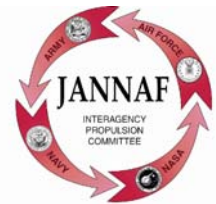


JANNAF INTERAGENCY PROPULSION COMMITTEE

JOINT ARMY-NAVY-NASA-AIR FORCE



54th JANNAF Propulsion Meeting 3rd Liquid Propulsion Subcommittee 2nd Spacecraft Propulsion Subcommittee 5th Modeling & Simulation Subcommittee Joint Meeting



3rd LPS / 2nd SPS /
5th MSS Joint Meeting

ANNOUNCEMENT AND CALL FOR PAPERS

The 54th Joint Army-Navy-NASA-Air Force (JANNAF) Propulsion Meeting (JPM) / 3rd Liquid Propulsion Subcommittee (LPS) / 2nd Spacecraft Propulsion Subcommittee (SPS) / 5th Modeling & Simulation Subcommittee (MSS) Joint Meeting will be held Monday through Thursday, May 14-17, 2007 at the Marriott Denver City Center located in Denver, Colorado. NASA is the host agency for this joint conference; Mr. James L. Cannon of the NASA Marshall Space Flight Center in Huntsville, Alabama is the Meeting Chair.

The overall security level of the meeting is unclassified. Attendance is restricted to U.S. citizens whose organizations are registered with the Defense Technical Information Center and certified for receipt of export-controlled technical data with the Defense Logistics Information Service. Please see the "Administrative Information" section located on page 2 for the requirements for non-government attendees at JANNAF meetings.

The 54th JPM solicits papers of general interest to the JANNAF community in the areas of tactical propulsion systems, missile defense and strategic propulsion systems, propulsion systems for space access, gun and gun-launched propulsion systems; rocket propulsion test facilities and test methods; sensors for propulsion measurement applications; rocket-based combined cycle system architecture; and test facilities modeling and simulation. The 3rd LPS is seeking papers on technical problems and issues of greatest national needs associated with liquid engine systems, including liquid and gel propulsion technology topics that include the overall engine system, combustion components, and propellant feed systems. The 2nd SPS seeks abstracts on the full array of spacecraft propulsion technology interests including electric propulsion, advanced chemical propulsion, solar thermal propulsion, nuclear thermal propulsion, aerocapture, solar sails, tether systems, and technologies for the future. The 5th MSS activities include modeling and simulation of systems; virtual engineering; integration of propulsion components and integration of propulsion systems with other vehicle systems; simulation credibility - uncertainty, verification, validation, reliability, and risk; and integrated health management.

The specific technical areas for this joint meeting are outlined on the following pages; topics are not intended to be exclusive. Also solicited are recommendations for workshops or specialist sessions as well as nominations for LPS, SPS, and MSS recognition awards. Individuals interested in organizing and chairing a specialist session should contact the Specialist Session Coordinator in their respective Subcommittee (or contact CPIAC). Individuals interested in nominating an award recipient should follow the guidelines and instructions on page 23. Please see additional information on page 25 regarding the submission of workshop topics.

CPIAC provides technical and administrative support to the JANNAF Interagency Propulsion Committee

JHU Chemical Propulsion Information Analysis Center - 10630 Little Patuxent Parkway, Suite 202, Columbia, MD 21044-3204

Telephone: (410) 992-7300 - Telefax (410) 730-4969 - E-mail: cpiac@jhu.edu - www.cpiac.jhu.edu

Abstract Submittal Information and Instructions

- The technical areas to be addressed are defined in this announcement. Individuals who wish to submit an abstract should carefully review the areas and complete and submit the ***electronic*** abstract form provided with this announcement.
- The submission of an abstract represents an agreement to **submit a final paper for publication by April 9, 2007**, attend the meeting, and deliver a 30-minute presentation.
- Submit only unclassified abstracts. Abstracts will not be published and will only be used by the program committee members for paper selection purposes.
- Limit the abstract to 250-300 words and exclude tables and figures. State the objective of the work. Describe the scope, method of approach, and any new advances in the state of the art. Highlight important conclusions and include a brief summary of the data used to substantiate them.
- Obtain management approval to ensure availability of resources for your participation in the meeting.
- Many organizations now require abstracts to be processed through an approval system prior to submission. This process takes additional time so authors should plan accordingly in an effort to meet the abstract deadline date.
- The deadline date for submission of abstracts is **September 9, 2006**.
- CPIAC accepts only electronic submission of abstracts and papers. Electronic abstracts are due at CPIAC by **September 9, 2006**. Abstracts may be submitted via e-mail to: dse@jhu.edu or mailed on disk or CD-ROM to: JHU/CPIAC, Attn: JPM-LPS-SPS-MSS, 10630 Little Patuxent Parkway, Suite 202, Columbia, MD 21044-3204.

Unclassified/limited-distribution abstracts may be uploaded to CPIAC's secure web-site. Instructions follow:

- 1) go to <https://webdatabase.cpia.jhu.edu/programs/docorg/program/cgi-bin/Login.pl>
- 2) choose info base: **JANNAF Document Submission Database**
- 3) type in User Name: **JANNAF**
- 4) type in Password (**contact CPIAC (410) 992-7300 for current password**)
- 5) click on **Meetings**
- 6) click on **JPM/LPS/SPS/MSS**
- 7) choose **Add Document** (to the right of the page)
- 8) complete the Add Document form (being sure to **Title your Document**, mark **Upload from Client** and attach your file via **Path**, note the appropriate file format under **Document Type**, and click on **Apply**)
- 9) e-mail dse@jhu.edu to notify that the file has been successfully uploaded.

Information about the May 2007 JANNAF Joint Meeting can also be found on CPIAC's web site at: <http://www.cpiac.jhu.edu/meetings/>. Questions concerning the meeting may be directed to Debra S. Eggleston, CPIAC, at (410) 992-7300, ext 202 or e-mail: dse@jhu.edu.

Schedule of Events for Authors

Date	Weeks before Meeting	Action	Date	Weeks before Meeting	Action
09 Sept 06	36	Deadline for receipt of abstracts.	9 Apr 07	5	Deadline for receipt of manuscripts and paper clearance forms. <i>Papers not received by this date may be removed from the program.</i>
16 Oct 06	30	Acceptance/Rejection Letters forwarded.	16 Apr 07	4	Deadline for changes to the final program.
22 Jan 07	16	Deadline for changes to the preliminary program.	23 Apr 07	3	Deadline for reservations at the Marriott Denver City Center.
05 Feb 07	14	Invitation, preliminary program, and registration materials forwarded.	30 Apr 07	2	Deadline for receipt of registration certification and remittance forms.

