Call for Papers

51st AIAA Aerospace Sciences Meeting
Including the New Horizons Forum and Aerospace Exposition

7–10 January 2013
Grapevine, Texas
(Dallas/Fort Worth Region)
Gaylord Texan Resort and Convention Center

Call for Papers
The AIAA Aerospace Sciences Meeting is the first major multidisciplinary event of the year for aerospace scientists and engineers from around the world. It provides an ideal forum for scientists and engineers from industry, government, and academia to share and disseminate scientific knowledge and research results with a view toward new technologies for aerospace systems.

This meeting is built around excellent technical paper presentation sessions. Plenary sessions that focus attention on program areas of current interest will start some sessions, followed by technical papers providing additional discussion of these topics. Distinguished lectures and evening networking events fill out the remainder of the program throughout the week.

**Executive Chair:**
**Dr. Ray O. Johnson**  
SVP and Chief Technology Officer  
Lockheed Martin Corporation

**New Horizons Forum**
The New Horizons Forum, held in conjunction with the Aerospace Sciences Meeting, will feature keynote speakers from industry and government who will share their perspectives on the new challenges, future opportunities, and emerging trends in aerospace education, research, and programs. The New Horizons Forum will also feature panel discussions in which leaders from industry, government, and academia will address current issues and trends in aerospace technology research and development.

**New Horizons Forum General Chair:**  
**Lt General John T. (Tom) Sheridan**  
USAF (Ret.)

**Aerospace Exposition**
The Aerospace Exposition will showcase exhibits from government, industry, and small businesses, allowing one-on-one discussions with exhibitors, hardware and software demonstrations, and opportunities for side meetings with these organizations throughout the week.

**Call for Papers**
The contributed papers for this meeting are chosen by a competitive selection process based on peer review. In addition, invited papers of the highest quality review major trends and accomplishments within or across various aerospace disciplines. To facilitate simultaneous sessions, papers will begin on the hour and half-hour. Six to eight 30-minute paper presentations per session are planned (20 minutes for presentation and 10 minutes for audience questions and discussion), but session organizers are encouraged to include one-hour survey papers where appropriate.

Listed in this call for papers are the AIAA Technical Committees sponsoring this meeting, the areas in which papers are being solicited, and the names and addresses of the topic organizers to whom questions should be addressed. Every effort will be made to provide uniformly rigorous evaluations and acceptance rates for all sessions.

General inquiries concerning the program, conference format, or policies, and suggestions for special high-interest sessions or presentations should be directed to:

**Aerospace Sciences Meeting Chair:**  
**Rob Vermeland**  
Manager – Aerodynamics and Acoustics  
Advanced Development Programs  
Lockheed Martin Aeronautics Company  
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**Why Submit a Paper?**

- **Networking** – Build your professional network when you interact with peers and colleagues during your paper presentation.
- **Worldwide Exposure** – Your paper will be added to the AIAA Electronic Library, the largest aerospace library in the world. More than two million searches are performed every year with 150 institutions as subscribers!
- **Respect** – AIAA journals are cited more often than any other aerospace-related journal and their impact factor is ranked in the top ten. When you publish with AIAA, you know that your name is connected with the most prestigious publications in aerospace.
- **Praise** – Receive recognition from your peers and community.
Technology Topics

Aeroacoustics
Papers are solicited that address computational, experimental, and analytical results and techniques in all areas related to aeroacoustics and structural acoustics. Specific areas of interest include, but are not limited to:

- Jet noise (subsonic and supersonic flight effects)
- Shock-associated noise
- Jet noise suppression
- Cavity tones and their suppression
- Computational aeroacoustics
- Turbomachinery noise; core noise
- Combustion noise
- Propeller noise
- Fan noise
- Open rotor noise
- Rotorcraft noise
- Airframe noise
- Sound-structure coupling, sonic fatigue
- Duct acoustics
- Atmospheric sound propagation/sonic boom
- Statistical energy analysis methods
- Modal analysis and synthesis
- Community noise and metrics
- Interior noise
- Active noise control
- Vibration control techniques

Please direct questions to:
Naval Agarwal
The Boeing Company
Phone: 425.965.7920
Email: naval.k.agarwal@boeing.com

Aerodynamic Measurement Technology
Papers are solicited on topics related to advanced and novel aerodynamic measurement techniques for ground-test or flight-test applications. Submissions are encouraged for all types of flows, including all speeds from incompressible to hypersonic, all thermodynamic conditions including plasmas and combustion, all scales from microfluidics to geophysical flows, and all diagnostic techniques from surface sensors to laser-based imaging. Topics of interest include, but are not limited to:

- Flow velocimetry
- Spectroscopic methods including laser-induced fluorescence, absorption, Rayleigh, and Raman techniques
- Planar and volume flow visualization and temporally-resolved imaging
- Surface measurements including boundary layer transition, skin friction, heat transfer, and surface temperature and pressure (including temperature- and pressure-sensitive paint techniques)
- Techniques for microfluidics
- Sensors based upon microelectromechanical systems (MEMS) and sensor miniaturization
- Techniques for acquiring multiple properties, property correlations, or space-time derivatives
- Aeroacoustic diagnostics including microphone arrays or pressure/density measurements
- Measurement of species concentration or thermodynamic state
- Aerodynamic data acquisition, processing, and display
- Diagnostics for harsh environments such as gas turbine engines, fires, cryogenic, high-G, or in-flight applications
- Application to production-scale testing
- Uncertainty quantification and error analysis of advanced diagnostics
- Novel calibration and data processing methodologies

To be included in an Aerodynamic Measurement Technology session, papers should emphasize advancements or innovations in the measurement technique itself or its implementation, rather than the particular fluid dynamic problem to which the technique is applied.

Please direct questions to:
Brian S. Thurow
Auburn University
Phone: 334.844.6827
Email: th row@auburn.edu

Air Breathing Propulsion Systems Integration
Papers are sought that discuss the science and technology of propulsion innovations including air-vehicle propulsion optimization, power systems, and propulsion system/subsystem integration.

