Infotech@Aerospace 2011 Conference
Unleashing Unmanned Systems

29–31 March 2011
Hyatt Regency St. Louis at the Arch
St. Louis, Missouri

Abstract Deadline: 13 September 2010

Synopsis

Infotech@Aerospace (I@A) is AIAA's premier forum for modern aerospace applications focusing on information-enabled systems, algorithms, hardware, and software. I@A provides a unique opportunity for fostering advances and interactions across these disciplines. The attendees and authors span military, scientific, commercial, and academic communities that are dominated by the communication of information via computers and software that will shape the 21st-century development of aerospace systems. Scientific and engineering issues related to architecting, designing, developing, operating, and maintaining modern aerospace and defense systems will be addressed. This includes aircraft, spacecraft, ground systems, robots, avionics, and sensors, as well as systems of systems. Of particular interest are autonomous, cooperative, and unmanned systems; communication and networked systems; robotic systems; and human-machine interactions. Select technical papers will be considered for publication in the *Journal of Aerospace Computing, Information, and Communication* (*JACIC*).

2011 Conference Theme: Unleashing Unmanned Systems

In recent years, Unmanned Systems (US) have proven their value in a wide variety of applications. Development of new US capability is expanding at an accelerating pace—in the air, in space, on the ground, and on and under the ocean. Customers continue to expect and demand even greater flexibility and responsiveness to meet a growing list of desired operations and applications.

This explosion of US applications began with several highly successful military applications. It is hard to pick up a newspaper today and not read of the expansion and success of Unmanned Aircraft Systems (UAS) in prosecuting current conflicts in the Middle East. We have seen the UAS applications grow from being mainly surveillance platforms to now carrying weapons and electronic warfare payloads. And commanders now demand even more, such as hyperspectral payloads, cargo resupply, and recovery of downed airmen. Ground robotic systems continue to expand with important missions such as investigating Improvised Explosive Devices.

In addition, US are already becoming mainstream tools for addressing many non-military applications. For example, 1) The Department of Homeland Security now operates UAS routinely for border protection; 2) The National Oceanic and Atmospheric Administration is using UAS for hurricane and polar ice cap monitoring; and 3) The United States Forest Service has partnered with NASA for imaging missions for wildfires in Southern California. Growth potential for further expansion of UAS and ground robotics applications in both government and civil applications is very strong, and many other groups are exploring the potential uses for US, such as: 1) law enforcement applications; 2) disaster response; 3) aerial photography; 4) crop dusting; 5) news organizations; 6) package delivery; and 7) pipeline and power line monitoring.

Unleashing the full potential of US requires a diverse toolkit of information technology and systems. These become the core building blocks to enable system capabilities. Though these building blocks have a level of capability as standalone systems, they must be must be integrated successfully into increasing complex systems, and even systems of systems, to achieve desired operational effects. Infotech@Aerospace 2011 will explore many of the core technologies and integration considerations that will truly "Unleash Unmanned Systems".

General Chair
John R. Moore
Rockwell Collins
319.295.5987
E-mail: jrmoore@rockwellcollins.com

Technical Program Chair
Nhan Nguyen
NASA Ames Research Center
650.604.4063
E-mail: nhan.t.nguyen@nasa.gov

Deputy Technical Program Chair
Tim Howard
EOSESS LLC
714.883.3821
E-mail: tim@eosess.com

Technical Events Chair
Brian Argrow
University of Colorado, Boulder
303.492.5312
E-mail: Brian.Argrow@colorado.edu

Confirmed Keynote Speakers
Lt Gen David Deptula
Deputy Chief of Staff for Intelligence,
Surveillance and Reconnaissance
U.S. Air Force

S. Pete Worden
Center Director
NASA Ames Research Center

Technical Panels and Demonstrations

In addition to the hundreds of technical papers that will be presented, the conference will offer multiple plenary events demonstrating the connection between core technologies and desired applications. This will not only involve keynote speakers but also two specific plenary level technical events: 1) a technology demonstration in the evening with relevant operational or development capabilities; and 2) a technical panel luncheon.

Technical Areas of Focus

Infotech@Aerospace covers a broad range of topics related to aerospace information systems. Authors are encouraged to submit abstracts in the following technical areas of focus. We also encourage you to submit ideas for sessions and papers that feature topics not listed below. Suggestions for additional session topics should be referred to the Technical Program Chair.

Unmanned Systems Applications

Papers are sought addressing unmanned air vehicle (UAV) and systems (UAS) technologies that enable expanding UAS applications through system integration. Of interest are papers that address spectrum management and communications as the critical policy/technology issue for UAS integration into the national airspace system. Other topics of interest include, but are not limited to:

- UAS operational applications and experience in military, civil, and commercial missions/environs, especially homeland security and disaster response

- Science applications, especially those involving climate monitoring and extreme environment diagnosis
- Unmanned system-of-systems architectures, technologies, and applications
- UAS sense-and-avoid strategies and sensors
- System and vehicle survivability
- System safety and reliability
- UAS intelligent mission management
- Cooperative unmanned systems

Autonomous Systems and Robotics

Papers are sought that address innovative approaches to autonomous system development and their integration into aerospace and robotic systems. Topics of interest include, but are not limited to:

- Automated spacecraft rendezvous and docking
- In-space assembly and servicing
- Space situational awareness (SSA) technologies for orbit determination, space object identification, and tracking
- Real-time decision support and architecture concepts for SSA
- Hazard avoidance for automated landing on planetary bodies
- Surface mobility
- Exploration robotics
- Human-robot interactions
- Air traffic management automation tools
- Dynamic airspace reconfiguration

Human-Machine Interface

Papers are sought that address innovative approaches to human-machine interface. Topics of interest include, but are not limited to:

- Mixed-initiative intelligent systems
- Intelligent decision supports
- Pilot and controller mode awareness
- Cockpit decision aids
- Preventing display of hazardously misleading information
- Pilot and controller workload
- Crew coordination

Intelligent Systems

Papers are sought that describe the application of Intelligent System (IS) technologies and/or their aerospace-related applications. Of interest are papers that address fundamental topics of IS, such as the nature of IS or what constitutes an artificial intelligent system. Other topics of interest include, but are not limited to:

- Evolutionary (genetic) algorithms
- Expert systems
- Fuzzy logic
- Knowledge-based systems and knowledge engineering
- Machine learning techniques
- Model-based reasoning
- Real-time reasoning and learning
- Neural networks
- Planning and scheduling algorithms
- Qualitative simulation

System Integrity/Trustworthiness

Papers are sought that describe recent developments, challenges, and future trends in the high-confidence design, development, certification, application, operation, and maintenance of networked information systems and software in commercial and military aviation. Topics of interest include, but are not limited to:

- Verification and validation of complex intelligent systems
- Verification, certification, accreditation for security
- Vulnerability and trustworthiness assessments
- Fault management
- Aircraft software, data, and multimedia distribution
- Next-generation air traffic management
- Aeronautical networks and airport wireless networks
- Security infrastructures for airports and airlines
- Multi-level security for aviation
- RFID systems
- Software-intensive, large-scale systems integration
- Security incident response strategies
- Long-term security protection mechanisms
- Information flows
- System engineering and architecting issues relevant to trust and high-confidence systems

Adaptive Systems

Papers are sought that address innovative approaches to intelligent adaptive control system development. Topics of interest include, but are not limited to:

- Adaptive control
- Neural net and fuzzy logic intelligent control
- Applications in aerospace systems
- Experimental/flight validation
- Verification and validation of adaptive systems
- Analytical/experimental tools for design and validation
- Metric evaluation of adaptive control

Integrated System Health Management (ISHM)

Papers are sought that describe innovative approaches for determining the status and condition of all elements of a system, including individual sensors and components. Topics of interest include, but are not limited to:

- Architectures and standards for ISHM implementation
- Software environments to integrate data, information, and knowledge for implementation of ISHM capability
- Algorithms and approaches to detect anomalies
- Automated diagnostics and prognostics
- User interfaces for integrated awareness of system health by the user
- Implementations of ISHM capability
- Business case and evaluations of benefits from ISHM capability implementation
- Verification and validation of ISHM systems

Sensor Systems

Papers are sought that address innovative approaches to sensor system development and their integration into aerospace systems. Topics of interest include, but are not limited to:

- New sensor technologies for unmanned and remotely piloted payload sensors, including multi- and hyperspectral sensors, active sensing with RF and lasers, multi-aperture systems, and sensors in new spectral regions
- Novel applications of distributed sensing and sensor networks
- Sensor systems for navigation, tracking, and control
- Vision-based unmanned systems for GPS denied navigation environments
- Embedded vehicle sensor systems for autonomous operations and system health management
- New sensors and techniques for measurement of phenomenology associated with atmospheric, natural resource, environmental, and deep space mission applications
- Detection, recognition, and tracking of moving objects on the ground, in the atmosphere, or in space, especially for unmanned systems applications
- Fundamental technology advances for new aerospace sensor applications, including micro- and nano-technology (MEMS and NEMS), packaging methodologies, development of sensors for ground and flight testing, harsh environment applications, and integrated systems of micro-sensors and actuators

Data/Information Fusion

Papers are sought that address innovative approaches to data processing, real-time reasoning/learning, and information fusion techniques allowing future systems to improve their performance autonomously or non-autonomously. Topics of interest include, but are not limited to:

- Knowledge extraction and update
- Data-based reasoning
- Centralized and distributed information fusion architectures and resource management for real-time and non-real-time operations
- Real-time information fusion software development, validation, and verification
- Image fusion techniques for EO systems
- Data and information fusion of sensor networks on a single vehicle or a multivehicle system for distributed sensing, navigation, and tracking
- Novel tracking and filtering techniques for target detection, acquisition, and classification methodologies
- New developments in the areas of multiple hypothesis tracking (MHT), particle filtering, and interacting multiple model (IMM) estimators
- Multisensor and mixed-modality sensor applications of data fusion
- Hardware and software integration issues relevant to data fusion and information extraction

Computer Systems

Papers are sought that address the theoretical and practical application of computer systems to aerospace problems. Areas of interest include, but are not limited to:

- High performance computing
- Volatile and nonvolatile memory and data storage; processing and memory applications
- Applications of commercial off-the-shelf (COTS) components, subsystems and test equipment, especially in mission and safety critical applications
- Convergence of software, hardware, and systems processes and design techniques
- Embedded signal and data processing, including parallel algorithms and optimizations
- Secure computer design and information assurance

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:

- Architectures, design, development, testing, verification and validation, quality, standards, software craftsmanship, software sustainment, legacy system modernization
- Platforms, languages, frameworks, tools, techniques, COTS, open source, model-driven development, auto generation, user-centered approaches
- Project management, globalization
- Net-centric systems, network management, communications, security, multilevel secure systems, trusted computing
- Real-time, mission critical, safety critical, embedded SW systems
- Parallel processing, high performance, fault tolerant, reconfigurable, survivable systems
- Data, signal, image, information, and knowledge processing
- Requirements management
- User expectation management
- Modeling, simulation, and training
- Education

Plug and Play Mechanisms

Submissions are sought for a variety of topics pertaining to systems that employ mechanisms (hardware, software, protocols, and tools) that can be considered "plug-and-play" (PnP) to include, but not limited to:

- Self-consistent architecture frameworks for intelligent modularity
- Self-describing components and applications
- Self-organizing/topology-agnostic heterogeneous networks
- Ontology concepts for machine-understandable electronic datasheets
- Scalable self-managing processing and networking approaches
- Composable software
- Self-test/hardware-in-the-loop approaches, especially those that work with PnP architectures
- Push-button tool flow, concepts for automatic spacecraft design connecting to plug-and-play components and inventory management systems

Real-Time Embedded Computing Technologies

Submissions are sought for a variety of topics pertaining to embedded computing systems for aerospace to include but not limited to:

- Multicores benchmarks, usage, programming, tools, electrical, performance, and integration
- Graphical processing units, benchmarks, COTS usage, programming, tools, performance, and integration
- Dependability approaches, implementations, tools, benchmarks, and algorithms from silicon to full processing systems
- Onboard processing hardware architectures utilizing advanced interconnect technologies
- Reconfigurable processors, support and infrastructure along with error mitigation in harsh or space environments
- Systems mixing some or all of the above

Focused Session Proposals

Individuals interested in organizing focused sessions should submit a Session Proposal to the Technical Program Chair. Solicited papers in the proposed session should form a cohesive set, focusing on the relevant topic with a reasonable diversity of viewpoints encouraged. The Session Proposal should contain a descriptive title of the session, a brief summary statement describing the proposed session, session organizer contact information (e-mail and phone), and potential authors.

Student Paper Competition

Papers from work not previously published are sought from graduates and undergraduates registered as full-time students through the spring of 2010. Both individual and group authored papers are welcome on any of the areas listed above.

A complete draft of the paper, not to exceed 15 pages, should be submitted to the Technical Program Chairs listed above by **1 October 2010**. The final manuscript is due by **24 November 2010**. The winner will be recognized at the Honors and Awards Luncheon. Complete guidelines and procedures may be found at **www.aiaa.org/events/I@A**.

Abstract Submission Guidelines

Authors should submit an abstract of 300–500 words. The abstract should provide a clear and concise statement of the problem to be addressed, the proposed method of solution, the results expected or obtained, and an explanation of the significance of the contribution.

Abstract submissions for the conference will be accepted electronically through AIAA's Web site at **www.aiaa.org/events/I@A**. This Web site will be open for abstract submittal through **13 September 2010**. The electronic submission process is as follows:

1) Access the AIAA Web site at **www.aiaa.org/events/I@A**.
2) On the right-hand side, click the "Submit Paper" button.
3) To access the submission site, you must be logged in to the AIAA Web site.
a. If you already have an account with AIAA, enter your User Name and Password in the "Login" box on the left-hand side and hit the arrow button.
b. If you do not have an account with AIAA, complete the steps for "Create Account".
4) Once logged in, you will be provided an active link for "Begin a New Submission or View a Previous Draft/Submission". Click the link to be directed to the Welcome page of the submission site.
5) Click the Submission tab at the top of the page to begin your submission.
6) Once selected, you will be provided with general information on the conference's abstract submission requirements and policies. To begin the submission, click the "Create a New Submission" link on the left-hand side. ***Please Note***: If you have previously visited the site and begun a draft submission, click the "View Submissions" link on the left-hand side to resume your submission.