Administrative Information

Policy on Non-Government Attendees at JANNAF Meetings. Attendance at unclassified meetings for non-government employees is restricted to U.S. citizens whose organizations are 1) registered with the Defense Logistics Information Service (DLIS) and 2) registered with the Defense Technical Information Center (DTIC) ***OR*** are certified by a sponsoring government official from one of the participating JANNAF agencies. Additional information concerning registrations with DTIC or DLIS can be obtained by contacting DTIC at 1-800-225-3842 (www.dtic.mil/dtic/registration/index.html) or DLIS at 1-800-352-3572 (www.dlis.dla.mil/jcp/).

Hotel Information: Sleeping rooms have been reserved with the Marriott Denver City Center located at 1701 California Street, Denver, CO 80202. The room rate per night for Government will be at the prevailing government per diem rate; the rate for Non-Government is \$174 plus tax (currently 14.85%). These rooms will be held for JANNAF until Monday, April 23, 2007. ***Each individual is responsible for his/her own reservation.*** Reservations may be made through the Marriott central reservations number at (800) 444-2206 or with the hotel directly at (303) 297-1300. There will be two room blocks, one for per diem attendees and one for non-per diem attendees—please refer to the JANNAF meeting when making your reservations to assure the negotiated rates.

JPM Mission Areas

The JPM sessions will cover systems development within the seven mission areas described below. Additional information concerning these areas or the topics being solicited should be directed to the appropriate Area Chair.

Mission Area I: Tactical Propulsion

Chair: Mr. Jeremy R. Rice, Army RDECOM, Redstone Arsenal, AL
Telephone: (256) 876-6077 e-mail: jeremy.rice@us.army.mil

This area encompasses all tactical propulsion systems including those applicable to air-to-air; air-to-surface, surface launched, and underwater missions. Typical systems include tactical missile boosters or sustainers, kinetic energy missiles, free-flight rockets, anti-radiation, anti-ship, anti-armor, anti-personnel/materiel missiles, ramjets, scramjets, and combined cycle propulsion. System studies that evaluate advanced propulsion concepts and demonstrations that incorporate one or more component technologies applicable to tactical propulsion are of interest. Examples of component technologies include propellants and fuels, fuel management systems, cases and combustors, inlets, nozzles, thrust vector control systems, thrust management systems, and advanced materials applications. Life cycle cost and demilitarization are also topics of interest. Abstracts are especially sought on the following topics:

- Airbreathing propulsion systems
- Hybrid propulsion systems
- Solid propellant rocket propulsion systems
- Demilitarization
- Hypersonic propulsion systems
- Improved missile kinematics
- Insensitive munitions (from a systems perspective)
- Propulsion system product improvement

Mission Area II: Missile Defense/Strategic Propulsion

Chair: Mr. Martin Minthorn, NAWCWD, China Lake, CA
Telephone: (760) 939-7305 e-mail: martin.minthorn@navy.mil

This area includes technology applicable to ballistic missiles, trans-atmospheric operational vehicles, and ground- and sea-based missile defense. Emphasis should be on system-level papers discussing propulsion technology for new vehicle systems, upgrades, modernization and sustainment; failure investigations; and economic considerations that include evolving business practices, life cycle cost estimation, and approaches that reduce development and operations costs. Abstracts are especially sought in the areas of:

- Strategic systems
- Ground-based missile defense
- Sea-based missile defense
- Advanced propellants
- Advanced materials
- Insensitive Munitions Technologies for large rocket motors
- Energy management approaches
- Dual mode systems (airbreathing/rocket)
- Unconventional propulsion
- Divert propulsion/attitude control propulsion
- Post boost control system propulsion

JPM Mission Areas (Continued)**Mission Area III: Propulsion Systems for Space Access**

Co-Chairs: Mr. James L. Taylor, NASA-MSFC, Huntsville, AL
Telephone: (256) 544-4915 e-mail: jim.l.taylor@nasa.gov
Dr. Shawn H. Phillips, AFRL, Edwards AFB, CA
Telephone: (661)275-5198 e-mail: shawn.phillips@edwards.af.mil

This area focuses on existing or potential primary and auxiliary Government, commercial or foreign propulsion systems for earth-to-orbit vehicles. Emphasis should be on system-level papers discussing propulsion technologies for new vehicle systems, upgrades and modernization, failure investigations, and evolving business practices that reduce development and operations costs while increasing mission reliability. Papers should address future access to space missions, future exploration missions and needs, vehicle system architectures, and the identification of critical propulsion requirements technologies that must be enabled to support these new system requirements. Abstracts are especially sought in the following areas:

- Methods for development of design reference missions and vehicle systems architecture
- Description of vehicle systems analysis models and assumptions
- Details of architecture studies and descriptions of promising vehicle architectures
- Uncertainty evaluation of vehicle systems analysis
- Results of sensitivity analysis of key parameters on vehicle dry mass fraction margin, gross take-off weight, cost, reliability, and safety, with emphasis on propulsion
- Methods for identification and prioritization of critical enabling propulsion technologies
- Approaches for utilizing higher fidelity propulsion analyses in the overall systems architecture model(s)
- Methods to standardize model assumptions and fidelity in order to make relevant comparisons between vehicle architectures and various propulsion system options
- Description of promising new propulsion systems
- Description and status of the access to space propulsion system technology or development activities
- Small launch vehicle mission analysis
- System analysis for responsive space access

Mission Area IV: Gun and Gun-Launched Propulsion

Chair: Mr. Sandor Einstein, Army ARDEC, Picatinny Arsenal, NJ
Telephone: (973) 724-5380 e-mail: einstein@pica.army.mil

This area embraces technologies applicable to small-, intermediate-, or large-caliber guns, as well as gun-launched rocket propulsion, for air, sea, or ground/mobile weapons systems. Typical rocket assisted systems include kinetic energy missiles and extended range projectiles, both guided and unguided. Abstracts are especially sought in the following areas:

- Conventional gun propulsion concepts to include solids and liquids
- Unconventional gun propulsion concepts
- System-level gun propulsion studies (gun tube wear and erosion, blast/flash mitigation, improved system survivability)
- Concepts to enable rocket systems to achieve high operating pressures (gun barrel, and motor case)
- Assisted projectiles
- Assisted guided munitions
- Insensitive munitions

JPM Mission Areas (Continued)**Mission Area V: Rocket Propulsion Test Facilities**

Chair: Mr. Robert R. Kowalski, NASA/WSTF, Las Cruces, NM
Telephone: (505) 524-5520, e-mail: robert.r.kowalski@nasa.gov

This area targets issues, technologies and achievements relevant to the operation and use of rocket propulsion test facilities for demonstration, development, characterization, and qualification of rocket, spacecraft, and gun propulsion systems, energetics, and materials for propulsion applications. Eligible test facilities include static test facilities for liquid rocket engines, solid rocket motors, electric and in-space propulsion systems, hypersonic test facilities, gel motors, hybrid propulsion systems, explosives, and insensitive munitions, wind tunnels, altitude/vacuum chambers, and other rocket propulsion technologies; laboratory test facilities for energetics and materials science characterization; and test ranges for missiles, guns and rocket sleds.