Of high interest this year are papers concerning:

- Hypersonic engine-vehicle integration and combined-cycle engines
- Supersonic inlet aerodynamics, flow control, and integration
- Inlet-fan integration for fixed-wing and V/STOL aircraft
- Fuel efficient propulsion: open rotors/ducted fans, geared turbofans, and variable cycle engines
- Military and civilian aircraft power/thermal systems integration:
  - More electric / hybrid electric aircraft vehicle systems including power generation, distribution and management, thermal management, etc.
  - Advanced aircraft thermal management system design for high energy intensity military applications – combat, directed energy weapons, hypersonic, morphing aircraft
  - System-level modeling and simulation
  - Platform-level systems integration
  - Aircraft energy optimization of integrated propulsion/power/thermal management/mission systems

Other topics of interest for these sessions include, but are not limited to:

- Alternative fuel cycle and subsystem design and integration
- Sonic boom-mitigating inlets and nozzles for supersonic aircraft
- Propulsion Systems Engineering: propulsion architecture definition; requirements, schedule, cost, and risk; total system performance responsibility
- Installed Performance and Controls: steady-state, dynamic, MDO, and real-time models; integrated flight/propulsion control; hardware/software integration
- Propulsion Aerodynamics (experimental, computational, and flight test): inlet/nozzle analysis, integration, installed performance; engine/inlet compatibility; inlet and nozzle flow control; thrust vectoring; secondary air systems and bay ventilation; throttle-dependent drag and jet effects
- Engine Physical Integration: performance-based specification development, interface control, and associate contractor/supplier management
- Propulsion Operations: reliability and maintainability; field support; removal and installation; overhaul and maintenance; prognostics and health maintenance
- Flight Certification: validation and verification; FAA compliance/regulations
- Environmental Factors: corrosion, icing, noise, bird strike, safety zone, etc.
- Full Range of Systems: V/STOL, UAV, transport, fighter, missile, lighter-than-air, propeller-driven, and non-turbine (reciprocating/rotating) systems

Please direct questions to:
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Bombardier Aerospace
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Aircraft Design
Papers are sought on all aspects of aircraft design, including, for example, configuration design, aerodynamic design, and systems design. Topics such as design methodologies and processes, design integration, technology developments, innovative designs, and case studies are all welcome. Review papers on recent developments and trends in aircraft design are also sought. Design considerations such as electric powered flight, environmental issues, energy optimization, noise reduction, electric aircraft systems, biomimetics, etc. are also important topics of interest. Applications to aircraft of all types are welcome including fixed and rotary wing, subsonic through hypersonic, micro air vehicles to jumbo jets, and manned or unmanned aircraft. Papers on design education are also solicited. Example categories of interest include:
Design processes and tools
Design optimization for reduced cost/weight
Design for reduced environmental impact (e.g., noise, emissions, fuel consumption)
Innovative aircraft design and design case studies
Micro air vehicle and unmanned aircraft design
Aircraft design education

Please direct questions to:
Gil Crouse Jr.
Auburn University
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Applied Aerodynamics
Papers are solicited that advance the field of Applied Aerodynamics in the areas of aerodynamic design, vehicle aerodynamics, and aerodynamic phenomena. Topics that span the flight regime from subsonic to hypersonic speeds are solicited. These topics may include, but are not limited to:

- Applied CFD with correlation to experimental data
- Innovative aerodynamic concepts and designs
- Unmanned aerial vehicle designs/tests
- Missile/projectile/guided-munition aerodynamics
- Drag estimation and reduction methodologies
- Propeller design, test, and optimization
- Rotorcraft aerodynamics
- Wind turbine aerodynamics
- Aerodynamic design methodologies
- Optimization methods in applied aerodynamics
- Weapons carriage and store separation
- Ground-to-flight scaling methodology and wind tunnel correlations
- Icing or roughness effects on vehicle aerodynamics
- Bio-inspired aerodynamics
- Low speed, low Reynolds number aerodynamics
- Active flow control
- Unsteady aerodynamics
- Vortical/vortex flow
- High angle-of-attack and high lift aerodynamics
- Aerodynamic-structural dynamics interaction
- VSTOL/STOL aerodynamics
- Aerodynamic design and enabling technologies for environmentally friendly and efficient aircraft
- Other topics in applied aerodynamics

Authors should indicate under which of the above topics they prefer their paper to be included and are highly encouraged to include experimental comparisons when applicable and possible.

Please direct questions to:
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Atmospheric and Space Environments
Papers are sought that provide the aerospace community (ground operations, aviation, rockets, launch vehicles, and spacecraft) with scientific and technical information concerning interactions between aerospace systems and the atmospheric/space/planetary environment. In addition, papers are solicited that provide new or refined information improving the basic understanding of the atmosphere or of space, or of their applications to aviation and aerospace vehicle design and operations issues. Atmospheric and Space Environments includes the areas of:

- Atmospheric environment
- Impacts of aerospace on the environment
- Aircraft wake vortex science, applications, and technology
- Aviation weather and atmospheric dynamics
- Meteorological applications to aerospace operations
- Satellite and ground-based measurement systems
- Environment standards
- Space environments
- On-orbit spacecraft-environment interactions
- Laboratory simulation of the space environment
- Spacecraft charging
- Space weather
- Meteoroid and debris environment

Potential ASE contributors are reminded that these and additional topic areas such as Aircraft Icing will also be represented at the 5th Atmospheric and Space Environments Conference, planned for June 2013.