STEP 1: Type or paste the title of your abstract into the Title field and the presenting author's biography (if requested by the conference) into the Presenter Biography field. Scroll down to read through the Rules and Reminders section and check the box noting you agree. Click "Save & Continue" to proceed to the next step.
STEP 2: Select your Presentation Type and the Topic Area of your abstract. Click "Save & Continue" to proceed to the next step.
STEP 3: In this system, affiliations are added before author information. The information will be filled in for the person logged in to the site. Add additional author affiliations, if necessary, by clicking the "Add" button after each new affiliation. Click "Save & Continue" to proceed to the next step.
STEP 4: To create a list of co-authors for this submission, click the "Add Author" button and enter the required information. Click "Save" after entering each one and then associate each author with their respective affiliation by entering the appropriate reference number from the drop-down boxes to the right of each name. When you have finished entering all authors ***YOU MUST*** put them in the order they should appear on the abstract and program. Use the drop-down boxes in the far left column of the list to do this. Failure to order the authors properly will result in them being incorrectly listed when the submission is published. After you have reordered the authors, click the "Save" button at the bottom of the list. Click "Save & Continue" to proceed to the next step.
STEP 5: Select at least one technical area that best represents your work. While only one selection is required, you may list up to six for your submission. Click "Save & Continue" to proceed to the next step.
STEP 6: Upload your abstract/draft manuscript file. Accepted file types are .doc, .docx, and .pdf. Click "Save & Continue" to proceed to the next step.
STEP 7: If you have no errors or omissions in your abstract a "Submit" button will appear at the end of the proof. If the Error Box appears you must correct all errors before the abstract can be submitted. Once the errors have been resolved the "Submit" button will appear at the bottom. If you exit the system without submitting the abstract, it will be logged in the system as a draft and will appear in the "Draft" section of your "View Submissions" page when you reenter the system. After you submit the abstract, you will receive a confirmation e-mail.

Special Notes
1) If authors wish to revise an abstract that has already been submitted, they must go to "View Submissions" and select "Return to Draft" to make any corrections. This removes the abstract from the organizers' view. Authors then need to submit the abstract again for it to be considered. An abstract cannot be returned to draft if it has been reviewed.
2) Once the abstract submission deadline passes, authors will no longer be able to submit new submissions or return previous submissions to draft for revisions. Be sure that all of your submission data—authors, keywords, title, and abstract file—are accurate before finalizing your submission as no modifications can be made to this data after the submission site closes.

Authors having trouble submitting abstracts electronically should contact ScholarOne technical support at ts.acsupport@thomson.com or 434.964.4100 or toll free 888.503.1050 (U.S. only). Questions about the manual abstract submission or full draft manuscript themselves should be referred to the appropriate Technical Chair.
Authors will be notified of paper acceptance or rejection on or about **1 November 2010**.
Instructions for preparation of final manuscripts will be provided by AIAA for accepted papers only. Authors must submit their manuscripts electronically to AIAA Headquarters for publication no later than **14 March 2011**. If your paper can fit under more than one technical area, then please contact one of the Technical Program Chairs to receive guidance on which area to submit your paper under. Please do not make duplicate submissions.

"No Paper, No Podium" and "No Podium, No Paper" Policy

This conference has a "no paper, no podium" and "no podium, no paper" policy. Submittal of an abstract is interpreted as an intention to attend the conference and to present the final paper. If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the conference. Also, if the paper is not presented at the conference, the paper will not be published, and it will be withdrawn from the conference proceedings. Videotaped presentations will not be allowed. These policies are intended to eliminate no-shows and to improve the quality of the conference for attendees.

Warning—Technology Transfer Considerations

All authors are reminded that technology transfer guidelines have substantially extended the time required for review of abstracts and completed papers by government agencies. Internal (company) plus external (government) review can consume 16 weeks or more. Government review 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.

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.

47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit
Design, Test, Fly: Turning Propulsion Ideas into Reality
and
9th International Energy Conversion Engineering Conference (IECEC)

31 July–3 August 2011
San Diego Convention Center
San Diego, California

Abstract Deadline: 23 November 2010

Abstract and Manuscript Submission Guidelines

Procedures for Abstract and Manuscript Submittal

Abstract submissions for the JPC or IECEC conferences will be accepted electronically through AIAA's Web site at **www.aiaa.org/events/jpc** or **www.aiaa.org/events/iecec**, respectively. Abstracts will be due no later than **23 November 2010**. Authors will be notified of paper acceptance via e-mail by 23 February 2011. An Author's Kit, containing detailed instructions and guidelines for submitting papers to AIAA, will be made available to authors of accepted papers. Authors of accepted papers must provide a complete manuscript online to AIAA by **18 July 2011** for inclusion in the online proceedings and for the right to present at the conference. It is the responsibility of those authors whose papers or presentations are accepted to ensure that a representative attends the conference to present the paper. Sponsor and/or employer approval of each paper is the responsibility of the author. Government review, if required, is the responsibility of the author(s). Authors should determine the extent of approval necessary early in the paper presentation process to preclude paper withdrawals or late submissions.

The electronic submission process is as follows:

1) Access the AIAA Web site at **www.aiaa.org/events/jpc** or **www.aiaa.org/events/iecec**, respectively.

2) On the right-hand side, click the "Submit Paper" button.

3) To access the submission site, you must be logged in to the AIAA Web site.

a. If you already have an account with AIAA, enter your User Name and Password in the "Login" box on the left-hand side and hit the arrow button.

b. If you do not have an account with AIAA, complete the steps for "Create Account".

4) Once logged in, you will be provided an active link for "Begin a New Submission or View a Previous Draft/Submission". Click the link to be directed to the Welcome page of the submission site.

5) Click the Submission tab at the top of the page to begin your submission.

6) Once selected, you will be provided with general information on the conference's abstract submission requirements and policies. To begin the submission, click the "Create a New Submission" link on the left-hand side. ***Please Note***: If you have previously visited the site and begun a draft submission, click the "View Submissions" link on the left-hand side to resume your submission.

STEP 1: Type or paste the title of your abstract into the Title field and the presenting author's biography (if requested by the conference) into the Presenter Biography field. Scroll down to read through the Rules and Reminders section and check the box noting you agree. Click "Save & Continue" to proceed to the next step.

STEP 2: Select your Presentation Type and the Topic Area of your abstract. Click "Save & Continue" to proceed to the next step.

STEP 3: In this system, affiliations are added before author information. The information will be filled in for the person logged in to the site. Add additional author affiliations, if necessary, by clicking the "Add" button after each new affiliation. Click "Save & Continue" to proceed to the next step.

STEP 4: To create a list of co-authors for this submission, click the "Add Author" button and enter the required information. Click "Save" after entering each one and then associate each author with their respective affiliation by entering the appropriate reference number from the drop-down boxes to the right of each name. When you have finished entering all authors ***YOU MUST*** put them in the order they should appear on the abstract and program. Use the drop-down boxes in the far left column of the list to do this. Failure to order the authors properly will result in them being incorrectly listed when the submission is published. After you have reordered the authors, click the "Save" button at the bottom of the list. Click "Save & Continue" to proceed to the next step.

STEP 5: Select at least one technical area that best represents your work. While only one selection is required, you may list up to six for your submission. Click "Save & Continue" to proceed to the next step.

STEP 6: Upload your abstract/draft manuscript file. Accepted file types are .doc, .docx, and .pdf. Click "Save & Continue" to proceed to the next step.

STEP 7: If you have no errors or omissions in your abstract a "Submit" button will appear at the end of the proof. If the Error Box appears you must correct all errors before the abstract can be submitted. Once the errors have been resolved the "Submit" button will appear at the bottom. If you exit the system without submitting the abstract, it will be logged in the system as a draft and will appear in the "Draft" section of your "View Submissions" page when you reenter the system. After you submit the abstract, you will receive a confirmation e-mail.

Special Notes

1) If authors wish to revise an abstract that has already been submitted, they must go to "View Submissions" and select "Return to Draft" to make any corrections. This removes the abstract from the organizers' view. Authors then need to submit the abstract again for it to be considered. An abstract cannot be returned to draft if it has been reviewed.

2) Once the abstract submission deadline passes, authors will no longer be able to submit new submissions or return previous submissions to draft for revisions. Be sure that all of your submission data—authors, keywords, title, and abstract file—are accurate before finalizing your submission as no modifications can be made to this data after the submission site closes.

Authors having trouble submitting abstracts electronically should contact ScholarOne technical support at ts.acsupport@thomson.com or 434.964.4100 or toll free 888.503.1050 (U.S. only). Questions about the manual abstract submission or full draft manuscript themselves should be referred to the appropriate Technical Chair.

The Joint Propulsion Conference and the International Energy Conversion Engineering Conference are unclassified conferences. All abstracts and papers by U.S. Persons (U.S. Citizens or Permanent Residents who are not explicitly acting as agents of a non-U.S. entity) must be approved through the ITAR, and in many cases other (e.g., corporate) approval processes. Authors are encouraged to contact their company's ITAR and Intellectual Property point of contact to start the approval process early, thus ensuring timely approval and submittal of the paper.

JPC Organizing Committee

Executive Chair (Government)
Lt Gen John T. Sheridan
Commander, Space and Missile Systems Center, and Program Executive Officer for Space
483 N. Aviation Blvd.
Los Angeles AFB, CA 90245-2808

Executive Chair (Industry)
Elon Musk
Chief Executive Officer and Chief Technical Officer
SpaceX
1 Rocket Road
Hawthorn, CA 90250

General Chair (Industry)
Wayne Hurwitz
Flight Sciences & Propulsion Integration
Northrop Grumman Corporation
827 Hornet Way, MS 9V02/W6
El Segundo, CA 90245
Phone: 310.332.2349
E-mail: Wayne.Hurwitz@ngc.com

General Chair (Government)
James A. Kenyon
Associate Director, Aerospace Technology
Office of the Director, Defense Research and Engineering
1777 North Kent Street, Suite 9030
Arlington, VA 22209
Phone: 703.696.8498
E-mail: james.kenyon@osd.mil

Technical Chair
Donald J. Malloy
Aerospace Testing Alliance
1099 Avenue C
Arnold AFB, TN 37389-9013
Phone: 931.454.4112
E-mail: Donald.Malloy@arnold.af.mil

Deputy Technical Chair
Anthony L. Watts
Dynetics, Inc.
1099 Avenue C
Arnold AFB, TN 37389-9013
Phone: 931.454.6697
E-mail: Anthony.Watts@arnold.af.mil

Academic Chair
Kenneth H. Yu
Dept. of Aerospace Engineering
University of Maryland
3181 Martin Hall
College Park, MD 20742
Phone: 301.405.1333
E-mail: yu@umd.edu

Exhibits Chair
Geraldine Kimball
Pratt & Whitney Rocketdyne
6633 Canoga Ave. RLA-07
Canoga Park, CA 91309
Phone: 818.586.0467
E-mail: Geraldine.Kimball@pwr.utc.com

ASME Technical Program Chair
John W. Robinson
The Boeing Company
P.O. Box 3829
Seal Beach, CA 97040
Phone: 714.896.1292
E-mail: John.W.Robinson2@boeing.com

SAE Technical Program Chair
Ramon Chase
ANSER, Suite 800
2900 South Quincy Street
Arlington, VA 22202
703.416.3290
E-mail: Ray.Chase@anser.org

ASEE Technical Program Chair
Robert A. Frederick Jr.
UAH Propulsion Research Center
University of Alabama in Huntsville
5000 Technology Drive, TH S226
Huntsville, AL 35899
Phone: 256.824.7200
E-mail: Robert.Frederick@uah.edu

JPC General Submission Guidelines

Abstracts are to be submitted subject to the following general rules:

- An abstract of at least 1000 words is recommended, with key figures and references to pertinent publication in the existing literature; contact session organizers for specifics. Authors must clearly identify new or significant aspects of their work in the abstract. Abstracts must be received by **23 November 2010**.
- The abstract should include key figures that illustrate the primary intent of the author's message. Dummy figures are acceptable if final data are not available, provided that final data will be submitted with the manuscript. The review and acceptance process will be weighted in favor of authors who submit more relevant documentation of their proposed papers.
- The abstract should not be submitted to more than one technical area. If an author is unsure which area is most appropriate, it is the author's responsibility to communicate with the technical program organizers in question well before the abstract submission deadline to determine to which area the abstract should be submitted. There is too little time in the review process for an abstract rejected by one technical program chair to be forwarded for review by another.
- Early submissions are encouraged to permit review and discussion of the abstracts among the technical program organizers, by the technical session chairs, and, if appropriate, with potential authors before final selections for the program are made. Abstracts submitted after **23 November 2010** may be subject to rejection without review.
- Authors will be notified of paper acceptance on or about **23 February 2011**. An author's kit, containing detailed instructions and guidelines for submitting papers to AIAA, will be made available to authors of accepted papers.
- As abstracts may be reviewed by non-U.S. persons, if required they should undergo ITAR review.
- Additional guidelines and exceptions to the aforementioned guidelines (except for deadlines) can be made at the discretion of the technical chair.

Publication Policy

AIAA will not consider for presentation or publication any paper that has been previously presented or published or is currently under consideration for publication elsewhere. Authors will be required to sign a statement to this effect. Final manuscripts are due at AIAA by **18 July 2011**. A general "no paper, no podium" and "no podium, no paper" policy will be in effect for contributed and invited papers (see immediately below). The length

of the paper should be appropriate for a conference paper—not a major project, final report, or final thesis. Videotaped presentations will not be allowed. Submittal of an abstract is interpreted as an intention to attend the conference and to present the final paper.

"No Paper, No Podium" Policy

If a written paper is not submitted by the final manuscript deadline, authors will not be permitted to present the paper at the conference. Final manuscripts are due at AIAA by **18 July 2011**. It is the responsibility of those authors whose papers are accepted to ensure that a representative attends the conference to present the paper.

"No Podium, No Paper" Policy

If an author does not give their scheduled presentation, the paper will be removed from the conference proceedings and list of published papers.

Exhibit Opportunities

The 47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit will feature an impressive exhibit showcasing leading industry products and services. We encourage industry members to bring their best and most innovative products, systems, and services to the JPC 2011 Exhibit for broad exposure to air-breathing, liquid, solid, nuclear, electric, and other forms of propulsion for aerospace. Also invited to exhibit are those companies involved in engine systems, environmental control systems, ground support equipment, software, testing, analysis, research and development, management, propellant tanks, thermal products, noise and vibration, and simulation components of propulsion technology. For more information about the exhibition, please contact Fernanda Tilleria at fernandat@aiaa.org or 703.264.7622.

Sponsorship Opportunities

For information regarding Sponsorship Opportunities, contact Cecilia Capece, AIAA Sponsorship Program Manager at ceciliac@aiaa.org or 703.264.7570.

