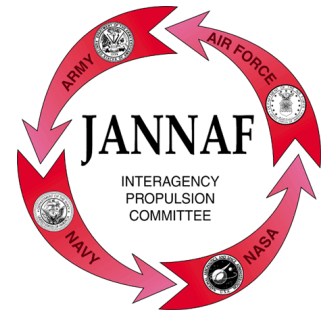


JANNAF INTERAGENCY PROPULSION COMMITTEE JOINT ARMY-NAVY-NASA-AIR FORCE

62nd JANNAF Propulsion Meeting (JPM)
10th Modeling and Simulation (MSS)
8th Liquid Propulsion (LPS)
7th Spacecraft Propulsion (SPS)
JOINT SUBCOMMITTEE MEETING



1 - 5 June 2015

Announcement and Call For Papers

**Abstract Deadline
Extended to
13 February 2015**

**Nashville Airport Marriott Hotel
Nashville, Tennessee**

Last updated 14 January 2015



The June 2015 meeting of the Joint Army-Navy-NASA-Air Force (JANNAF) will consist of the 62nd JANNAF Propulsion meeting; and the Joint Meeting of the 10th Modeling and Simulation, 8th Liquid Propulsion, and 7th Spacecraft Propulsion Subcommittees. This meeting will be held **Monday through Friday, 1 - 5 June 2015**, at the **Nashville Airport Marriott Hotel in Nashville, Tennessee**. Please refer to page 4 for hotel information.

ATTENDANCE

The overall security level of the meeting is Unclassified. All sessions will be held at the Nashville Airport Marriott Hotel in Nashville, Tennessee. Attendance is restricted to U.S. citizens qualified to receive unclassified, limited-distribution information. To qualify, the attendee must be employed by a DoD, DoE, or NASA facility, or with a DoD, DoE, or NASA contractor facility. No foreign nationals will be permitted to attend.

ALL non-government attendees (which includes contractors, consultants and universities) attending this meeting **must**:

1. Be certified by a Sponsoring Government Official
2. Provide their organization's DD 2345 Certification Number for receipt of militarily-critical technical data

DD 2345: For additional information, contact the Joint Certification Program Office (JCP) at 1-800-352-3572 or visit their Web site at www.dlis.dla.mil/jcp/.

Questions concerning attendance eligibility should be directed to the JHU/CPIAC Facility Security Officer, Mary Gannaway, at (410) 992-7304, ext. 211 or mtg@jhu.edu.

PURPOSE

The purpose of the JANNAF Interagency Propulsion Committee is to coordinate fundamental research, exploratory development, and advanced development programs; standardize procedures and nomenclature; promote and facilitate the exchange of technical information; and accomplish problem solving in areas of joint agency interest on propulsion systems used in missiles, rockets, boosters, spaceplane, spacecraft, satellites, and guns. JANNAF subcommittees focus their resources on technical issues of interest to the JANNAF agencies.

SCOPE

JANNAF Propulsion Meeting

The JANNAF Propulsion Meeting (JPM) encompasses research and applications at the systems level. The JPM is held each year in conjunction with standing JANNAF subcommittee meetings on a rotating basis. The scope of the

62nd JPM in 2015 spans six mission areas:

- I) Tactical Propulsion
- II) Missile Defense/Strategic Propulsion
- III) Propulsion Systems for Space Access
- IV) Gun and Gun-Launched Propulsion
- V) Propulsion and Energetics Test Facilities
- VI) Sensors for Propulsion Measurement Applications

In conjunction with the JPM, the standing JANNAF subcommittees for Modeling and Simulation; Liquid Propulsion; and Spacecraft Propulsion will also hold their biannual meeting (held every 18 months). To learn more about the scope of the standing JANNAF subcommittee meetings, please visit the meeting website at <https://www.jannaf.org/mtgs/June2015/pages/index.html>.

Modeling and Simulation Subcommittee

The 10th MSS activities include modeling and simulation of systems; virtual engineering; development of software analogs of propulsion devices or systems; software integration-coupling of diverse simulation tools to enable more detailed, system-of-systems analysis and simulation; simulation credibility-uncertainty, verification, validation, reliability, and risk; and integrated health management-identification and management of off-nominal conditions in propulsion.

Liquid Propulsion Subcommittee

The 8th 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.

Spacecraft Propulsion Subcommittee

The 7th 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.

Topics to highlight include: spacecraft power; secondary payload manifest requirements; advanced monopropellants; and spacecraft modeling and simulation.

MISSION AREAS/SPECIALIST SESSIONS

Mission areas within each subcommittee, as well as specialist sessions, are outlined on pages 6 - 16. Topics are not intended to be exclusive.

RECOMMENDATIONS FOR WORKSHOPS OR SPECIALIST SESSIONS

Recommendations for workshops or specialist sessions are solicited at this time. Individuals interested in organizing

and chairing a workshop or specialist session should contact the CPIAC Technical Staff member in their respective subcommittee with suggestions for topics by **13 February 2015**. See page 16 for additional information and requirements.

AWARDS

Nominations for JANNAF Executive Committee, MSS, LPS and SPS recognition awards are being solicited. Individuals interested in nominating an award recipient should follow the guidelines and instructions on page 17.