Please direct questions to:
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Jet Propulsion Laboratory
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Email: Nelson.W.Green@jpl.nasa.gov

Atmospheric Flight Mechanics
Papers are solicited that present new theoretical, computational, or experimental results in atmospheric flight mechanics. Topics of interest include recent simulation and flight test evaluation of a variety of vehicle configurations, including X-vehicles, unmanned aerial vehicles, and missiles. Papers covering advanced technologies to meet challenging atmospheric flight problems during ascent/abort and reentry flight phases of launch vehicles are also welcome. Interesting and novel flight mechanics problems or lessons learned during the development and testing of these vehicles would be of particular interest as well. Specific areas of relevancy include, but are not limited to, the following:

- Aerodynamic Prediction Methods: This technology area covers the prediction of aerodynamic forces and moments acting on all types of atmospheric flight vehicles. Of particular interest is the integration of a variety of methods such as computational aerodynamics, advanced dynamic testing techniques, and unique flow-field measurement methods into unified approaches for the prediction of aerodynamic loads. Also of interest is flight simulation in subsonic, transonic, supersonic, and hypersonic flight environments, at steady and unsteady conditions, and at low and high angles of attack.
- Aircraft Flight Dynamics, Handling Qualities, and Performance: This topic area includes aircraft stability, control response, handling qualities, and response to atmospheric disturbances. Subtopics of interest include determination of stability and control derivatives, manned and unmanned vehicle handling qualities, high-angle-of-attack control, nonlinear modeling, rotorcraft handling qualities with and without slung loads, trajectory optimization, effects of icing and turbulence on flight dynamics and control, aeroelastic and aeroservoelastic dynamics, flow-field effects, departure prevention, and spin characteristics.
Launch Vehicle, Missile, and Projectile Flight Dynamics: This area pertains to the application of analytical or experimental methods for the analysis and prediction of the flight dynamics of expendable and reusable launch vehicles, missiles, and projectiles. The advanced technology areas include performance, stability, and control; adaptive guidance, control reallocation, and re-configurable flight control methods during ascent/abort and reentry phases of the mission to improve safety and operability of second-generation reusable launch vehicles. Topics of interest include high-angle-of-attack aerodynamics, determination of dynamic stability derivatives, component and store-to-store interference effects, prismatic tau law and flight dynamics, incorporation of predictions into trajectory simulations, trajectory flight dynamics affecting the impact accuracy of missiles and projectiles, and analysis of flight test data.

Small/Mini/Micro Aerial Vehicles: Currently there is great interest in very small flight vehicles for a variety of purposes. Such small vehicles pose many new challenges for the design engineer. Low flight speeds, hovering flight, light-weight-low-inertia vehicles, and unconventional designs all present challenges for development. Papers are therefore requested relating to the unique flight mechanics and handling qualities of small/mini/micro aerial vehicles. Topics include low Reynolds number aerodynamic prediction methods, flight mechanics for low-inertia vehicles, effects of flexible vehicle structures, very low speed flight mechanics, and transition between forward and hovering flight. Additionally, topics relating to the flight mechanics of unconventional small/mini/micro flight vehicles (e.g., ornithopters, flapping wing vehicles, rotorcraft, etc.) are welcome.

Planetary Entry and Aeroassist Technology: Papers are requested relating to the entry dynamics into the Earth’s atmosphere as well as the atmosphere of other celestial bodies. Topics include hypersonic flight performance, optimization of reentry vehicle configurations, trajectory optimization, and trans-atmospheric vehicles. Papers are also requested in the area of aerogravity assist orbit transfer dynamics. Topics include planetary aerobraking and aerocapture, low-density atmospheric flight mechanics, and atmospheric maneuvering to effect orbital transfer. Papers in other areas related to very high speed reentry atmospheric flight mechanics are also welcome.

Please direct questions to:
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Design Engineering
Papers are solicited on current design engineering and design process activities. Design-oriented papers should focus on innovative, novel, or otherwise distinctive designs or concepts resulting in or leading toward products that effectively satisfy requirements or demonstrate design efficiency improvements. Emphasis on current aerospace programs such as commercial access to space, very light business jets, NASA Environmentally Responsible Aviation, ESTOL, satellites, missile systems, Unmanned Air Systems, and service life extension projects are encouraged. The definition, application, and implementation of emerging design tools that have resulted in significant design-cycle time reduction from tool integration, and the use of experiments, simulation, or rapid synthesis and analysis tools that have resulted in the ability to analyze a large number of design configurations resulting in or leading toward reduced program cost and risk should be emphasized.

Process-oriented papers should focus on current design engineering process activities, such as process definition, analysis, architecture, and metrics, as applied to aerospace hardware products from the exploratory design phase through the detailed design phase. Papers on the advances in model-based design processes and related activities are especially encouraged. Other design engineering process-related activities that may be addressed are the interaction between processes and tools, impact of tool integration on a process, and risk reduction from the use of higher-fidelity tools earlier in the design process. Other enablers to reducing design cycle time and cost while increasing the ability to meet all cost, schedule, and technical requirements may also be addressed.

Education-oriented papers are solicited that emphasize design in curriculum development, class content and student activities. Examples showing how to teach design are especially requested.

Please direct questions to:
E. Russ Althof
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Energetic Components and Systems
The science of energetic materials is critical to the aerospace community. Energetic components, both explosive and pyrotechnic, provide critical performance attributes to aeronautical and astronautical missions. The successful engineering and application of the controlled use of energetic materials in these components is a result of fundamental understanding of scientific phenomena that govern the performance of these materials. Papers relating to the science of energetic materials and devices are sought for sessions for ASM 2013. Paper topics are solicited in the following, non-inclusive list of areas:

- Energetic materials synthesis/characterization
- Energetic materials compatibility/aging/surveillance
- Analytical method development for analysis of energetic materials
- Testing and diagnostics of energetic materials events
- Numerical simulation of energetic materials/components
- Nano-scale phenomena of energetic material performance
- Environmental initiatives relating to energetic materials and components
- Practical applications and novel uses of energetic materials

Please direct questions to:
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Fluid Dynamics
Papers are solicited in the areas of experimental, theoretical, and computational fluid dynamics relevant to aerospace applications, including basic research and development, applied research, and advanced technology development. Papers that present new insights into flow physics, introduce innovative applications, address emerging technical areas, or combine experimental, computational, and/or theoretical approaches are strongly encouraged. Authors who have recognized expertise in a particular area and are interested in writing a comprehensive review are encouraged to contact the track chair. Potential subject areas include, but are not limited to:

- CFD Methods
  - Structured CFD algorithm development, methodology, and validation
  - Higher-order unstructured CFD algorithm development, methodology, and validation
Please direct questions to:

**topics they prefer their paper to be included.**

In addition, sessions are planned in the following areas:

- High-speed turbulent flows
- Boundary-Layer Transition
- Low- and high-speed flows
- Roughness effects
- Control methods
- Other Areas of Fluid Dynamics

In addition, sessions are planned in the following areas of interest:

- Turbulence: including free-shear, wall-bounded, and high-speed flows
- Shock-dominated flows: including shock boundary-layer interactions
- Low Reynolds-number flows: including biologically-inspired flight
- Wing Aerodynamics: including deformable wings and flapping wings

Authors should indicate under which of the above topics they prefer their paper to be included.

