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SPACE 2008

CONFERENCE
& EXPOSITION

9-11 September 2008
San Diego Convention Center
San Diego, California

Future Space:
National Priorities,
Critical Decisions

www.aiaa.org/events/space

Call for Papers

Abstract Deadline
31 January 2008

Co-chaired by



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Laboratory



U.S. Air Force Space and
Missile Systems Center

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Future Space: National Priorities, Critical Decisions

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Synopsis

Space has proven to be the silent backbone underpinning our commercial, civil, and military sectors. Three of the top issues in the upcoming election—economic competitiveness, the global war on terror, and the need for increased global climate change monitoring—are all dependent on our technological and operational achievements in space. The AIAA SPACE 2008 Conference & Exposition will reflect on these issues and more, while providing direction for future actions.

This event will be attended by leaders from all elements of the space community, including key government and business decision makers, providing an unparalleled forum for exchange and dialogue. Topics of discussion will include:

- ❑ How is the role of National Security Space changing in light of our recent experience fighting the global war on terror?
- ❑ What new space capabilities does the Department of Defense need? What role will space play in homeland defense?
- ❑ How will NASA, NOAA, and USGS implement a global earth observation system-of-systems?
- ❑ What will the future of space exploration be in the next decade?
- ❑ What are the challenges and opportunities relating to continued growth in commercial space?
- ❑ What are the technologies currently under development that will allow further utilization of space?
- ❑ How do we better support foundational technologies?
- ❑ What is being done to ensure there is a strong and competent aerospace workforce to support future space activities?
- ❑ What policy and regulatory issues must be addressed to facilitate future international collaborations?

AIAA SPACE 2008 will provide researchers, developers, and management from government, industry, and academia an opportunity to reflect upon the progress over the past decade, and debate how best to focus the great talent and resources of the space community on the future. Invited speakers and panelists will provide unique perspectives on key issues, setting the stage for continuing discussion throughout the program. This conference complements other more specialized meetings by offering both a top-down and a bottom-up perspective on interdisciplinary capabilities and space systems, making this meeting the “must attend” conference for 2008.

AIAA SPACE 2008 is organized by the American Institute of Aeronautics and Astronautics, co-chaired by NASA Jet Propulsion Laboratory and U.S. Air Force Space and Missile Systems Center, sponsored by Northrop Grumman Corporation, Raytheon, and ATK, and supported by California Space Authority, Space News, and Aerospace America.



Technical Tracks

The conference organizers welcome the submittal of abstracts on all aspects of space systems and technologies. The program is structured around nine technical tracks:

- Space Exploration/Space and Earth Science**
- National Security Space**
- Space Systems and Technologies**
- Space Transportation**
- Space Operations**
- Space Logistics, Tourism, and Colonization**
- Space Policy and Economics**
- Space Workforce and Education**
- Space History and Astrosociology**

Track Descriptions



Space Exploration/ Space and Earth Science

From the outset of national civilian space programs, science and human spaceflight have been intertwined. Current resource limitations present an opportunity to build consensus that humans and robotics are both important components of a robust civil space program. Given the imperative of uniting the space community behind common policy and programmatic objectives, AIAA SPACE 2008 seeks to combine science and human spaceflight into a single unifying theme—Space Exploration—and foster the next generation of space science and exploration missions.

Space and Earth Science—Science is the foundation of most NASA activities, and has been for almost 50 years. The Space Act that chartered the agency in 1958 lists as NASA's first objective, "the expansion of human knowledge of the Earth and of phenomena in the

atmosphere and space." In pursuit of this knowledge, NASA has sent probes to seven planets and several other celestial bodies, telescopes have examined the universe in all wavelengths, satellites have enabled us to anticipate geo and space weather patterns, and spacecraft orbiting Earth have improved understanding of our home planet. The International Space Station will continue to provide opportunities for microgravity science. Discovery is the Vision for Space Exploration.

NASA's activities are being shaped in a significant way by the new direction for Space Exploration, which seeks to extend human presence and activity to the moon, Mars and beyond. A significant component of this objective is the robotic precursor missions that will blaze the trail for humans to follow. And once bases are established, the pursuit of science on the lunar and Martian surfaces will be enabled as never before. Non-U.S. space agencies are also increasingly turning their attention to these bodies, as India, China, Europe, and Canada all plan missions to the moon and/or Mars.