ABSTRACT SUBMITTAL 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 Submittal Form](#) posted on the June [meeting website](#).
- The submission of an abstract represents an agreement to submit a final paper for publication by May 4, 2015, attend the meeting, and deliver a 30-minute presentation. Your presentation will be heard by all qualified individuals within industry, government, and university organizations. If your paper cannot be presented to all qualified attendees, it cannot be presented in this program without specific approval from members of the JANNAF Executive Committee.
- 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.
- Please submit using the [Abstract Submittal Form](#), which can be downloaded from the [June meeting website](#). Obtain management approval on the abstract form to ensure availability of resources for your participation in the meeting.
- Many organizations 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 to CPIAC has been extended until **13 February 2015**.

CPIAC accepts only electronic submission of abstracts and papers. The deadline to submit abstracts has been extended; completed abstracts are due at CPIAC by **13 February 2015**. Abstracts must be submitted on the [Abstract Submittal Form](#):

- Via email to: scohen@cpiac.jhu.edu; (Distribution A only);
OR
- Uploaded to CPIAC's secure server as follows:
 1. Go to <https://www.cpiac.jhu.edu>
 2. Under Tools (lower right side of page), click "Document Submittal"
 3. Choose Infobase: JANNAF Mtg Abstract Uploads
 4. Type in User Name: Abstract
 5. Type in Password [contact CPIAC (410) 992-7302 or 7300 for current password]. Click the "Login" button.
 6. Click on "June 2015 JANNAF Meeting - Nashville"; choose "Add Document" (to the left of the page)
 7. Complete the "Add Document" form, being sure to Title your Document, select "Upload from Client", click the "Browse" button and navigate to where you have saved your completed Abstract Submittal Form on your computer. Select the file and click "Open". Choose the appropriate file format (MS Word or PDF) under Document Type, and click on "Apply".
 8. Email scohen@cpiac.jhu.edu to notify that the file has been successfully uploaded.

JPM/MSS/LPS/SPS AUTHOR TIMELINE

Date	Weeks before Meeting	Action
13 Feb 2015	16	NEW Deadline for receipt of Abstract Submittal Form .
6 March 2015	13	Acceptance/rejection letters sent to authors.
16 March 2015	11	Deadline for changes to meeting invitation and preliminary program
23 March 2015	10	Invitation, preliminary program, and registration materials forwarded to propulsion community.
30 March 2015	9	Deadline for award nominations.
20 April 2015	6	Deadline for submission of changes to the final program.
4 May 2015	4	Deadline for receipt of manuscripts and paper/presentation clearance forms. Papers not received by this date may be removed from the program.
11 May 2015	3	Deadline for reservations at Nashville Airport Marriott.
18 May 2015	2	Deadline for receipt of Registration Certification Forms. Deadline for reduced registration fee.
18 May 2015	2	Deadline for receipt of presentations.
1 June 2015	0	JPM/PIB/MSS/LPS/SPS Joint Subcommittee Meeting

HOTEL INFORMATION

Sleeping rooms have been reserved with the Nashville Airport Marriott Hotel, located in Nashville and a short 10 minute ride from the Nashville International Airport.

Negotiated concessions include complimentary airport shuttle and hotel parking, as well as free wireless internet access in guestrooms (a savings of \$14.95 plus tax per day). These concessions are available only to attendees who are staying at the Nashville Airport Marriott and make their reservations on or before Monday, 11 May 2015.

The room rate per night for **attendees with a valid Government employee I.D. will be at the prevailing government per diem rate, currently \$132**, plus tax (currently 15.25% plus \$2.50 city occupancy fee). Non-government attendee rooms are available for \$169 plus tax and city occupancy fee.

These rooms will be held for JANNAF attendees until **Monday, 11 May 2015** or until they sell out, whichever comes first. After that date, any remaining rooms will be returned to the hotel inventory; reservations will then be accepted on a space-and rate-available basis.

Each individual is responsible for his/her own reservation. Reservations may be made either by telephone or on the Web. A reservations link and phone number to reserve a room at the JANNAF discounted rate will be provided on the [Hotel page](#) of the meeting website soon.



SUBCOMMITTEES / MISSION AREAS AT THIS MEETING

Mission Area	JPM	MSS	LPS	SPS
I	Tactical Propulsion	Modeling and Simulation of Systems	Liquid Engine Systems	Chemical Propulsion
II	Missile Defense/Strategic Propulsion	Virtual Engineering	Liquid Combustion Subsystems and Components	Electric Propulsion
III	Propulsion Systems for Space Access	Integrated Health Management	Liquid Propellant Feed and Pressurization Systems	Cube/Nano Satellite Propulsion
IV	Gun and Gun-Launched Propulsion	Simulation Credibility: Uncertainty, Verification, Validation, and Risk	Advanced Materials for Liquid Propulsion Applications	Propellantless Propulsion Systems
V	Propulsion and Energetics Test Facilities		Special Topic: Engine Health Management (EHM) “Technology Roadmap”	Nuclear/Solar Thermal Propulsion / Technologies for the Future
VI	Sensors for Propulsion Measurement Applications			Program and Mission Application Overviews, and Technology Infusion Challenges
VII				Special Topic: Spacecraft Modeling and Simulation

JPM MISSION AREAS

The 62nd JPM sessions will cover systems development within the six mission areas described below. Additional information concerning these areas or the topics being solicited should be directed to the respective Area Chair.

Mission Area I: Tactical Propulsion

Co-Chairs: Mr. Jeremy R. Rice, AMRDEC/Redstone Arsenal

Telephone: (256) 876-6077

Email: jeremy.r.rice.civ@mail.mil

Mr. Frank C. Tse, NSWC/Indian Head

Telephone: (301) 744-1459

Email: frank.tse@navy.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.