Please direct questions to:

**Gary Dale**

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**Matthew Borg**

Wright-Patterson Air Force Base
Phone: 937.255.3401
Email: matthew.borg@wpafb.af.mil

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**Gas Turbine Engines**

Papers are solicited in the disciplines of thermodynamics, aerodynamics, aeroelasticity, mechanical design and fabrication, combustion, heat transfer, icing, and controls as related to the science, research, technology development, and testing of gas turbine engines and related components for air vehicles in the subsonic and transonic flight regimes. Topics areas include, but are not limited to:

- Improved analytical/computational methodologies for fluid, thermal, and structural analysis of engine components
- Analytical and computational models for engine-level analysis/simulation
- Advances in turbine engine systems and components
- Advanced engine cycles and game-changing component technologies
- Engine preliminary and detailed design methodologies
- Variable cycle engines
- Combustion technologies in emissions, operability and reliability
- Turbomachinery technologies in noise, efficiency, cooling and durability
- Engine icing
- Electric power generation
- Comparisons of engine flight test with ground test data and simulation results
- Auxiliary systems and structures, and their interaction with the primary engine system
- Open rotor
- "Green"/environmentally friendly aviation
- Engine inlet compatibility
- Geared turbofan engines
- Distributed propulsion
- Alternate fuel manufacturing and testing

Please direct questions to:

**Won-Wook Kim**

GE Energy
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Email: wonwook.kim@ge.com

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**High Speed Air Breathing Propulsion**

Papers are solicited that address the design, analysis, testing, and evaluation of technologies and systems that enable supersonic and hypersonic air vehicle propulsion. Topics include, but are not limited to:

- Advances in propulsion systems including ramjets, scramjets, pulse detonation engines, and combined cycles (including rocket and turbine based)
- Experimental and/or numerical results pertaining to high-speed inlets, isolators, combustors, nozzles, fuel injectors/systems, thermal management systems, and integrated flowpaths
- Instrumentation, diagnostics techniques, and test methods
- Engine component materials and manufacturing
- Analytical/computational methods involving fluid, thermal, structural, or multidisciplinary analysis
- Comparison of numerical simulation with flight or ground engine test data

Papers on other topics related to high speed air breathing propulsion technologies and systems are also invited.
Please direct questions to:

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History
In 2013, we mark the 100th anniversary of Orville Wright’s 1913 Collier Trophy, awarded for the automatic stabilizer, and the 50th anniversary of the 34-hour mission of astronaut L. Gordon Cooper, marking the end of Project Mercury, as well as the 25th anniversary of the U.S. Air Force’s public unveiling of the Stealth Fighter, the F-117A Nighthawk. This year’s history sessions will remind us of the early accomplishments of AIAA, its members, and the industry. Papers are sought covering significant advancements of flight, both in air and in space. All papers on the history of aeronautics and space flight will be considered.

Please direct questions to:

Cam Martin
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Homeland Security
Homeland security depends critically on a number of research areas, encompassing the full range of AIAA technical committees and beyond. We strongly encourage submission of abstracts for the relevant sessions, including examples such as:

▶ Fluid dynamics and multi-phase flow relating to atmospheric dynamics, climate, oceans, and water supplies
▶ Unmanned sensor platforms
▶ Space assets and capabilities/limitations
▶ Sensors and intelligent systems
▶ Manned assets/operations
▶ C2I, communications, and interoperability
▶ Human factors and dynamics
▶ Biometrics
▶ Economic and legal considerations/impact
▶ Air traffic and operations
▶ Energy, lasers, directed energy, and non-lethal counter-asset/counter-personnel technologies
▶ Modeling/simulation in any pertinent areas

The above list is simply to suggest possibilities. All papers relating to homeland security will be considered.

Please direct questions to:

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OSI
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Intelligent Systems
Papers are sought that illustrate the relevance of Intelligent System (IS) technologies to aerospace sciences. Topics of interest include, but are not limited to:

▶ Autonomous systems
▶ Data fusion and reasoning
▶ Evolutionary (genetic) algorithms
▶ Expert systems
▶ Fuzzy logic
▶ Human-machine interaction
▶ Intelligent and adaptive control
▶ Intelligent data/image processing
▶ Knowledge-based systems and knowledge engineering
▶ Machine learning techniques
▶ Model-based reasoning
▶ Neural networks
▶ Planning and scheduling algorithms
▶ Qualitative simulation

Please direct questions to:

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or

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Meshing, Visualization, and Computational Environments
The Meshing, Visualization, and Computational Environments TC solicits papers describing tools and techniques that facilitate simulation of real-world problems in all areas of computational field simulation including computational fluid dynamics (CFD), computational aeroacoustics (CAA), computational solid mechanics (CSM), and computational electromagnetics (CEM). Although not limited to these topics, papers that describe advanced techniques and extreme applications in the following areas are particularly encouraged:

▶ A priori and a posteriori grid quality metrics related to solution accuracy involving real-world configurations such as the Drag Prediction Workshop, Shock Wave Boundary Layer Interaction Workshop, High Lift Prediction Workshop, and large-eddy simulation
▶ Integrated computational environments, including user interfaces, Internet technology, virtual reality, and advances in the interaction, automation, and computational speed/efficiency of and between preprocessing, computational simulation execution and monitoring, and post-processing as well as between computational simulations across multiple disciplines that increases fidelity and capability
▶ Advances in the management and comprehension of trends across multiple solutions, summary of results, discovery of relationships, feature detection, knowledge capture, engineering animation, and management of large volumes of data involved with optimization
▶ Geometry modeling for meshing and simulation, including CAD-CAE interoperability
▶ Meshing techniques, including surface and volume grids, grid adaptation, overset grid techniques, and moving/deforming meshes
▶ Applied meshing for real-world engineering applications
A special session will be developed for computational environment papers for this meeting.

Authors are encouraged to submit their manuscripts, either before or after the meeting, to the Journal of Aerospace Computing, Information, and Communication for possible publication.