47TH AIAA/ASME/SAE/ASEE JOINT PROPULSION CONFERENCE AND EXHIBIT

Synopsis

AIAA, ASME, SAE, ASEE, and their industry partners proudly invite you to San Diego, CA, for the 47th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit (JPC), 31 July–3 August 2011. The design of our next-generation flight and space systems will be dependent more than ever on technologies providing high performance, increasingly efficient, reliable, and affordable propulsion systems. Our ability to design, test, and fly new aircraft and spacecraft propulsion technologies will have far-reaching impacts on the revolutionary roles these complex systems play in our everyday lives.

Come to San Diego and be part of the exciting future of the aerospace propulsion industry. The objective for JPC 2011 is to identify and highlight how innovative aerospace propulsion technologies powering both new and evolving systems are being designed, tested, and flown. Flight applications include next-generation commercial aircraft, regional, and business jets, military applications, supersonic/hypersonic high-speed propulsion applications, launch systems, orbital insertion, satellite, and interstellar propulsion. Special panel sessions to be announced will focus on advanced system applications that can be used to showcase propulsion systems and components, and the technologies that enable them. For more information, or to offer suggestions, please contact any of the organizers listed in this Call for Papers.

Air-Breathing Propulsion, Combined Cycle Systems, and Components

Air-Breathing Propulsion Systems Integration Sessions

Air-Breathing Propulsion Systems Integration Organizer
Rod Daebelliehn
Aerojet
PO Box 13222
MS 5552
Sacramento, CA 95813
916.355.5168
E-mail: Roderick.Daebelliehn@aerojet.com

Papers are solicited in all aspects of air-breathing propulsion systems integration including: a) installed performance and controls; b) propulsion aerodynamics, inlet and nozzle systems; c) power and thermal management; and d) propulsion system/air vehicle interface and certification.

The sessions are jointly sponsored by the AIAA Air-Breathing Propulsion Systems Integration Technical Committee, the SAE Aircraft Propulsion Committee and Turbomachinery Committee, and the ASME Propulsion Technical Committee. Please submit abstracts in one of the four organizational areas below (refer to the details below or contact the above organizer for more information):

- Aerodynamic Performance
- Subsystems Integration
- Propellers/Pistons/Turboprops
- Requirements Verification, Certification, and Testing

The aerodynamic performance organizational area includes the development and integration of aircraft inlets, nozzles, and exhaust systems. Emphasis is given to computational results, experimental results and comparisons of computational and experimental results (including subscale and flight components), component optimization, and inlet and exhaust system design techniques at speeds ranging from subsonic through hypersonic. Areas of interest include:

- Jet effects
- Thrust vectoring
- Area control
- Flow control application including scaling effects
- Aircraft performance
- Nacelle/wing interaction
- STOVL
- Structural integration of inlets and exhaust systems
- Thrust reversers
- Real-world operation environmental issues (corrosion, icing, sand, rain, bird strike, etc.)
- Acoustics and acoustic treatments
- Affect of inlet and nozzle on sonic boom
- Survivability

The subsystems integration organizational area includes:

- Integrated flight/propulsion control, hardware/software integration
- Power/thermal management—integrated propulsion/power/thermal architecture, all electric architectures, power/fluid systems integration, environmental control system integration, thermal management systems
- Engine physical integration—performance-based specification development, interface control and associated contractor/supplier management
- Propulsion operations—reliability and maintainability, field support, removal and installation, and overhaul and maintenance.

The propellers, pistons, and turboprops organizational area addresses all aspects of air-breathing propulsion system integra-

tion with emphasis on those issues particular to propeller-driven systems. The requirements verification, certification, and testing organizational area addresses all aspects of air-breathing propulsion integration certification and testing including FAA compliance and regulations.

Gas-Turbine Engine Sessions

Gas-Turbine Engine Organizer
Guillermo Paniagua
Turbomachinery and Propulsion Department
Von Karman Institute for Fluid Dynamics
Chaussee de Waterloo 72
1640 Rhode Saint Genese, Belgium
32.02.359.9629
E-mail: gpaniagua@me.com

Papers are solicited in the disciplines of mechanical design, fluid mechanics, and thermodynamics as related to the science and technology of air vehicle gas turbine engines and engine components in the subsonic and transonic flight regimes. The sessions are jointly sponsored by the AIAA Gas Turbine Engine Technical Committee, the SAE Aircraft Propulsion Committee and Turbomachinery Committee, and the ASME Propulsion Technical Committee. Contact the above organizer for more information.

Topics of interest for these sessions include, but are not limited to, the following:

- Experimental and computational efforts related to inlets, fans, compressors, combustors, turbines, augmentors, transmissions, bearings, seals, and nozzles
- Techniques for the advancement of engine component technologies, including design and manufacturing methods, materials, testing, diagnostics, and instrumentation
- Improved analytical/computational methodologies for fluid, thermal, and structural analysis of engine components
- Heat transfer, cooling, and sealing flows
- Analytical and computational models for engine level analysis/simulation
- Advanced engine cycles and game-changing component technologies
- Engine preliminary and detailed design methodologies
- Variable cycle engines
- Aeroacoustics, noise generation, and mitigation
- 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

High Speed Air-Breathing Propulsion and Hypersonic Combined Cycle Propulsion Application Sessions

High Speed Air-Breathing Propulsion Organizer
Roy Hartfield
Auburn University
211 David Hall
Auburn, AL 36849-5338
334.844.6819
E-mail: rjh@eng.auburn.edu

Hypersonic and Combined Cycle Propulsion Organizer
Ryan Starkey
University of Colorado at Boulder
Aerospace Engineering Sciences
Engineering Center, ECAE 115, 429 UCB
Boulder, CO 80309-0429
303.492.0871
E-mail: RStarkey@colorado.edu

Papers are solicited for all forms of air-breathing hypersonic and combined cycle propulsion systems, as well as high speed air-breathing propulsion systems used in the full spectrum of aircraft, space launch vehicles, and missiles. The sessions are jointly sponsored by the AIAA Hypersonic Technology and Aerospace Plane Program Committee, the AIAA High Speed Air Breathing Propulsion Technical Committee, the SAE Hypersonics Committee, and the ASME Propulsion Technical Committee. Please contact the above organizer for more information.

Topics of interest for these sessions include, but are not limited to, the following:

- Ramjet, scramjet, and combined cycle (TBCC, RBCC, etc.) engines using hydrogen, hydrocarbon, or alternate fuels
- Engine components such as combustors, injectors, inlets, and MHD generators for power generation
- The use of plasmas to modify shock structure and combustion
- Ground and flight test of hypersonic propulsion systems
- Control systems
- Applications for reusable launch vehicles, including single- and multiple-stage to orbit launch vehicle concepts
- Flight demonstrator research vehicle concepts
- Combined cycle engine system design and development
- Combined cycle engine analysis, optimization, and performance prediction
- Internal/external flow CFD analyses
- Innovative propellant management concepts
- System demonstration/validation plans
- Component development status
- Engine life-cycle costs
- Mission requirements
- Vehicle/engine integration and performance, engine thrust and LSP, mass fraction
- Ramjet, scramjet, and combined cycle engine air inlets, including inlet airflow, inlet boundary layer considerations, bleed/bypass, and shock positioning requirements
- Ramjets, scramjets, including combustors and combustion, fuel injection, flame holders, ramjet/scramjet transition, and fuel heating/thermal management
- Propellants, including propellant handling, air liquefaction, slush hydrogen, and bi/tri propellants
- Pulse detonation engines, including detonation initiation, propagation, and practical design, including fuel system, mechanical and thermal design, inlet system, and system integration
- High-fidelity propulsion system simulations discussing physics-based subsystem and system simulation methods and technologies, including validation, simulation frameworks, variable fidelity analysis, visualization environments, and high performance computing

System Concepts and Supporting Propulsion Technologies Sessions

System Concepts and Supporting Propulsion Technologies Organizer
James Chenoweth
Combustion Research and Flow Technology Inc.
7501 Memorial Parkway South, Suite 200
Huntsville, AL 35802
256.883.1905
E-mail: jdc@craft-tech.com

Papers are solicited for the full spectrum of aircraft, space launch vehicles, and missiles. The sessions are jointly sponsored by the ASME Propulsion Technical Committee and the AIAA Air Breathing Propulsion Systems Integration Technical Committee. Please submit abstracts in one of the seven organizational areas below (contact the above organizer for more information).

- Hybrid, distributed, and other technologies for intelligent and robust propulsion control systems
- Integrated modeling and simulation in systems
- Engineering and analysis for propulsion systems
- Design
- Prognostics, diagnostics, and condition-based maintenance
- Sensing and measuring technologies for propulsion systems and propulsion controls
- Advanced seal technology

Papers are requested describing recent developments in: a) system-level trade studies evaluating competing sealing approaches on the basis of performance metrics (specific fuel consumption, specific impulse, direct operating cost savings, thermal management, other); b) new seal design concepts and sealing approaches showing promise of meeting performance requirements; c) methods for seal design and predicting seal performance under service conditions; d) coupled techniques (experimental or analytical) to assess the interaction between the seal, cavity, and main flows; e) test results demonstrating concept feasibility under simulated/actual conditions, and description of novel test rigs used to evaluate seal concept performance; and f) seal material advancements, including improved materials for low wear and long life and seal tribological evaluations.

Ground Test Sessions

Ground Test Organizer
David P. Wishart
Pratt & Whitney Rocketdyne
PO Box 109600
M/S 715-83
West Palm Beach, FL 33410-9600
E-mail: david.wishart@pwr.utc.com

The AIAA Ground Test Technical Committee invites unclassified papers on topics related to new and improved test facilities; innovative testing and measurement techniques; applications of instrumentation and flow diagnostic tools; or any other area of interest in the field of testing and evaluation of aircraft, marine, or aerospace propulsion systems.

Information pertaining to the following broad categories for measurement of data and ground testing will be considered. Sessions will be organized within these broad categories and will include invited papers as well as contributed presentations. Subjects of general interest include, but are not limited to, the following:

- Air breathing and rocket and combined-cycle engine test techniques
- Measurement uncertainty including applications and automation
- Advances in data measurement, recording, monitoring, and retrieval
- Development of flow diagnostics tools and data processing
- Application and validation of new test techniques such as pressure-sensitive paints, infrared imaging, and optical diagnostics
- Thrust stand or facility calibration
- Hypersonic propulsion system testing
- Testing for engine life/integrity
- Propulsion system/test facility interactions
- New or upgraded test facilities
- Unique or innovative uses of existing facilities
- Advances in test article fabrication and applications
- Reduction of cost or increased productivity in test facilities
- Engine component testing
- Modern Design of Experiment methods in ground testing

The Ground Test Technical Committee has a process for recognizing "outstanding papers" presented in the ground testing sessions, as well as a "best paper" for the year. Please contact the above organizer for more information.

Rockets and Space Propulsion

Electric Propulsion Sessions

Electric Propulsion Organizer
James Polk
Jet Propulsion Laboratory
818.354.9275
E-mail: James.Polk@jpl.nasa.gov

Papers are solicited in all areas of electric propulsion, such as:

- Hall thrusters
- Ion thrusters
- Field emission thrusters, colloid thrusters, and other micropropulsion concepts
- MPD, PPT, and PIT thrusters
- Resistojets and arcjets
- Advanced thruster concepts
- Other electrothermal, electromagnetic, or electrostatic thruster concepts
- Innovative or advanced electric propulsion systems

For the concepts or systems listed above, the topics of interest include:

- Fundamental physics
- Analytical modeling
- Numerical simulations
- Laboratory and space testing
- Diagnostics
- Lifetime characterization
- Mission analysis
- Systems analysis
- Development programs
- Flight programs
- Other applications

The sessions will be sponsored by the AIAA Electric Propulsion Technical Committee and the ASME Propulsion Committee. Please contact the above organizer for more information.

Hybrid Rocket Propulsion Sessions

Hybrid Rocket Propulsion Organizer
Brian Evans
The Pennsylvania State University
139 Research Building East
University Park, PA 16802
814.404.5238
E-mail: Bje134@psu.edu

Papers are solicited that address all areas of hybrid propulsion technology including propulsion system applications, engine development and testing, oxidizer and fuel evaluation, and computational studies. These sessions are sponsored by the AIAA Hybrid Rockets Technical Committee. Please contact the above organizer for more information. Specific topics of interest for these sessions include, but are not limited to, the following:

- Development and evaluation of novel oxidizer and fuel formulations and combinations
- Injector designs and effect on engine performance and stability
- Physical processes related to oxidizer vaporization, heat transfer, solid-phase to gas phase species evolution, and mixing of oxidizer and fuel species
- Chemical kinetics between fuel and oxidizer species
- Analysis of internal ballistics including predictive capability
- Computational fluid dynamics studies of internal flow fields and combustion
- Design studies including cost and feasibility analysis
- Combustion stability, motor performance, and related issues

- Design and development of novel hybrid rocket motor concepts
- Descriptions of current programs—their objectives and progress to date

In-Space Propulsion Technologies Sessions

In-Space Propulsion Technologies Organizer
Eric J. Pencil
NASA Glenn Research Center
21000 Brookpark Road
Cleveland, OH 44135-3127
216.977.7463
E-mail: Eric.J.Pencil@nasa.gov

Papers are solicited in two general areas: In-Space Propulsion Technologies, and Lunar and In-Space Propulsion Systems: Operability and Health Management. The sessions are sponsored by NASA's In-Space Propulsion Technology program and the AIAA Space Tethers Technical Committee. Contact the above organizer for more information. Topics of interest are as follows:

In-Space Propulsion Technologies and Systems

Special interest in papers focused on propulsion activities related to sample-return missions will be emphasized. Example applications include propulsion for planetary ascent vehicles, Earth-return vehicles, and transfer stages. Beyond primary propulsion, papers on auxiliary propulsion applications such as formation flying, precision propulsion and micro-propulsion systems are welcome. Papers are also solicited that address non–rocket-based, or "propellantless," in-space propulsion technologies, such as tether, solar sail, and aerocapture/earth entry vehicle propulsion systems. Additionally, papers are solicited for rocket-based in-space propulsion technologies, such as chemical and solar thermal propulsion systems. Topics of interest for these sessions include, but are not limited to, the following:

- Near-term mission concepts
- Innovative system designs, concepts, and requirements
- Technology overviews
- Technology infusion approaches
- Ground testing
- Advanced development of these propulsion systems

Lunar and In-Space Propulsion Systems: Operability and Health Management

Papers are solicited that deal with the technology requirements, capabilities, and/or architectures in the domain of lunar and in-space propulsion systems that specifically relate to their health management and operability assurance. Papers in this domain could include embedded data and information architectures as well as system robustness, especially relating to health management and system operability assurance. The focus of the session is on multi-use technologies such as adaptive control, relevant sensors and monitoring systems, the application of reconfigurable computing, and the use of genetic algorithms. The goal of the session is to promote technical dialogue among the technologists engaged in the development of such systems, to heighten their sensitivity to this need, and to maximize the overall operational system flexibility, reliability, and affordability through the benefits offered by these technologies.

