGuide.
Only in Atlanta can you...

... see the largest fish through the largest window in the largest aquarium in the world.

At the Georgia Aquarium, you can see tens of thousands of animals in more than eight million gallons of water. The world's largest aquarium houses whale sharks, the largest fish in the sea and the only whale sharks in an aquarium in North America.

... stroll through collections of art from around the world without leaving Atlanta.

The High Museum of Art, the premier art museum in the South, is in a multi-year partnership with The Museum of Modern Art that through 2013 will bring many international exhibitions to Atlanta. Past exhibitions have included masterpieces by Claude Monet and Leonardo da Vinci.

... try “a Coke and a smile.”

Born and raised in Atlanta, Coca-Cola is synonymous with Atlanta. Visit the World of Coca-Cola to learn the story of the famous soft drink, now celebrating its 125th year. Go back to the early years of Coke's creation in Atlanta and follow the global brand through the decades. After you’ve refreshed yourself with more than 60 products from around the world, step out of the museum’s front door and into the hub of the tourism district.

... race the gold shoes for a gold medal.

The host of the 1996 Centennial Olympic Games, Atlanta continues to commemorate the Olympic legacy. Centennial Olympic Park was the world's gathering place during the Games and includes the Fountain of Rings, the world's largest fountain utilizing the Olympic symbol of five interconnecting rings.

Hotel Reservations

AIAA has made arrangements for a block of rooms at the:

Hyatt Regency Atlanta
265 Peachtree Street NE
Atlanta, Georgia, USA 30303
Tel: +1 404.577.1234 Fax: +1 404.588.4137
Reservations: 888.421.1442

Room rates are $145 per night for single or double occupancy, plus applicable taxes. Please identify yourself as being with the AIAA conference. These rooms will be held for AIAA until 28 June 2012 or until the block is full. After 28 June 2012, any unused rooms will be released to the general public. You are encouraged to book your hotel room early. (Online Reservations)

Government employees—There are a limited number of sleeping rooms available at the government per diem rate. Government I.D. is required upon check-in. (Online Reservations)
Let AIAA Continuing Education courses pave the way to your continuing and future success! As the premier association representing aeronautics and astronautics professionals, AIAA has been a conduit for continuing education for more than sixty years. AIAA offers the best instructors and courses, and is committed to keeping aerospace professionals at their technical best.

On 2–3 August at the Hyatt Regency Atlanta, AIAA will be offering Continuing Education courses in conjunction with the AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit. Please check the Conference website for up-to-date information regarding the courses.

**Hybrid Rocket Propulsion**

The “Hybrid Rocket Propulsion” short course is quintessential for all professionals specializing in chemical 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.

**Advanced Solid Rockets**

Solid propulsion is vital to tactical, space, strategic and launch vehicles. The course examines fundamental and advanced concepts related to solid rockets. Theoretical and practical aspects of the field are covered.

**Hydrogen Safety**

The Hydrogen Safety course is intended to provide the student with a working knowledge of safety issues associated with the use of hydrogen. Using the aerospace industry standard, “Guide to Safety of Hydrogen and Hydrogen Systems,” AIAA G-095-2004, this course presents basic safety philosophy and principles and reviews a practical set of guidelines for safe hydrogen use. The information presented in this course is intended as a reference to hydrogen systems design and operations and handling practices; users are encouraged to assess their individual programs and develop additional requirements as needed.

**NPSS: A Practical Introduction**

The objective of this course is to give attendees a working knowledge of NPSS software and allow them to create and/or modify system models using this tool. The course material will discuss the object oriented architecture and how it is used in NPSS to develop flexible yet robust models. A detailed presentation of NPSS execution options, syntax, and interfaces with external codes will be addressed.

**Missile Design and System Engineering**

This short course provides the fundamentals of missile design, development, and system engineering. A system-level, integrated method is provided for missile configuration design and analysis. It addresses the broad range of alternatives in satisfying missile performance, cost, and risk requirements. Methods are generally simple closed-form analytical expressions that are physics-based, to provide insight into the primary driving parameters. Configuration sizing examples are presented for rocket, turbojet, and ramjet-powered missiles. Systems engineering considerations include launch platform integration constraints. Typical values of missile parameters and the characteristics of current operational missiles are discussed as well as the enabling subsystems and technologies for missiles. Sixty-six videos illustrate missile development activities and performance. Attendees will vote on the relative emphasis of types of targets, types of launch platforms, technical topics, and round table discussion.

For detailed information on these courses, visit the AIAA website at www.aiaa.org.
## Exhibitors

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<tr>
<td>Aerojet</td>
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<td>Arnold Engineering Development Center</td>
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<td>General Electric Aviation</td>
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<td>Moog</td>
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<td>Pointwise</td>
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<td>Pratt &amp; Whitney Rocketdyne</td>
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<td>Sierra Nevada Corp.</td>
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<td>Thales Components</td>
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<td>Vacco</td>
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<td>Wyle</td>
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## Sponsorship Opportunities

Sponsorship opportunities are still available for this conference. For information regarding sponsorship opportunities, please contact:

Cecilia Capece  
AIAA Sponsorship Program Manager  
Phone: 703.264.7570  
Email: ceciliac@aiaa.org

AIAA is the world’s largest technical society dedicated to the global aerospace profession. With more than 35,000 individual members worldwide, and 90 corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense.

## American Institute of Aeronautics and Astronautics

1801 Alexander Bell Drive, Suite 500  
Reston, VA 20191-4344  
703.264.7500 or 800.639.AIAA (2422)  
Fax: 703.264.7657  
custserv@aiaa.org  
www.aiaa.org/jpc2012