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**SPACE
2007**

CONFERENCE
& EXPOSITION

Call for Papers

Abstract Submittal Deadline:
28 February 2007

Submit Abstracts at:
www.aiaa.org/Space2007

Exploring Space: The Next 50 Years

18–20 September 2007
Long Beach Convention Center
Long Beach, California

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Exploring Space: The Next 50 Years

On the eve of NASA's 50th anniversary, space still represents a frontier left remarkably undiscovered. We have come to depend on space systems for communicating with many parts of the world, for monitoring weather, for airplane navigation, for protecting the Earth's resources, and to alert us of terrorist activities. Yet, we have barely scratched the surface. Why? This is the question we intend for this conference to address—to focus on the next 50 years of space exploration and further refine the vision NASA has started to implement.

Discussions over the three-day event will highlight the numerous advances in space technologies and applications over the past half-century, and the obstacles that must be overcome for us to be successful as we look toward the next 50 years. The fact that the successes we have had in space remain largely unrecognized by the majority of people outside the space community is just one of the issues we must resolve. With increasing demands on national budgets and global tensions rising, growing awareness of both the achievement of space activities to this point—as well as the promise they hold for a more secure, comfortable life on a global scale—is one of the main objectives of this conference.

Leaders from government, industry, and academia will convene to share ideas and offer their perspectives on the political, economic, and social issues that must be addressed to take space utilization to the next level. Invited speakers and panelists will set the tone for discussions that will continue throughout the three-day program. This conference, with its space systems emphasis, complements other, more specialized meetings by offering a broad view on all disciplines, making this meeting the "must attend" conference in 2007.

Space 2007 is co-chaired by The Boeing Company, NASA Jet Propulsion Laboratory, and the U.S. Air Force Space and Missile Systems Center.

AIAA would like to thank the following sponsors:

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Important Dates

Abstract Submittal Deadline: **28 February 2007**

Author Notification: **12 March 2007**

Final Manuscript Deadline: **27 July 2007**

CALL FOR PAPERS ■ ABSTRACT SUBMITTAL PROCEDURE ■

AIAA welcomes the submittal of papers on all aspects of space systems and technology. The program is structured around the following eight technical tracks:

- Space Systems
- Human and Robotic Exploration
- Space Transportation/Space Access
- Military Space
- Space Science
- Space Policy
- Space Economics
- Enabling Technologies and Workforce Development

The technical program committee will referee and select papers for presentation at the conference to ensure high quality and relevance. Preference will be given to papers that document significant advances in technology and system development, highly innovative concepts, significant planning initiatives and policy analyses, and other matters of high interest and value to the attendees. Prospective authors are urged to take advantage of this opportunity to communicate important results to their peers and colleagues.

Abstracts should be 500–1000 words, with supporting graphics as necessary, and should present facts that are new and significant. Abstract submissions will be accepted electronically through AIAA's Web site at **www.aiaa.org/Space2007**. The Web site is now open for abstract submittal. On the Web, authors will click on "View Call for Papers or Begin a New Submission," and then click "Select" next to the title of the technical track to which the abstract is being submitted.

Each author will then be prompted to provide his or her address, corresponding author information, citation information, AV requirements, and biographical information. Finally, authors will be prompted to upload their abstracts in any one of five formats: MS Word, WordPerfect, Text, RTF, or PDF. The system will accept abstracts for this conference until **28 February 2007**.

Authors having trouble submitting abstracts electronically should e-mail AIAA technical support at: **paper_tech_support@aiaa.org**. Questions about the full abstract submission should be referred to the Deputy Program Chair.

The technical program committee will review abstracts. Notice of acceptance will be sent to authors around 12 March 2007. Instructions for submitting papers will be included with acceptance notices. The deadline for manuscript submittal is 27 July 2007. 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. For more information, contact the Deputy Program Chair.

A general "no paper, no podium" policy will be in effect for all contributed papers. This means that an author will not be allowed to present if a written paper has not been prepared and uploaded to AIAA. Video-taped presentations will not be allowed. Submittal of an abstract is interpreted as an intention to attend the conference and to present the final paper. (Note: Published papers are not required for the Young Professional Presentation Program, described below.)