Please direct questions to:

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Multidisciplinary Design Optimization
Multidisciplinary Design Optimization (MDO) is a computational technology for the discovery and exploitation of interactions among disparate disciplines to improve performance, lower cost, and shorten the product/system design cycle, through the application of optimization algorithms. The influence of MDO reaches diverse phases of a product or system life, including manufacturability, operability, and serviceability.

We seek papers discussing applications of MDO methods towards a wide variety of aerospace engineering design problems. Papers incorporating more than one discipline or technology should explain the nature and benefit of interdisciplinary synergies at the system level. Papers limited to single discipline optimization should emphasize aspects of the optimization process such as sensitivity analysis, approximation, or visualization. MDO applications of interest address aeronautical and mechanical systems that may incorporate any number of enabling technologies.

Core topics of interest include:

▶ Multidisciplinary analysis and optimization applications
  ▶ Aircraft system design
  ▶ Spacecraft system design
  ▶ Aircraft power and thermal systems design
  ▶ Aeroelastically tailored structural design
▶ Computational design frameworks
  ▶ Environments
  ▶ Visualization techniques
  ▶ Interfaces to CAD
▶ Modeling and simulation methods
  ▶ Design decomposition strategies
  ▶ Modeling and simulation approaches
  ▶ Simulation based design of power and thermal systems
▶ Uncertainty quantification and nondeterministic design optimization
  ▶ Multi-point design
  ▶ Robust design
▶ Shape and topology optimization
  ▶ Fundamental methods
  ▶ Applied aerodynamic shape generation
Plasmadynamics and Lasers

Papers describing basic and/or applied research and development results in the areas of plasmadynamics and lasers and related topics are solicited. Efforts combining contemporary theoretical/computational analyses with experimental verification/validation and which represent notable advancements in the aerospace sciences are especially encouraged. Special consideration will be given to works reporting milestone R&D and/or engineering achievements related to aerospace system application of plasma and laser technologies. Survey papers on the current state of the art and historical perspectives are also desired. Specific topics of interest include, but are not limited to:

- Plasma and Laser Physics: Including fundamental processes, laboratory plasma generation and characterization, experimental research or methods, plasma chemistry and kinetics, non-equilibrium reacting flows, properties, and advances in theory and/or computational simulation methods
- Space Plasma Physics and Applications: Including spacecraft-plasma interactions, space laser applications, and space experiments
- Laser Devices and Systems: Including the physics, engineering, and application of high-energy lasers, chemical lasers, electric lasers, laser material interaction, laser optics, and fluid-optic interactions
- Highly Energetic Plasma Systems: Including the physics, engineering, and application of high-power gas discharge and plasma generation devices, arc-heater technology, explosively generated plasma applications, compact pulse power, and high temperature systems and environments
- Magnetohydrodynamics (MHD): Including MHD power generation and propulsion technologies, terrestrial and aerospace systems applications, combustion plasma methods, innovative non-equilibrium plasma techniques, nuclear MHD systems, electromagnetic-fluid interaction and characterization, fundamental processes, and theoretical and/or computational simulation methods
- Plasma and Laser Propulsion: Including innovative and efficient plasma formation and acceleration approaches, high power thruster concepts, electrode erosion issues, electrodeless discharge mechanisms, modeling of fundamental processes, experimental performance characterization, and beam energy propulsion
- Plasma Materials Processing and Environmental Applications: Including exhaust gas treatment, remediation, and hazardous materials disposal
- Advanced Diagnostics: Including the development and utilization of laser-based diagnostics, flow field characterization methods, and plasma diagnostics
- Weakly Ionized Plasma Physics and Aerospace Applications: Including plasma actuators for aerodynamic flow control
- Fluid-Optics Interactions: Including the propagation of laser beams through the atmosphere and the effects of aerodynamics on the transmission of laser beams
- Fusion Energy Science: Including emerging confinement concepts for terrestrial or in-space power or propulsion, experimental programs, enabling technologies, instrumentation and diagnostic development, computational or theoretical modeling, and mission analysis
- Papers concerning dual-use technologies which address non-aerospace issues of major public concern, such as energy, environment, and medicine are strongly encouraged. Suggestions for invited papers and joint sessions are also welcome.
- Students are strongly encouraged to present papers on their research at this meeting. There will be a student paper competition for those papers where the student is the primary author. Papers submitted and accepted for the PDL meeting whose principal author is a student and which are delivered by that student will be considered for a “Best Student Paper Award.”
- Please identify the principal author as a student (graduate or undergraduate student) at the time the abstract is submitted.

Propellants and Combustion

Papers are sought from all areas of propellants and combustion relevant to aerospace sciences, technologies, and applications. New developments as well as review papers are of interest. Potential topics include the following:

- Rocket and Air-Breathing Combustion: design and analysis issues for practical combustors such as rockets, gas turbines, turbojets, ramjets, and other hybrid engines; related topics of interest include combustion instabilities, thermo-acoustic interactions, active and passive combustion control, plume characteristics, fuel flexibility, and other fundamental combustion processes related to conventional propulsion systems
- Detonations, Explosions, and Supersonic Combustion: fundamental research in detonation and supersonic combustion as well as combustion dynamics involving scramjets, pulse detonation engines, oblique detonation engines, ram accelerators, and other unconventional propulsion systems
- Spray and Droplet Combustion: liquid jet break-up processes, atomization, vaporization, mixing, and their impact on spray flame characteristics as well as droplet combustion, supercritical combustion, and other related topics
- Combustion Chemistry: development and application of reduced kinetic mechanisms, surrogate fuels, NOx and SOx chemistry, soot formation and oxidation, flow-chemistry interaction, and other related physical and chemical processes affecting reaction kinetics
- Micro-Combustion and Micro-Propulsion: micro-scale combustion for power generation, micro-IC engines, micro-propulsion engines, and micro-thrusters
- Combustion Diagnostics: development and application of advanced diagnostic or sensing techniques for understanding and controlling the combustion phenomena
- Heterogeneous Combustion and Propellants: fundamental aspects of combustion of solid fuels, propellants, and fuel additives, as well as propellant synthesis and related topics
- Turbulent Combustion: fundamental aspects of turbulent reacting flows and combustion dynamics involving premixed, partially-premixed, and non-premixed turbulent flames linked to rockets, air-breathing combustors, etc.
- Laminar Flames: fundamental aspects of laminar flame behavior along with their ignition, extinction, stabilization, instabilities, and interactions with laminar flow processes