Manufacturing technologies and fabrication techniques:

Papers are requested that emphasize manufacturing technologies and fabrication techniques. Papers need not be associated with a particular system but should be applicable to materials associated with such vehicles and their corresponding flight environment. 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
- Manufacturing technologies and fabrication techniques

Airframe Structures and Materials: Materials development and characterization, and structural concepts, design, test, and validation for Airframe applications and components exposed to extreme environments as found in atmospheric high speed

or reentry conditions. Topics of interest include: TPS and hot structures, materials, structures and related technology for leading edges, exterior acreage surfaces, control surfaces, hot structures, and seals (penetrations). Further topics include hot and integrated structures; acreage thermal protection systems, including ceramic matrix composites, tiles, blankets, ablators, and metallics; fuel tanks, including cryogenic and hydrocarbon, composite and metallic; leading edges, including active, passive, and heat-pipe-cooled; design and analysis methods; and seals. Papers on structures and materials that have recently flown, or are planned for flight, on flight vehicles are encouraged.

Mission Area II: Missile Defense / Strategic Propulsion

Co-Chairs: Dr. Carlos A. Lopez, Navy Strategic Systems Programs/Arlington

Telephone: (202) 433-5805

Email: carlos.lopez@ssp.navy.mil

Dr. Robert J. Jensen, Sierra Lobo, Incorporated/
Edwards AFB

Telephone: (661) 275-5468

Email: robert.jensen.12.ctr@us.af.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. Papers are requested that emphasize manufacturing technologies and fabrication techniques. Papers need not be associated with a particular system but should be applicable to materials associated with such vehicles and their corresponding flight environment. 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
- Manufacturing technologies and fabrication techniques

Mission Area III: Propulsion Systems for Space Access

Chair: Mr. Bruce R. Askins, NASA-MSFC/Huntsville

Telephone: (256) 544-1096

Email: bruce.askins@nasa.gov

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.

Manufacturing technologies and fabrication techniques:

Papers are requested that emphasize manufacturing technologies and fabrication techniques. Papers need not be associated with a particular system but should be applicable to materials associated with such vehicles and their corresponding flight environment. 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
- Manufacturing technologies and fabrication techniques
- Manufacturing use of 3D printing for propulsion hardware

Mission Area IV: Gun and Gun-Launched Propulsion

Chair: Mr. Lucas R. Lopez, ARDEC/Picatinny Arsenal

Telephone: (973) 724-4702

Email: lucas.r.lopez@us.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

Mission Area V: Propulsion and Energetics Test Facilities

Co-Chairs: Mr. Michael D. Owen, NASA-WSTF/Las Cruces

Telephone: (575) 524-5403

Email: michael.d.owen@nasa.gov

Ms. Julie A. Carlile, AFRL/Edwards AFB

Telephone: (661) 275-5098

Email: julie.carlile@edwards.af.mil

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, 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: Sensors for Propulsion Measurement Applications

Co-Chairs: Dr. Gary W. Hunter, NASA-GRC/Cleveland

Telephone: (216) 433-6459

Email: gary.w.hunter@nasa.gov

Mr. Robert F. Peterson, Aerojet/Culpeper

Telephone: (703) 789-3994

Email: 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); and 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; and recent advances in micro/nano technology, embedded sensor systems, optical diagnostics, and multiparameter measurement technologies

CPIAC Technical Representative

Mr. Peter Zeender, JHU-CPIAC, Columbia, MD

Telephone: (410) 718-5001

Email: pzeender@cpiac.jhu.edu

JANNAF Program Planning Committee

Mr. Bruce R. Askins, NASA-MSFC/Huntsville

Telephone: (256) 544-1096

Email: bruce.askins@nasa.gov

Mr. Ryan E. Hunter, NAWCWD/China Lake

Telephone: (760) 939-7893

Email: ryan.hunter@navy.mil

Ms. Patricia D. Pearce, AFRL/Wright-Patterson AFB

Telephone: (937) 255-7294

Email: patricia.pearce@wpafb.af.mil

Dr. Stephanie M. Piraino, ARL/Aberdeen

Telephone: (410) 306-0885

Email: stephanie.m.piraino-haynes.civ@mail.mil

Mr. Jeremy R. Rice, AMRDEC/Redstone Arsenal

Telephone: (256) 876-6077

Email: jeremy.r.rice.civ@mail.mil

Dr. Stephen L. Rodgers, AFRL/Edwards AFB

Telephone: (661) 275-5881

Email: stephen.rodgers.6@us.af.mil

Dr. Charles J. Trefny, NASA-GRC/Cleveland

Telephone: (216) 433-2162

Email: charles.j.trefny@nasa.gov

Mr. Frank C. Tse, NSWC/Indian Head

Telephone: (301) 744-1459

Email: frank.tse@navy.mil

MSS MISSION AREAS

The JANNAF 10th 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).

Mission Area I: Modeling and Simulation of Systems

Chair: Mr. Eric J. Paulson, AFRL/Edwards AFB

Telephone: (661) 275-5841

Email: eric.paulson.1@us.af.mil

Modeling and simulation analyses of missile, aircraft, and launch vehicle systems detailing the results of propulsion technology tradeoffs, technology parameter sensitivities, and technology payoff assessments as applied to vehicle level M&S are highly encouraged.

