

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

43rd Structures and Mechanical Behavior (SMBS)

39th Propellant and Explosives Development and
Characterization (PEDCS)

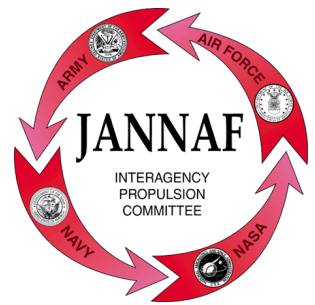
30th Rocket Nozzle Technology (RNTS)

28th Safety and Environmental Protection (SEPS)

JOINT SUBCOMMITTEE MEETING

7 - 11 December 2015

Announcement and Call For Papers



**Abstract Deadline Extended
6 July 2015**

Location to be announced

Last updated 15 June 2015

The December 2015 meeting of the Joint Army-Navy-NASA-Air Force (JANNAF) will consist of the Joint Meeting of the Structures and Mechanical Behavior, Propellant and Explosives Development and Characterization, Rocket Nozzle Technology, and Safety and Environmental Protection Subcommittees. This meeting will be held **Monday through Friday, 7 - 11 December 2015**, at a location to be announced.

ATTENDANCE

The overall security level of the meeting is Unclassified. All sessions will be held at a hotel located in the selected city, to be announced.

Attendance is restricted to **U.S. citizens qualified to receive unclassified, limited-distribution information**. To qualify, the attendee must be employed by a U.S. Government facility, or with a U.S. Government contractor facility, or have a U.S. Government sponsor. *No foreign nationals will be permitted to attend.*

To register, you must have a JANNAF Secure Portal account. Please visit the [Registration](#) page of the meeting website for additional information and important links. *All presenters do need to register and pay the registration fee.*

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

PURPOSE

The JANNAF Interagency Propulsion Committee focuses on the technology, development, and production capabilities for all types of propulsion systems and energetics for tactical, strategic and missile defense rockets and missiles, for space boost and orbit transfer, for in-space propulsion, and for gun systems. JANNAF provides a forum for discussion of propulsion issues, challenges, and opportunities across the Military Departments, Defense Agencies and NASA. JANNAF subcommittees focus their resources on technical issues of interest to the JANNAF agencies.

Work in all areas of DoD and NASA are solicited as defined below:

6.1 Basic Research:

Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products.

6.2 Applied Research:

Systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

6.3 Development:

Systematic application of knowledge toward the production of useful materials, devices, and systems or methods, including

design, development, and improvement of prototypes and new processes to meet specific requirements.

JANNAF accepts papers that are unclassified/unlimited and unclassified/limited for all meetings; and up to classified Secret as announced in the specific meeting's announcement and call for papers.

SCOPE

Structures and Mechanical Behavior Subcommittee

The SMBS addresses the development, application, and verification of experimental, analytical, and statistical techniques required in the preliminary or detailed structural design of solid propellant rocket motors and gun ammunition, the assessment of their structural integrity, and the prediction of their service life based on structural or chemical aging mechanisms.

Propellant and Explosives Development and Characterization Subcommittee

The scope of PEDCS comprises work and issues associated with propellants, explosives, and other energetic formulations used in the development, manufacture, performance, and operation of weapons, propulsion systems, and gas generator devices. This subcommittee covers the technology areas required to develop, manufacture, and characterize propellants and ingredients. The manufacturing technologies of interest include mixing procedures, sampling and quality control, safety and handling practices, and the design and operation of mixing equipment. The characterization tests involve classical wet chemistry, instrumental analysis, chemical stability, compatibility, and calorimetric measurements.

Rocket Nozzle Technology Subcommittee

The RNTS focuses on the application of advanced composite materials, including carbon-carbon, ceramic matrix, and carbon phenolic composites, and other advanced materials, as applied to solid rocket nozzles and their components, nozzle-based propulsion control systems; and related technology developments for liquid and electric propulsion.