Abstracts are specifically solicited on the following topics:

- Best practices and testing standards
- Integrating instrumentation, controls and data acquisition systems
- Static thrust measurement systems
- Propellant and materials handling and safety
- Accident and incident lessons learned
- Test facility modeling

Abstracts on improvements in base infrastructure, updates and upgrades of test stand capabilities, new propellant inventories, or other general advertisements of capabilities or assets will not be considered for this area.

Mission Area VI: RBCC System Architecture

Co-Chairs: Mr. Chuck Trefny, NASA GRC, Cleveland, OH
Telephone: (216) 433-2162, e-mail: charles.j.trefny@nasa.gov
Mr. Glenn Liston, AFRL, WPAFB, OH
Telephone: (937) 255-2449, e-mail: glenn.liston@wpafb.af.mil

The RBCC System Architecture mission area is a joint subcommittee mission, sponsored by the JPM, the MSS, the LPS, and the Airbreathing Propulsion Subcommittee (APS). This area encompasses all aspects of Rocket-Based Combined-Cycle (RBCC) propulsion. Applications of interest include military and civilian launch systems and aircraft as well as weapons. Abstracts are specifically sought on:

RBCC System Design, Integration and Multi-Disciplinary Optimization: Innovative integration of air-breathing, rocket, and propellant system elements with vehicle components to enable efficient operation over a wide speed range. System optimization methods and results considering vehicle configuration, propellants, aerodynamic and propulsive efficiency, weight, reliability, reusability, and life-cycle cost. Flowpath structural design and optimization techniques, and the application of advanced hot and cooled composite materials.

Space Launch and Recovery Operations: Examination of the potential impacts to ground support crew size and specialization, response times, system generation and regeneration times, maintenance operations, range support requirements, and safety.

Life Cycle Cost: Assessment methods and results for all aspects of life cycle cost affected by the use of RBCCs instead of conventional single-cycle propulsion systems.

JPM Mission Areas (Continued)**Mission Area VII: Sensors for Propulsion Measurement Applications**

Co-Chairs: Dr. Gary Hunter, NASA-GRC, Cleveland, OH
Telephone: (216) 433-6459, e-mail: gary.w.hunter@nasa.gov

Mr. Bob Peterson, Aerojet, Culpeper, VA
Telephone: (540) 854-2177, e-mail: bob.peterson@aerojet.com

This area captures technologies and advancements in sensors and measurement devices for rocket and gun propulsion applications. Emphasis should be on development, application, modeling and integration of sensors for use in various propulsion applications.

Abstracts are specifically sought on systems and sensors for:

- Storage, tanking and cryogenic systems, including true cryogenic mass flow, cryogenic temperature measurement, mass and level measurement in micro and zero gravity, pump and turbomachinery induced pressure fluctuations, leak and tank integrity monitoring, and other propellant feed and storage measurements.
- High-temperature systems and hostile environments, including: extreme high-temperature measurements, real-time nozzle erosions and fuel regression, material ablation, flame propagation, high temperature electronics, packaging, and communications, and measurement and analysis of thermal effects on pressure transducers.
- In-chamber diagnostics, including development of methods to make measurements of velocity, temperature, pressure, and/or other flow quantities inside of firing combustion chambers.
- Plume measurement technology, including methods to utilize plume measurements to understand chamber operating conditions and spacecraft contamination issues.
- Systems health monitoring and non-destructive evaluation (NDE) and repair, including: test stand characterization and control, structure and sense line frequency characterization, micro and nanotechnologies, systems for conversion of sensor data into actionable knowledge, technologies for intelligent health management systems, integrated fiber optics, electromagnetic NDE technologies, NDE data processing and analysis, life cycle monitoring of solid rocket motors, and monitoring of aeroshells and ballutes during reentry.
- Smart sensing technology, including the development of sensors capable of automatic calibration and fault detection. Intelligent sensors that are calibrated in situ and provide dynamic compensation for environmental changes (temperature, humidity, etc.) Fault detection also including any fault that would cause a sensor to provide inaccurate information such as sensor damage, lead wire damage or disconnection, and the disbonding or detorquing of the sensor. Smart and distributed sensor system approaches, systems architectures, and applications.
- Chemical sensors suitable for solid rocket motor environments and applications. Sensors of interest include those for measuring the chemical state or composition of a solid, including gaseous diffusion, liquid diffusion, changes in free volume, direct measurement of changes in molecular weight or molecular weight per crosslink due to chain scission (or the reaction products which result from chain scission). Development and applications of sensors that do not alter the chemical equilibrium of the solid solution are of particular interest.
- Sensor modeling and simulation including modeling and simulation methods for sensor selection and data validation approaches. Recent advances in micro/nano technology, embedded sensor systems, optical diagnostics, and multiparameter measurement technologies.

JPM Mission Areas (Continued)**SPECIALIST SESSIONS: JANNAF Propulsion Meeting**

Coordinator: Peter Zeender, Johns Hopkins University - CPIAC
Telephone: (410) 992-9950x205 e-mail: pzeender@cpi.jhu.edu

The 54th JANNAF Propulsion meeting will be hosting several dedicated specialist sessions to focus on topics of current and emerging interest. Specialist sessions under consideration include:

- ***Hybrid Launch Vehicle (HLV) Studies***
- ***Small Launch Vehicle Systems***
- ***University-Based Rocket Development Efforts***

To have your abstract considered for a specialist session, please submit it to the most appropriate JPM Mission Area (above), and note on the Abstract Submittal Form in which specialist area you would like it to be included. Suggestions for additional specialist sessions should be provided to the session coordinator along with proposed paper authors.

LPS Mission Areas

The JANNAF 3rd Liquid Propulsion Subcommittee meeting will include sessions in five general technical areas: liquid engine systems; liquid combustion subsystems and components; liquid propellant feed and pressurization systems; tactical liquid and gel propulsion systems; and advanced materials for liquid propulsion applications. Papers are solicited that will aid in the design, development and test of efficient and stable liquid propulsion systems. Please note, liquid propulsion papers related specifically to NASA's Crew Launch Vehicle, Cargo Launch Vehicle, and Lunar Surface Access Module should be submitted here; papers related specifically to the Crew Exploration Vehicle liquid propulsion systems should be submitted to the appropriate Spacecraft Propulsion Mission Area.