Contact the Deputy Program Chair

For more information about abstract and paper submittals, please contact the Space 2007 Deputy Program Chair:

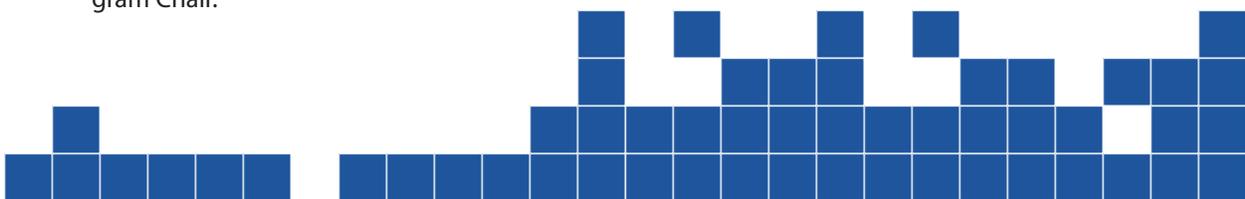
Kathie Gutierrez
562/797-7342
562/797-5030 FAX

E-mail:

kathie.gutierrez@boeing.com

Warning—Technology Transfer Considerations

Prospective authors are reminded that technology guidelines have considerably extended the time required for review of abstracts and completed papers by U.S. government agencies. Internal and external review 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.



SPACE 2007 TRACK DESCRIPTIONS

■ *Space Systems*

Operating in space requires large, complex systems. How to architect, design, develop, build, operate, and maintain these large systems in a cost-effective manner are the fundamental questions facing the systems engineering community. Adding to their complexity and challenge is the increasing reliance on software required to make these systems work, as well as the supporting ground infrastructure. Innovative architectures will incorporate advancements in miniaturization and new technologies that will become available in the coming years, but with a certain level of risk. Increasing communication requirements will put additional demands to expand the available bandwidth beyond what is available today.

Papers are solicited that address topics related to the development of new architectures and the issues associated to design, develop, build, operate, and maintain these large space systems.

■ *Space Transportation/Space Access*

The success of all space endeavors—military, scientific, exploration, and development of commercial business—depends upon low-cost, highly reliable access to space. Current worldwide space deployments are achieved, for the most part, through expendable launch vehicles. The space shuttle still remains the only reusable system for human access, and it will be retired in 2010. Small launch vehicles have offered promises of low-cost space access, but so far they have found difficulties in execution. Orion is the first of NASA's Constellation Program and will be capable of transporting four crew members for lunar missions and later supporting crew transfers. NASA's Ares Rockets will return humans to the moon and later take them to Mars and other destinations.

The U.S. military is currently developing concepts for responsive space systems, including responsive and small launch vehicles. Current space launch ranges add additional constraints on space launch flexibility and responsiveness, impacting both commercial and government missions. Reusable launch concepts offer substantial promise but seem unattainable. Additionally, the human and robotic exploration program requires significant increased capabilities (to include heavy lift) from the space transportation community.

■ *Human and Robotic Exploration*

Robotic systems have historically been the "first" explorers in space and on planetary surfaces and should continue to pave the way for safe human exploration. Many believe human life should not be risked and robots should be at the forefront of all future exploration. Humans must go into space for the same reasons that have driven us in the past, to find new resources, to create a better life for all, and to extend the human presence throughout the solar system. The Vision for Space Exploration presents an excellent opportunity to build consensus and to recognize that humans and robotics are both necessary components of a robust civil space program.

Papers are invited that address the issues and challenges associated with human and robotic exploration of the solar system. When do we send humans to Mars, or can exploration needs be met utilizing robotic missions? What are the technical and political barriers to human exploration of Mars?