Liquid Rocket Propulsion Sessions

Liquid Rocket Propulsion Organizer
J. Arthur Sauer
Orbital Technologies Corporation
1212 Fourier Drive
Madison, WI 53717
608.827.5000
E-mail: sauerc@orbitec.com

The sessions will be jointly sponsored by the AIAA Liquid Propulsion Technical Committee, the SAE Space Transportation and Propulsion Technical Committee, and the ASME Propulsion Committee. Please contact the above organizer for more information. Unclassified papers are solicited in all areas of liquid propulsion technology, including propulsion system applications, engine development and testing, fluid control instrumentation, pressurant, and propellant storage. Studies that involve unique or new applications for next-generation propulsion solutions are of particular interest. Topics of interest for these sessions include, but are not limited to, the following:

Liquid Rocket Engine and Propulsion Systems

- Domestic/foreign expendable and reusable launch vehicle propulsion for booster, upper stage, and single stage to orbit applications
- Space vehicle propulsion for orbital, de-orbit, and interplanetary applications
- Liquid engine and propulsion systems for exploration systems and programs
- Propulsion systems utilizing non-toxic propellants and associated technologies
- Propulsion subsystem, analysis, and testing associated with NASA's Constellation University Institutes Project (CUIP)

Liquid Rocket Engine and Propulsion System Components

- Ignition systems such as combustion wave, laser, advanced torch, and hypergolic
- Engine combustion chamber design and analysis including coolant channels, innovative concepts, heat transfer, manufacturing processes, and materials
- Injector design and analysis, innovative concepts, manufacturing processes, materials, and testing
- Nozzle design, analysis, manufacturing processes, materials, and testing
- Turbomachinery for liquid rocket engines; fluid dynamic analysis, design innovation, manufacturing, materials, and testing
- Combustion device injector design, analysis, manufacturing, materials, and testing
- Lightweight gas storage vessels and propellant tanks; propellant acquisition technology involving positive expulsion or surface tension devices; all phases of design, development, fabrication, materials, testing, ground handling, and flight performance
- Feed systems/fluid management technology; fluid controls, sensors, pressurization, space vehicle servicing, control and health monitoring, on-orbit gauging, and materials compatibility

Feed System Studies: Valves, Tank, and Duct Flows

Papers are solicited on recent accomplishments in all areas related to feed system issues. These topics include experimental studies, CFD methodologies as well as system modeling studies. Of special interest are the following topics:

- CFD/experimental investigations of high pressure gas and cryogenic liquid valves for liquid rocket feed system. Flow instabilities that result in valve chatter, valve sticking, and high dynamic actuation loads are of particular interest.
- Modeling of cryogenic storage tanks including tank pressurization, tank sloshing, and mixing of high temperature gas with cryogenic liquids
- Studies addressing interaction and coupling between system components in liquid rocket feed systems (e.g., inlet feed ducts, cavitating venturis, orifices, valves, etc.)

Modeling and Simulation of Liquid Rocket Engines and Propulsion Systems

- Liquid rocket combustion fluid dynamics, chemical kinetics, engine/system modeling dynamics, and engine/system modeling

- Flow and combustion performance and stability including fuel injection phenomena, combustion stability, injector-chamber coupling, faceplate compatibility, and alternative fuels

Solid Rocket Propulsion Sessions

Solid Rocket Propulsion Organizer
Amy Gerards
U.S. Army RDECOM
RDMR-WDP-P
Redstone Road, Building 7120
Redstone Arsenal, AL 35898
256.313.0234
E-mail: Amy.Gerards@us.army.mil

Papers are solicited for the solid rocket propulsion sessions. Specific topics include, but are not limited to, the following:

- Air-launched tactical missile propulsion
- Surface/ground-launched tactical propulsion
- Commercial-launched vehicle propulsion
- Space-launched vehicle propulsion
- Space storable solids
- Strategic propulsion
- Divert and attitude control propulsion
- Missile interceptor propulsion
- Safety, health, and environmental issues
- Rocket motor demilitarization and propellant and ingredient reclamation, reuse, and disposal
- Propellant hazards classification; procedures and practices for safe handling, transportation, and storage
- Insensitive munitions technology, including advanced cases, active and passive mitigation concepts, and advanced propellants
- Propellant development
- Analysis and evaluation, including internal ballistics prediction, combustion, precision and accuracy, internal flow field assessment, heat transfer, structural/material response, particle impingement on insulation and nozzle, crack/de-bond propagation, performance, and energy management
- Solid rocket combustion instability
- Safety, reliability, and maintainability
- Materials and component technology relating to nozzles, igniters, safe/arm devices, TVC, and gas generators
- Lessons learned in rocket design, manufacture, qualification, static test, and flight programs
- Composite case technology
- Advanced nozzle technology; advanced composite materials, materials processing, quality control, and assurance
- Innovative ignition systems
- Motor-level combustion stability
- Motor temperature stability
- Development/production cost reduction, including modeling and analysis
- Nondestructive diagnostic evaluation of motors or components
- Innovative approaches to qualification of solid rocket motor design
- Solid rocket motor aging evaluation
- Solid rocket motor failure and accident investigations
- Solid rocket motor history
- University initiatives/programs in solid rocket propulsion
- Health monitoring systems for solid rocket motors
- Future technologies
- Solid rocket propulsion for crew exploration vehicle systems
- Controllable solid propulsion/thrust management

Space and Earth-to-Orbit Vehicle Systems Sessions

Space Transportation and Future Generation Space Transportation Sessions Organizer
Leo Daniel
Massachusetts Institute of Technology
Aeronautics and Astronautics
77 Massachusetts Ave, Bldg 37-371
Cambridge, MA 02139-4307
617.253.5199
E-mail: Leo@mit.edu

Space Transportation and Future Space Transportation sessions are sponsored by the AIAA Space Transportation Technical Committee and the ASME Propulsion Committee. In these sessions, special emphasis will be given to propulsion system and launch vehicle developments associated with contemporary commercial, military, and civil programs. For more information, please contact the session organizer listed above. Topics of interest for these sessions include, but are not limited to, the following:

Space Transportation
Papers are sought for sessions on space transportation including enabling technologies and economics. Of particular interest are papers that address propulsion system impact on performance, reuse, operability, and overall mission effectiveness of space transportation systems. Space transportation systems may include expendable launch vehicles, reusable launch vehicles, missiles, and upper stage and orbital transfer vehicles. Papers are sought for space transportation topics, including, but not limited to, commercial, civil, and military systems; cost modeling; performance safety, reliability, and maintainability; and environmental aspects.

Future Generation Space Transportation
This session set is directed to presentations of advanced fully reusable space transport vehicle and propulsion system concepts. Future civil, military, and commercial space transport missions are to be addressed, such as envisioned Spaceliner-/Spacelifter-class systems featuring aircraft-like mission dependability, flight safety, and overall affordability. Papers are solicited that present the latest thinking in system design and operations, relating key enabling and enhancing technologies. Innovative development and demonstration program approaches are of interest, including the use of X-vehicle flight testing and early prototyping.

Advanced Propulsion and Technologies

Advanced Propulsion Concepts for Future Flight Sessions

Advanced Propulsion Concepts for Future Flight Organizer
John W. Robinson
The Boeing Company
P.O. Box 3829
Seal Beach, CA 97040
714.896.1292
E-mail: John.W.Robinson2@boeing.com

The sessions are sponsored by the ASME Propulsion Committee.

Unique Propulsion Systems
Papers are solicited that address unique propulsion systems and innovative or nonconventional engine concepts. Some specific topics include design and development of systems for prime movers for the following:

- Earth launch systems
- Space systems
- Advanced compact systems
- Nano-propulsion systems

- Reciprocating systems
- Lightweight aircraft engines

Innovative Concepts for Future Propulsion

Papers are solicited on the subject of innovative or emerging propulsion concepts. Topics of interest for these sessions include, but are not limited to, the following:

- Theoretical concept development
- Computational results
- Proposed experimental facilities
- Experimental results
- Mission analysis
- Instrumentation and diagnostic techniques
- Low LCC systems

Innovative Fusion Propulsion Confinement Concepts for Far-Term Application

Papers are solicited on the subject of innovative or emerging plasma confinement concepts for fusion-based space propulsion. Topics of interest for these sessions include, but are not limited to, the following:

- Theoretical concept development
- Computational results
- Proposed experimental facilities
- Mission analysis
- Instrumentation and diagnostic techniques

Innovative Confinement Concept for Fusion Propulsion to the Moon and Mars

Papers are solicited that investigate all aspects for utilizing indigenous space materials for propulsion for lunar and Mars missions. Topics of interest for these sessions include, but are not limited to, the following:

- Production of propellants
- Theoretical and experimental designs
- Theoretical evaluations of engine performance
- Analyses on the benefits of in situ technologies for current and future missions

Emerging Commercial Propulsion Systems Sessions

Emerging Commercial Propulsion Systems Organizer
Ken Davidian
FAA Office of Commercial Space Transportation
800 Independence Avenue SW, Suite 331
Washington, DC 20591
202.267.7214
E-mail: Ken.Davidian@faa.gov

Ever since the release of fiscal year 2011 budget in February 2010, there has been an increasing awareness of the emerging commercial space sectors by the rest of the aerospace industry, the Congress, and the public at large. There have been new entrants (i.e., companies) into the established space markets that have demonstrated high levels of capability. At the same time, some incumbent firms have begun to demonstrate the ability to envision space markets beyond a sole government customer by taking on a forward-leaning posture with respect to unknown marketing risks and signaling their intentions to develop new products or services in those same markets. These are the stories that will be told in this paper session, and although a main character of these stories will be the propulsion systems, the vehicles and their companies will also play major roles.

Papers in this session can focus on the methods, techniques, results, innovations, lessons learned, interesting experiences, etc., of one or more of the following aspects of the emerging commercial rocket propulsion systems:

- Design
- Analysis
- Development
- Manufacture
- Testing
- Technical Performance
- Operation

Energetic Components and Systems Sessions

Energetic Components and Systems Organizers
Hobin Lee
Scot Incorporated Engineering
2525 Curtiss Street
Downers Grove, IL 60515
630.969.0620, ext. 361
E-mail: hslee@scotinc.com

Steven F. Son
School of Mechanical Engineering
Purdue University
500 Allison Road
West Lafayette, IN 47907-2088
765.494.8208
E-mail: sson@purdue.edu

Papers are solicited in the areas of energetic components and systems and their applications. Energetic systems provide controlled and directed explosive energy to perform a variety of functions in a multitude of applications. Energetic systems are defined as any component or system containing or operated by explosive materials. International submissions are encouraged. The sessions are sponsored by the AIAA Energetic Components and Systems Technical Committee. Please contact the above organizer for more information. Topics of interest for these sessions include, but are not limited to, the following:

- Applications and requirements for civilian and military aircraft, space vehicles and missiles, automotive safety, mining, and controlled demolition
- Electro-explosive devices, initiators, detonators, gas generators, igniters and their initiation systems (which may include hot bridge wire, exploding bridge wire, exploding foil, laser/fiber optics, or semiconductor bridge elements) and explosive energy transfer products, including detonating cord, thin layer explosive, linear shaped charge, and through bulkhead initiators
- Explosively actuated devices, including severing/penetration charges, expanding tube/bellows separation systems, explosive bolts, frangible nuts, separation nuts, pin pullers, bolt cutters, cable cutters, pyrovalves, and safe/arm devices
- Lessons learned and education
- Modeling and simulations of energetic components/systems
- Energetic material chemistry, including synthesis, characterization, compatibility, and aging, and analysis techniques as applied to ordnance applications
- Nontraditional topics other than those listed

Nuclear and Future Flight Propulsion Sessions

Nuclear and Future Flight Propulsion Organizer
Brice Cassenti
University of Connecticut
Mechanical Engineering Department
191 Auditorium Road U-3139
Storrs, CT 06269-3139
860.486.4939
E-mail: Cassenti@engr.uconn.edu

Papers are solicited that address all aspects of future concepts in propulsion. The sessions are supported by the AIAA

Nuclear and Future Flight Propulsion Technical Committee. Abstracts should be submitted using Nuclear and Future Flight as the main heading and one of the following subheadings described below. Please contact the above organizer for more information. Topics of particular interest are below.

Nuclear Thermal Propulsion

Papers are requested on all aspects of Nuclear Thermal Rocket (NTR) propulsion design, testing, and utilization for future robotic and human exploration missions of the solar system. Topics of interest for these sessions include, but are not limited to, the following:

- Bimodal solid core NTR concepts capable of producing both thrust and electrical power for enhanced stage/vehicle operations
- Bimodal NTR system for human Mars exploration
- Bimodal NTR spacecraft and mission design
- Common gas-cooled reactor design for both propulsion and closed surface power generation
- Candidate bimodal nuclear fuel options
- Reactor controls and shielding requirements
- Ground test facility options to accommodate both propulsive and power modes of engine operation
- Prospects for commercial space activities that could be enabled by NTR systems

Fusion Energy in Space Propulsion

- Fusion energy in space propulsion
- Inertial electrostatic confinement
- Magnetically Insulated Inertial Confinement
- Fission/fusion hybrid
- Concepts that utilize fusion reactions directly or indirectly

Future Flight Propulsion Systems

Papers are solicited that present advanced concepts for both near- and far-term future space propulsion. Some specific topics include technologies that promise significant gains in specific impulse, such as the following:

- High-energy fuels
- Novel fusion concepts
- Antimatter engines
- Laser or microwave propulsion
- Mass drivers
- Interstellar propulsion
- Breakthrough propulsion physics, including:
  – Fundamental physics of space–time, motion, forces, and energy exchange
  – Possible coupling between electromagnetism, inertia, and gravitation
  – Creation or modification of general relativistic space–time topologies
- Properties of the quantum vacuum

Propellants and Combustion Sessions

Propellants and Combustion Organizer
Kailas Kailasanath
Code 6410, U.S. Naval Research Laboratory
Washington, D.C. 20375
202.767.2402
E-mail: Kailas@lcp.nrl.navy.mil

Papers are solicited that describe recent experimental, theoretical, and numerical work in all areas related to the combustion of liquid, solid, and gaseous fuels in air-breathing, rocket,

and underwater propulsion systems. An award will be given for the best paper. These sessions are jointly sponsored by the AIAA Propellants and Combustion Technical Committee and the ASME Propulsion Committee. Please contact the above organizer for more information. Papers covering a broad range of topics are sought. These topics include, but are not limited to:

Propellant and Fuel Development (Green Fuels)
Future propellants with special emphasis on "green propellants": those with minimal environmental impact. Topics include, but are not limited to, formulations and physical chemical properties of fuels including characterization by surrogates, hazards, safety evaluation, materials compatibility, applications to propulsion devices, high-energy and high-density fuels and materials, propellants for operation under extreme thermodynamic conditions, thermal stability of fuels and propellants, reformed fuels, implications of rising oil prices on jet propellants, and in situ propellant production concepts for military contingencies and planetary missions.