- M&S of vehicle system technology trades for space launch systems, prompt strike platforms, long-range ballistic missiles, cruise missiles, and hypersonic cruise vehicles
- Advances in the development of tools, models, and methods for vehicle-level modeling and simulation
- Simulations, methods, and models to evaluate performance capabilities, cost, and reliability of systems
- Vehicle and launch facility, weapon and weapon platform, propulsion system and test facility simulations, interactions, integration

Mission Area II: Virtual Engineering

Chair: Mr. Gary C. Prybyla, NSWC/Indian Head

Telephone: (301) 744-1473

Email: gary.prybyla@navy.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.

- Design, integration, manufacturing, and testing—tools and techniques.
- Engineering decision support. Optimization, cost analysis, scheduling, and knowledge-based tools—integration into the engineering process.
- Advances in the development of models and methods for component modeling and simulation to aid design

Mission Area III: Integrated Health Management

Chair: Mr. R. Scott Hyde, ATK Aerospace Propulsion Systems/Brigham City

Telephone: (435) 863-6307

Email: scott.hyde@atk.com

Integrated Health Management promotes advancement and development of industry practices for IHM of propulsion systems within a “system of systems” environment. IHM includes methods and tools for: data management and mining; integrated command and control; sensors; diagnostics; and 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.

- Data Management and Mining: Advances in data mining, machine learning, and statistics with applications to verification and validation of data, prognosis and diagnosis of system health
- Integrated Communications, Command and Control: theory, test beds, and demonstrations
- Sensor Systems: measurement technology, smart sensors, test beds, sensor fidelity
- Diagnostic Systems: theory, simulations, and demonstrations of diagnosis of current state of health of propulsion and vehicle system
- Prognostic Systems: theory, simulations, and

demonstrations of prognosis of future state of health of propulsion and vehicle system.; mitigation of, and recovery from, degraded system health to enable successful missions

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

Co-Chairs: Dr. Unmeel B. Mehta, NASA-ARC/Moffett Field
Telephone: (650) 604-6744
Email: unmeel.b.mehta@nasa.gov

Dr. Dean R. Eklund, AFRL/Wright-Patterson AFB
Telephone: (937) 255-0632
Email: dean.eklund@us.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 and 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.

- Uncertainty assessment, sensitivity analysis, quantification, for experiments and simulations
- Validation of models and verification of simulations
- Propagation of uncertainty
- Communication, management of uncertainty; risk assessment and management
- Recommendations for guidelines, procedures, or standards.

Modeling and Simulation Subcommittee Chair

Mr. Eric J. Paulson, AFRL/Edwards AFB
Telephone: (661) 275-5841
Email: eric.paulson.1@us.af.mil

Modeling and Simulation Subcommittee Deputy Chair

Mr. Joseph C. Boyle, NAWCWD/China Lake
Telephone: (760) 939-7607
Email: joseph.c.boyle@navy.mil

CPIAC Technical Representative

Mr. Nick Keim, JHU-CPIAC/Columbia
Telephone: (443) 718-5005
Email: nkeim@cpiac.jhu.edu

LPS MISSION AREAS

The JANNAF 8th 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.

Mission Area I: Liquid Engine Systems

Co-Chairs: Mr. Jason B. Turpin, NASA-MSFC/Huntsville
Telephone: (256) 544-2807
Email: jason.b.turpin@nasa.gov

Dr. Gregory A. Ruderman, AFRL/Edwards AFB
Telephone: (661) 275-5332
Email: gregory.ruderman@us.af.mil

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.

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.

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.

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.

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.

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 Space Launch System (SLS) 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 OCSST) 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.

LRE Development History: Papers addressing the important process which LRE have gone through in the course of their development. Particular subjects of note are successes, failures, mishaps, and lessons learned. Topics can be detailed in their information or can provide a general overview of the program. Papers are not limited to flight systems; testbeds, proof-of-concepts, and R and D programs are encouraged as well.

Operability: Papers addressing the operational needs of rocket engines. Operability entails all aspects with rapid turn-around, automated checkout, cleaning, rapid remove-and-replace, etc. This mission area seeks new techniques, processes, design requirements, and proposed design changes to the combustion devices that enable operability.

Mission Area II: Liquid Combustion Subsystems and Components

Co-Chairs: Dr. Christopher S. Protz, NASA-MSFC/
Huntsville

Telephone: (256) 544-6956

Email: christopher.s.protz@nasa.gov

Mr. Nils M. Sedano, AFRL/Edwards AFB

Telephone: (661) 275-5972

Email: nils.sedano@us.af.mil

Thrust Chamber Assembly (TCA) Design and Applications:

This mission area addresses the components and subcomponent features required in all sizes of liquid rocket engines. Components include main combustion chambers, preburners, gas generators, nozzles, and their subcomponent features including items such as injectors, stability aids, and coolant passages. Papers on combustion devices are being sought that cover all aspects of design analysis, component test results, test rig development, diagnostic techniques,

and novel design features that are being made possible by manufacturing advances.

Hydrocarbon Fuel Properties, Performance, and Specifications:

Papers addressing chemical composition, physical properties, fit-for-purpose quality, colling and combustion performance, and specification for various hydrocarbon fuels, including RP-1/RP-2, methane, LNG, JP-10 and other high energy density propellants, and alternatively derived fuels (F-T), fIPK, ATJ, etc.); experimental and numerical efforts to characterize operational performance of these fuels in terms of cooling, combustion, and other application-specific processes.

Combustion Stability: Papers addressing design and performance challenges, modeling and simulations techniques, and scaling methods associated with combustion stability in main combustion chambers, preburners, and gas generators for all sizes liquid rocket engines.

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.