This call requests papers which cover missions that will support the new direction, including innovative and inexpensive spacecraft approaches, the next generation of space-based earth science missions, robotic missions to explore the extremes of the solar system, space weather monitoring programs in support of lunar and Martian missions (such as detection of radiation flares), as well as specific science activities that may be enabled by human presence. Specific areas of interest for which papers are solicited include:

- Environmental and Earth Science
- Heliophysics
- Planetary Science
- Astrophysics
- International Space Station
- Planetary Protection

Human Exploration of the Moon and Beyond—The United States has embraced the new Vision for Space Exploration to return to the moon and send humans to Mars, and other nations are beginning to articulate their own plans for exploration. These lofty goals

See You in San Diego!

The **AIAA SPACE 2008 Conference & Exposition** will be held at the San Diego Convention Center in sunny San Diego, California's second largest city. Accommodations for attendees will be available at the Omni San Diego Hotel.

now need to be turned into operational reality based on mission/flight program experience and through the development of robust architectures that outline how to carry out the vision and what can be accomplished within the framework of the programs. Areas of particular interest include:

- ❑ Hardware Systems
- ❑ Human Exploration Transportation Architectures
- ❑ Surface Activities
- ❑ Program Management

Space Robotics—Robotic systems will always be the “first” explorers in space and on planetary surfaces, and will pave the way for safe human exploration. Robotic capabilities need to be extended in several areas to make robots ever more useful. The challenge of space environments will in turn produce technological advances that will find applicability on earth. Some of the challenges to be discussed by the conference are the following:

- ❑ Mobility in extreme environments. These may include rocky terrains, cliffs, and water.
- ❑ Spacecraft inspection and repair. This can reduce the cost of EVA (Extra Vehicular Activity) and increase astronaut safety. It may also increase the cost effectiveness of missions by extending the life of components that can be robotically repaired, replaced, or re-supplied.
- ❑ Surface and space construction. All systems that provide capabilities to assemble space or surface structures and facilities.
- ❑ Human–robot interaction. Efforts that increase the efficiency of activities that involve both robots and humans.
- ❑ Self-sustaining robotic systems. Distance from Earth, exploration of remote areas of the solar system, and the possibility of utilizing in situ resources make it desirable to have systems that are capable of self-repair and extreme adaptability and resilience.

For questions, please contact:

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Dr. Ronald Polidan
Northrop Grumman Space Technology
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National Security Space

Space is a national security imperative. From communications and navigation, to intelligence, surveillance, and reconnaissance, space is an essential element of our national defense. Today’s challenge is to exploit space in new and better ways, providing decision makers worldwide the information they need to ensure the safety and security of the United States and our allies. Meeting this challenge requires a transformation in our space capabilities. However, new transformational space programs are facing budget realities and competition from pressing operational needs. Which programs will survive? How can we better integrate our space capabilities with airborne and ground systems for improved decision making? What is the best way to track, monitor, and otherwise improve our space situational awareness? How can we protect our space assets and quickly reconstitute our space capabilities in the event of failures? How should we incorporate space assets in homeland defense?

Papers are invited that address future mission requirements, including:

- ❑ Integration of space-, air-, and ground-based assets
- ❑ Network-centric operations
- ❑ Space situational awareness
- ❑ Operationally responsive space
- ❑ Application of commercial space to meet military and intelligence needs
- ❑ National Security Space systems engineering and acquisition issues
- ❑ Missile defense
- ❑ Homeland defense

Only papers approved for public release will be accepted.