Combustion Diagnostics
Development, assessment, and calibration of advanced diagnostic techniques related to fundamental experiments or their applications to practical combustion devices.

Spray Combustion
Spray flame characteristics; supercritical droplet combustion; design of fuel spray systems; break-up behavior; non-dilute spray characteristics encountered in propulsion combustors.

Fundamental Combustion Processes
Ignition; laminar and turbulent flame propagation and extinction; detonation; chemical kinetics; infrared radiation from gas flames of gas turbine combustors; lean pre-vaporized premixed combustion systems; other transport processes in gas, liquid, solid, or mixed systems.

Combustion Modeling
Reynolds-averaged turbulent combustion models, subgrid scale turbulent combustion models for large-eddy simulations, other methods for capturing turbulent transport and fluid-chemistry interactions. Strategies for model implementation in computational tools influence of initial and boundary conditions, numerical diffusion, etc.

Combustion Dynamics/Detonations
Mechanisms of combustion instability in gas turbine and rocket combustors and augmentors. Instability suppression techniques. Detonation physics; applications to pulsed and continuous (or rotating) detonation engines.

Hybrid Combustion Systems
Chemical reaction in power/propulsion systems consisting of two or more integrated, chemically reacting components. Examples include fuel cells and reformers integrated with conventional combustors to provide propulsive and electric power, and endothermic reactors integrated with scramjet combustors to provide leading-edge cooling and fuel cracking.

Micro-Scale Combustion
Combustion in miniaturized propulsion systems with special emphasis on combustion in channels/passages with characteristic dimensions of the order or smaller than the flame thickness. System performance scaling and role of fluid structure coupling.

History and Education

History Sessions

History Organizer
David Whalen
John D. Odegard School of Aero Science
Stop 9008
4149 University Avenue
Grand Forks, ND 58202-9008
701.777.3558 • 701.777.3711 FAX
E-mail: whalen@space.edu

Papers are solicited on any aspect of aviation or space history—especially papers on vehicle propulsion and propulsion systems. Possible topics might be the technological trajectory of specific propulsion systems, transition from government (NASA and U.S. Air Force) to commercial provision (and transitions), historic aircraft/launch vehicle systems, test program summaries, aircraft/launch overviews, and corporate histories. The sessions will be sponsored by the AIAA History Technical Committee. Please contact the session organizer for more information.

Propulsion Education Sessions

Propulsion Education Organizer
Robert A. Frederick Jr.
UAH Propulsion Research Center
The University of Alabama in Huntsville
5000 Technology Drive, TH S226
Huntsville, AL 35899
256.824.7200
E-mail: Robert.Frederick@uah.edu

Papers are solicited from both universities and industry on topics relating to all aspects of propulsion education and research. Sessions are planned for K–16 Outreach and University Initiatives in Propulsion. K–12 teachers are encouraged to submit case study papers on new projects involving propulsion concepts. Areas of interest include air-breathing, rocket, and advanced propulsion systems, subsystems, and component analysis and design course work as implemented for both graduate and undergraduate programs. Industry papers of interest include desired attributes of next-generation engineers and examples of successful industry/education outreach programs.

The sessions are sponsored by the ASEE Propulsion Education Committee. Please contact the above organizer for more information. Topics of interest include the following:

- K–16 educational outreach case studies
- Industry-desired attributes of new engineers
- University/industry initiatives in propulsion education/research
- University capabilities in propulsion education/research-institutional summary
- Student design projects/experiments
- Software tools for propulsion education
- International propulsion projects
- Propulsion laboratories

9TH INTERNATIONAL ENERGY CONVERSION ENGINEERING CONFERENCE (IECEC)

Synopsis

The 9th International Energy Conversion Engineering Conference (IECEC) will be held 31 July–3 August at the San Diego Convention Center. The IECEC provides a forum to present and discuss engineering aspects of energy conversion technology, advanced energy and power systems, devices for terrestrial energy systems and aerospace applications, and the policy, programs, and environmental impact associated with the development and utilization of this technology.

IECEC Organizing Committee

General Chair
Ted Stern
VP / General Manager
Space Power, Optics and Thermal Products
DR Technologies, Inc.
9431 Dowdy Drive
San Diego, CA 92126
Phone: 858.444.1830

Technical Program Chair
Farzad Mashayek
Department of Mechanical & Industrial Engineering
University of Illinois at Chicago
Chicago, Illinois
Phone: 312.996.1154
E-mail: Mashayek@uic.edu

Deputy Technical Program Chair
Michael Choi
NASA Goddard Space Flight Center
Code 545, Mechanical Systems Division
8800 Greenbelt Road
Greenbelt, MD 20771
Phone: 301.286.4707
E-mail: Michael.K.Choi@nasa.gov

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

- The Heat Transfer Society of Japan Advanced Energy Conversion Group
- The IEEE Aerospace & Electronic Systems Society (AESS)
- The Egyptian Society of Mechanical Engineers (ESME)

Topics *(Note: Submitting topics are listed in all-caps)*

ENERGY CONVERSION DEVICE TECHNOLOGY

Technical papers are sought that discuss the details of various types of energy conversion devices, including, but not limited to, the specific devices listed below. Papers should address specific characteristics, processes, and methodologies. Topics may include initial concepts, device component fabrication, modeling, analysis, testing, operation and applications.

Direct Energy Conversion Devices and Components
AMTEC
Magnetohydrodynamics (MHD)
Photovoltaic devices
Thermionics
Thermoacoustic engines
Thermoelectrics
Thermophotovoltaics (TPV)

Thermodynamic Devices, Components and Systems
Advanced cycles
Brayton and Rankine cycles
Heat engines and heat pumps
MEMS
Stirling engines

Advanced Energy Conversion Concepts
Combined Heat/Electrical Power Concepts
Applications of Nanotechnology for Energy Conversion
Policy, Environmental and Historical Perspectives of Energy Conversion

ENERGY STORAGE TECHNOLOGY

Technical papers are being sought that discuss all primary or secondary devices or mediums utilized to store, charge, recharge, or regenerate a source of energy for immediate or delayed utilization. Of great interest are papers discussing innovative methods, materials, and processes, including lessons learned. Topics may include initial concepts, device component fabrication, analysis and testing, and energy storage system testing, operation, and applications.

Capacitive Energy Storage
Supercapacitors
Ultracapacitors

Flywheel Energy Storage
Device components
System operation, test and analysis

Primary Batteries
Lithium cells and advanced batteries
Active primary batteries
Reserve batteries
Thermal batteries

Rechargeable Cell and Batteries
Lithium ion
Lithium polymer
Nickel cadmium
Nickel hydrogen
Nickel metal hydride
Electric vehicle batteries
Special purpose batteries

Fuel Cells
Components and system designs
Regenerative

Superconducting Magnetic Energy Storage
Applications of Nanotechnology for Energy Storage
Policy, Environmental and Historical Perspectives of Energy Storage

THERMAL MANAGEMENT TECHNOLOGY

Technical papers are being sought that illustrate the delicate balance of temperature, results of practical applications, tests, simulations, and R&D initiatives of thermal management. Papers discussing operational performance, current limitations, and study results of thermal management components and systems for aircraft, spacecraft, and terrestrial applications are encouraged.

Micro Chemical and Thermal Systems (Micro CATS)

Heat Transfer and Transport
Heat exchangers
Heat pipes and capillary pumped loops
Phase change heat transfer

Thermal Energy Storage
Advanced materials
TES applications and issues

Thermal Systems and Components
Cooling electronic components
Cryogenic cooler systems
Modeling and simulation of thermal systems
Power systems cooling
Solar collector thermal design
Thermal interface materials
Thermal testing

Thermal System Applications and Unique Environments
Aircraft
Building heating and cooling

Fuel cell thermal management
Ground vehicle thermal management
Lunar/Martian surface and deep space applications
Thermal control of machinery and electronics
Spacecraft
Waste heat utilization

Applications of Nanotechnology for Thermal Management
Policy, Environmental and Historical Perspectives of Thermal Management

FUELS, COMBUSTION, AND TERRESTRIAL ENERGY SYSTEMS

Technical papers are being sought that address the latest research, developments, and viable new technologies applicable to fuels, combustion research, and terrestrial power systems. The primary focus of this topic area is on the development, application, and operation and power systems for terrestrial systems. This topic area focuses on, but is not limited to, the following areas:

Combustion
Advanced designs
Micro-combustors
Waste fuels
Opportunity fuels
Pollution
Chemical kinetics
Diagnostics
Modeling and simulation

Alternative Fuels
Biomass
Hydrogen
Ammonia
Solar Fuels

Energy Efficient Vehicle Technology
Electric and hybrid vehicles
Alternative-fueled vehicles

Terrestrial Energy Systems
Fossil fuels
Geothermal
Nuclear and advanced nuclear
Photovoltaic and solar thermal systems
Wind and tidal systems
Building energy

Transmission, Distribution, and Utilization
Power transmission technology
Cogeneration
Cryogenic systems
Distributed generation
Utility power electronics

Mobile and Military Power Systems
Marine energy systems
Electric ship components and systems
Advanced naval power systems
Transportable military power
Small portable power designs

Applications of Nanotechnology for Terrestrial Systems
Policy, Environmental and Historical Perspectives of Terrestrial Systems

AEROSPACE POWER SYSTEMS

Technical papers are being sought on power system and subsystems developed specifically for aerospace applications. Papers may include concepts, development initiatives, testing, simulations, and mission requirements addressing the broad range of power for aircraft and space applications. Papers discussing aerospace-specific power technologies, operational performance, requirements, and system designs are highly desired. Topics include, but are not limited to:

Space Power System Designs & Operational Performance
New power technology for space applications
Space station
Space exploration missions
Spacecraft solar
Spacecraft radioisotope
Space environment interactions

Aero Power System Design and Operational Performance
New power technology for aero applications
Aircraft
UAV
Balloon

Specific Space Power Systems
Directed energy power
Missile power systems
Spacecraft solar arrays
Radioisotope power systems
Space nuclear reactors
Solar thermal power for spacecraft
Spacecraft tether power systems
Space solar power concepts
Energy and power architectures for lunar exploration
Mars surface power systems
Power systems for deep space exploration

Electrical Power System Management and Distribution
Power system architecture
In-orbit battery management and calibration
Space power system fault protections
High voltage systems
New power components
Superconductors

Power System Modeling, Analysis and Simulation
Terrestrial Applications of Aerospace Technology
Weapon Power Systems and Studies
Applications of Nanotechnology for Aerospace Systems
Policy, Environmental, and Historical Perspectives of Aerospace Power Systems

AIAA Guidance, Navigation, and Control Conference
AIAA Atmospheric Flight Mechanics Conference
AIAA Modeling and Simulation Technologies Conference

8–11 August 2011
Oregon Convention Center
Portland, Oregon

Draft Manuscript/Abstract Deadline: 17 January 2011
Final Manuscript Deadline: 18 July 2011

Draft Manuscript/Abstract Submittal Procedures for All Conferences

Draft manuscripts and abstract submissions will be accepted electronically through the AIAA Web site at **www.aiaa.org/events/gnc**, **www.aiaa.org/events/afm**, and **www.aiaa.org/events/mst**. Once you have entered the conference Web site, on the right-hand side, click "Submit a Paper" and follow the instructions listed on the screen to follow. This Web site will be open for abstract submittal starting **1 September 2010**. The deadline

for receipt of draft manuscripts and abstracts via electronic submission is **17 January 2011**. Authors will be notified of paper acceptance via e-mail by **5 April 2011**. An Author's Kit, containing detailed instructions and guidelines for submitting papers to AIAA, will be made available to authors of accepted papers. Authors of accepted papers must provide a complete manuscript online to AIAA by **18 July 2011** for inclusion in the online proceedings and for the right to present at the conference. It is the responsibility of those authors whose papers or presentations are accepted to ensure that a representative attends the conference to present the paper. Sponsor and/or employer approval of each paper is the responsibility of the author. Government review, if required, is the responsibility of the author(s). Authors should determine the extent of approval necessary early in the paper presentation process to preclude paper withdrawals or late submissions.

The electronic submission process is as follows:

1) Access the AIAA Web site at **www.aiaa.org/events/gnc**, **www.aiaa.org/events/afm**, and **www.aiaa.org/events/mst**.

2) On the right-hand side, click the "Submit Paper" button.

3) To access the submission site, you must be logged in to the AIAA Web site.

a. If you already have an account with AIAA, enter your User Name and Password in the "Login" box on the left-hand side and hit the arrow button.

b. If you do not have an account with AIAA, complete the steps for "Create Account".

4) Once logged in, you will be provided an active link for "Begin a New Submission or View a Previous Draft/Submission". Click the link to be directed to the Welcome page of the submission site.

5) Click the Submission tab at the top of the page to begin your submission.

6) Once selected, you will be provided with general information on the conference's abstract submission requirements and policies. To begin the submission, click the "Create a New Submission" link on the left-hand side. ***Please Note***: If you have previously visited the site and begun a draft submission, click the "View Submissions" link on the left-hand side to resume your submission.

STEP 1: Type or paste the title of your abstract into the Title field and the presenting author's biography (if requested by the conference) into the Presenter Biography field. Scroll down to read through the Rules and Reminders section and check the box noting you agree. Click "Save & Continue" to proceed to the next step.

STEP 2: Select your Presentation Type and the Topic Area of your abstract. Click "Save & Continue" to proceed to the next step.

STEP 3: In this system, affiliations are added before author information. The information will be filled in for the person logged in to the site. Add additional author affiliations, if necessary, by clicking the "Add" button after each new affiliation. Click "Save & Continue" to proceed to the next step.

STEP 4: To create a list of co-authors for this submission, click the "Add Author" button and enter the required information. Click "Save" after entering each one and then associate each author with their respective affiliation by entering the appropriate reference number from the drop-down boxes to the right of each name. When you have finished entering all authors ***YOU MUST*** put them in the order they should appear on the abstract and program. Use the drop-down boxes in the far left column of the list to do this. Failure to order the authors properly will result in them being incorrectly listed when the submission is published. After you have reordered the authors, click the "Save" button at the bottom of the list. Click "Save & Continue" to proceed to the next step.

STEP 5: Select at least one technical area that best represents your work. While only one selection is required, you may list up to six for your submission. Click "Save & Continue" to proceed to the next step.

STEP 6: Upload your abstract/draft manuscript file. Accepted file types are .doc, .docx, and .pdf. Click "Save & Continue" to proceed to the next step.