AREA I: Liquid Engine Systems

Chair: Dr. Kendall Brown, NASA Marshall Space Flight Center, Huntsville, AL
Telephone: (256) 544-5938 e-mail: kendall.k.brown@nasa.gov

- A. **System Analysis and Trades** – Analytical tools, computational models, and methodologies for liquid engine system analysis and design trade methods; cost and weight models; boost/upper-stage engine design tools; model validation methods and criteria; technology and risk identification.
- B. **Health Management and Controls** – New and innovative approaches for sensing engine system performance and hardware condition characteristics during all phases of operation (including Preflight Prep, Prestart, Start, Flight, Shutdown, Safing and Turnaround) with an emphasis on improving overall system reliability and maintainability. Papers discussing instrumentation innovations, failure prognostic and diagnostic algorithms, maintenance prognostic and diagnostic algorithms, and new and innovative target platforms for performing real-time health management are of interest.
- C. **Test Practices, Standards, and Facilities** – Industry-consensus best practices and standards for the test and evaluation of liquid engines, components and propulsion/vehicle interaction. Status, capabilities, and operation of government and commercial rocket engine test facilities. This includes training, problem reporting, failure investigation, lessons learned, safety, FOD control, process control, and infrastructure improvements to meet aggressive technical goals. Concepts and innovations for engine life testing, engine fault detection, flight qualification testing practices, data reduction and uncertainty analysis methodologies, and other test needs to meet future demands are of interest.
- D. **Long-Life, Reusable, and Long-Duration Engine Design and Integration** – Methodology for the design of long-life and long mission duration operable chemical rocket engine propulsion systems. Long-life engines with current performance levels that have extremely high reliability and operability with 40+ cycles of engine life. Design methodologies for engines with highly responsive, rapid turnaround operational capability.

LPS Mission Areas (Continued)

E. **Small Launch Vehicle Engines** – Design, development, test, and evaluation approaches for small launch vehicle liquid propellant rocket engines: vehicle integration, safety and reliability, fabrication, testing, verification, validation, operations, and the affordable integration of those areas.

F. **Liquid Engine Systems for Human-Rated Launch Vehicles** – Design, analysis, development, test, and evaluation approaches and planning associated with liquid propellant rocket engines for use on human-rated launch vehicles; including NASA's Crew Launch Vehicle, Cargo Launch Vehicle, Lunar Surface Access Module, and vehicles intended for commercial space tourism applications. Functional requirements and design concepts and/or design modifications for the engines on these vehicles. Approaches for meeting government (NASA, FAA, or OCST) safety and reliability requirements for operation with crew and passengers, including fault tolerance; fault detection, isolation, and recovery; crew interaction, reliability predictions and models, and *qualification/certification testing requirements and approaches.

AREA II: Liquid Combustion Subsystems and Components

Chair: Dr. Richard K. Cohn, AFRL, Edwards AFB, CA
Telephone: (661) 275-6177 e-mail: richard.cohn@edwards.af.mil

A. **Hydrocarbon Fuel Characteristics and Specifications** - Papers addressing the specifications for various Hydrocarbon fuels, including RP-1 and Methane, fuel additives to improve system performance, and studies comparing the advantages and disadvantages of various hydrocarbon fuels.

B. **Advanced Liquid and Gel Propellants** - Papers addressing advanced liquid and gel propellants and the development of supporting technologies such as fuel management systems and lightweight tankage systems to advance state-of-the-art chemical capabilities are of particular interest.

C. **Thrust Chamber Assembly (TCA) Design and Applications** - Papers are sought that address major components such as Combustion Chamber, and Nozzle Design and their Component Test and Integration. This mission area seeks papers in main combustion chambers, preburners, and gas generators for all sizes of liquid rocket engines.

D. **Liquid Injection Systems.** The injection system of liquid rocket engines is critical to system performance. This mission area seeks papers describing new injector concepts, the physical processes required to understand injection concepts (including supercritical jets, sprays, and droplets), and methods to determine injector performance and stability.

E. **Hybrid Rocket Engines.** Papers addressing hybrid rocket engine systems and the combustion process in these systems.

LPS Mission Areas (Continued)**AREA III: Liquid Propellant Feed and Pressurization Systems**

Chair: Mr. James L. Cannon, NASA Marshall Space Flight Center, Huntsville, AL
Telephone: (256) 544-7072 e-mail: james.cannon@msfc.nasa.gov

- A. ***Turbomachinery Design and Applications*** – Turbopump fed liquid rocket engine systems require the use of high speed and high performance rotating machinery. Turbomachinery for this application requires support from a wide range of technical disciplines. Technical areas typically considered include the design, analysis, and testing of inducers, impellers, turbines, seals, bearings and structural elements. Papers on liquid rocket engine Turbomachinery are being sought that cover all aspect of design, analysis, code development, component test results, test rig development, diagnostics techniques, and system level testing.
- B. ***Pressurization and Feed Subsystem Design and Applications*** – This area covers all aspects of design, analysis and testing of the propellant feed system and engine system specific elements. The propellant feed system is composed of tanks, major component lines, pressurization systems, ducts, feed system control valves, and suppression systems. Engine system specific elements include ducts, flow measurement devices and valves. Papers are being sought which address design, analysis, tool development, diagnostics techniques, and testing of propellant feed system elements and engine system specific elements.

AREA IV: Tactical Liquid and Gel Propulsion Systems

Chair: Dr. William M. Chew, Army AMCOM, Redstone Arsenal, AL
Telephone: (256) 876-5034 e-mail: william.chew@us.army.mil

Liquid and Gel Bi-propellant Tactical Systems - Systems that provide primary axial propulsion, divert thrust, and attitude control for missile defense, air defense, close combat, and fire support applications. Component technologies of interest include propellants, propellant storage and expulsion systems, injectors, combustors, nozzles, thrust vector control and energy management systems, and advanced materials. Meeting system safety, handling, transportation, and environmental regulations/requirements are key issues.

- A. ***Mission Analysis and Trades*** - Methods used to analyze mission requirements and determine the optimum solution trading performance, weight, volume, cost, flexibility, and logistics. This includes computational modeling, trajectory analysis, energy management/flexible thrust modeling, and model validation methods.
- B. ***System and Component Analysis and Trades*** - Methods used to analyze system components to determine optimum component solutions for a specific mission and to examine component interfaces to assure functionality and trade the key drivers to determine the optimum system solution.
- C. ***Specific Tactical Propulsion Systems*** - Discussions of specific tactical propulsion systems, their requirements, system drivers, and component and system development and testing.
- D. ***System Safety, Handling, Transportation, and Environmental Issues*** - Approaches to address regulatory requirements on logistics and operation of propulsion systems.

