The AIAA SPACE 2012 Conference is AIAA’s premier event on space technology, policy, programs, management, and education. Nowhere else will you get the depth and breadth of sessions and information-sharing on space systems and technology. At this three-day event, attendees can expect discussions with government and industry leaders in plenary panel and keynote sessions; interactive exhibits, demonstrations, presentations, and poster sessions in the exposition hall; networking activities for all participants, including students and young professionals; and unique learning opportunities in the capstone events, AIAA Education Alley and the William H. Pickering Lecture. Participation at the 2012 event is beneficial for industry executives, government and military officials, program managers, business developers, engineers and scientists, government affairs staff, consultants, professors, and students.

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• Engineers
• Academics

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“CROWN OF THE VALLEY”—PASADENA, CALIFORNIA
Pasadena—an Indian name that means “Crown of the Valley”—is located at the base of the San Gabriel Mountains and just 15 minutes north of downtown Los Angeles. Pasadena is home to the NASA Jet Propulsion Laboratory, the California Institute of Technology (Caltech), the Rose Bowl, and many shops, restaurants, and art galleries. Within Pasadena’s 1.5-mile downtown core, you’ll find retail areas, cobblestone courtyards, sidewalk bistros, and nightlife in three alluring shopping and entertainment districts: Old Pasadena, the Playhouse District, and South Lake Avenue.

Conference sessions, exhibits, and special events will be held at the Pasadena Convention Center, 300 E. Green Street, Pasadena, California 91101. Newly renovated, the Pasadena Convention Center is a state-of-the-art, LEED-certified green meeting facility.

11–13 September 2012
Pasadena Convention Center
Pasadena, California
The conference organizers welcome the submittal of abstracts on all aspects of space systems and technologies. The program is structured around 14 technical tracks:

- Commercial Space .................. 3
- Intelligent Systems ................. 3
- National Security Space ............ 3
- Robotic Technology and Space Architecture ... 3
- Space and Earth Science ............ 4
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- Space Exploration .................. 4
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- Space Logistics and Supportability ....... 5
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- Space Systems Engineering and Space Economics ... 6
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For questions, please contact:

Mari Gravlee
United Launch Alliance
mari.gravlee@ulalaunch.com

Robert Ewart
U.S. Air Force Space and Missile Systems Center
roberta.ewart@losangeles.af.mil

Kary Miller
U.S. Air Force Space and Missile Systems Center
kary.miller.ctr@losangeles.af.mil

www.aiaa.org/events/space

For questions, please contact:

Christopher R. Tschan
AIAA Intelligent Systems Technical Committee (ISTC)
The Aerospace Corporation
christopher.r.tschan@aero.org

National Security Space

The National Security Space track invites papers in the following areas:

- Advanced Concepts: Including advanced CONOPS, material solutions, and architectural solutions
- Technology Transition: Including updates on existing programs working on technology transition from any partner toward the NSS customer
- Enterprise Architecting Analysis: Including requirements analysis, military utility analysis, multi-mission analysis and one-on-one engagement analysis, acquisition simulation analysis, and procurement
- Emerging Trends: Including descriptions of the latest trends affecting MIL space applications and development
- Prototypes and Demonstrations: Including updates on existing prototypes in the NSS pipeline
- Science and Technology Efforts: Including those aimed at key science and technologies for revolutionary MIL applications

For questions, please contact:

Joseph Betser
The Aerospace Corporation
joseph.betser@aero.org

Roberta Ewart
U.S. Air Force Space and Missile Systems Center
roberta.ewart@losangeles.af.mil

Kary Miller
U.S. Air Force Space and Missile Systems Center
kary.miller.ctr@losangeles.af.mil

Robotic Technologies and Space Architecture

This track will explore robotic technologies for orbital and planetary surface applications and space architectures, including systems supporting robotic construction techniques. Abstracts are solicited on the following technical topics:

- Advanced Technologies for Space Robotics
- Unique Applications of Space Robotics
- Self-Sustaining/Self-Repairing Systems
- Robotic EVA or IVA Servicing
- Robot and Spacecraft Automation
- Crew Cabin Architecture
- Orbital and Planetary Surface Construction
- Unique Space Architecture Design

For questions, please contact:

Christopher R. Tschan
AIAA Intelligent Systems Technical Committee (ISTC)
The Aerospace Corporation
christopher.r.tschan@aero.org
For questions, please contact:

Shahzad Khaligh
AIAA Space Architecture Technical Committee
DOD-AF-ENI
shahzad.khaligh@cox.net

François Lévy
AIAA Space Architecture Technical Committee
Synthesis International
francoislevy@synthesis-inl.com

Gregory P. Scott
AIAA Space Automation and Robotics Technical Committee
U.S. Naval Research Laboratory
gregory.scott@nrl.navy.mil

Steven E. Fredrickson
AIAA Space Automation and Robotics Technical Committee
NASA Johnson Space Center
steven.fredrickson@nasa.gov

Space and Earth Science

Sessions for the Space and Earth Science track are by invitation only. If interested in participating, please contact:

Virendra Sarohia
NASA Jet Propulsion Laboratory
virendra.sarohia@jpl.nasa.gov

Space Colonization and Space Tethers

The goal of space colonization is to create permanent human settlements beyond Earth. A logical implementation approach to be would be to develop outposts and colonies in key locations in space (e.g., Lagrange points) and on the moon, near-Earth asteroids, and Mars, as technological advances enable progressively more ambitious missions. The Apollo missions demonstrated that humans can land on and explore other bodies in our solar system. The Shuttle and ISS missions demonstrated that humans can live and work in low-Earth orbit (LEO) for extended periods of time. Humanity is ready for exciting and challenging exploration missions beyond LEO that will open the door for future expansion into the solar system. The development of advanced science and technologies needed for space settlements will help humanity improve life on Earth and shape a better future. Space tethers show great promise for enabling a variety of future space missions, both as engineering components and as scientific components. Applications of space tethers include propulsion, space structures, remote sensing, and artificial gravity, among others. To date, several tethered missions have flown and many more have been proposed for flight. This track will include missions enabled and the technologies necessary for exploiting the use of space tethers. Papers are invited that address the following topics related to space colonization:

- Drivers: Desires for exploration, commerce, tourism, and adventure
- Destinations: Space, the moon, asteroids, and Mars, including missions
- Challenges: Environment, distance, isolation, logistics, and financing
- Designs: Concepts for robotic and human vehicles, outposts, and colonies
- Exploitation: Mining, utilization of in-situ resources, and terraforming
- Enablers: Needed research and development of key technologies
- Space law: Claims, property rights, extraction of resources, and commerce

Papers are invited that address the following topics related to space tethers:

- Theory: Physics, kinematics, dynamics, and material requirements
- Applications: Advantages gained by using space tethers
- Missions: Unique missions enabled by space tethers
- Enablers: Needed research and development of key technologies

For questions, please contact:

Anita Gale
AIAA Space Colonization Technical Committee
The Boeing Company
anita.e.gale@boeing.com

Sven G. Bilén
AIAA Space Tethers Technical Committee
The Pennsylvania State University
sbilen@engr.psu.edu

Space Exploration

The Space Exploration track spans mission architectures, advanced technologies, and flight systems to enable robotic precursor and human exploration missions to the moon, Lagrange points, Near-Earth Objects (NEOs), and Mars and its moons. Abstracts are solicited on the following topics:

- Mission Architectures: Studies, systems analysis, and operational scenarios for human exploration missions beyond Earth orbit
- Enabling Technologies: The development of critical technologies to enable human exploration missions, including advanced propulsion; cryogenic propellant storage and transfer; high-efficiency space power systems; life support and habitation systems; radiation shielding; entry, descent, and landing technology; EVA technology;
- Advanced robotics; autonomous systems and avionics; high-data rate communications; in-situ resource utilization; and lightweight structures and materials
- Robotic Precursor Missions: Mission concepts and plans for robotic precursor missions to characterize space environments and scout potential destinations for future human activity
- Flight Systems: Flight experiments to demonstrate critical capabilities, and development of crew exploration vehicles and in-space transportation systems
- Using ISS for Exploration: Using the International Space Station as an analog for long-duration missions, and as a test bed for demonstrating technologies and operational concepts for exploration

For questions, please contact:

Chris Moore
Space Exploration Program Committee
NASA Headquarters
christopher.moore@nasa.gov

Space History, Society, and Policy

The Space History, Society, and Policy track examines the history of our time in space, space law and policy, international cooperation, the societal impacts of aerospace technologies and an educated and trained workforce, and the evolution of our spacefaring society. Topics addressed include:

- The History of Aerospace — Legacy and Lessons Learned: Collection, preservation, and analysis of historical materials related to spacecraft and space technology, manned space programs, launch systems, and unmanned programs—with an emphasis on understanding the significance of people and organizations, programs, facilities, and infrastructure
- Space Law and Policy: Current and emerging policy and legal issues affecting space acquisition, operations, sustainment, and the future of space activities; national space policies of the United States, other countries, and the United Nations; the U.S. National Space Strategy; liabilities and legal obligations associated with space debris and end-of-life and orbital operations; space warfare; insurance, contracting, and liability issues; jamming threats and telecommunications regulation; legal institutions
- International Cooperation: Risks and opportunities of cooperative engagement; recognizing and surmounting legal impediments to cooperation, including ITAR and technology transfer control regimes;
successful and unsuccessful international approaches to acquiring, organizing, operating, and sustaining space systems; international institutions

- Space Science, Technology, Engineering, and Mathematics (STEM) perspectives: Shortfalls in the space workforce’s STEM education and training, and their impact; and policy, programmatic and economic solutions to education and workforce shortfalls
- Spinoffs and Technology Transfer: Space technologies and discoveries transferred or commercialized outside of the industry; policies enabling technology transfer and technology transfer lessons learned; analyses of the societal impacts of space technology spinoffs
- Interactions with Society: Impact of space systems on communication, trade, and access to information; the impact of space systems and technology on global emergency response to disasters or acts of terrorism; space stakeholder risk tolerance and perceptions; analyses of the intangible benefits of spaceflight and of space themes in media and literature
- Astrosociology: Social, cultural, psychological, ethical dimensions, and the institutional responses associated with space medicine and isolated long-duration space missions; psychological, sociological, and anthropological perspectives on space-based natural disasters

In addition, this track will host a Best Student Paper Competition. Submitted and accepted papers by student authors will be presented within a session of the Space History, Society, and Policy track. Papers will be judged based on merit with the winning paper(s) receiving a certificate and a monetary award. For further information, including the complete rules and guidelines of the competition, please visit the SATTIC Web site at https://info.aiaa.org/tac/ETMG/SATTIC/, or contact the competition administrator, Brad Steinfeldt, at bsteinfeldt@gatech.edu

For general track questions, please contact:

James D. Rendleman
AIAA Legal Aspects of Aeronautics and Astronautics Technical Committee
Rendleman & Associates
napatarheel@hotmail.com

Brad Steinfeldt
AIAA Society and Aerospace Technology Technical Committee
Georgia Institute of Technology
bsteinfeldt@gatech.edu

Space Logistics and Supportability

Space Logistics is the theory and practice of driving space system design for operability, and of managing the flow of material, services, and information needed throughout a space system lifecycle. It includes management of the logistics supply chain from Earth and on to destinations throughout the solar system. Supportability considers system architecture strategies to minimize both logistics requirements and operational costs of human and robotic operations. Supportability strategies include processes and technologies to minimize maintenance complexity, exploit in-situ resources, scavenge and reuse flight hardware, and recycle consumables. Representative areas include the servicing and sustainment of the International Space Station, lunar and planetary outposts, the optimization of logistics launch vehicles for responsiveness and serviceability, and modeling of the supply chain in space for human and robotic mission campaigns. Technical topics include:

- International Space Station On-Orbit Resources Management
- In-Space Spacecraft and Satellite Servicing
- Advanced Supportability Concepts: in-situ repair, in-situ fabrication, flight hardware scavenging and reuse, resource repositioning, consumables recycling
- Advanced Destination Logistics: outpost management and provisioning, in-situ resource logistics, EVA logistics
- Advanced Space Logistics Infrastructures: solar power stations, on-orbit fuel depots, refueling in space, planetary or asteroid resource infrastructures
- Logistics of NASA, DoD and Commercial Programs: space operations affordability, design for commonality, integrated logistics concepts
- Space Logistics Campaign Planning: methods, modeling, simulation, and cost analysis tools
- Automated spaceflight supply chain asset tracking and monitoring
- Spaceport ground processing and launch logistics
- Commercial Space Logistics Opportunities

For questions, please contact:

Richard Oeftering
AIAA Space Logistics Technical Committee
NASA Glenn Research Center
richard.c.oeftering@nasa.gov

Leif Anderson
AIAA Space Logistics Technical Committee
The Boeing Company
leif.anderson@boeing.com

Space Operations

This track is calling for papers in a number of areas that are key to the success of spacecraft and launch systems, with an emphasis on the operational aspect. Technical topics include:

- Space Operations in the 21st Century
- Space Operations Automation and Reducing Cost of Operations
- Future Human and Robotics Space Exploration Operations
- Mission Operations Assurance
- Responsive Space Operations
- Human Factors in Space Operations
- Advanced Technologies for Space Operations
- Network-Centric Space Operations
- Space Operations Policy
- Improving Space Operations (Panel)
- Spaceport Operations (Panel)
- Future Satellite Operations (Panel)

For questions, please contact:

Shirley Tseng
AIAA Space Operations and Support Technical Committee
MorganFranklin Corporation
shirleytseng@earthlink.net

Space Resources

Utilization of the natural resources found in space offers a uniquely sustainable approach to human exploration. By leveraging available materials on planetary bodies, the constraining supply chain can be broken. The Space Resources track will examine alternatives to the classic resupply challenge by providing many of the needed commodities for human sustainment using locally available resources. The current focus on developing technology for multiple exploration destinations has renewed interest in Mars in-situ resource utilization and sparked new interest in prospecting and utilizing resources on near-Earth objects. Papers are solicited on all aspects of the resource utilization cycle, from prospecting and precursor missions through production, storage, and delivery. Technical topics include:

- Resource Prospecting and Precursor Missions
- Resource Collection and Transport
- Lunar Resource Utilization Technologies
- ISRU for Mars and Beyond
- ISRU for Fabrication and Repair
- ISRU Hardware Demonstrations

For questions, please contact:

Leslie Gertsch
AIAA Space Resources Technical Committee
Missouri University of Science and Technology
gertschl@mst.edu
Space Systems and Sensors

The Space Systems and Sensors track seeks to present important findings from recent work on emerging space systems, space science, and sensor technologies. In particular, papers are sought that address technical, operational, and economic feasibility of current and future space systems that address the full range of civil, military, and international applications. Papers by students are especially encouraged. Technical topics include:

- Architectures and Concepts of Operation
- New and Emerging Technologies and Applications
- Remote Sensing for Climate and Weather
- Space and Planetary Science Missions and Technologies
- Rapid and Responsive Space Systems
- Enabling Technologies for Distributed or Fractionated Space
- Proximity Sensing of Space Objects and Orbital Space Situational Awareness (SSA)
- Space Sensor Technologies
- Laser Communication
- Cubesats
- Workforce Development for Space Systems and Sensors Engineering (Panel)
- Space Systems Lessons Learned (Panel)

For questions, please contact:

Jerry Sellers
AIAA Space Systems Technical Committee
Teaching Science and Technology, Inc.
j sellers@stsi.net

Amy Lo
AIAA Space Systems Technical Committee
Northrop Grumman Aerospace Systems
amy.lo@nro.com

Timothy L. Howard
AIAA Sensor Systems Technical Committee
EOSESS
tim@eosess.com

Space Systems Engineering and Space Economics

The role of systems engineering in space programs has become more important as systems have become increasingly complex, architectures have become expansive, and integration across architectures has become commonplace and essential. As the utilization of space increases, driven by technological advances and mission need, the cost and economics of space will remain a formidable challenge. These challenges can be met by analyzing data and developing models to clarify the best value and key economic insights for decision makers. A goal of the systems engineering and space economics community is to develop and apply capabilities to facilitate robust future space systems. Aspects of systems engineering and space economics that may be included in this track are:

- Definition and Application of Space System Architectures
- Advances in Systems Engineering Processes and Tools Applied to Space Systems
- Systems Engineering Lessons Learned from Current and Previous Space Programs
- Space Systems Requirements Generation, Verification, and Validation
- Space Systems Integration and Associated Tests
- Systems Engineering for Autonomous Space Systems
- Space Systems Risk Management
- Evaluating and Balancing Space Systems Cost, Performance, Schedule, and Risk
- Space Workforce Development and Industrial Base Challenges
- New Developments in Economic Analysis and Cost Models
- Examples of Trade Studies Incorporating Economic Analysis, Affordability, or Value Engineering
- Space Systems Engineering Efficiencies in a Constrained Budget Environment

For questions, please contact:

Edmund H. Conrow
AIAA Systems Engineering Technical Committee Management and Technology Associates
cronrow@risk-services.com

Jairus M. Hiha
AIAA Economics Technical Committee
Jet Propulsion Laboratory
jairus.m.hiha@jpl.nasa.gov

Space Transportation and Launch Systems

The success of all space endeavors—military, scientific, exploration, and commercial—depends upon low-cost, highly reliable access to space. Since the retirement of the Space Shuttle, current worldwide space deployments are achieved through expendable launch vehicles (ELVs). New emerging space companies have offered the promise of low-cost space access, and some of them are proceeding with development and testing efforts. NASA’s Commercial Orbital Transportation Services Demonstration Program is designed to demonstrate low-cost, reliable commercial cargo delivery, and potentially crew delivery, to the International Space Station (ISS). NASA has contracted for ISS Commercial Resupply Services for resupply and return of ISS cargo. NASA’s human exploration program promises to continue the U.S. civilian human spaceflight effort by developing and operating new vehicle systems for human exploration of the solar system and continuing missions to the ISS. Within the U.S.

DoD, RLV activity is gaining momentum with the Air Force’s pursuit of a Reusable Booster System (RBS) as seen with the release of the broad agency announcement for the Reusable Booster System Flight and Ground Experiments program. Papers are invited that address the issues and challenges associated with space transportation. Papers may be submitted within, but are not limited to, the following categories:

- Space Transportation System, Technology, Design, and Integration Challenges
- In-Space Transportation Systems and Architectures, including Propellant Depots
- Advanced Concept Vehicles and Systems
- Launch Vehicles
- Designs, Concepts, and Developments (ELVs, RLVs, or partially reusable LVs)
- RLV Development, Programmatic (including economics), and Industry Related Strategies
- Lessons Learned from Previous RLV Related Programs and Design Studies
- Operationally Responsive Space
- Operations of Spaceports and Ranges
- Space Transportation for Space Tourism
- Space Transportation Analytical Tools, Materials, and Technologies
- Suborbital Vehicles and Systems

For questions, please contact:

Douglas Stanley
AIAA Space Transportation Technical Committee National Institute of Aerospace
stanley@nianet.org

Randy Kendall
AIAA Space Transportation Technical Committee The Aerospace Corporation
randolph.l.kendall@aero.org