For questions, please contact:

Col. Richard White
Air Force Space and Missile Systems Center
E-mail: richard.white@losangeles.af.mil

Space Systems and Technologies

Papers are being solicited on topics related to current and visionary Space Systems and Technologies such as satellite systems, moon and planetary missions and associated space support

systems, and advanced technologies that are being applied to space systems engineering. Papers are also being solicited broadly regarding developments and trends in:

- ❑ Earth Observation Missions
- ❑ NASA Advanced Space Concepts and Missions
- ❑ Space Debris Design Impacts
- ❑ Spacecraft Systems for Mars and Other Planets
- ❑ Enabling Technologies for Space-Based Networks and Architectures
- ❑ Space Systems Design, Analysis, and Engineering Methods
- ❑ In-Space Satellite Operations Concepts
- ❑ Space and Planetary Science Missions Engineering
- ❑ Space Systems Operations and Monitoring
- ❑ Visionary Space Systems and Infrastructure

For questions, please contact:

Russell Joyner
Pratt & Whitney Rocketdyne
E-mail: claude.joyner@pw.utc.com

Space Transportation

The success of all space endeavors—military, scientific, exploration, and commercial—depend upon low-cost, highly reliable access to space. Current worldwide space deployments are achieved, for the most part, through expendable launch vehicles. NASA’s Space Shuttle still remains the only reusable system for human access to space, and current plans call for its retirement in 2010. Small launch vehicles have offered the promise of low-cost space access, and some of them are proceeding in their development. 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’s Constellation Program promises to continue the U.S. civilian human spaceflight effort by developing and operating the new Orion and Ares systems. NASA’s new space transportation system is being designed primarily to return humans to the Moon, continue servicing missions to the ISS, and later take humans to Mars and other destinations.

The U.S. military is currently developing concepts for operationally responsive space systems, including responsive and small launch vehicles. Current space launch ranges may add additional constraints on space launch flexibility and responsiveness, impacting both commercial and government missions. Reusable launch concepts seem to offer substantial promise and some are currently in development.

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 Systems and Technologies
- In-Space Transportation and Architecture
- Advanced Concept Vehicles and Systems
- Launch Vehicles and Development
- Operationally Responsive Space
- Operations of Spaceports and Ranges
- Space Transportation for Space Tourism

For questions, please contact:

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Federal Aviation Administration
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Allison Zuniga

NASA Ames Research Center
E-mail: allison.f.zuniga@nasa.gov



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. These areas include:

- Space Operations Policy
- Lunar Operations
- Responsive and Small Satellite Operations
- Government Space Operations
- Human Factors in Space Operations
- Space Operation Best Practices
- Operations of Secondary Payloads on Commercial GEO Communications Satellites

For questions, please contact:

Shirley Tseng

MorganFranklin Corporation
E-mail: shirleytseng@earthlink.net



Space Logistics, Tourism, and Colonization

There is an increasing need to think not only about how to reach space and return to Earth, but also about what long-term activities we might engage in while in space. Space logistics encompasses a broad set of topics, including the buildup, servicing, and sustainment of the International Space Station and a future Lunar Outpost, the range of logistics services that might be provided, the optimization of future vehicles for serviceability, and the broader modeling of manned and unmanned missions and campaigns as a supply chain in space. Enabling technologies and methods such as system design for commonality and reconfigurability and availability-to-sparing approaches are also included in this track.

Space tourism is a growing segment of space activities. Plans for space hotels and tourism-related activities are beginning to enter the mainstream. Topics such as maximizing the value, safety, and profitability of space tourism are welcome.

Colonization focuses on the long-term exploration and settlement of other worlds by humans and robots. Of interest are papers that address areas such as in-situ resource development, design for reuse, and sustainability of long-duration space missions.

Utilization of space resources offers a path for reduction in exploration costs and the possibility for economic development for long-term settlement. Topics would consider near-term applications of lunar resources, as well as long-term development of resources on Mars and other planetary bodies.