LPS Mission Areas (Continued)**AREA V: Advanced Materials for Liquid Propulsion Applications**

Chair: Dr. Joseph Mabry, AFRL, Edwards AFB, CA

Telephone: (661) 275-5857 e-mail: Joseph.Mabry@edwards.af.mil

A. Characterization and Fabrication. Characterization of materials and development of fabrication processes; development of materials testing capabilities in representative environments; test methods (e.g., demonstration or verification testing), repair techniques, inspection, etc. Standards developed for new materials. Advanced or innovative fabrication process assessment and characterization.

B. Material Applications in Liquid Rocket Engines. Papers addressing advanced materials and their application to component technologies in liquid rocket propulsion systems, including:

- Polymer matrix composite thrust chamber structural jackets
- Lightweight, high-temperature nozzle materials
- Polymer matrix composite tank materials for fuels and oxidizer
- Advanced seal materials
- Lightweight lines, ducts, and valves
- Hydrogen and hydrocarbon compatible lightweight materials
- Liquid and gaseous oxygen compatible lightweight materials
- Materials resistant to oxidation at high temperatures
- Metals, ceramics, and their composites for component applications

SPECIALIST SESSIONS: Liquid Propulsion

Coordinator: Peter Zeender, Johns Hopkins University - CPIAC

Telephone: (410) 992-9950x205 e-mail: pzeender@cpia.jhu.edu

The JANNAF 3rd Liquid Propulsion Subcommittee meeting will be hosting several dedicated specialist sessions to focus on topics of current and emerging interest. Specialist sessions under consideration include:

- **Hybrid Launch Vehicle (HLV) Studies**
- **Small Launch Vehicle Systems**
- **Modeling and Simulation Tools for Combustion Stability Applications**
- **Verification and Validation of Liquid Rocket Engine Tools**
- **Propellant Management and Liquid Level Sensing**
- **University-Based Rocket Development Efforts**

To have your abstract considered for a specialist session, please submit it to the most appropriate LPS Mission Area (above), and note on the Abstract Submittal Form in which specialist area you would like it to be included. Suggestions for additional specialist sessions should be provided to the session coordinator along with proposed paper authors.

SPS Mission Areas

The JANNAF Spacecraft Propulsion Subcommittee meeting will include sessions in eight general technical areas of *advanced chemical propulsion, aerocapture, electric propulsion, nuclear thermal propulsion, solar sails, solar thermal propulsion, technologies for the future, and tether systems*. Papers are solicited presenting experimental studies, theoretical analyses, or numerical modeling efforts to aid in the design, development and testing of efficient and stable spacecraft propulsion systems. Specific topics of interest are defined below.

Area I: Advanced Chemical Propulsion

Co-Chairs: Mr. Paul Zuttarelli, AFRL/PRSS, Edwards AFB, CA
Telephone: (661) 275-5698 e-mail: Anthony.Zuttarelli@edwards.af.mil
Dr. Steven J. Schneider, NASA-GRC, Cleveland, OH
Telephone: (216) 977-7484 e-mail: steven.j.schneider@grc.nasa.gov

The following topics are of particular interests for sessions:

- Advanced propellants
- Development of earth and space storable propellants
- Cryogenic fluid management
- Ignition technologies
- Supporting optimized propulsion technologies
- Propellant management systems
- Throttleable engine technologies
- Pulsing propulsion systems
- Lightweight components and manufacturing technologies that result in significant mass reductions and performance advances over state-of-the-art chemical capabilities

Area II: Aerocapture

Chair: Dr. Andrew Keys, NASA-MSFC, Huntsville, AL
Telephone: (256) 544-8038 e-mail: andrew.keys@nasa.gov

Emphasis is in two key focus areas: rigid aeroshell systems and inflatable / deployable decelerator systems.

- For rigid aeroshell systems, areas of interest include, but are not limited to the following topics:
 - Advanced thermal protection system materials
 - Advanced structures
 - Aero/aerothermodynamic modeling
 - Engineering performance sensors
 - Guidance, navigation and control
 - Atmospheric modeling
 - Testing methods
 - Systems-level analyses
- For inflatable/deployable decelerator systems, areas of interest include, but are not limited to the following topics:
 - Advanced materials and seaming concepts
 - Aero/aerothermodynamics and structural stability tools
 - Analyses and test
 - Space deployment concepts
 - Systems-level analyses

SPS Mission Areas (Continued)**Area III: Electric Propulsion**

Co-Chairs: Mr. David H. Manzella, NASA-GRC, Cleveland, OH
Telephone: (216) 977-7432 e-mail: david.h.manzella@grc.nasa.gov
Dr. Mike LaPointe, NASA-MSFC, Huntsville, AL
Telephone: (256) 544-2648 e-mail: michael.r.lapointe@nasa.gov

Papers are invited in all areas of electric propulsion (including solar- and nuclear-powered systems). Topics of interest include:

- A.) Basic Research and Development of Electric Propulsion Thrusters
 - Physics of electric propulsion processes
 - Thruster technology development
 - Advanced and breakthrough concepts
 - Micropropulsion and nanopropulsion
 - High-power electric propulsion
 - Hybrid and dual-mode systems using electric propulsion
 - Laboratory and flight diagnostic techniques
- B.) Systems Engineering of Electric Propulsion Thrusters
 - Electric propulsion system design
 - Propellants, propellant storage, and propellant feed systems
 - Power processing units
 - Command and control systems
- C.) Electric Propulsion Applications
 - Mission design and analysis for LEO, GEO, orbit transfer, planetary, and interplanetary applications
 - Electric propulsion for attitude control systems
 - Microsatellite applications
 - High-power electric propulsion applications
 - Non-propulsive applications
- D.) Electric Propulsion Flight Programs
 - Ground and flight system operations
 - Space qualification programs
 - Flight programs
 - Ground testing and facilities
- E.) Modeling of Electric Propulsion Thrusters, Plume, and Spacecraft Interaction
 - Thruster/spacecraft interactions
 - Thruster model development
 - Plume model development
 - Ground and flight validation of electric propulsion models

SPS Mission Areas (Continued)**Area IV: Nuclear Thermal Propulsion**

Co-Chairs: Mr. Stanley K. Borowski, NASA-GRC, Cleveland, OH
Telephone: (216) 977-7091 e-mail: stanley.k.borowski@nasa.gov

Mr. Wayne J. Bordelon, NASA-MSFC, Huntsville, AL
Telephone: (256) 544-1579 e-mail: wayne.j.bordelon@nasa.gov

Session includes 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 topics:

- NTR spacecraft and mission design for human Mars Exploration mission
- Solid core NTR concepts with or without bimodal capability
- Common reactor design for both propulsion and surface power generation
- Candidate nuclear fuel options
- Reactor controls and shielding
- NTR test methods and facilities
- NTR demonstration options
- Safety, reliability, risk analysis and crew-rating
- NTR vehicle operations and costs

Area V: Solar Sails

Chair: Mr. Roy Young, NASA-MSFC, Huntsville, AL
Telephone: (256)-544-0283 e-mail: roy.young@nasa.gov

Emphasis is on solar sail propulsion technologies, missions, and concepts. Topics of interest for these sessions include, but are not limited to the following topics.