STEP 7: If you have no errors or omissions in your abstract a "Submit" button will appear at the end of the proof. If the Error Box appears you must correct all errors before the abstract can be submitted. Once the errors have been resolved the "Submit" button will appear at the bottom. If you exit the system without submitting the abstract, it will be logged in the system as a draft and will appear in the "Draft" section of your "View Submissions" page when you reenter the system. After you submit the abstract, you will receive a confirmation e-mail.

Special Notes

1) If authors wish to revise an abstract that has already been submitted, they must go to "View Submissions" and select "Return to Draft" to make any corrections. This removes the abstract from the organizers' view. Authors then need to submit the abstract again for it to be considered. An abstract cannot be returned to draft if it has been reviewed.

2) Once the abstract submission deadline passes, authors will no longer be able to submit new submissions or return previous submissions to draft for revisions. Be sure that all of your submission data—authors, keywords, title, and abstract file—are accurate before finalizing your submission as no modifications can be made to this data after the submission site closes.

Authors having trouble submitting abstracts electronically should contact ScholarOne technical support at ts.acsupport@thomson.com or 434.964.4100 or toll free 888.503.1050 (U.S. only). Questions about the manual abstract submission or full draft manuscript themselves should be referred to the appropriate Technical Chair or Topic Area Chair.

"No Paper, No Podium" and "No Podium, No Paper" Policies

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

Publication Policy

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

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.

Sponsorship Opportunities

If your company is looking for a mechanism to heighten visibility, expand networking capabilities among industry leaders, and demonstrate your unique value to thousands of aerospace professionals, AIAA can help to achieve your overall objectives. For more information on sponsorship opportunities, contact Cecilia Capece, AIAA Sponsorship Program Manager, at 703.264.7570 or ceciliac@aiaa.org.

AIAA GUIDANCE, NAVIGATION, AND CONTROL CONFERENCE

Synopsis

The AIAA Guidance, Navigation, and Control Technical Committee is inviting participation in the AIAA Guidance, Navigation, and Control Conference. The conference is the largest forum dedicated to guidance, navigation, and control (GN&C) serving the aerospace community. It brings together experts from industry, government, and academia on an international level to present and discuss all technical areas related to GN&C for aerospace applications.

Draft Manuscript Submission Guidelines for GNC Conference

Paper selection for this conference will be based on a full draft manuscript of the proposed technical paper. No exceptions will be made. Draft manuscripts and final papers must not exceed at total length of 25 pages. Each draft must begin with a 100–200 word abstract, and an introduction that includes a brief assessment of prior work by others and an explanation of the paper's main contributions. The body of the manuscript must include sufficient detail to allow an informed evaluation of the paper.

Technical Areas

Technical papers are sought on advances made in aerospace system GN&C. Papers of interest include those that describe analytical techniques, applications, and technological developments in the guidance, navigation, and control of aircraft, spacecraft, missiles, robotics, and other aerospace systems; general aviation; in-flight system architecture and components; navigation and position location; sensors and data fusion; multidisciplinary control; and GN&C concepts in air traffic control systems and high-speed flight. The areas of interest above will be organized into the following topics.

Control Theory, Analysis, and Design

Papers are sought that develop new theories, generate new algorithms, derive new analysis techniques or design tools, or modify existing techniques for general application to control of flight vehicles. Topics of interest include robust control, nonlinear control, optimal control, multivariable control, adaptive control, estimation, filtering, identification, fault detection, and redundancy management. Papers describing new analysis and synthesis techniques with illustrative aerospace control examples are encouraged.

GNC General Chair
Irene M. Gregory
NASA Langley Research Center
100 Langley Boulevard, MS 308
Hampton, VA 23681
757.864.4075 • 757.864.7722 FAX
E-mail: irene.m.gregory@nasa.gov

GNC Technical Program Chairs
D. Brett Ridgely
Raytheon Missile Systems
Flight Control Dept., GNC Center
Bldg. 805, M/S M4
Tucson, AZ 85734
520.794.3197 • 520.794.9570 FAX
E-mail: dbridgely@raytheon.com

Leena Singh
Draper Laboratory
555 Technology Square
Cambridge, MA 02420
617.258.1766 • 617.258.2555 FAX
E-mail: lsingh@draper.com

Technical Area Chair
Soon-Jo Chung
University of Illinois at Urbana-Champaign
Department of Aerospace Engineering
104 South Wright Street
Urbana, IL 61801
E-mail: sjchung@illinois.edu

Technical Area Co-Chair
Puneet Singla
Department of Mechanical and Aerospace Engineering
1010 Furnas Hall
University at Buffalo
Buffalo, NY 14260
716.645.1429 • 716.645.2883 FAX
E-mail: psingla@buffalo.edu

Novel Navigation, Estimation, and Tracking Methods

Papers are sought that develop new theory, applications, or analysis in the area of navigation, estimation, and tracking theory. Of interest are the applications of optimization and estimation theory, identification, nonlinear filtering and smoothing, combined detection/tracking, sequential Monte Carlo filtering methods (particle filtering), nonlinear programming, and multiple model/multihypothesis methods. Applications include vision-based navigation, X-ray source-based navigation, robust and adaptive filtering, spacecraft and missile integrated estimation/control, nonlinear and multihypothesis tracking, orbit and trajectory estimation, autonomous navigation and control (including integrated GNSS/INS applications), terrain-guided navigation, biologically inspired navigation and tracking, formation flying, and FDIR/redundancy management. Papers that emphasize stochastic modeling and analyses, handling of non-Gaussian error distributions, and attitude filtering applications or analyses (especially those involving GNSS phase measurements and multipath errors) are also encouraged.

Technical Area Chair
Jason K. Hui
BAE Systems
P.O. Box 868, MER15-2350
Nashua, NH 03061-0868
603.885.0646 • 603.885.9819 FAX
E-mail: jason.k.hui@baesystems.com

Technical Area Co-Chair
John A. Christian
EG6 /GN&C Autonomous Flight Systems Branch
NASA Johnson Space Center
2101 NASA Parkway
Houston, TX 77058
770.330.9732
E-mail: john.a.christian@gmail.com

Aircraft Guidance, Navigation, and Control

Papers are sought that describe the development, simulation, and flight testing of GN&C systems designed for aircraft, helicopters, and V/STOL vehicles. Areas of interest include stability augmentation, automatic flight path, and speed control of self-repairing or reconfigurable aircraft. Problems of particular interest include interdisciplinary flight control, control authority and vehicle performance limits, nonlinearities, aeroservoelasticity, structural control and vibration suppression in aircraft, control of morphing aircraft, saturation of control effectors, and control at extreme angles of attack. Also of interest are papers concerned with aircraft handling qualities, human-machine interfaces, situational awareness and decision support, goal-oriented control, and pilot-in-the-loop problems, including pilot-induced oscillations. Papers that emphasize experimental results from either flight test or simulation will be considered preferentially.

Technical Area Chair
Jong-Yeob Shin
Gulfstream Aerospace Corporation
912.965.4022 • 912.965.3367 FAX
E-mail: jong.yeob.shin@gulfstream.com

Technical Area Co-Chair
Winfried Lohmiller
System Design and Navigation
Military Air Systems
EADS
Rechliner Strasse, 85077 Manching, Germany
+49 8459 8179139 • + 49 8459 8179804 FAX
E-mail: winfried.lohmiller@eads.com

Spacecraft Guidance, Navigation, and Control

Papers are sought that deal with topics specific to GN&C of on-orbit flight of single space vehicles. Areas of interest include attitude and orbit determination and control, momentum control, payload pointing and articulation, adaptations of computer software for spaceflight use, and sensor and actuator selection and distribution. Also sought are papers that describe innovative techniques to improve performance through the use of existing sensors and actuators, and through reduction of structural dynamic interaction resulting from instrument articulated mass motion, GN&C actuation, and thermally induced disturbances. Also of interest are papers dealing with any aspects of GN&C systems for planetary and exploration missions, the International Space Station and its resupply and servicing vehicles, Earth and space science missions, unclassified topics concerning defense and surveillance satellites, small satellites, low-Earth-orbiting and geostationary communications satellites, and small satellites of the future. Theoretical discussions should be supported by simulation, test, and/or flight performance data where possible. Discussions on system-level error sources affecting GN&C functions are also encouraged. For papers that concern multiple vehicles, such as formations, constellations, and rendezvous and docking, authors should submit their drafts to the "Multi-Vehicle Control" topic area. For papers that concern ascent and entry, authors should submit their drafts to the "GN&C of Hypersonic and Space Transportation Vehicles" topic area.

Technical Area Chair
Lawrence "Robbie" Robertson
Air Force Research Lab
Space Vehicles Directorate (AFRL/RVSV)
3550 Aberdeen Ave. SE
Kirtland AFB, NM 87117
505.846.7687 • 505.846.7787 FAX
E-mail: lawrence.robertson@kirtland.af.mil

Technical Area Co-Chair
Adam Fosbury
Johns Hopkins University Applied Physics Laboratory
Space Department
Mission Design, Guidance, and Control Group
11100 Johns Hopkins Road
Laurel, MD 20723
443.778.3824 • 443.778.0355 FAX
E-mail: adam.fosbury@jhuapl.edu

Missile Guidance, Navigation, and Control

Papers are sought that relate to the GN&C of missiles, launch vehicles, and reentry vehicles. Papers relating to missile applications associated with national or theater missile defense systems are also solicited. Topics include design, analysis, simulation, and test of complete systems or subsystems. Problem areas of interest are system implementation using modern techniques, estimation and filtering algorithms, modern autopilot configurations, and application of computer-based design and analysis techniques.

Technical Area Chair
Joseph S. Brinker
The Boeing Company
P.O. Box 516, Mail Code S064-4205
St. Louis, MO 63166-0516
314.234.3343 • 314.233.0516 FAX
E-mail: joseph.s.brinker@boeing.com

Technical Area Co-Chair
Scott Wells
Raytheon Missile Systems
Flight Control Dept., GNC Center
Bldg. 805, M/S M4
Tucson, AZ 85734
520.545.8716 • 520.794.9570 FAX
E-mail: scott_wells@raytheon.com

Multi-Vehicle Control

Papers are sought that relate to cooperative decision and control of autonomous agents, formation flight of air/space vehicles, and mixed initiative control of semi-autonomous teams. This area addresses the unique problems of cooperative behavior and control of autonomous and/or semi-autonomous teams. Specific areas of interest include cooperative task assignment and trajectory optimization, aircraft formation flight for drag savings, distributed aperture satellite formations, swarming, platooning, mobile sensor networks, team auto-routing and coordinated rendezvous, and biologically inspired group behavior and control schemes. Platforms include UAVs, Unmanned Combat Air Systems (UCAS), Unmanned Ground Vehicles (UGVs), Unmanned Underwater Vehicles (UUVs), Wide Area Search Munitions (WASMs), and satellite constellations and/or clusters.

Technical Area Chair
Frank R. Chavez
Air Force Research Laboratory
AFRL/RVES
3550 Aberdeen Avenue, SE
Kirtland Air Force Base, NM 87117
505.846.6066 • 505.853.4760 FAX
E-mail: frank.chavez@kirtland.af.mil

Technical Area Co-Chair
Derek A. Paley
Department of Aerospace Engineering
University of Maryland
3150 Glenn L. Martin Hall
College Park, MD 20742 USA
301.405.5757 • 301.314.0213 FAX
E-mail: dpaley@umd.edu

Space Exploration and Transportation Guidance, Navigation, and Control

Papers are sought dealing with GN&C of space exploration and space transportation systems. Of particular interest are studies dealing with NASA's vision for space exploration and the Crew Exploration, Launch, and Cargo Vehicles (CEV, CLV, CaLV). Especially encouraged are papers dealing with GN&C aspects for ascent or entry flight phases on Earth (for the CEV, CLV), the moon, and other planets (for exploration missions). Papers are also solicited that address next-generation systems involving hypersonic entry vehicles, reusable launch vehicles (RLVs), or systems with reusable stages. Examples of current interest include commercial and military access to space concepts such as the U.S. Air Force's Hybrid Launch Vehicle. General topics of interest include: design, development, and analysis of advanced, adaptive, or reconfigurable control and guidance approaches that increase overall vehicle safety and reliability; verification and validation techniques for such advanced systems; approaches that make use of information obtained from vehicle health management systems; or optimal trajectory design and/or online trajectory reshaping methodologies. Papers are also encouraged that present new guidance, control, or mission planning approaches that will reduce development costs, reduce turnaround time for planning and redesign, or present synthesis tools that support rapid tradespace analysis for new vehicle concepts. Papers are also sought that focus on the unique challenges associated with controlling air-breathing hypersonic vehicles. Especially encouraged are papers that address coupling between the propulsion system, aerodynamics, thermodynamics, control system, and vehicle structure.

Technical Area Chair
John L. Crassidis
Department of Mechanical and Aerospace Engineering
Center for Multisource Information Fusion
University at Buffalo, State University of New York
Amherst, NY 14260-4400
716.645.1426 • 716.645.3668 FAX
E-mail: johnc@buffalo.edu

Technical Area Co-Chair
Uday J. Shankar
Space Department
Mission Design, Guidance, and Controls Group
Johns Hopkins University Applied Physics Lab
11100 Johns Hopkins Road
Laurel, MD 20723
240.228.8037
E-mail: uday.shankar@jhuapl.edu

Guidance, Navigation, and Control Concepts in Air Traffic Control Systems

Papers are sought that describe innovative techniques for implementing GN&C concepts in air traffic control (ATC) systems, as well as in the simulation, analysis, and modeling of such systems. Both near-term implementation issues such as the development and testing of new ATC decision support tools, and advanced ATC concepts such as multi-agent control strategies, are of interest. Example areas of application are the introduction and integration into the ATC system of new vehicles and technologies, such UAVs, GPS-based navigation, data link communication/surveillance, four-dimensional trajectory synthesis, and guidance using cockpit display of traffic information. Other example areas include the development and evaluation of GN&C enhancements for aviation security, and revolutionary ATC operational concepts that offer the potential for large benefits in safety, capacity, and efficiency. Papers are also encouraged that describe operational issues for existing ATC systems, lessons learned from past experience, or field test/evaluation activities.