Safety and Environmental Protection Subcommittee

SEPS sessions will cover chemical propulsion safety and environmental protection issues such as space launch range safety; risk assessments of rocket propellants, explosives and pyrotechnics; environmental and health effects of propellants and explosive compounds, precursors, combustion products, wastes, etc.; packaging, storage and transportability; propellant handling and use; demilitarization, disposal, and reclamation of energetic materials; emergency management activities; explosives safety aspects of propellants and related energetic materials; and manufacturing/processing hazards of energetic materials.

MISSION AREAS/SPECIALIST SESSIONS

Mission areas within each subcommittee, as well as specialist sessions, are outlined on pages 6 - 12. 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 CADRE Technical Staff member in their respective subcommittee with suggestions for topics by **22 June 2015**. See page 13 for additional information and requirements.

AWARDS

Nominations for SMBS, PEDCS, SEPS, and RNTS recognition awards are being solicited. Individuals interested in nominating an award recipient should follow the guidelines and instructions on page 13-14.

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 [December meeting website](#).
- The submission of an abstract represents an agreement to submit a final paper for publication by 9 November 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 [December 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 and begin the process early in an effort to meet the abstract deadline date.**

- Remember, ***you must be a U.S. Citizen to attend and present at this meeting.*** No foreign nationals are permitted to attend.
- The **extended deadline** date for submission of completed Abstract Submittal Forms to CADRE is **6 July 2015**.

CADRE accepts only **electronic submission** of abstracts and papers. **Abstracts must be submitted on the [Abstract Submittal Form](#):**

- Via email to: scohen@cadre.jhu.edu; (*Distribution A only*); **OR**
- Uploaded to CADRE's secure server as follows:
 1. Go to <https://webdatabase.cpia.jhu.edu/docorg/program/cgi-bin/Login.pl>
 2. Choose Infobase: JANNAF Mtg Abstract Uploads
 3. Type in User Name: Abstract
 4. Type in Password [contact CADRE (410) 992-7302 or 7300 for current password].
 5. Click the "Login" button.
 7. Click on "December 2015 JANNAF Meeting"; choose "Add Document" (to the left of the page)
 8. 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".
 9. Email scohen@cadre.jhu.edu to notify that the file has been successfully uploaded.

Remember, the deadline to submit completed [Abstract Submittal Forms](#) is **22 June 2015.**

AUTHOR TIMELINE

Date	Weeks before Meeting	Action
6 July 2015	22	Deadline for receipt of Abstract Submittal Form .
10 August 2015	17	Acceptance/rejection letters sent to authors.
31 August 2015	14	Deadline for changes to meeting invitation and preliminary program
14 September 2015	12	Invitation, preliminary program, and registration materials forwarded to propulsion community.
5 October 2015	9	Deadline for award nominations.
26 October 2015	6	Deadline for submission of changes to the final program.
9 November 2015	4	Deadline for receipt of manuscripts and paper/presentation clearance forms. Papers not received by this date may be removed from the program.
16 November 2015	3	Anticipated deadline for reservations at host hotel.
23 November 2015	2	Deadline for reduced registration fee. Deadline for completion of Registration Questionnaire.
23 November 2015	2	Deadline for receipt of presentations.
7 December 2015	0	SMBS/PEDCS/RNTS/SEPS Joint Subcommittee Meeting

HOTEL INFORMATION

The selected hotel will be announced here and on the meeting website once the meeting location has been finalized. A discounted room rate will be made available to JANNAF meeting attendees.