- Near-term mission concepts
- Innovative sail designs and concepts
- Technology testing and development
- Sail packaging and deployment
- Guidance, navigation, and control
- Sail materials and dynamics
- Environmental issues and concerns

SPS Mission Areas (Continued)**Area VI: Solar Thermal Propulsion**

Co-Chairs: Dr. Michael R. Holmes, AFRL, Edwards AFB, CA
Telephone: (805) 838-7653 e-mail: ekim.semloh@verizon.net
Mr. Harold P. Gerrish, NASA-MSFC, Huntsville, AL
Telephone: (256) 544-7084 e-mail: harold.p.gerrish@nasa.gov

Key focus areas are engines and concentrators with specific interest in the following topics:

- Engine concepts (thermal storage, direct gain, bi-modal, volumetric, etc.)
- Engine support structures, insulation techniques, and materials
- Inflatable, deployable or rigidizing and secondary concentrations
- Reflectors
- Engine/concentrator integration and alignment
- Sun acquisition
- Sun tracking and pointing
- Mission concepts and applications utilizing a solar thermal propulsion system to enable new mission scenarios or to enhance current mission capabilities

Area VII: Technologies for the Future

Chair: Dr. Jean-Luc Cambier, AFRL/PRSA, Edwards AFB, CA
Telephone: (661) 275-5676 e-mail: jean-luc.cambier@edwards.af.mil

Session will include advanced concepts for both near- and far-term future space propulsion. Specific topics include technologies that promise significant gains in specific impulse, and/or power density, but are based on known fundamental physics, such as:

- Fusion Energy in Space Propulsion
 - Conventional magnetic schemes
 - Inertial fusion schemes
 - Inertial electrostatic confinement
 - Magnetically insulated inertial fusion
 - Fission-fusion hybrid systems
 - Concepts that utilize fusion reaction directly or indirectly
- High-energy fuels
- Use of antimatter in propulsion systems
- Laser or microwave propulsion
- Mass drivers

SPS Mission Areas (Continued)**Area VIII: Tether Systems**

Co-Chairs: Dr. Nobie H. Stone, SRS Technologies, Huntsville, AL
Telephone: (256) 971-7029 e-mail: nstone@stg.srs.com

Dr. Joseph H. Bonometti, NASA-MSFC, Huntsville, AL
Telephone: (256) 544-4101 e-mail: joseph.a.bonometti@nasa.gov

Specific areas of interest include, but are not limited to the following topics:

- A.) Momentum eXchange Electrodynamic Reboost (MXER) systems
 - High strength-to-weight tether materials
 - Long-life tether configurations (both conducting and non-conducting)
 - MXER control node concepts
 - Reliable deployment systems
 - Plasma contact devices
 - Payload capture / release devices
 - Predictor codes and algorithms applicable to MXER tether systems
 - Alternative applications of MXER technology to non-Earth ionospheric operations
- B.) Electrodynamic (ED) tethers
 - Missions concepts
 - Innovative designs
 - Technology development and testing (deployers, tethers, etc.)
 - Plasma contact devices
- C.) Analyses of tether performance parameters and systems studies of mission concepts including:
 - Launch operations
 - Economic studies
 - Spiral development
- D.) Terrestrial, lunar and other special applications of tethers, cables and stringers including:
 - Science missions – atmospheric sampling, lunar surface mobility, lunar launch
 - Aerocapture/aeroentry applications
 - Wind power generation and other tethered aero-platforms
 - Formation flying using stringer/cables structures

MSS Mission Areas

The JANNAF 5th Modeling and Simulation Subcommittee meeting covers: engineering models and simulations for virtual design, virtual tests, virtual operations, and virtual manufacturing of propulsion components/subsystems or of complete propulsion systems; systems integration of subsystems into an engine, motor or vehicle, and integration of the propulsion system with other systems; integrated health management (IHM) including M&S of IHM systems for diagnostics, failure modes, prognostic, and corrective modes; and credibility assessments of models and simulations including verification, validation, certification or accreditation, sensitivity-uncertainty analysis, measurement uncertainty, simulation uncertainty, and uncertainties in probabilistic risk assessment (PRA).

Area I: Modeling and Simulation of Systems

Co-Chairs: Dr. Gregory Ruderman, AFRL, Edwards AFB, CA
Telephone: (661) 275-5332, e-mail: gregory.ruderman@edwards.af.mil

Mr. Eric J. Paulson, AFRL, Edwards AFB, CA
Telephone: (661) 275-5841, e-mail: eric.paulson@edwards.af.mil

A) Results of propulsion technology Modeling & Simulation analyses of missile, aircraft, and launch vehicle systems is the focus of this session. Papers detailing the results of propulsion technology tradeoffs, technology parameter sensitivities, and technology payoff assessments as applied to vehicle-level M&S are highly encouraged. Example vehicle-level system papers include (but are not limited to): space launch systems, prompt strike platforms, long-range ballistic missiles, cruise missiles, and hypersonic cruise vehicles.

B) Papers detailing advances in the development of tools, models, and methods for vehicle-level modeling & simulation including the integration of propulsion analysis.

Area II: Virtual Engineering

Chair: Mr. Eric J. Paulson, AFRL, Edwards AFB, CA
Telephone: (661) 275-5841, e-mail: eric.paulson@edwards.af.mil

Virtual engineering encompasses the set of tools used to help develop, design, test, analyze, and screen systems, components, and concept for simulation-based acquisition. Virtual engineering uses rapid synthesis and simulation tools, which include traditional deterministic and non-deterministic simulation methods and non-traditional or "soft computing" methods, including fuzzy logic, neural networks, and genetic algorithms. The goal of virtual engineering is the application of high-credibility models for accurate analysis and rapid design-space evaluation, leading to increases in functionality at reduced cost.