Modeling and Simulation: Recent advances in modeling and simulation bring forward new capabilities to performance prediction and design of combustion devices. Papers are sought that look at the recent developments, new techniques, results of implementation or comparison with tests. Aspects covered include, but are not limited to: hot gas flow fields, heat transfer, cooling mechanism, integrated models, and injector element dynamics.

Advanced Liquid and Gel Propellants: Papers are sought addressing advanced liquid and gel propellants and the development of supporting technologies such as "green" propellants, fuel management systems and lightweight tankage systems to advance state-of-the-art chemical capabilities.

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

Mission Area III: Liquid Propellant Feed and Pressurization Systems

Co-Chairs: Mr. James L. Cannon, NASA-MSFC/Huntsville

Telephone: (256) 544-7072

Email: james.l.cannon@nasa.gov

Lt. Jacob Robertson, AFRL/Edwards AFB

Telephone: (661) 275-3240

Email: jacob.robertson.1@us.af.mil

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 aspects of design, analysis, code development, component test results, test rig development, diagnostics techniques, and system level testing.

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.

Mission Area IV: Advanced Materials for Liquid Propulsion Applications

Co-Chairs: Mr. Clyde "Chip" Jones, NASA-MSFC/Huntsville

Telephone: (256) 544-2701

Email: chip.jones@nasa.gov

Mr. Jamie B. Malak, AFRL/Edwards AFB

Telephone: (661) 275-5539

Email: jamie.malak@us.af.mil

Material Applications in Liquid Rocket Engines: Papers are sought addressing advanced materials and processing for liquid rocket propulsion systems, including:

- Material technologies resulting in significant thrust-to-weight ratio increases and/or performance advantages over state-of-the-art capabilities
- Lightweight, high-temperature nozzle materials
- Polymer matrix composites (PMCs) for lightweight components and structures
- PMC resin development for high-temperature or cryogenic environments
- Materials for lightweight lines, ducts, valves, and tanks
- Metals, ceramics, and their composites for component applications
- Materials and production methods for lower lifecycle costs
- Near net shape production for components and structures
- Modeling of materials for liquid rocket engines

Materials For Commercial Space Transportation: The recent shift by NASA to commercial space transportation to

the ISS under COTS has created the need for low-cost, high performance material solutions for a new generation of space vehicle engines. Papers are sought addressing areas such as:

- Materials selection criteria
- Material characterization requirements
- Flight qualification standards for materials
- Risk management as related to materials selections

Heavy Lift Launch Vehicles: A need for heavy lift launch vehicles (>100 metric tons payload) has been identified for future space exploration and other missions. Such a launch vehicle will likely require engines in the 1 million pound thrust class as well as smaller upper stage and other liquid-fueled engines. Papers are sought addressing materials and processes for:

- Manufacturing and production of new liquid fueled engines
- Integrated health management for materials and structures
- Lightweight tanks and composite ducts
- Materials for reusable engines
- Concepts for material solutions that optimize the entire propulsion system for improved performance

Nanotechnology For Liquid Propulsion Systems: Application of new nanomaterials to liquid propulsion systems has the potential to greatly increase performance of future engines. Papers are sought to address:

- Nanomaterials and nanoprocessing to improve strength, conductivity, density, modulus, and other properties
- Concepts of how to integrate nanotechnology into future liquid-fueled rocket engines
- Nanotechnology areas that may have high payoffs for liquid rocket engine systems

Materials For Green Fuel Engines: In addition to the traditional hydrogen, hydrocarbon and hypergolic engines, new engines with "green" fuels such as methane and ethanol as well as newer fuels that go beyond the traditional definition of green fuels have been proposed. Little work has been done to address the compatibility of these fuels and their combustion products with current and potential future engine materials. Papers are sought to address:

- Environmental corrosion issues for both the fuels and the combustion products
- Compatibility test methods
- Materials concepts for future green fueled engines
- Concepts for future engines and materials for them

Turbomachinery Materials: Turbomachinery require new materials or coatings to address new engine cycles such as oxygen-rich staged combustion. The chemical and temperature environments will be considerably different than prior

expander or gas-generator cycles. Papers are sought to address potential issues such as:

- Hydrogen and oxygen compatibility
- Testing for oxygen promoted combustion and hydrogen embrittlement
- Development process for new materials
- Criteria for inserting new materials into turbomachinery for hydrogen-, hydrocarbon- and green-fueled engines

Additive Manufacturing: Processing methods using additive manufacturing techniques such as selective laser sintering, electron beam sintering, UV additive manufacturing, microwave additive manufacturing and other three-dimensional rapid prototyping methods offer considerable potential for reduction of times to produce parts, cost savings and increased part complexity. Papers are sought for both the development of techniques and the practical use of additive manufacturing technologies as applied to liquid propulsion applications.

Mission Area V: Special Topic: Engine Health Management (EHM) “Technology Roadmap”

Chair: Mr. James A. Larkin, Aerojet Rocketdyne/West Palm Beach

Telephone: (561) 882-5370

Email: james.larkin@rocket.com

This session will provide an opportunity to play a role in the creation of an Engine Health Management (EHM) “Technology Roadmap”. The focus will be on defining future EHM technology needs and challenges, as well as methods by which to close requirement gaps. The Liquid Propulsion Subcommittee’s EHM Panel will coordinate this effort across academia, Government, and industry. Technical areas include, but are not limited to: Hardware, Software, and Processes. Reusable and expendable systems will be addressed.