SUBCOMMITTEES / MISSION AREAS AT THIS MEETING

Mission Area	SMBS	PEDCS	RNTS	SEPS
I	Service Life / Missile Sustainment	Liquid Propellants	Nozzle Thermal, Structural, Fluids Analysis and Modeling	Toxicology
II	Materials Properties and Characterization	Explosive Formulation	Nozzle Design, Test and Evaluation	Atmospheric Dispersion Modeling and Hazards Assessment
III	Structural Analysis and Design	Propellant and Explosives Process Engineering	Thrust Control	Instrumentation
IV	Experimental Structural and Mechanical Analysis and Test Methods	Solid Propellant Chemistry Test Methods	Innovative Nozzle Materials	Environmental
V	Nondestructive Evaluation	Solid Propellant Ingredients and Formulations	Damage Tolerance / Fracture for Non-Metallic Materials [Joint Mission Area with SMBS]	Industrial Hygiene
VI	Damage Tolerance / Fracture for Non-Metallic Materials [Joint Mission Area with RNTS]	Propellant and Explosive Surveillance and Aging		Range Safety and Explosives Safety
VII		Gun Propulsion Component Formulation and Development		Environmental, Safety and Occupational Health of Insensitive Munitions
VIII		Green Energetic Materials (GEM) Joint PEDCS - SEPS Mission Area		Green Energetic Materials (GEM) Joint PEDCS - SEPS Mission Area
IX				Demilitarization, Reclamation, and Reuse Technologies
X				Review of Accidents and Incidents

SMBS MISSION AREAS

The 43rd Structures and Mechanical Behavior Subcommittee sessions relate to the structures and materials comprising propulsion systems, including composite structures. Papers are solicited on developing, applying, and verifying techniques for preliminary or detailed structural design of propulsion units (rocket motors, liquid- or gel-fueled engines and gun propulsion) and related composite structures, for assessing their structural integrity and reliability, and for predicting their service life. Additional information concerning these areas or the topics being solicited should be directed to the appropriate Area Chair. Specific areas of interest are listed below.

Mission Area I: Service Life / Missile Sustainment

Chair: Dr. Kara D. Lormand, Aerojet Rocketdyne/
Sacramento, CA

Telephone: (916) 355-2680

Email: kara.lormand@rocket.com

Methodology for service life prediction and assessment.

- Aging systems - surveillance, service life prediction, extension
- Factors which limit the service life of propulsion systems and propellants, such as chemical/structural aging, changes in binder/filler interaction, crystallization, migration/diffusion of ingredients or moisture
- Development approaches for improving service life of solid rocket motors and liquid rocket components
- Motor monitoring - NDE methodologies applicable to service life evaluation
- Factors which limit service life of structural sub-components (nozzles, cases, igniters, combustion chambers, tanks, etc)
- Hazards related to service life and aging

Mission Area II: Materials Properties and Characterization

Co-Chairs: Dr. Soe T. (Tom) Bhe, Aerojet Rocketdyne/
Sacramento, CA

Telephone: (916) 355-4159

Email: soe.bhe@rocket.com

Mr. David J. Braithwaite, Orbital ATK/Brigham
City, UT

Telephone: (435) 863-6904

Email: david.braithwaite@orbitalatk.com

New developments or application experiences related to mechanical properties and characterization.

- Effects of propellant formulation on gun tube wear and erosion (GTWE)

- Fundamental molecular modeling related to gun tube wear and erosion
- New and/or improved test methods for evaluating materials used in liquid engine components or liquid engine propellant tanks
- New and/or improved test methods for evaluating propellant and case or component construction materials mechanical properties including tensile, shear, friability, dilatation and bulk, fracture, microstructure, aging, propellant/case bond, etc.
- New and/or improved approaches to material properties optimization during solid rocket motor or gun propellant development
- Advancements in test equipment and procedures, test instrumentation, data acquisition and processing techniques, and data reduction and analysis
- Test specimen preparation techniques and dynamic characterization
- Mechanical properties related to propulsion systems hazards, e.g., material characterization under impact loads or high loading rates

Mission Area III: Structural Analysis and Design

Chair: Dr. Brian C. Liechty, Orbital ATK/Brigham City, UT

Telephone: (435) 863-3459

Email: brian.liechty@orbitalatk.com

Evaluation and validation of structural analysis methods applicable to initial design, structural integrity, and service life prediction of propulsion systems.