MSS Mission Areas**Area III: Integrated Health Management**

Co-Chairs: Mr. R. Scott Hyde, ATK Thiokol, Brigham City, UT
Telephone: (435) 863-6307, e-mail: scott.hyde@atk.com

Dr. Ashok Srivastava, NASA Ames Research Center, Moffet Field, CA
Telephone: (650) 604-2409, e-mail: ashok@email.arc.nasa.gov

Integrated Health Management promotes advancement and development of industry practices for IHM of propulsion systems within a "system of systems" environment. IHM is desirable to reduce the cost of maintainability and to increase reliability of propulsion systems. IHM is ideally addressed early in the life-cycle of a propulsion system, in particular, during the design effort where it's functionality and payoff are addressed in detail. Propulsion system IHM must manage the health of the propulsion systems prior to integration into a vehicle. Once integrated, the propulsion system IHM must communicate with the Vehicle IHM system and visa-versa. IHM includes methods and tools for 1) Data Management and Mining, 2) Integrated Command and Control, 3) Sensors, 4) Diagnostics and 5) Prognostics. These tools enable making redline and contingency decisions using knowledge-based expert systems, model-based diagnostic and reasoning, fault models, neural networks, fuzzy logic, genetic and evolutionary algorithms, and life-cycle analysis. These methods will rely on improved physics-based models, and understanding of system and sub-system performance.

Objective of sessions will be to facilitate the formation of successful collaborations and technology transfer between researchers and developers. Specific areas of interest include, but are not limited to the following topics:

- A) **Data Management and Mining.** Recent advances in data mining, machine learning, and statistics have enabled significant advances in numerous disciplines including integrated systems health management (ISHM). Areas of interest include:
1. Applications of data mining and machine learning in the ISHM domain
 2. Extraction of trends from high-dimensional heterogeneous data sets.
 3. Clustering and classification methods for text documents
 4. Data driven methods for prognosis and diagnosis of aerospace systems
 5. Verification and validation of learning systems
 6. Data warehousing of ISHM data
- B) **Integrated Communications, Command and Control.** Areas of interest include:
1. Examples of Integrated Communications, command and control in real-world applications
 2. Theoretical results in command and control and ISHM technologies
 3. Test beds
 4. Implications for prognosis and diagnosis of aerospace systems
 5. Verification and validation
- C) **Sensor Systems.** Sensor systems are a key technology for ISHM applications. This session focuses on Sensor Systems and their cross-cutting applications on ISHM platforms. Areas of interest include:
1. Descriptions of sensor systems in ISHM applications
 2. Sensor system test beds
 3. Smart sensor technology
 4. Theoretical results in sensor fidelity and ISHM applications
 5. Verification and validation

MSS Mission Areas

D) **Diagnostic Systems.** Diagnostic systems are required to determine the current state of propulsion systems. This session focuses on Diagnostic Systems and their use or potential use in ground and flight applications. Areas of interest include:

1. Descriptions of diagnostic systems in ISHM applications
2. Ground based diagnostic system applications
3. Flight based diagnostic system applications
4. Real time situational awareness
5. Verification and validation

E) **Prognostic Systems.** Prognostic systems are required to determine the future state of propulsion systems. This session focuses on Prognostic Systems and their use or potential use in ground and flight applications. Areas of interest include:

1. Descriptions of prognostic systems in ISHM applications
2. Ground based prognostic system applications
3. Flight based prognostic system applications
4. Fault identification, isolation and recovery
5. Verification and validation

Area IV: Simulation Credibility: Uncertainty, Verification, Validation and Risk

Co-Chairs: Dr. Unmeel B. Mehta, NASA-ARC, Moffett Field, CA
Telephone: (650) 604-6744, e-mail: Unmeel.B.Mehta@nasa.gov

Dr. Dean Eklund, AFRL/PRAT, Wright Patterson AFB, OH
Telephone: (937) 255-0632, e-mail: dean.eklund@wpafb.af.mil

The credibility of digital and analog simulations is a major issue for incorporating simulation tools and data into a technology-development program, for conducting simulation-based acquisition, for assessing system reliability to assure human safety and/or mission success, and for identifying and assessing risks in complex, technological systems. Simulation credibility includes assessment and management of computer simulation uncertainty, sensitivity-uncertainty analysis, experimental uncertainty, modeling uncertainty, verification and validation (V&V) of simulation models and of simulations, and risk assessment. Abstracts are solicited on unusual or specific solutions, on novel approaches, and on technological advances. The topics of interest include (but not limited to): (1) uncertainty assessment, (2) validation, (3) verification, (4) sensitivity analysis, (5) propagation of uncertainty, (6) communication of uncertainty, (7) management of uncertainty, (8) reliability assessment, (9) risk assessment and management, and (10) recommendations for guidelines, procedures, or standards.

MSS Mission Areas (Continued)**Area V: TBCC Modeling, Simulation and Planning**

Co-Chairs: Mr. Peter A. Montgomery, AEDC, Arnold AFB, TN
Telephone: (931) 454-5852, e-mail: Peter.Montgomery@arnold.af.mil

Dr. Unmeel B. Mehta, NASA-ARC, Moffett Field, CA
Telephone: (650) 604-6744, e-mail: Unmeel.B.Mehta@nasa.gov

This area encompasses all aspects of Turbine-Based Combined-Cycle (TBCC) propulsion. Applications of interest include access to space launch systems and hypersonic global reach aircraft. Abstracts are specifically sought on:

- System Issues and Plans
- Design
- Integration
- Modeling and Simulations
- Multi-Disciplinary Optimization
- Ground and Flight Tests

Sessions in this area will be used to open a dialog between the hypersonics and high speed turbine engine communities through discussion of turbine based combined cycle engines and the issues and plans involved with their integration into high speed vehicle systems. Representatives from U.S. government and industry programs are sought to provide overviews or status of their efforts and discuss the challenges of working with such fully integrated systems. These sessions will be jointly sponsored by the MSS, the Airbreathing Propulsion Subcommittee (APS), and the JPM.

MSS Mission Areas (Continued)**SPECIALIST SESSIONS: Modeling and Simulation**

Coordinator: Peter Zeender, Johns Hopkins University - CPIAC
Telephone: (410) 992-9950x205 e-mail: pzeender@cpia.jhu.edu

The JANNAF 5th Modeling and Simulation Subcommittee meeting will be hosting several dedicated specialist sessions to focus on topics of current and emerging interest. Specialist sessions under consideration include:

- ***Simulation-Based Acquisition Issues***
- ***Modeling- and Simulation-Based Decision Making***
- ***Propellant Management and Liquid Level Sensing***
- ***Modeling and Simulation Tools for Combustion Stability Applications***
- ***Verification and Validation of Liquid Rocket Engine Tools***
- ***Test Facilities M&S***
- ***Low Thrust Trajectory M&S***

To have your abstract considered for a specialist session, please submit it to the most appropriate MSS Mission Area (above), and note on the Abstract Submittal Form in which specialist area you would like it to be included. Suggestions for additional specialist sessions should be provided to the session coordinator along with proposed paper authors.