Liquid Propulsion Subcommittee Co-Chairs

Dr. Richard K. Cohn, AFRL/Edwards AFB

Telephone: (661) 275-6177

Email: richard.cohn@us.af.mil

Mr. James L. Cannon, NASA-MSFC/Huntsville

Telephone: (256) 544-7072

Email: james.l.cannon@nasa.gov

CPIAC Technical Representative

Mr. Peter Zeender, JHU-CPIAC/Columbia

Telephone: (443) 718-5001

Email: pzeender@cpiac.jhu.edu

SPS MISSION AREAS

The 7th JANNAF Spacecraft Propulsion Subcommittee SPS seeks abstracts on the full array of spacecraft propulsion technology interests including electric propulsion, chemical propulsion, micro-thrust propulsion, solar thermal propulsion, nuclear thermal propulsion, aerocapture, solar sails, tether systems, and technologies for the future.

Topics to highlight:

- Spacecraft power
- Secondary payload manifest requirements
- Advanced monoprops
- Spacecraft modeling and simulation

Mission Area I: Chemical Propulsion

Co-Chairs: Mr. A. Paul Zuttarelli, AFRL/Edwards AFB

Telephone: (661) 275-6786

Email: anthony.zuttarelli@us.af.mil

Dr. Steven J. Schneider, NASA-GRC/ Cleveland

Telephone: (216) 977-7484

Email: steven.j.schneider@nasa.gov

Papers are invited that cover all areas of chemical propulsion; topics of interest are those which address thruster development for state of the art and advanced propellant formulations. Monopropellant, bipropellant, gel, solid, and hybrid chemical propulsion areas are all of interest. Decreased toxicity monopropellant thruster technology development has been of primary interest for spacecraft applications in the last decade. Monopropellant technology is of critical importance to spacecraft operations and principally relies upon catalyst technology. Papers targeting development and validation of catalytic, augmented catalytic and non-catalytic decomposition or ignition means, operational parameters of duty and thermal cycle impacts to response repeatability and useful life, pre-cursor and synthesized material quality control measures, impact of impurities on catalytic performance, and operational conditioning of propellants and decomposition and ignition means such as catalytic reactors are solicited. The relationship of these items on delivered performance and the ability to model and estimate their impacts supports increased resolution mission planning and spacecraft design. Papers addressing additional system configuration concerns such as propellant atomization, dispersion within an ignition means, associated kinetics, and mixing are also of interest.

Papers on decreased toxicity chemical propulsion approaches are solicited that discuss their advantages and disadvantages to ground operations and overall spacecraft delivered performance relative to state of the art alternatives. Increasing community knowledge of the relative impact of forthcoming technologies will support the transition and evolution of these propulsion approaches.

The following topics are of particular interest for sessions supporting spacecraft chemical propulsion:

- Integrated thruster performance
- Catalyst response and life limiting factors
- Alternative catalytic, augmented catalytic, and non-catalytic decomposition and ignition configurations
- Thruster component technologies (valves, seals, catalytic reactor bed plates, catalytic substrate and active materials, chamber materials, advancements to decrease manufacturing expense, mass and power required)
- Propellant (decreased toxicity and state of the art) storage and management
- Propellant formulation, synthesis and quality control
- Propellant hazards and their impact to operations (ground and flight)
- Propellant decomposition and combustion environment impact to materials requirements and duty cycle
- Throttleable and pulsed system delivered performance, architecture considerations relative to state of the art, and optimum mission application

Mission Area II: Electric Propulsion

Co-Chairs: Dr. Hani Kamhawi, NASA-GRC/Cleveland

Telephone: (216) 977-7435

Email: hani.kamhawi-1@nasa.gov

Dr. Daniel L. Brown, AFRL/Edwards AFB

Telephone: (661) 275-5028

Email: daniel.brown.50@us.af.mil

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

- Basic Research and Development of Electric Propulsion Thrusters: This area includes physics of electric propulsion processes, thruster technology development, advanced and breakthrough concepts, high-power electric propulsion, hybrid and dual-mode systems using electric propulsion, laboratory and flight plasma diagnostic techniques, and electric propulsion test facilities.
- Systems Engineering of Electric Propulsion Thrusters: This includes electric propulsion system design, alternate propellant testing, propellant storage and feed systems development, power processing units design and testing, navigation and control systems development, and integrated system testing of electric propulsion sub-systems.
- Electric Propulsion Flight Programs: This includes reporting on ground and flight system operations, space qualification programs, and in-flight programs status.
- Modeling of Electric Propulsion Thrusters, Plume, and Spacecraft Interaction: This includes modeling of the

physics of electric propulsion thrusters, modeling of thruster and spacecraft interactions, development of plume models, and development of models to validate ground and flight measurements and operations.