Please direct questions to:

Timothy Takahashi
Santa Clara University
Phone: 520.977.4459
Email: ttakahashi@scu.edu

Propellants and Combustion
Papers are sought from all areas of propellants and combustion relevant to aerospace sciences, technologies, and applications. New developments as well as review papers are of interest. Potential topics include the following:

- Rocket and Air-Breathing Combustion: design and analysis issues for practical combustors such as rockets, gas turbines, turbojets, ramjets, and other hybrid engines; related topics of interest include combustion instabilities, thermo-acoustic interactions, active and passive combustion control, plume characteristics, fuel flexibility, and other fundamental combustion processes related to conventional propulsion systems
- Detonations, Explosions, and Supersonic Combustion: fundamental research in detonation and supersonic combustion as well as combustion dynamics involving scramjets, pulse detonation engines, oblique detonation engines, ram accelerators, and other unconventional propulsion systems
- Spray and Droplet Combustion: liquid jet break-up processes, atomization, vaporization, mixing, and their impact on spray flame characteristics as well as droplet combustion, supercritical combustion, and other related topics
- Combustion Chemistry: development and application of reduced kinetic mechanisms, surrogate fuels, NOx and SOx chemistry, soot formation and oxidation, flow-chemistry interaction, and other related physical and chemical processes affecting reaction kinetics
- Micro-Combustion and Micro-Propulsion: micro-scale combustion for power generation, micro-IC engines, micro-propulsion engines, and micro-thrusters
- Combustion Diagnostics: development and application of advanced diagnostic or sensing techniques for understanding and controlling the combustion phenomena
- Heterogeneous Combustion and Propellants: fundamental aspects of combustion of solid fuels, propellants, and fuel additives, as well as propellant synthesis and related topics
- Turbulent Combustion: fundamental aspects of turbulent reacting flows and combustion dynamics involving premixed, partially-premixed, and non-premixed turbulent flames linked to rockets, air-breathing combustors, etc.
- Laminar Flames: fundamental aspects of laminar flame behavior along with their ignition, extinction, stabilization, instabilities, and interactions with laminar flow processes

Please direct questions to:

Michael Stanek
Wright-Patterson Air Force Base
Phone: 937.286.8264
Fax: 937.656.4169
Email: michael.stanek@wpafb.af.mil
Advanced Combustion Concepts, Fuel Technology, and Environmental Impact: fundamental aspects of flameless combustion, alternative fuels, bio-fuels, hydrogen technologies, and other combustion-related environmental technologies as well as papers on associated environmental impact

Other topics in combustion and propellant research, such as fire research, high-energy fuels, endothermic fuels, novel propellants, and in situ propellant production for planetary missions

Please direct questions to:
Keith R. McManus
GE Global Research Center
Phone: 518.387.6597
Fax: 518.387.7104
Email: mcmanus@ge.com

Society and Aerospace Technology
The Society and Aerospace Technology Technical Committee examines societal benefits of aerospace technologies as well as the relationship between aerospace and society, culture, and the arts. Abstracts are solicited that address these and related issues. Areas of interest include, but are not limited to:

- Aerospace and terrorism
- Aerospace and public safety
- Astrosociology
- Benefits and examples of aerospace technology spin-offs
- Utilization of aerospace assets to address social problems
- Space medicine and medical astrosociology
- Group dynamics and societal institutions in isolated communities (space settlements, Antarctica, etc.)
- Discussion of aerospace topics and programs from the perspective of disciplines such as psychology, social psychology, sociology, and anthropology

Please direct questions to:
Daniel Lockney
NASA Headquarters
Phone: 202.358.2037
Email: daniel.p.lockney@nasa.gov

Software Systems
Abstracts are solicited on a wide range of topics in aerospace related applications of software engineering and software systems. Areas of interest include, but are not limited to:

- COTS and open-source software for aerospace technologies
- Knowledge management and collaborative software
- Autogeneration of software
- Software agents
- Software requirements
- Software complexity and maintenance
- Validation and verification testing
- Software development practices
- Software education and training
- Real-time software systems
- Parallel computing software issues
- Safety-, mission-, or security-critical software
- Formal methods
- Software assurance
- Software standards and certification
- Plug-and-play software

Authors are encouraged to submit their manuscripts, either before or after the meeting, to the Journal of Aerospace Computing, Information, and Communication for possible publication.

Please direct questions to:
James R. Murphy
NASA Ames Research Center
Phone: 734.676.1164
Email: james.r.murphy@nasa.gov

Space Exploration and Colonization
A complementary program of robotic and human exploration missions beyond low Earth orbit could lead to a robust civil space program and the eventual development of space settlements on the moon and Mars. The goals of exploring space include learning about our past, improving life on Earth, and shaping our future through discovery, scientific scrutiny, and sound judgment, planning, and management. The Apollo era was shaped by the space race and was widely popular and successful. The present environment presents unique challenges for the space program to be relevant and to captivate the next generation.

Experience in space has shown that operations outside Earth’s atmosphere and on the surfaces of extraterrestrial moons, planets, and asteroids frequently encounter serious and unique challenges. These include the effects of radiation and microgravity on materials and humans, electrical charging and arcing, pervasiveness of abrasive lunar dust, effects of hard vacuum, atomic oxygen, and rarefied gases, and significant thermal loads. New exploration strategies and technologies must be developed to address these challenges and support mission logistics for human and robotic exploration, power generation, and resource utilization.

The yearning of people to travel into space, even in short sub-orbital flights, is an important first step towards future space colonization by humans. Space tourism represents an important commercial aspect of this endeavor as we mature the technologies, achieve measurable successes, and develop the strong advocacy needed to enable us to move permanently to new residences elsewhere in the solar system, hopefully within this century.