Topics of interest for this track include:

- Services provided by a space station
 - Crew-tended Earth observations
 - Crew-tended astronomical observations
 - Crew-tended free-flying science and surveillance instruments
 - On-orbit assembly of spacecraft too large and/or delicate to launch
 - On-orbit caching and replenishment of consumables for spacecraft

- On-orbit servicing, repair and upgrade of spacecraft
- Off-Earth life sciences facility
- Off-Earth physics, chemistry, and materials research facility
- Proof-of-Concept for off-Earth habitation technology
- Space tourism destination
- On-orbit servicing, replenishment, and repair
- Interplanetary supply chain management
- Sustainment for extended human settlement in space
- Innovative concepts for small package logistics
- Information architectures to support in-space logistics
- Spacecraft ground processing and supplier logistics
- Launch system responsiveness and life cycle support
- Integrated system health management
- Design for commonality
- Design for maintenance
- Environmental control and life support
- Regenerative life support systems
- Medical sciences and systems
 - Health maintenance
 - Behavior and performance
 - Radiation health
- Biological sciences and gravitational ecology
- Systems design for spacesuits and portable life support
- Human factors engineering
- Long-term plans and concepts for colonization beyond Earth
- Lunar resource utilization
 - Oxygen production from lunar regolith
 - Lunar resource characterization
 - Polar volatile characterization and collection
- Mars resource utilization
 - Mars regolith product production
 - Mars atmospheric resources

For questions, please contact:

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Alan Johnson

Air Force Institute of Technology
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Space Policy and Economics

Some question the human and technological costs associated with space exploration and the relevancy of having a space program at all. They argue that we should not spend money on space until we resolve all our problems here. At the same time, space assets are on the critical path of some of these very problems, such as global climate change. Therefore, it is imperative that 21st century space policy remains relevant with respect to terrestrial issues, as space and earth are now part of one social and economic system. Because space exploration enables the very innovation that policy makers and a robust economy require, partnerships must also be established to leverage a limited civil space budget. Legal, financial and political concerns must be addressed in the process. In addition, space policy must be responsive to key stakeholders in government, the private sector, and the academic community, as well as to international partners and a more engaged public. The policy challenge of meeting a variety of societal needs and expectations and continuing the quest for space exploration and discovery will be a key theme of the policy discussions at SPACE 2008.

Economics is a critical discipline in advancing technological change in society. Space economics has become a key element in any exchange of information in the space and space technology arena, whether in illuminating the way to optimizing the allocation of scarce resources or in modeling/measuring the economic impacts and implications of technological change. Papers are welcome covering a broad set of topics and interest areas, including economic and cost-benefit analysis, cost estimating and analysis, financial/investment analysis, resource allocation, cost effectiveness, cost reduction initiatives, risk analysis, economics associated with new technology, and affordability. Authors are also encouraged to contribute papers that are outside these specific topic areas but that may be of interest to conference participants.

For questions, please contact:

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The Boeing Company
E-mail: miles.a.nesman@boeing.com

Kathleen Connell
The Connell Whittaker Group, LLC
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Space Workforce and Education

Without a strong and competent aerospace workforce, the United States stands to lose the immense economic and national security benefits it derives from this important industry. Many voices have expressed concern about the viability of the aerospace workforce, and the related ability of educational institutions, corporations, and government agencies to produce and retain motivated engineers qualified to design and develop next generation space systems. Papers are solicited that address a data-driven understanding of aerospace workforce demographics and trends, causes of workforce attrition, effective development programs, and alternative strategies to address this issue.

For questions, please contact:

Dr. Heidi Davidz
Pratt & Whitney Rocketdyne
E-mail: heidi.davidz@pwr.utc.com



Space History and Astrosociology

History—Papers are solicited on the history of spaceflight and space technology. Topics of interest include manned space programs, launch systems and their components, unmanned programs and their systems, and the people and organizations involved with the development of space along with its impact. Papers will be considered on these and other topics of historical interest.

For questions, please contact:

J. Campbell (Cam) Martin
NASA Dryden Flight Research Center
E-mail: cam.martin@nasa.gov

Astrosociology—Papers are solicited on the relationship between space exploration and society. Examples of acceptable topics include, but are not limited to, astrobiology (and/or SETI), NASA (or any space program) as a social organization, space settlements ("space societies"), the future of space exploration and humanity, planetary defense, medical astrosociology, space exploration and social change (including spinoffs and technology transfers), spacefaring society as a future societal structure, privatization of space, militarization and/or cooperation

in space, space assets utilized to solve social problems, and space in social science education. Potential participants are welcome from specialties within the space community as well as from sociology, psychology, anthropology, political science, economics, and all of the social/behavioral sciences and humanities. One session will be dedicated to "Astrosociology: The Olympics in 2108."