Mission Area III: Cube / Nano Satellite Propulsion

Co-Chairs: Dr. Juergen Mueller, JPL/Pasadena

Telephone: (818) 354-4755

Email: juergen.mueller@jpl.nasa.gov

Dr. William A. Hargus, Jr., AFRL/Edwards AFB

Telephone: (661) 275-6799

Email: william.hargus@us.af.mil

Papers are invited to discuss micro-propulsion and propulsion options for CubeSATS, NanoSATS, and other small satellites. Applications, concepts, and designs for propulsion systems or components in small satellites are of interest. Of particular interest are papers on components such as valves, tankage, propellant feed parts, and power conditioning for micro-propulsion applications. Other areas of interest include:

- Micro-propulsion
- Nano-propulsion
- Micro-thrust devices
- Cube satellite applications
- Micro satellite applications
- Nano-satellite applications
- Cube/Micro/Nano satellite propulsion systems
- Small component development and design for small propulsion applications
- Power conditioning for micro-EP applications
- System-level integration studies
- Mission design studies
- Nano-satellite applications

Mission Area IV: Propellantless Propulsion Systems

Chair: Mr. Matthew Gasch, NASA-ARC/Moffett Field

Telephone: (650) 604-5377

Email: matthew.j.gasch@nasa.gov

Emphasis is on solar sail propulsion, electrodynamic and momentum exchange tether propulsion, aerocapture and other innovative technologies that use the natural environments of space to derive propulsion without the expenditure of conventional fuel. Atmospheric entry and thermal protection systems are also of interest.

- Review or summary of previous flight experiments
- Planned and/or funded missions
- Near-term mission concepts
- Advanced mission concepts
- Innovative system or subsystem designs

- Guidance, navigation and control
- Space environmental effects
- Atmospheric entry systems
- Development, characterization, modeling and testing of TPS materials

Mission Area V: Nuclear / Solar Thermal Propulsion / Technologies for the Future

Co-Chairs: Dr. Marcus P. Young, AFRL/Edwards AFB

Telephone: (661) 275-5624

Email: marcus.young.4@us.af.mil

Dr. Kurt A. Polzin, NASA-MSFC/Huntsville

Telephone: (256) 544-5513

Email: kurt.a.polzin@nasa.gov

Mr. Wayne J. Bordelon, NASA-MSFC/Huntsville

Telephone: (256) 544-1579

Email: 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

Key focus areas of Solar Thermal Propulsion are engines and concentrators with specific interest in the following topics:

- Engine concepts (thermal storage, direct gain, bimodal, volumetric, etc.)
- Engine support structures, insulation techniques, and materials
- Inflatable, deployable or rigidizing and secondary concentrators
- 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.

Sessions 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 including conventional magnetic schemes, inertial fusion schemes, inertial electrostatic confinement, magnetically insulated inertial fusion, fission-fusion hybrid systems, and concepts that utilize fusion reaction directly or indirectly.
- High-energy fuels
- Use of antimatter in propulsion systems
- Laser or microwave propulsion
- Mass drivers

Mission Area VI: Program and Mission Application Overviews, and Technology Infusion Challenges

Chair: TBD

Telephone:

Email:

This mission area is intended to raise awareness of NASA and DOD propulsion technology development programs, relevant mission and flight applications, related technologies, and the challenges and issues of infusing new technologies in future missions. New technologies face significant barriers to adoption onto spaceflight systems. Uncertainty and disagreement regarding the maturity level of new technologies, as well as the requisite maturity necessary for integration into existing systems is a pervasive issue in the spacecraft community. There are also the challenges of risk perception and its impact on technology development and transition efforts.

Specifically, papers are solicited that discuss technology development programs, technology infusion barriers, and how to overcome them, from a multitude of perspectives: technology provider, spacecraft builder, mission manager, and principle investigator. Technologies can include any SPS related technology or system, flight instrumentation, spacecraft power, avionics, GN&C, or structural systems. Issues to be covered include, but are not limited to, flight opportunities, integration issues, first flight, operational complications, testing and qualification, and cost determination.

Technology Development Programs, Related Technologies, and Infusion Challenges

- Program and Mission Overviews
- Spacecraft Power

- Technology Infusion Challenges
- Spacecraft Modeling and Simulation

Mission Applications and Flight Programs

- Mission design and analysis for LEO, GEO, orbit transfer, planetary, and interplanetary applications
- Ground and flight system operations
- Space qualification programs
- Flight programs
- Ground testing and facilities
- Propulsion applications (nano and micro satellites, high-power electric propulsion, primary propulsion versus station keeping, non-propulsive applications for electric and chemical propulsion, etc.

Mission Area VII: Special Topic: Spacecraft Modeling and Simulation

Chair: Dr. Justin Koo, AFRL, Edwards AFB
 Telephone: (661) 275-5908
 Email: justin.koo@us.af.mil

Virtually all the mission areas represented at JANNAF SPS have some Modeling and Simulation (M&S) activity as an essential, yet underrepresented, component of successful technology development. We strongly encourage prospective authors to develop separate M&S papers, in addition to mission area specific papers, so that knowledge of the unique and promising computational aspect of SPS can be disseminated throughout the community. These include computational models for physical behavior, innovative numerical methods, development of robust computational validation techniques and exploitation of novel hardware configurations. Topics of particular interest to the organizing committee are those supporting: catalyst development; electromagnetic and electrostatic thruster development; prediction of plume signatures and spacecraft/plume interaction behavior.

Spacecraft Propulsion Subcommittee Chair

Dr. Daniel L. Brown, AFRL/Edwards AFB
 Telephone: (661) 275-5028
 Email: daniel.brown.50@us.af.mil

Spacecraft Propulsion Subcommittee Deputy Chair

Mr. David T. Jacobson, NASA-GRC/Cleveland
 Telephone: (216) 433-3691
 Email: david.t.jacobson@nasa.gov

CPIAC Technical Representative

Mr. David Owen, JHU-CPIAC/Columbia
 Telephone: (443) 718-5006
 Email: dowen@cpiac.jhu.edu

WORKSHOPS/SPECIALIST SESSIONS

Workshops

The JANNAF Workshop is reserved for bringing the community together to address a specific task or problem, the outcome of which is important and substantial enough to warrant the publication of a final report detailing the discussions, conclusions, and recommendations that resulted from the workshop. The workshop final report and accompanying presentations will be published separately from the JANNAF meeting proceedings.