Papers are invited that address these and related subjects. What are the true requirements for future launch vehicles? What concepts in development are viable options, and what are the critical technologies needed for these concepts to be realized? How should the government stimulate industry to develop future launch vehicles and their associated technologies (e.g., X-vehicles)? What is the best role for the government? What are the DoD requirements for a next-generation launch system? Can a joint NASA/DoD program be successful? Will the launch market ever become robust enough to support commercial development of a next-generation launch system? What are the characteristics of the future launch market? Will space tourism become a large market? Should our policies and regulatory rules be revised? What international teaming is appropriate? What barriers exist? How do we overcome these barriers? What are the real financial concerns of prospective launch service providers, investors, and users? Should the government increase its investments in R&D, specifically in engine technology and development, as an enabler for commercial development of future launch systems?



■ *Military Space*

The strength of a military's space capabilities has become the determining factor in winning battles quickly and decisively. They also play a vital role in protecting the peace, allowing us to monitor terrorist activities in remote parts of the world. Communications, battlespace awareness, navigation and timing, precision targeting, weather monitoring, and other capabilities have all vastly improved thanks to the availability of space assets. However, these assets are complex systems that present unique challenges to manage and maintain. Operational concepts must be developed to integrate space assets more efficiently and to greater effect to ensure these space systems are available to the warfighter when needed.

Papers are solicited addressing both current state of the art and future opportunities in the following areas:

- Intelligence
- Deterrence
- Situational awareness
- Communications
- Battlespace awareness
- Operational responsiveness

■ *Space Science*

The foundation of most NASA activities, since it was charted in 1958, has been "the expansion of human knowledge of the Earth and of phenomena in the atmosphere and space." NASA will continue to send probes to examine the universe, but it is the implementation of their Vision for Space Exploration that will enable space science to go way beyond what has been done to date. By establishing bases first on the moon, and then on Mars, science will have an unprecedented platform to perform experiments related to scientific questions on the origin of life, effects from solar radiation, study of black holes, and many others. We can also use these bases to study Earth and gain insight into how our environment is changing. Another key element space science offers is the opportunity for international cooperation, which has been a cornerstone of past programs.

Papers should cover missions that will support the vision, including innovative and inexpensive spacecraft approaches, 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. The International Space Station should not be ignored as it offers excellent opportunities for microgravity science, and robotic precursor missions should be included as well.

Papers are invited that address such topics as space control, space situational awareness, mission requirements, ground operations, and infrastructure, including the state-of-the-art enabling technologies needed to support the future requirements. Papers are also invited that discuss U.S. and other government policies, plans, and international agreements that are required to ensure continued peaceful and mutually beneficial exploitation of space to support national security needs. Utilization of space-based assets to support warfighter and homeland defense requirements, including lessons learned from recent events, are other topics intended to be covered in this technical track, as well as dealing with the role of commercial systems in military missions (e.g., do commercially available services adequately address military requirements?). Please submit only unclassified papers.

■ *Space Policy*

Numerous skeptics question the human and technological costs associated with space exploration and the relevancy of a space program in its entirety. Many believe that we should not spend money on space until we resolve all our problems here. Therefore, it is imperative that firm legal, financial, and political ties are established with key stakeholders to provide a network for both government agencies and private industry to continue in the quest for space exploration and discovery. Without a space policy that deals with regulatory issues, international collaboration, and legal and financial concerns, they will become barriers to the success of future space missions.

Papers are invited to address policy topics dealing with regulatory issues, licensing, insurance and indemnification, lease or sale of government assets, environmental concerns, and international agreements and treaties, as well as space law topics relating to liability issues, space surveillance, and anti-corruption laws. Papers are also invited that discuss the government's role in space. Should the governments of the world be supporters and providers of infrastructure that would enable the commercial sector to become the owner/operator of the systems put in place?