Technical Area Chair
Craig R. Wanke
The MITRE Corporation
7515 Colshire Drive
McLean, VA 22102-7508
703.983.3634 • 703.983.1226 FAX
E-mail: cwanke@mitre.org

Technical Area Co-Chair
Gano B. Chatterji
NASA Ames Research Center
Mail Stop 210-8
Moffett Field, CA 94035-0001
650.604.1639
E-mail: gano.b.chatterji@nasa.gov

Sensor Systems for Guidance, Navigation, and Control

Papers are sought that describe novel standalone sensors, integrated sensor systems, and innovative sensing techniques for GN&C of airborne or surface, manned or unmanned, vehicles. Testing and performance evaluation results from actual hardware, as well as new techniques for designing, modeling, simulating, prototyping, and fielding sensor systems that support GN&C, are of particular interest. Papers addressing miniaturization of hardware and applications of relevant micro- and nano-technologies are highly encouraged. Papers describing innovative research, development, design, and integration work with illustrative GN&C sensor systems applications are also highly desirable. Application areas of interest include, but are not limited to: synthetic vision for autonomous navigation, obstacle avoidance, collision avoidance, and autonomous landing; autonomous navigation in GPS-denied environments; controlled atmospheric reentry; mobile ad hoc networks for swarming unmanned vehicles; planetary robotic missions; networked sensors for vehicle control and navigation; and novel inertial guidance and control sensors.

Technical Area Chair
Daniel Choukroun
Ben-Gurion University of the Negev
Mechanical Engineering Department
P.O. Box 653
Beer-Sheva 84105, Israel
+972.8.6477091 • +972.8.6472813 FAX
E-mail: danielch@bgu.ac.il

Technical Area Co-Chair
Daniel J. Clancy
Lockheed Martin Aeronautics Company
Mail Zone 1745, P.O. Box 748
Fort Worth, TX 76101
817.777.5017 • 817.762.3457 FAX
E-mail: daniel.j.clancy@lmco.com

Mini/Micro Air Vehicle Guidance, Navigation, and Control

Papers are sought that address the challenges and missions associated with mini and micro air vehicles (MAVs). Of particular interest are flight dynamics of small vehicles operating in realistic atmospheric conditions; implications of low-Reynolds numbers on

the mechanics and control of flight; flight control architectures for mini/micro air vehicles; sensors, power, and actuation; bird- and insect-inspired flight; energy harvesting; trajectory optimization in complex flow fields; flight mechanics and control of flapping-wing micro air vehicles; mission execution; and man-machine interfaces. Papers are also sought that present the results of micro air vehicle experiments, including new empirical unsteady aerodynamic models; low-Reynolds number aerodynamic force and moment characterization; identification of actuator characteristics; fluid-structure interaction characterization; and implications for control design. Novel sensor and data filtering methods that are suitable for use with MAV feedback control laws and guidance systems are of interest; sensors and algorithms that can provide reliable feedback and navigation information in GPS-denied environments are of particular interest. Papers related to power conversion and extending the endurance of current MAV systems are also of interest, including high-voltage low-current power conversion for piezoelectric actuators for MAVs; and battery or fuel cell improvements. Sensor processing and control algorithms that enable new capabilities such as autonomous perching of MAVs or atmospheric energy harvesting are of interest. Man-machine interfaces that enable multiple MAV systems to be controlled by a single operator are of interest. Papers that discuss new control strategies for novel MAV designs, and the interaction between the vehicle design and control synthesis process are of interest.

Technical Area Chair
Kamesh Subbarao
The University of Texas at Arlington
Mechanical and Aerospace Engineering
500 W. First St., Box 19018, 211 Woolf Hall
Arlington, TX 76019-0018
817.272.7467 • 817.272.5010 FAX
E-mail: subbarao@uta.edu

Technical Area Co-Chair
Yunjun Xu
University of Central Florida
Department of Mechanical, Materials, and Aerospace Engineering
4000 Central Florida Blvd.
Orlando, FL 32816
407.823.1745
E-mail: yunjunxu@mail.ucf.edu

Human and Autonomous/Unmanned Vehicle Systems

Papers are sought that describe the principles and methodologies for effective collaboration of humans and autonomous systems as peers to increase task performance, maximize their respective strengths, and minimize weaknesses. Papers are also sought that describe issues unique to Unmanned Systems, in particular the development, modeling, simulation, and testing of guidance, navigation, control, and decision systems for autonomous and/or remote operation of fixed- and rotary-winged UAV systems, unmanned underwater vehicle (UUV) systems, unmanned ground vehicles (UGVs), and autonomous and robots/robotic systems, and the development of an unmanned hybrid vehicle. Issues of particular interest include cooperative distributed decision making and coordinating tasks between humans and a distributed network of vehicles as well as among multiple vehicles; determination of levels of autonomy; autonomy and integration of intelligent control; user interactions with autonomous agents to coordinate autonomous planning and execution with those of manned platforms; interface with air traffic control; integrated management systems; mixed initiative control; upset prevention/avoidance/recovery; online decision systems; preflight mission planning; in-flight replanning; near-real-time trajectory generation and tracking; near-real-time optimization; tactics; obstacle/trap avoidance; noncooperative collision avoidance; navigation with minimal sensors; control law formulation; limited communication; and communication delays and corruption. Additional areas of interest include robust/adaptive control, reconfigurable control, sensor analytical redundancy, mode switching, fault diagnosis, fault tolerance, and flight safety. Papers that address these issues in simulation, laboratory implementations, or flight testing will be considered preferentially.

Technical Area Chair
Antonios Tsourdos
Cranfield University
Department of Informatics and Sensors
Defence Academy of the United Kingdom
Shrivenham, Swindon SN6 8LA, United Kingdom
+441793785841 • +441793785260 FAX
E-mail: a.tsourdos@cranfield.ac.uk

Technical Area Co-Chair
Khanh D. Pham
Decision Support Systems
Air Force Research Laboratory-Space Vehicles Directorate
2050 Chanute Ave. S.E.
Kirtland AFB, NM 87117
505.846.4823
E-mail: khanh.pham@kirtland.af.mil

Intelligent Control in Aerospace Applications

Papers are solicited that deal with the theory and application of all aspects of intelligent control within aerospace GN&C. Papers are sought that present innovative developments as well as implementation, and certification issues of controllers and estimators designed using rule-based and model-based techniques, artificial neural networks, fuzzy logic, machine learning, and genetic algorithms. The area's interests include applications to traditional inner loop control of aircraft, missile, spacecraft, as well as smart autonomous vehicles, mission planning management, multi-objective control, system integration, and fault detection, identification, and accommodation issues. Particular interests are in the stability and robustness of complex distributed control tasks, as well as in real-time implementation.

Technical Area Chair
Nazli E. Kahveci
Powertrain Controls Research & Advanced Engineering
Ford Motor Company
2101 Village Road, RIC 2036
Dearborn, MI 48121-2053, USA
313.390.7877 • 313.594.0010 FAX
E-mail: nkahveci@ford.com

Technical Area Co-Chair
Yildiray Yildiz
UCSC, NASA Ames Research Center
Mail Stop 269-1
Moffett Field, CA 94035-0001
650.604.4382
E-mail: yildiray.yildiz@nasa.gov

Aerospace Robotics

This area includes all robotics activities like GN&C, but also handling and operations. In particular, papers are welcome that relate to space robotics, UAVs, autonomous robotic spacecraft, autonomous ground vehicles, autonomous micro vehicles, robot formation flying, cooperative robotics, sensor/data fusion, sensor-based navigation and control, trajectory planning and tracking under uncertainty, dynamics, controls and optimization of robotic manipulators and vehicles, etc. Examples of possible application involve, but are not limited to, robot autonomous

Graduate Student Paper Competition

Papers are sought from graduate students on GN&C technical research topics, from which six finalists will be selected by a panel of judges for inclusion in the AIAA Guidance, Navigation, and Control Conference. To be eligible for the competition, graduate students must be enrolled at an institution of higher education and be in good academic standing at the time of submission of their manuscript. Each manuscript must be sole authored and represent the work of the graduate student. Selection will be based on a review of a full draft manuscript not exceeding a total length of 15 pages. Finalists will make two presentations at the conference: once in the Graduate Student Paper Competition session (held Sunday, 7 August 2011, 1800–2200 hrs), and again in an appropriate regular session. *Please note*: Manuscripts for the Graduate Student Paper Competition must be submitted by **3 January 2011** (earlier than regular papers) to allow more time for selecting the finalists and placing their manuscripts in appropriate sessions.

Finalists will receive complimentary student registration and a ticket to the awards luncheon where they will be recognized. Finalists will also receive a $1,200 award after attending and presenting their papers. An overall best paper and presentation will be selected from the Graduate Student Paper Competition session, and this winner will be presented with a $2,500 prize and recognized at the awards luncheon. Questions should be referred to the Technical Area Chair or Co-Chair below:

Technical Area Chair
Jack W. Langelaan
Department of Aerospace Engineering
The Pennsylvania State University
229 Hammond Building
University Park, PA 16802
814.863.6817 • 814.865.7092 FAX
E-mail: jlangelaan@psu.edu

Technical Area Co-Chair
Tannen S. VanZwieten
NASA Marshall Space Flight Center
Mail Code: EV42
Huntsville, AL 35812
256.961.1509
E-mail: tannen.s.vanzwieten@nasa.gov

navigation using occupancy grid, potential fields, Kalman filtering, particle filters, vision, laser, GPS, INS, and other forms of robotics systems.

Technical Area Chair
Jurek Z. Sasiadek
Department of Mechanical and Aerospace Engineering
Carleton University
Rm. 2190, MacKenzie Bldg.
1125 Colonel By Drive
Ottawa, Ontario, Canada K1S 5B6
613.520.2600, ext. 5698 • 613.520.5715 FAX
E-mail: jsas@connect.carleton.ca

Technical Area Co-Chair
Marcello Romano
U.S. Naval Postgraduate School
Monterey, CA 93940
831.656.2885 • 831.656.2238 FAX
E-mail: mromano@nps.edu

Invited Sessions

Invited session proposals are solicited in any of the areas listed above as well as in new or emerging technical areas. Papers in an invited session should form a cohesive focus on the relevant topic with a reasonable diversity of viewpoints encouraged. The procedure for submitting an invited session proposal is different from the normal paper submission procedure. Instead of submitting each invited session paper individually, the invited session organizer will submit the entire session as a whole. Invited session organizers should invite authors to participate, collect the required information, assemble the Session Proposal Packet, and electronically submit the Session Proposal Packet as one file to the "Invited Session" area. The Session Proposal Packet must contain a Summary Statement describing the motivation and relevance of the proposed session, session organizer contact information, and an Extended Abstract of at least 1,000 words for each invited paper. The individual extended abstracts for a session are also to be submitted electronically to the "Invited Session" area by the session organizer, or the individual contributing authors, and must include each author's name, affiliation, address, phone number, and e-mail address. Please note that at the discretion of the Technical Program Committee, individual papers may be removed from proposed sessions and replaced by an appropriate contributed paper. Likewise, selected papers from rejected Invited Sessions may be placed into the regular program. If you are unable to submit your proposal electronically, send four copies of the Session Proposal Packet to the Technical Area Chair or Co-Chair below:

Technical Area Chair
Hugh Liu
University of Toronto
Institute of Aerospace Studies
4925 Dufferin Street
Toronto, Ontario, Canada M3H 5T6
416.667.7928 • 416.667.7799 FAX
E-mail: liu@utias.utoronto.ca

Technical Area Co-Chair
Emelio Frazzoli
Massachusetts Institute of Technology
Dept. of Aeronautics and Astronautics
77 Massachusetts Avenue
Room 33-332
Cambridge, MA 02139
617.253.1991 • 617.258.5779 FAX
E-mail: frazzoli@mit.edu

AIAA ATMOSPHERIC FLIGHT MECHANICS CONFERENCE

Synopsis

The AIAA Atmospheric Flight Mechanics (AFM) Conference provides a forum for presentation and discussion of all technical areas related to atmospheric flight. It brings together experts from industry, government, and academia on an international level. Presentations will cover the topics of aircraft dynamics, unsteady and high-angle-of-attack aerodynamics, flying qualities, system identification, aerospace vehicle flight testing, projectile and missile dynamics, UAVs, expendable and reusable launch vehicles, and reentry and aeroassist vehicles. These technical sessions consist of formal presentations followed by an informal discussion. They are intended to serve as a platform to bring together experts and interested people, not only to discuss technical aspects, but also to cultivate professional relationships.

Draft Manuscript Submission Guidelines for AFM Conference

Paper selection for this conference will be based on a full-length draft manuscript of the proposed technical paper. Drafts

AFM General Chair
Francis J. Priolo
Millennium Engineering and Integration Company
2231 Crystal Drive, Suite 711
Arlington, VA 22202
540.663.1876
E-mail: fpriolo@meicompany.com

AFM Technical Program Chairs
Ming Xin
Mississippi State University
Department of Aerospace Engineering
Starkville, MS 39762
662.325.2139
E-mail: xin@ae.msstate.edu

Travis Vetter
Northrop Grumman
Aerospace Systems Sector
One Hornet Way 9V24/W6
El Segundo, CA 90245
310.332.2123
E-mail: travis.vetter@ngc.com

of proposed papers must be unclassified and not exceed a length of 36 standard-size, double-spaced, typed pages (including equations, figures, and tables), where each normal-sized figure counts as one page. Each draft must begin with a 100- to 200-word abstract, and an introduction that includes a brief assessment of prior work by others and an explanation of the paper's main contributions. The body of the manuscript must include sufficient detail to allow an informed evaluation of the paper. At a reduced chance of acceptance, in lieu of the full-length draft manuscript, authors can submit an extended abstract of at least 1500 words that includes major results of the work backed by illustrative figures. A few succinct data figures that clearly show actual results are mandatory. Submissions not meeting the above criteria will not be considered for acceptance.

Technical Areas

Technical papers discussing any and all areas of interest in atmospheric flight are solicited for the AIAA AFM Conference. Student papers are also eligible for the Best Student Paper Competition, which has a $500 prize. Papers are invited that address new findings and/or innovative approaches in computational, experimental, or theoretical development; flight testing; research and development; or simulation results. Areas of interest for this conference include, but are not limited to: aerodynamic performance; trajectories, attitude dynamics, and evaluation of conventional aircraft as well as vehicles of unusual configurations, including unmanned systems and unmanned combat aerial vehicles (UCAV), expendable and reusable launch vehicles (ELV/RLV), and short take-off vertical landing vehicles (STOVL); hypersonic platforms; flying qualities and aircraft-pilot coupling phenomena; missiles; spacecraft; reentry vehicles and vehicles moving through planetary atmospheres; and response to atmospheric disturbances. Of special interest are papers in bio-inspired flight mechanics. In addition, papers are encouraged that deal with education and design in the field of atmospheric flight mechanics, multidisciplinary efforts, and international collaboration projects. The areas of interest above will be organized into the following topics:

UAVs and Unmanned Systems
All aspects of UAVs, particularly those addressing innovative control effectors, operator interface flying qualities throughout the flight envelope, trajectory and flight path optimization, flight test results, and related subjects.