Requirements for JANNAF workshops and established best practices can be found in the [Guide for JANNAF Workshop Chairs](#); this document will guide you through the planning and approval process for workshops held at a JANNAF meeting.

To request a workshop you must submit a [Workshop Request Form](#) to your CPIAC Technical Liaison or Shelley Cohen at scohen@cpiac.jhu.edu. This form must be submitted to CPIAC by **Friday, 13 February 2015**. The agenda and invitation list is due **Monday, 16 March 2015**, and must be approved no later than **Monday, 20 April 2015** for inclusion in the final program.

Specialist Sessions

A JANNAF Specialist Session is an opportunity for experts in a specific technical area to meet to stimulate ideas and contributions from the audience. These sessions are dedicated to a single topic and often include invited presentations. The organization of these sessions is similar to a regular JANNAF paper session with time allocated to individual presentations; however, specialist sessions often include moderator-led discussion periods or a question and answer session with expert panelists. Unlike a regular JANNAF paper session, the presentations from Specialist Sessions are published as part of the meeting proceedings; this can include an executive summary authored by the session chair if desired.

To request a Specialist Session for this JANNAF meeting, a [Specialist Session Request Form](#) must be submitted to CPIAC. This form requires a statement of justification for the Specialist Session as well as a well thought out agenda. Requests will be reviewed by the designated JANNAF subcommittee TSG chair and CPIAC for approval; this approval is necessary for any Specialist Session to be included in the final program. A Specialist Session within a JANNAF joint subcommittee meeting is scheduled as a regular technical session.

The deadline for submission of a Specialist Session request is **13 February 2015**. If you have any questions about planning a Specialist Session please contact your CPIAC Technical Liaison or Shelley Cohen at scohen@cpiac.jhu.edu.

JANNAF AWARDS PROGRAM

In the tradition of recognizing the outstanding achievements of the propulsion community, the JANNAF Executive Committee and the Modeling and Simulation (MSS), Liquid Propulsion (LPS) and Spacecraft Propulsion (SPS) subcommittees are soliciting nominations for awards to be presented at the meeting. An EC Award is justified if the achievement or service is in a technical area that is not covered by an existing subcommittee, or is of such scope or magnitude that merits this recognition.

Special Recognition Awards

The Special Recognition awards for Sustained Contribution and Lifetime Achievement honor individual achievements, either in the last 18 months or for a lifetime of dedicated service. These awards are the most prestigious subcommittee awards and reflect on the awardees contributions to JANNAF.

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

- 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.

Outstanding Achievement Award

The Outstanding Achievement Award is given for the most outstanding technical achievement in the subcommittee's area by an individual, by a team within an organization, or by a team of organizations. To recognize the varied nature of the JANNAF subcommittees and the accomplishments of their communities, nominations may be solicited and given in the two focus areas of R&D Technology and Operational Systems.

The achievement shall have been accomplished in the previous 18 months. The nominees must work have worked for the organization during the same 18-month period of performance.

The award recipients(s) must be able to attend the meeting to receive the award.

Certificate of Commendation

The Certificate of Commendation is given to recognize an individual whose contributions within the last 18 months have been pivotal in ensuring the success of a JANNAF activity.

Certificate of Appreciation

The Certificate of Appreciation is given to recognize individuals for outstanding contributions and dedicated service to JANNAF.

Nominations

To nominate an individual for one of the above awards please use the "[JANNAF Executive Committee and Subcommittee Award Nomination Form](#)." Nomination submissions should include the following:

- 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 or MS Word) via Email.
- Supporting data (if desired) of no more than 10 pages.
- Supporting curriculum vitae, list of publications, and/or professional activities as required to support the nomination.
- Contact information for the nominee(s) and the nominator, including organization affiliation, phone number, and Email address.

Nominations should be submitted to the appropriate CPIAC technical representative no later than **Monday, 30 March 2015**.

Best Paper Awards

In addition to the nomination awards listed above JANNAF recognizes authors of papers that exhibit excellence and significant merit with the Best Paper Awards. Best Paper Awards will be given at the next JANNAF Subcommittee meeting.

Best Student Paper Awards

The Best Student Paper Award will be given to undergraduate or graduate students who author papers that exhibit excellence and significant merit. One paper will be selected to receive the Best Student Paper Award. All student-authored works will automatically be included in the initial round of consideration with the submission of an abstract; in order to facilitate identification of student-authored works please ensure to clearly state on your abstract that you wish to be considered for the Best Student Paper Award or contact the appropriate CPIAC technical representative.

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 given on page 2. 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.

Student papers will be reviewed upon submission of their cleared manuscripts, in order to be considered for the student best paper selection, the completed paper must be provided to CPIAC by **30 March 2015**. The Best Student Paper Award will be presented at the JANNAF meeting at which the paper is given.

UPCOMING JANNAF MEETINGS

62nd JANNAF Propulsion Meeting / 10th Modeling and Simulation / 8th Liquid Propulsion / 7th Spacecraft Propulsion Joint Subcommittee Meeting

1 - 5 June 2015
Nashville, Tennessee

43rd Structural and Mechanical Behavior / 39th Propellant and Explosives Development and Characterization / 30th Rocket Nozzle Technology / 28th Safety and Environmental Protection Joint Subcommittee Meeting

December 2015
Location TBD