- Advancements in the state-of-the-art in structural analysis, particularly in nonlinear viscoelastic analysis and incorporation of nonlinear constitutive behavior
- Cumulative damage, failure criteria, and thermal and moisture diffusion analysis are included in these areas
- Structural reliability analyses and analysis of nondestructive evaluation results relative to structural reliability are two areas of particular interest
- Approaches to incorporating the results of NDE in a structural analysis code and methods of evaluating the effects of defects on structural integrity are of particular interest
- Applications of nonlinear elastic-plastic analysis to design of metal components, such as cases and pressure vessels
- A priori predictive modeling methods for gun tube wear and erosion
- Application of structural analysis methods to health-monitoring sensors, including sensor design, influence of sensors on motor integrity, and interpretation and application of sensor data

Mission Area IV: Experimental Structural and Mechanical Analysis and Test Methods

Chair: Mr. Gary L. Biggs, NSWC/Indian Head, MD
Telephone: (301) 744-1449
Email: gary.biggs@navy.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: Nondestructive Evaluation

Chair: Mr. Scott H. McClain, ARDEC/Picatinny Arsenal, NJ
Telephone: (973) 724-8428
Email: scott.mcclain3.civ@mail.mil

Nondestructive evaluation and inspection techniques to solid propellant rocket motors, liquid or gel engines, and gun propulsion systems and components.

- Application of NDE techniques during any portion of the life cycle of the propulsion components
- Application of NDE technology and methods for enhancing propulsion system and/or subcomponent quality and reliability
- Use of NDE methods during the propulsion system life cycle from manufacturing to acceptance (buy-off)
- The monitoring and control of manufacturing processes
- Automated NDE sensing systems for quality control and conformance testing
- Use of embedded sensing system (including Micro-Electromechanical Systems – MEMS) for performance testing
- NDE methods used during static test
- NDE standards for system or component acceptance

- NDE methods for health management
- Role of NDE in service life assessment and extension
- Evaluation of propulsion system aging characteristics
- The post-acceptance evaluation of grain integrity, inert materials aging, chemical attack and migration, corrosion, and environmental storage effects
- Use of NDE technologies in strategic sustainment
- Advanced NDE systems and technologies, including but not limited to, real-time radiography, digital ultrasonics, holography, shearography, computed tomography, acoustic emission, electro-optic fiber embedments, thermography, lasers, and advanced digital image analysis techniques
- Emerging NDE technologies and their potential application to the propulsion community

Mission Area VI: Damage Tolerance / Fracture for Non-Metallic Materials [Joint Mission Area with RNTS]

Chair: Dr. David E. Richardson, Orbital ATK/Brigham City, UT
Telephone: (435) 863-6995
Email: david.richardson@orbitalatk.com

This mission area will focus on experimental and modeling studies into damage tolerance and/or fracture pertaining to non-metallic materials which can be used on space systems such as rocket motors or re-entry vehicles. Examples of areas of research could include investigation into fracture behavior of propellants, liners, insulation, adhesives, nozzle ablative liners, re-entry insulators, etc. Emphasis will be placed on material characterization of flaw behavior and analytical methods used to simulate these behaviors. Areas of study would include into propagation, arrest, and fatigue and related topics. Current and historical investigations into anomalies and failures as related to damage tolerance and fracture will also be addressed.

Structures and Mechanical Behavior Subcommittee Chair

Dr. Timothy C. Miller, AFRL/Edwards AFB
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Email: timothy.miller.26@us.af.mil

Structures and Mechanical Behavior Subcommittee Deputy Chair

Dr. Jeremy R. Rice, AMRDEC/Redstone Arsenal, AL
Telephone: (256) 876-6077
Email: jeremy.r.rice4.civ@mail.mil

CADRE Technical Representative

Mr. David B. Owen, JHU-CADRE/Columbia, MD
Telephone: (443) 718-5006
Email: dowen@cadre.jhu.edu

PEDCS MISSION AREAS

The 39th Propellant and Explosives Development and Characterization Subcommittee sessions will be organized into the topic areas described below. Please submit your abstract according to the interest area.