For questions, please contact:

Dr. Jim Pass
Astrosociology.com
E-mail: jpass@astrosociology.com

Proposals for Special Sessions

Individuals who wish to organize special sessions embedded within the technical tracks (i.e., invited oral presentations, panel, or demonstration) should submit a short proposal describing the nature of the session as it relates to the specified technical track. The proposal should also include the names of the organizers and participants. Please e-mail your proposal by **31 January 2008** to Karen Sklenar, Administrative Chair, at **karens@aiaa.org**. Do not upload an abstract for the proposal.



Exhibition

SPACE 2008 is AIAA's premier symposium on space technologies, systems, programs, and policy. Space is limited! To reserve your exhibit space, contact:

Fernanda Tilleria
Sales Manager
Sponsorships/Exhibits/Advertising/Lists
Phone: 703/264-7622
E-mail: fernandat@aiaa.org



Abstract Submittal Guidelines

An abstract of 500-1000 words, with key figures and references if necessary, is required. Abstract submissions will be accepted electronically through the AIAA Web site at www.aiaa.org/events/space. The electronic submission process is as follows:

1. On the right-hand side, click on "Submit a Paper."
2. Click on "View Call for Papers or Begin a New Submission."
3. From the conference Call for Papers screen, identify the topic to which the prospective paper is best correlated, and click the "Select" link next to that topic.
4. Verify the topic selection and click "Select" again, then verify the rules and regulations on the subsequent page.
5. Answer the prompts to enter paper title, corresponding author information (including e-mail address), and A/V requirements.
6. When this information is complete, authors will be prompted to upload the abstract in any one of five formats: MS Word, WordPerfect, Text, RTF, or PDF.

The deadline for receipt of abstracts via electronic submission is **31 January 2008**.

Questions pertaining to the abstract or technical topics should be referred to the corresponding technical track chair or the Technical Program Chairman, Tony Williams, at williams_tony@bah.com. Authors having trouble submitting abstracts electronically or those with questions should e-mail AIAA technical support at paper_tech_support@aiaa.org.

Letters of official acceptance and instructions for preparation of manuscripts will be sent on or about **3 April 2008**. Abstracts not accepted for a session may be included in a poster session.

Important Dates

Abstract Deadline
31 January 2008

Special Session Proposal Deadline
31 January 2008

Author Notification
3 April 2008

Final Manuscript Deadline
29 July 2008

"No Paper, No Podium" Policy

A "no paper, no podium" rule is in effect for this conference, which stipulates that any author failing to submit a written manuscript prior to his or her presentation will not be permitted to present the paper. Videotaped presentations are not permitted. Prospective authors should keep this rule in mind when submitting their abstracts.

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.

Final Manuscript Guidelines

An Author's Kit containing detailed instructions and guidelines for submitting papers will be made available to authors of accepted papers. Authors must submit their final manuscripts via the conference Web site no later than **29 July 2008**.

Young Professional Presentation Program

Young professionals are sought to participate in the Young Professional Presentation Program that provides young professionals under the age of 35 with the opportunity to present their work at a national AIAA technical conference. This program integrates young engineers into the regular sessions and allows them to give presentations covering continuing and in-process design or research works, in addition to completed projects. The Young Professional Presentation Program allows for oral presentations only; manuscripts are not required. Abstracts will need to be submitted as specified in this call for papers. All submission deadlines and policies are the same as those specified in this call for papers.

Presentation topics for the Young Professional Presentation Program for the conference should derive from the topics listed in this call for papers, and should be work with which the presenting engineer is engaged or intimately familiar. When submitting your abstract, follow the abstract submittal guidelines listed, making sure to click the "Young Professional Presentation" box.

Department of Defense Approval

The Department of Defense finds this event meets the minimum regulatory standards for attendance by DoD employees. This finding does not constitute a blanket approval or endorsement for attendance. Individual DoD Component commands or organizations are responsible for approving attendance of its DoD employees based on mission requirements and DoD regulations.

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, who are U.S. citizens and Green Card holders, 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.

Questions? Please contact:

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