Aircraft Dynamics
Interaction between aerodynamics and aircraft motion across the flight spectrum (subsonic, transonic, supersonic, and hypersonic). Subtopics include effects of configuration changes on aircraft stability, control, and air data systems; store separation; determination of stability and control derivatives and analysis; departure prevention and spin characteristics; atmospheric disturbance response and control of such disturbances; trajectory optimization; and flow-field effects. All airframe types, from general aviation to transatmospheric, are appropriate topics for consideration.

Aircraft Flying Qualities
Flying qualities of aircraft. Topics of interest include aircraft-pilot coupling phenomena, controllers with associated aerodynamic and feel characteristics, displays with associated lag characteristics/placement/adequacy, and pilot-vehicle interface in general. Because pilot opinion is the final determination of flying qualities, papers are sought on the design of specific simulation and flight test maneuvers for flying-qualities evaluation. Other topics include development and validation of criteria; design tools and procedures to satisfy criteria; techniques to analyze and verify compliance on highly augmented and highly maneuverable aircraft; flying qualities of UAVs, UCAVs, and micro-UAVs; and flying qualities of STOVL aircraft transitioning between powered flight and wing-borne flight and flying qualities guidelines for STOVL mode flight.

Projectile and Missile Dynamics and Aerodynamics
Dynamics and aerodynamics of missiles and projectiles, both powered and unpowered. Subtopics include bodies with circular and noncircular cross sections; roll-stabilized and spin-stabilized missiles and projectiles; the application of computational methodologies to the prediction of aerodynamic characteristics, especially roll-coupling and high-angle-of-attack effects; launch dynamics of both surface- and air-launched missiles; measurement, numerical computation, and estimation of dynamic stability and control derivatives; incorporation of analysis, experimental results, and computational predictions into six DOF trajectory simulations; and analysis of flight test data.

System Identification and Parameter Estimation
Papers are desired on techniques for extracting aerodynamic data from flight-test, dynamic wind tunnel, or free flight model experiments. Topics of interest include modeling of nonlinear or time-dependent aerodynamic effects; techniques of model structure determination; the effects of active controls; incorporation of results into simulation and analysis databases; vehicle flexibility; techniques for the high-angle-of-attack flight regime; flight path reconstruction techniques; estimation of air data and flow-field parameters; identifiability issues; experiment design; and results obtained for conventional as well as new or unusual vehicle configurations.

Reentry and Aeroassist Vehicle Technology
Dynamics of entry into the Earth's or other planetary bodies' atmospheres. Subtopics include computational aerothermodynamics, aeroassist orbit transfer vehicles, tethered satellite applications, technology concerning development of high L/D vehicles, hypervelocity and impact technology, trajectory optimization, maneuvering of reentry vehicles, ablation and erosion effects, and low-density atmospheric flight mechanics.

Launch Vehicles
Flying qualities throughout the flight envelope, innovative design concepts, trajectory optimization, aerothermal environ-

Best Atmospheric Flight Mechanic Student Paper Competition Winner Receives Certificate and $500 Award

The AIAA Atmospheric Flight Mechanics Technical Committee, with the support of Calspan Corporation (**www.calspan.com**), is sponsoring a Best Student Paper Competition at the 2011 AIAA AFM Conference. Entrants will be judged by Technical Committee members, and the winner will receive a certificate and $500 award to be presented at the conference awards luncheon.

To be eligible for this award, the student must be the primary author of the paper and the work must have been performed while the author was a student. The student author must also: 1) be an AIAA member; 2) present the paper at the conference; 3) indicate "Student Paper" at the time of electronic draft manuscript submittal (**17 January 2011**; refer to submittal guidelines); 4) send an electronic copy of the final paper by **1 July 2011** to the competition administrator, Brenna Stachewicz (716.667.6420), at brenna.stachewicz@cobham.com; and 5) along with the final paper, include a cover letter from his/her advisor stating that the student did the majority or a significant amount of the research in question.

Students will present their papers twice: on the first day of the conference for judging so that the award may be presented at the awards luncheon, and then during a regular technical session in an appropriate topic area. Students should submit their draft manuscripts online to an appropriate, regular technical session (i.e., Aircraft Dynamics, Aircraft Flying Qualities, etc.) according to the conference guidelines above. At the time of submittal, students should indicate that the manuscript is also being submitted for consideration in the Student Paper Competition. Students will be contacted by a conference organizer to confirm their participation in the competition. Students should submit their final manuscript to the conference technical session per the guidelines above, and additionally should send an electronic copy of the paper to the competition administrator for judging. Note that the deadline for submittal to the competition administrator is earlier than the conference final manuscript deadline.

The scoring for the award will be equally based on written paper content and audio presentation. The written paper will be judged on: 1) relevance of the topic to atmospheric flight mechanics (see list of sample session groupings in this call for papers); 2) organization and clarity of the paper; 3) appreciation of the technical issues and sources of errors; and 4) meaningful conclusions of the research. The audio presentation will be judged for overall presentation clarity, including: 1) background and problem definition statement; 2) explanation of technical approach; and 3) explanation of research results.

ments, reusability, and the effects of solar wind, space junk, radiation hazards, and hardening on trajectories.

Unsteady and High Angle-of-Attack Aerodynamics

Aerodynamic characteristics of aircraft and missiles operating in a nontraditional part of the flight envelope (e.g., high angles-of-attack or sideslip, large angular rates). Of particular interest are unsteady and nonlinear aerodynamic characteristics, concepts for improved aerodynamic control effectiveness, dynamic lift and super-maneuverability, symmetric and asymmetric vortex wake structures, vortex breakdown, computational fluid dynamics techniques applicable to vortical and separated flows, and math modeling approaches to represent the dynamic characteristics in simulation studies.

Linear and Nonlinear Equations of Motion

Classes of ordinary differential equations; nominal and perturbation solutions; axis systems, Euler angles, rotations, and transformations; integration of nonlinear differential equations; stability and control derivatives; unsteady aerodynamic effects; separation of equations into longitudinal and lateral-directional sets; and numerically implemented qualitative methods, their applications, and the results of these applications.

Atmospheric Flight Mechanics Education

Papers are sought from industry, government agencies, and universities that deal with all aspects of atmospheric flight mechanics education at both undergraduate and graduate levels in aerospace engineering curricula. Topics include the needs of industry and government agencies; support needed to advance the state of the art; techniques for keeping up with the fast pace of research, especially at the undergraduate level; and innovative and realistic approaches to education.

Vehicle Flight Test

All aspects of testing atmospheric and exospheric flight vehicles, particularly as they pertain to the vehicle flight mechanics. Topics of interest include flight evaluation of novel control systems or vehicle configurations; development and implementation of new maneuvers, methods, or tools for testing that provide new insight into flight mechanics; presentation of data analysis and testing results for important or unique vehicles; and modeling and simulation techniques used in support of flight test.

Bio-Inspired Flight Mechanics

Flight mechanics of bio-inspired flight technologies and concepts, such as micro and nano air vehicles. Such vehicles present unique technological challenges on multiple levels including aerodynamics, performance, mission endurance, sensors, and flight GN&C. Topics of interest include flight mechanics of birds, insects, and bio-inspired air vehicles; and modeling of coupled unsteady aerodynamics and flight dynamics for maneuvers such as flapping, hovering, and perching.

Invited Sessions and Workshops

Invited sessions and workshops are solicited in any of the areas listed above as well as in related and new or emerging technical areas. Such an invited session or workshop should form a cohesive focus on the particular topic. It will be the job of the invited session/workshop organizer to contact and confirm the expert speakers in advance. Any potential invited session/workshop organizer should contact the Technical Program Chairs well in advance of the submittal deadline for approval. Workshops may be conducted on an informal basis and limited to presentations without written manuscripts, if deemed appropriate by the organizer. Authors will submit all appropriate information to the invited session organizer by **3 January 2011**. Upon approval of special session, the session organizer will notify authors of the invited papers to upload their draft manuscripts or short abstract electronically to the invited session area of the conference Web site by **17 January 2011**.The session package must contain 200- to 300-word abstracts of the papers, and each author's name, affiliation, address, phone number, and e-mail address. Please note that incorporation of the proposed Invited Session and Workshop at the 2011 AIAA AFM Conference will be at the discretion of the Technical Program Chairs. Furthermore, in consultation with the prospective organizer, individual papers may be removed from the proposed invited session and/or put in the regular session. Likewise, normal contributed papers may be put in the invited session.

AIAA MODELING AND SIMULATION TECHNOLOGIES CONFERENCE

Synopsis

The annual AIAA Modeling and Simulation Technologies conference provides an opportunity for aviation and aerospace professionals interested in modeling, simulation, and simulators to gather and share their recent work and latest findings. The conference is attended by representatives of industry, government, and academia from all over the world, and is intended to foster collaboration and help build professional relationships. Experts willing to share their thoughts, as well as those people seeking fresh knowledge and ideas, are encouraged to participate. The conference format consists of multiple technical sessions covering a wide range of topics in the field of modeling and simulation. Within each technical session is a series of formal presentations, each followed by a short question-and-answer period.

Abstract Submission Guidelines for MST Conference

Prospective authors are asked to submit their work electronically through the AIAA Web site prior to the published deadline. Authors may submit either an extended abstract of 500 to 1000 words, or a draft of the paper itself, if available. Draft papers must include a 100- to 200-word abstract. The manuscript, whether abstract or draft paper, must include discussion on the background and motivation for the work, as well as an explanation of the paper's main contributions to the particular area(s) of interest, including examples of results. The inclusion of the paper in the conference will depend solely on the quality and detail of the submitted manuscript.

Technical Areas

Authors are invited to submit technical papers on topics related to modeling, simulation, and simulators as applied to the fields of aviation and aerospace. Papers for this conference will be grouped into technical sessions according to subject matter provided in the submitted manuscripts. Technical areas and topics of particular interest for this year's forum include:

Simulation Design and Architecture

Papers are sought in the area of simulation design and architecture. As the variety and complexity of simulations increase, so does the need for supporting changes in simulation design and architecture. Technology changes and the increased use of commercial-off-the-shelf (COTS) products have also played a major role in the development of new simulation designs and architectures. Papers addressing these changes are encouraged, as well as papers on the development and application of networked/distributed simulations and standards that facilitate interaction of diverse simulation environments.

Simulation/Simulator Testing and Validation

Papers are sought in the area of simulation/simulator testing and validation. As simulations are increasingly becoming the preferred method to test and evaluate systems, it is critical that they be validated. Papers are encouraged that address testing and validation methodologies, regulatory issues, and experiences with simulator validation, techniques, issues, and lessons learned.

Modeling Tools and Techniques

Papers are sought in the area of modeling tools and techniques. As the complexity of systems has increased, so has the need to rapidly prototype multiple design concepts to reduce development risks. Papers are encouraged that discuss novel tools and techniques that decrease the development time or increase the fidelity of dynamic models. Of particular interest are papers discussing the integration of COTS tools into existing simulation development processes and the application of PC-based simulation.

Vehicle Dynamics, Sub-Systems and Environments

Papers are sought that describe the modeling of vehicle dynamics, vehicle subsystems, and the environments in which they operate. Papers are also welcome on the testing, verification, and validation of these models.

Human Operators, Perception, and Cueing

Papers are sought in the broad area of human operator modeling, human perception, and cueing systems. Of particular interest is the human perception of the essential cues required for flight, and the reproduction of these cues in a simulator. A related topic is the application of existing knowledge on perception and cueing for understanding and measuring simulation fidelity. Papers on human factors related to the pilot-vehicle interface are also encouraged.

Visual Systems

Visual systems play an important role in simulation. Papers are sought that discuss the development and application of visual systems or any of their three major elements: image generation, image display technology, and visual/sensor databases. Traditional uses of visual systems include out-the-window displays, sensor displays, control room observer stations, and remote operator control stations. As onboard sensors are increasingly put to use, accurate, physics-based image generation is also required for test and evaluation of image processing and navigation algorithms. Papers that examine the latest advances and technologies in any of these areas are encouraged.

Motion Systems

Motion systems are an important part of many simulators. Papers are sought involving all aspects in their design, development, and use. Papers that discuss industry experience with motion system applications, novel motion configurations and hardware, or the application of motion in research and training are all encouraged.

MST General Chair
Daniel H. Cartmell
The Boeing Company
P.O. Box 3707
M/C 19-RU
Seattle, WA 98124-2207
206.662.5965
E-mail: daniel.h.cartmell@boeing.com

MST Technical Program Chairs
Jae H. Shin
The Aerospace Corporation
M/S 4-906
2310 E. El Segundo Blvd.
El Segundo, CA 90245-4691
310.336.0820
E-mail: jae.h.shin@aero.org

Julien Scharl
The Boeing Company
P.O. Box 3707
M/C 07-25
Seattle, WA 98124-2207
425.717.9195
E-mail: julien.scharl@boeing.com

Vehicle Loss-of-Control and Upset Recovery

Papers are sought in the use of flight simulation and flight simulators for vehicle loss-of-control and upset recovery research, analysis, and training. Relevant topics include modeling and simulation of non-normal flight conditions and unusual attitudes, as well as the recovery phases of these events. Papers presenting upset recovery training strategies and techniques that utilize flight simulators are also welcome.

Air Traffic Management

Papers are sought that describe the use of simulation in Air Traffic Management (ATM) concept development, testing, and analysis. Topics of interest include, but are not limited to, real-time and non-real-time simulation studies that investigate ATM automation concepts and decision support tools, airspace and airport traffic modeling methods, and model validation/verification experiences and methods.

Unmanned Air Vehicles (UAVs)

Papers are sought in the area of UAV simulation. The variety and number of vehicles in this area are ever increasing, as are the missions they perform. This variety offers a number of new challenges to the field of simulation. Papers are sought on novel simulation techniques and technologies for UAV development, operator training, and the development of operational concepts.

Space Systems

Papers are sought in the area of space systems simulation. The recent activity in the development of space exploration has resulted in considerable focus on this area of simulation. Topics of interest include real-time and non-real-time simulation in support of commercial and government space vehicle development (satellites, deep-space spacecraft, rendezvous and proximity operations, lunar lander, etc.) and extraterrestrial robotic vehicle development.

Hardware-in-the-Loop Simulation

Papers are sought that involve all areas of the development and use of hardware-in-the-loop simulations. Topics of interest include, but are not limited to, signal interfacing, timing and control issues when integrating real vehicle hardware into the simulation environment; incorporation of simulation into system integration laboratories used for large-scale vehicle integration testing; and incorporation of real flight software into training simulators.

Other Topics

The use of modeling and simulation in the field of aviation and aerospace is an ever-expanding field. The range of potential topics is quite broad and papers are encouraged from any relevant area not specifically mentioned in this Call for Papers.