SPECIALIST SESSION: M&S Tools

Chair: Mr. Gary Prybyla, NSWC, Indian Head, MD
Telephone: (301) 744-1473, e-mail: prybylagc@ih.navy.mil

The Modeling and Simulation Subcommittee will be inviting government and industry M&S tool developers to discuss recent advances in product development and software tool capabilities, and give live demonstrations.

Developers will be discussing software development and applications for:

- ***System performance assessment***
- ***Virtual engineering and prototyping***
- ***Complex systems integration***
- ***Failure prediction and modeling***
- ***Fluid flow modeling***
- ***Combustion modeling***
- ***Structural and stress modeling***
- ***Fluid/structural interface modeling***
- ***Mechanical integration and clearance assessment***
- ***Probabilistic analysis capabilities***

If you are a software or tool developer, please contact the specialist session chair (above) for inclusion in the session.

JANNAF Awards Programs

In the tradition of recognizing the outstanding achievements of the propulsion community, the JANNAF Liquid Propulsion, Spacecraft Propulsion, and Modeling and Simulation Subcommittees are soliciting nominations for several awards to be presented at the meeting.

Best Student Paper Awards

In order to foster and support interest in science and engineering in young academics, the JANNAF Subcommittees are pleased to announce Best Student Paper Awards. The award is open to any paper where the primary author and presenter is an undergraduate or graduate student at the time of submission. The award will be presented to the author at the awards ceremony session during the meeting. Awards will be given in each of three categories: Liquid Propulsion, Spacecraft Propulsion, and Modeling and Simulation.

All student-authored works will automatically be included in the initial round of consideration with the submission of an abstract, but in order to be considered for the final Best Student Paper selection, **the completed manuscript must be provided to CPIAC by March 5th 2007** (approximately two months prior to the meeting). Please note your interest in participating on your abstract form, or contact Peter Zeender at CPIAC (address information on following page) directly.

As a reminder: student authors must conform to the same JANNAF eligibility requirements as other authors, per the Policy on Non-Government Attendees at JANNAF Meetings as given on page 2 of this Call for Papers. Student authors are encouraged to work with their advisors to ensure they meet these requirements, and should contact CPIAC at their earliest convenience with questions regarding their eligibility and participation.

Special Recognition Awards

The JANNAF Subcommittees are also soliciting nominations for Individual Achievement and Distinguished Recognition Awards to honor individual achievements, either in the last 18 months or for a lifetime of dedicated service. These awards will be chosen from nominations by members of the appropriate propulsion community.

Special recognition award winners will be selected by the respective subcommittee Awards Committees based on review of the nomination for:

- Technical value of the achievement(s) including level of technical complexity and challenge, quality of results, degree of innovation and timeliness of research.
- Impact of the achievement on the broader propulsion community.
- For individuals nominated for lifetime achievement, demonstrated participation in technical societies as evidenced by positions held and papers published will be considered favorably.

Nomination submissions should include:

- A description of the achievement or distinguished service, of no less than 200 and no more than 1000 words. The description must be typed or provided in electronic format (Acrobat PDF, MS Word, Word Perfect, Rich Text Format) via e-mail; submission packages in excess of 8 Mb (total) should be mailed on CD.
- Supporting curriculum vitae, list of publications, and/or professional activities as required supporting the nomination.
- Contact information for the nominee(s) and the nominator, including organization affiliation, phone number and e-mail address.

Nominations should be submitted to Peter Zeender at CPIAC (at the address provided on the following page) **no later than Feb 5th 2007.**

JANNAF Awards Program (Continued)**3rd LPS Outstanding Achievement in Liquid Propulsion Award**

The JANNAF LPS has established the "Outstanding Achievement in Liquid Propulsion Award" to recognize the most outstanding liquid propulsion achievement during the current LPS meeting cycle. The award will honor the most significant achievements in liquid propulsion by an individual, team within an organization, or team of organizations.

Nominations are being solicited in the two focus areas of Operational Systems and R&D Technology, but work in other areas is also encouraged for nomination. Nominations will be judged on three primary criteria: technical significance, technical complexity, and degree of innovation. Nomination is subject to the following restrictions:

- The technical achievement must have been accomplished in the last 18 months.
- The nominees must work or have worked for the organization during the same 18-month period of performance.
- The award recipient(s) must be able to attend the LPS meeting to receive the award.

Nomination submissions must include:

- A description of the achievement, of no less than 500 and no greater than 1500 words, including an executive summary (short paragraph) that succinctly highlights the achievement and addresses the significance of the accomplishment. The description must be typed or provided in electronic format (Acrobat PDF, MS Word, Word Perfect, Rich Text Format) via e-mail; submission packages in excess of 8 Mb (total) should be mailed on CD.
- Supporting data (if desired) of no more than 10 pages.
- Contact information for the nominee(s) and the nominator, including organization affiliation, phone number and e-mail address.
- Distribution limited and proprietary data is acceptable if appropriately marked. Classified work will not be considered for the award.

Nominations should be submitted to Peter Zeender at CPIAC (at the address below) **no later than Feb 5th 2007.**

Nominations should be submitted to:

Peter Zeender
JHU Chemical Propulsion Information Analysis Center
10630 Little Patuxent Pkwy, Suite 202
Columbia, MD 21044
(410) 992-9950 x205
pzeender@cpia.jhu.edu

Subcommittee Workshops

Workshops are informal roundtable discussions on a specific topic, which are typically initiated by a series of invited chart presentations. Workshops require approval by the respective subcommittee's Technical Steering Group (TSG) and its Executive Committee (EC) Liaison. The TSG/EC requires that persons wishing to conduct a workshop at the meeting must send the following information to CPIAC by **September 9, 2006**:

- Title of workshop
- Purpose and description of workshop (including objectives, approach, and specific issues to be addressed)
- Expected outcome
- Expected attendance
- Chairperson of workshop (include address and telephone number)

To assist in the organization of workshops, please refer to the JANNAF Practices and Procedures Brochure located on the JANNAF web site at: www.jannaf.org.

Upcoming JANNAF and DDESB Meetings**Upcoming JANNAF and DDESB Meetings**

- Aug. 22-24, 2006** 32nd United States Department of Defense Explosives Safety Seminar, Marriott Philadelphia Downtown, Philadelphia, PA
- Dec. 4-8, 2006** JANNAF 41st Combustion Subcommittee / 29th Airbreathing Propulsion Subcommittee / 23rd Propulsion Systems Hazards Subcommittee Joint Meeting, Sheraton Sand Diego Hotel and Marine/Naval Fleet Intelligence Training Center, San Diego, CA
- Mar. 20-22, 2007** JANNAF 16th Nondestructive Evaluation Subcommittee / 25th Rocket Nozzle Technology Subcommittee / 38th Structures & Mechanical Behavior Subcommittee Joint Meeting, Hyatt Regency Newport Hotel and Spa, Newport, RI