SPACE 2007 TRACK DESCRIPTIONS

■ *Space Economics*

Economics is a critical discipline in advancing technological change in society. Space and space-related activities are at the forefront of cutting-edge technological change. Therefore, economics has a very significant role in space. Economic growth and scientific/technological achievement have been intertwined since the dawn of history in an ever-expanding spiral. It is only recently that we have understood and begun to quantify the strong interdependent relationship of economic growth and technology. Space activities and off-planet enterprises have been, and will continue to be, catalysts for revolutionary changes in our global society, significantly contributing to economic strength and the advancement of our nation and world. Space economics has thus 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. From market analyses of supply and demand to issues facing the nation in our international activities, economics is crucial to both intelligent decision making and our understanding of the world.

Papers are invited covering a broad set of topics and interest areas, including economic and cost-benefit analysis, cost estimating and analyses, financial/investment analysis, resource allocation, cost effectiveness, cost reduction initiatives, risk analysis, 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.

■ *Enabling Technologies and Workforce Development*

Engineers must push the boundaries of technology to make the exploration of space easier, safer, more operationally efficient, and less expensive. Future space missions require significant advances in critical technologies and also discovery and development of new technologies to revolutionize space transportation, systems, and operations. With new emerging technologies that have the potential to enhance significantly the performance of existing and future systems, there is always increased risk associated with these unproven technologies. What is the acceptable tradeoff in terms of risk? What are the requirements that will be imposed on systems, subsystems, and components for which key technology advance is the only option? In what areas must technological progress be made to meet these requirements? What are the critical technologies that need to be developed for future space missions to be successful? Finally, when must these technologies be available (roadmaps) to enable these missions to be planned and implemented?

Papers are invited describing progress in critical areas, for example, of advanced structures; innovative new materials, including nano-materials and composites; protection against space debris, meteoroids, and the space environment; thermal protection; vehicle power, environmental control, and life support systems; biotechnology; advanced avionics; command, control,

and communications; high-operability and alternative propulsion systems; advanced aerodynamics; and integrated vehicle management and inflatables. Of particular interest is the identification of what precursor capabilities are necessary to fulfill exploration objectives. Areas may include advanced robotics, novel approaches to navigation and communications at the moon and/or Mars, closed-loop life support systems, ground operations, command and control software architectures, advances in propulsion, new materials, new developments for space-based observatories, autonomous docking systems, in-space refueling, nuclear and other energy concepts for sustaining bases on celestial bodies, and other technologies.

Another enabler to the future development of space is the need for a sustainable motivated, articulate, knowledgeable workforce that is capable of real-time problem solving, critical thinking, and the ability to work together to develop integrated solutions. Therefore, papers are also invited that consider the development of the future workforce that involves all stakeholders (i.e., systems approach to solving the issues, or "E"). Similar to the quality issues the industry faced in the past, solutions resulted from thinking about all the elements that affect quality, "Q," not just the process of inspection, "q."

YOUNG PROFESSIONAL PRESENTATION PROGRAM

Young professionals are sought to participate in the Young Professional Presentation Program, which 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 professionals 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 presenta-

tions only; published papers are not required. Please note that the Young Professional Presentation Program does not violate the "no paper, no podium" policy; the program is fully supported by the AIAA Technical Activities Committee.

Presentation topics for the Space 2007 Young Professional Presentation Program should be work with which the presenting speaker is engaged or intimately familiar. When submitting your abstract to a session, please

indicate that it is a Young Professional presentation. To submit your work for consideration, submit a brief (500 words or less) abstract for the technical track for which you wish to be considered.



We're Going Back to the Beach!

The Space 2007 Conference & Exposition will return to Long Beach, California, in 2007. The Long Beach Convention Center provides a world-class venue for this high-profile event. Convenient lodging will be available at the adjacent Hyatt Hotel. Local attractions include the Aquarium on the Pacific, Shoreline Village, and the famous ship, *Queen Mary*.

EXPOSITION

Showcase your products and services at the Space 2007 Conference & Exposition to address this year's theme, Exploring Space: The Next 50 Years.

To reserve your exhibit space, contact:

Cecilia Capece
Sponsorship Manager
703/264-7570
703/264-7562 FAX
ceciliac@aiaa.org

Check out our Web site for continuous program updates:

www.aiaa.org/Space2007



American Institute of
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1801 Alexander Bell Drive, Suite 500
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