Barry Hellman
AIAA Reusable Launch Vehicle Program Committee
Air Force Research Laboratory
barry.hellman@wpafb.af.mil

Adam Dissel
AIAA Reusable Launch Vehicle Program Committee
Lockheed Martin Space Systems
adam.f.dissel@lmco.com

PROPOSALS FOR SPECIAL SESSIONS

Individuals who wish to organize special sessions embedded within the technical program (e.g., invited oral presentations, panels, or demonstrations) should submit a short proposal describing the nature of the session as it relates to a specified technical track. Be sure to include the names of the organizers and participants. Please e-mail your proposal by 17 January 2012 to Jeffrey R. Laube, AIAA SPACE 2012 Technical Chair, at laube.jeff@gmail.com. Please do not upload an abstract for the proposal.
Abstract submissions will be accepted electronically through the AIAA Web site listed above.

Click the “Submit Paper” button under the conference name. The deadline for receipt of draft manuscripts and abstracts via electronic submission is 26 January 2012. Authors will be notified of paper acceptance via e-mail by 10 April 2012.

An Author’s Kit, containing detailed instructions and guidelines for submitting papers to AIAA, will be made available to authors of accepted papers. Authors of accepted papers must provide a complete manuscript online to AIAA by 21 August 2012 for inclusion in the online proceedings and for the right to present at the conference. 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. Sponsor and/or employer approval of each paper is the responsibility of the author. Government review, if required, is the responsibility of the author(s). Authors should determine the extent of approval necessary early in the paper presentation process to preclude paper withdrawals or late submissions.

Additional instructions can be found at www.aiaa.org/events/space.

Authors having trouble submitting abstracts electronically should contact ScholarOne Technical Support at ts.acsupport@thomson.com, or at 434.964.4100 or 888.503.1050. Questions about abstract submission or the full draft manuscript should be referred to the appropriate Track Chair.

www.aiaa.org/events/space
Important Dates

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<td>Author Notification</td>
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“No Paper, No Podium” and “No Podium, No Paper” Policies

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

Publication Policy

AIAA will not consider for presentation or publication any paper that has been or will be presented or published elsewhere. Authors will be required to sign a statement to this effect.

Please note: AIAA policy precludes an abstract or paper from being submitted multiple times to the same conference. Also, once a paper has been published, by AIAA or another organization, AIAA will not republish the paper. Papers being submitted to the Student Paper Competition being held in conjunction with this conference may not be submitted to the general sessions. Author(s) must choose to submit to the Student Paper Competition OR to the conference. If your paper is selected for competition it will be published along with the conference proceedings.

WARNING—Technology Transfer Considerations

Prospective authors are reminded that technology transfer guidelines have considerably extended the time required for review of abstracts and completed papers by U.S. government agencies. Internal (company) plus external (government) reviews can consume 16 weeks or more. Government review if required is the responsibility of the author. Authors should determine the extent of approval necessary early in the paper preparation process to preclude paper withdrawals and late submissions. The conference technical committee will assume that all abstracts papers and presentations are appropriately cleared.

International Traffic in Arms Regulations (ITAR)

AIAA speakers and attendees are reminded that some topics discussed in the conference could be controlled by the International Traffic in Arms Regulations (ITAR). U.S. nationals (U.S. citizens and permanent residents) are responsible for ensuring that technical data they present in open sessions to non-U.S. nationals in attendance or in conference proceedings are not export restricted. Authors should determine the extent of approval necessary early in the paper preparation process to preclude paper withdrawals and late submissions. The conference technical committee will assume that all abstracts papers and presentations are appropriately cleared.

EXHIBIT AND SPONSORSHIP OPPORTUNITIES

AIAA SPACE 2012 is AIAA’s premier conference on space technologies, systems, programs, and policy. Exhibit space is available to showcase your company’s products and services before an audience of aerospace decision makers and practitioners.

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AIAA Exhibit Manager
Fernanda Swan
fernandas@aiaa.org
703.264.7622

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