Mission Area I: Liquid Propellants

Chair: Dr. Benjamin Greene, Jacobs Technology, Incorporated/Las Cruces, NM

Telephone: (575) 524-5761

Email: benjamin.greene-1@nasa.gov

Papers are sought on:

- Research, development, and improvement of methods of analysis of liquid propellants
- Development and characterization of new and existing liquid engine and gun propellants
- Assessment of materials compatibility and reactivity with various propellants including hydrazine fuels, dinitrogen tetroxide oxidizers, gels, ionic and other monopropellants, and liquid gun propellants
- Evaluation of liquid propellant supply status and qualification of new or alternate suppliers

Mission Area II: Explosive Formulation

Chair: Dr. Mark H. Mason, Jr., NAWCWD/China Lake

Telephone: (760) 939-4330

Email: mark.h.mason@navy.mil

Development, characterization and testing of explosive and reactive material formulations; relationship of composition to sensitivity, metal acceleration, air-blast performance, mechanical properties, and initiation; phenomenology of non-ideal explosives, influence of ingredients, non-energetic components and additives, on composite explosive materials. Abstracts are especially sought in the following areas:

- The use of resonance mixing to produce plastic bonded explosives
- The characterization of large critical diameter explosives
- Initiation and growth in non-ideal explosives
- Advances with CL-20
- Formulation and Characterization of Thermally Robust Explosives

Mission Area III: Propellant and Explosives Process Engineering

Co-Chairs: Dr. Jamie B. Neidert, ARDEC/Redstone Arsenal, AL

Telephone: (256) 876-5455

Email: jamie.neidert@us.army.mil

Mr. Richard S. Muscato, NSWC/Indian Head, MD

Telephone: (301) 744-2585

Email: richard.muscato@navy.mil

Papers are sought in the areas of propellant and energetic formulation development and processing technology. Additional areas of interest include the measurement and characterization of rheological properties such as viscosity, yield stress, pot life/gelation time, cure rate, and viscoelasticity and their effect on properties such as processability, ballistics, and mechanical behavior. Of particular interest are the continuous processing of energetic materials and lessons-learned in propellants and explosives manufacture.

Mission Area IV: Solid Propellant Chemistry Test Methods

Chair: Dr. James G. Carver, AMRDEC/ Redstone Arsenal, AL

Telephone: (256) 876-2323

Email: james.g.carver2.civ@mail.mil

Methods to analyze and characterize solid propellants; especially propellants that contain new ingredients; modifications of current test methods or alternate procedures that minimize/eliminate the use of ozone depleting solvents or other organic chemicals; statistics of sample selection; techniques of sample preparation; methods development on a Microcal instrument for explosives, gun propellant, and rocket propellant; and related subjects.

Mission Area V: Solid Propellant Ingredients and Formulations

Chair: Dr. Gregory W. Drake, AMRDEC/Redstone Arsenal, AL

Telephone: (256) 842-0647

Email: gregory.w.drake.civ@mail.mil

Identification of advances and challenges in the area of solid propellant ingredients and formulations with emphasis on ingredient synthesis and production, industrial base and supplier status, chemical and physical characteristics (including reactivity), and recovery, reuse, and disposal of ingredients as well as the qualification and use of new and novel ingredients in propellant formulations.

Mission Area VI: Propellant and Explosive Surveillance and Aging

Co-Chairs: Dr. Kerry A. Clark, NAVSEA/Indian Head, MD
Telephone: (301) 744-1207
Email: kerry.a.clark@navy.mil

Dr. Heather F. Hayden, NSWC/Indian Head, MD
Telephone: (301) 744-1730
Email: heather.f.hayden@navy.mil

Papers are sought on analysis techniques for the determination of the chemical aging behavior and safe storage of solid propellants. Of particular interest are the decomposition of solid propellants that contain nitrate esters and the autoignition risk that may result from their degradation.