Papers are invited that address the following specific topics within the broad portfolio of Space Exploration and Colonization. Submissions should contain sufficient detail for the program committee to evaluate the technical content of the final presentation and paper. Topics include:

- Value proposition for space exploration and colonization
- Space, lunar, and planetary environmental challenges
- Enabling research: theoretical and applied
- Solar system exploration strategies and mission logistics
- Space transportation and lander vehicle/architecture design
- Design concepts for surface mobility and power
- Design concepts for space colonies
- Design concepts for space tourism/adventure
- Lunar, planetary, and asteroid commercialization
- Legal issues, including sovereignty and land rights

Please direct questions to:
Mark Benton
The Boeing Company
Phone: 310.364.5186
Fax: 310.416.0345
Email: mark.benton@boeing.com

Space Operations and Support
The AIAA Space Operations and Support Technical Committee (SOSTC) is soliciting papers in all areas of space operations and ground support. Topics include, but are not limited to, original space operations research and reports in the areas of new technology, technology trends, operations procedures, standards and practices. Areas of interest include:

- Human factors
- Space policy and law factors
- Human and robotic space exploration operations
- Space operations tools and technologies
- Space operations policies
- Ground support in space operations
- Public safety for launch and reentry planning and operations
- Commercial space operations
- Error reduction (command file error reduction, process improvement, etc.)

Please direct questions to:
J. Paul Douglas
ASRC Aerospace Corp.
Phone: 301.817.4031
Email: JPaul.Douglas@noaa.gov

Systems Engineering
Papers in all areas of systems engineering (SE) are encouraged. All types of papers will be considered, including case studies, developmental work, and technical analysis. Topics include but are not limited to systems engineering applications, integrated disciplines and technology, future trends and predictions in systems engineering, systems engineering education and research, and systems engineering life cycle processes and systems effectiveness.

Please direct questions to:
John C. Hsu
California State University, Long Beach
Phone: 714.349.6810
Email: jhsu2@csulb.edu
Terrestrial Energy Applications of Aerospace Technology

The Terrestrial Energy Systems Technical Committee is sponsoring sessions on the use of aerospace technology in ground-power systems. Papers are solicited on development and application of technology common to the aerospace and terrestrial energy communities. Experimental, computational, and theoretical papers dealing with fundamental and applied energy conversion technologies will be considered for presentation. Topics include, but are not limited to:

- Combustion modeling and measurements
- Active and passive combustion control
- Fires and explosions
- Gasification and related technologies
- Clean and alternative fuels
- Nuclear energy
- Sustainable energy sources
- Energy use and climate change
- Energy efficiency and waste reduction
- Energy-power system efficiency and economics
- Advanced materials for energy systems

Please direct questions to:
Ahsan Choudhuri
University of Texas at El Paso
Phone: 915.747.6905
Fax: 915.747.5019
Email: ahsan@utep.edu

Thermophysics

The Thermophysics Technical Committee solicits abstracts of proposed papers on topics in thermophysics and heat transfer. Papers are solicited on topics related to all aspects of thermal energy transfer and aerospace applications therein. Contributions based on analytical, numerical and/or experimental studies are welcomed. Scientific and technical contributions are emphasized, rather than status reports on work in progress. Areas of specific interest include, but are not limited to:

- Aircraft/spacecraft thermal management
- Ablation
- Aerothermodynamics
- Cryogenics and cryogenic systems
- Direct simulation Monte Carlo methods
- Electronic and microelectronic avionics cooling
- Electronic thermal management
- Heat pipes, loop heat pipes, and innovative heat pipe designs
- Heat exchangers
- Heat transfer: computational, conduction, convection (free and forced), phase change, and radiation
- Heat transfer and cooling in turbomachinery
- High-speed flows
- Historical perspectives in thermophysics research
- Hypersonic and low density facilities
- Microgravity effects on high power two-phase thermal management systems
- Microgravity testing for aerospace applications
- Micro-scale heat transfer and micro-fluidics
- Missiles thermal management
- Non-equilibrium flows
- Non-equilibrium radiation
- Non-intrusive diagnostics
- Particle-laden flow modeling and measurement
- Rocket plumes
- Propulsion
- Power systems
- Radiation analyses (surface properties)
- Radiators and heat rejection systems
- Spacecraft contamination
- Space environmental effects
- Spacecraft thermal management and modular spacecraft
- Surface catalysis
- Thermal contact conductance
- Thermal control
- Thermal protection systems
- Thermophysical properties

Emerging Topics:

- Advanced materials thermal management applications
- Advanced thermoelectrics
- Integrated and multidisciplinary modeling and simulation
- Minimization of entropy production
- Nanoscale heat transfer and nanofluidics
- MEMS and nanotechnologies
- Multiphase flows and heat transfer continuum methods for transition-to-rarefied flows
- Plasma actuated heat transfer
- Wireless thermal measurements

Authors are requested to address a single subject area from the above list. Each year, the Thermophysics Technical Committee has offered a best paper award for both the professional and student categories (with the student receiving a monetary award). Student submissions are strongly encouraged. Also, timely survey and review articles on the above topics are solicited. Authors are encouraged to submit their manuscripts, either before or after the meeting, for possible publication.

Please direct questions to:
Ingrid Cotoros
Lockheed Martin Space Systems
Phone: 650.424.2079
Email: ingrid.a.cotoros@lmco.com

6th Symposium on Space Resource Utilization

The 6th Symposium on Space Resource Utilization is soliciting papers on research and development of processes, technologies, and hardware that demonstrate the utilization of space resources in support of human or robotic exploration and science missions to the moon, Mars, the moons of Mars, and Near-Earth Objects. Papers including analytical and hardware development results in the following areas are of particular interest:

- Mission Critical Consumables: Production of consumables such includes oxygen, hydrogen, water, and propellants from available resources
- Planetary Atmosphere Processing: Acquisition and conditioning of planetary atmospheres in preparation for processing
- Surface Material Manipulation: Physical processing of regolith, rocks, and dust such as drilling, excavation, beneficiation, dust mitigation, and surface transportation
- Construction Materials: Production of metals, glasses, ceramics, and plastics from natural resources and from recycled hardware and consumables

Additional areas of interest include:

- Environmental Synergy: Concepts for making use of natural thermal gradients, radiation, particle fluxes, vacuum and pressure
differentials, atmospheric gases, and other aspects of the space environment which can reduce the mass launched from Earth to further exploration and science objectives.

- System Integration: Integration of ISRU systems with other surface systems including joint use technologies such as electrolysis or cryogenic storage systems.

- Propulsion Systems: Utilization of in-situ derived propellants to supply propellant depots in support of missions to various destinations (including mass and cost-benefit comparisons).

Where possible, papers should include performance of hardware or hardware concepts in the space environment at the component, sub-system, or system levels.

Please direct questions to:
Julie E. Kleinhenz  
NASA Glenn Research Center  
Cleveland, OH 44135-3127  
Phone: 216.433.5383  
Email: jule.e.kleinhenz@nasa.gov

27th Symposium on Gravity-Related Phenomena in Space Exploration

The 27th Symposium on Gravity-Related Phenomena in Space Exploration is being organized for January 2013 to actively investigate scientific and technological possibilities in gravity-dependent research and to support strategic research and technology enabling space exploration. As such, papers are solicited from academic, commercial, and governmental institutions in the following areas:

- Acceleration Environment: measurements of microgravity, sensitivity of physical phenomena to acceleration environment including disturbances.
- Biotechnology: bio-fluids, protein crystals.
- Combustion Science and Chemically Reacting Flows: fundamental and applied research in flames, fire detection and suppression, heterogeneous combustion, micro-combustion systems, and reacting systems for in-situ space resource utilization such as propellant production and life support systems.
- Fluid Physics and Transport Phenomena: fundamental and applied research related to biological systems, in-space propulsion, in-situ space resource utilization, and space-based power and life support systems.
- Materials Science: fundamental and applied research in electronic materials, metals and alloys, ceramics, glasses, polymers, radiation shielding, advanced materials for propulsion systems, space manufacturing.
- Special Session: technological applications from research in reduced gravity including examples from the scientific, commercial, and educational realms.

Papers in related but not cited topics are strongly encouraged. Papers describing spaceflight hardware will be considered where specific innovations in functionality, performance, or hardware development processes are the focus.

Abstract submissions should be sufficiently detailed to survive competitive peer-review for selection into the symposium. Summaries of the research or study activity, results, and applications should be highlighted, keeping background information to a minimum. Important references, graphs, or pictures may be included.

A Best Paper and Best Student Presentation will be selected by the Microgravity and Space Processes Technical Committee from among the participants in the Symposium.

Please direct questions to:
Stephen D. Tse  
Rutgers, The State University of New Jersey  
Phone: 732.445.0449  
Email: sdtysse@rci.rutgers.edu

31st ASME Wind Energy Symposium

Papers are solicited for a broad range of topics related to wind energy conversion, both land-based and offshore. Topics of interest include, but are not limited to:

- Acoustics.
- Airfoil, blade, and wake aerodynamics.
- Atmospheric physics and inflow.
- Wind farm and turbine-wake interactions.
- Offshore wind systems and environment.
- Hybrid and off-grid systems.
- Testing: non-destructive testing, inspection and QA, field test results, laboratory testing techniques.
- Controls: energy capture enhancement, load attenuation, sensors and actuators, generator and power electronics.
- Structural dynamics.
- Reliability.
- Fatigue and failure.
- Innovative components and subsystems.
- Materials and manufacturing processes.
- Turbine design and development: design loads and certification, site specific design and optimization.
- Drivetrains.
- Health monitoring.
- Electrical systems and machines.
- Utility and grid integration.
- Radar interference.

This conference will follow the abstract/manuscript submission and approval process used by AIAA as outlined in this call for papers.

Please direct questions to:
Pat Moriarty  
National Renewable Energy Laboratory  
Phone: 303.384.7081  
Fax: 303.384.6901  
Email: patrick.moriarty@nrel.gov
Abstract Submittal Procedures

Abstract submissions will be accepted electronically through the AIAA website at www.aiaa.org/events/asm. From the conference website click the 'Submit Paper' button and follow the instructions for submission. The website will open for abstract submission on 1 February 2012. Authors having trouble submitting abstracts electronically should email AIAA technical support at paperTech_support@aiaa.org. Questions about the electronic abstract submission or full draft manuscript themselves should be referred to the appropriate Technical Chair. The deadline for receipt of abstracts via electronic submission is 5 June 2012, 2359 hrs Eastern Daylight Time, USA. Authors will be notified of paper acceptance or rejection on or about 22 August 2012. Instructions for preparation of final manuscripts will be provided by AIAA for accepted papers only.

Abstract Guidelines

Abstracts should have a total length of 5–10 pages including figures and tables. Draft papers are encouraged. The extended abstract or draft paper should clearly describe the purpose and scope of the work to be included in the final manuscript, methods used, key results, and contributions to the state of the art. The submittal should include illustrations and data that support the results and contributions asserted.

Both abstracts and final manuscripts must adequately address the accuracy of results. Abstracts will be reviewed and selected based on technical content, originality, importance to the field, clarity of presentation, accuracy validation, and the potential to result in a quality final manuscript. Note that all abstracts are chosen by a competitive process based on anonymous peer review using these criteria. The review and acceptance process will be weighted in favor of authors submitting more relevant documentation of their proposed papers. The length of the final manuscript should be appropriate for a conference paper, not a major project, final report, or final thesis.

The abstract should not be submitted to more than one technical topic. If an author is unsure which topic is most appropriate, it is the author's responsibility to communicate with the technical topic organizers in question well before the abstract deadline to determine the topic area under which the abstract best fits. There will be too little time in the review process for an abstract rejected by one topic to be considered for review under another.

Questions pertaining to the abstract or technical topics should be referred to the corresponding technical topic chair.

“No Paper, No Podium” and “No Podium, No Paper” Policy

There will be "No Paper, No Podium" and “No Podium, No Paper” policies in effect. 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. 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.

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 website no later than 20 December 2012.

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 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.

Exhibiting and Sponsorship Opportunities

Whether you are looking to build new relationships within the aerospace community, or strengthen your brand image as a major industry contender, an AIAA sponsorship will provide global marketing and access to key industry, government, and academic contacts that matter most to your organization.

For more information on sponsorship opportunities, please contact:

Cecilia Capice
AIAA Sponsorship Program Manager
Phone: 703.264.7570
Email: ceci@iaia.org.