Mission Area VII: Gun Propulsion Component Formulation and Development

Co-Chairs: Dr. Pamela J. Kaste, ARL/Aberdeen Proving Ground, MD
Telephone: (410) 306-0749
Email: pamela.j.kaste.civ@mail.mil

Ms. Christine D. Knott, NSWC/Indian Head, MD
Telephone: (301) 744-2555
Email: christine.knott@navy.mil

Research in the areas of formulation and processing of propellants and associated components (igniters, case and packaging materials, etc.) for use in gun propulsion. This can include new compositions, new ingredient development, novel geometries and structures, propellant development protocols, performance diagnostics, aging and shelf life, increased performance, reduced wear and erosion, as well as insensitive munitions response.

Mission Area VIII: Green Energetic Materials (GEM) Joint PEDCS - SEPS Mission Area

Co-Chairs: Mr. Noah Lieb, Jensen Hughes/Baltimore, MD
Telephone: (410) 737-8677
Email: nlieb@jensenhughes.com

Dr. Jesse J. Sabatini, ARL/Aberdeen Proving Ground, MD
Telephone: (410) 278-0235
Email: jesse.j.sabatini.civ@mail.mil

Papers are sought on the development of environmentally sustainable energetic ingredients, formulations, and processing technologies with an emphasis on the following: Reduction of impacts from energetic materials and unexploded ordnance on

military ranges, manufacturing and demilitarization facilities; Enhancement of recycling, recovery, reuse and reduction of waste; and Response to specific impacts that environmental regulations have had on military readiness, such as limiting training with live ordnance, outsourcing of manufacturing overseas or explicit banning of the use of specific materials.

Propellant and Explosives Development and Characterization Subcommittee Chair

Mr. Paul F. Jones, AFRL/Edwards AFB, CA
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Propellant and Explosives Development and Characterization Subcommittee Deputy Chair

Dr. Mark H. Mason, Jr., NAWCWD/China Lake, CA
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CADRE Technical Representative

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RNTS MISSION AREAS

The 30th Rocket Nozzle Technology Subcommittee sessions will focus on materials, processing, testing, evaluation, design, analysis, and other topics of interest in the rocket nozzle technology area. Additional information concerning these areas or the topics being solicited should be directed to the appropriate Area Chair. Papers are sought in the specific areas listed below.

Mission Area I: Nozzle Thermal, Structural, Fluids Analysis and Modeling

Chair: Mr. J. Louie Clayton, NASA-MSFC/Huntsville, AL
Telephone: (256) 544-2322
Email: jeppy.l.clayton@nasa.gov

Suggested topics for papers in this session:

- Advances in Charring Material Ablator (CMA) style modeling of nozzle composite materials
- Advances in CFD modeling of nozzle heat and mass transfer processes
- Advances in structural composite materials modeling and failure criteria
- Coupled thermo-structural modeling of heated composites using explicit methods

- Coupled fluid-thermal surface ablation modeling with two-phase surface interaction
- Porous media, pyrolysis gas, and pore pressure modeling
- Semi-empirical laboratory methods used for gathering of heated composite property data

Mission Area II: Nozzle Design, Test and Evaluation

Chair: Mr. Clyde E. Carr, Jr., Orbital ATK/Elkton, MD

Telephone: (410) 392-1877

Email: clyde.carr@orbitalatk.com

- Nozzle design, test, and evaluation areas of interest include Evaluation - Health monitoring for material aging and material characterization
- Nozzle Design 'lessons learned'
- Test - performance based acceptance test/post-test evaluation and new, improved test methods
- New materials characterization and fabrication, including constituent/composite material behavior throughout all phases of processing
- In-process characterization techniques and instrumentation
- Assessment of the state-of-the-art, vision of the future, and research/development paths is requested

Papers addressing qualitative and quantitative goals relevant to technical, and system level challenges are specifically sought. Discussion of new technologies/materials and future expectations is also invited.

Mission Area III: Thrust Control

Chair: Ms. Susan L. Burroughs, AMRDEC/Redstone Arsenal, AL

Telephone: (256) 876-9928

Email: susan.burroughs@us.army.mil

Specific topics of interest include nozzle designs that use active or passive control to achieve thrust control; weight, volume, size, and cost reduction techniques; component and system modeling and analysis, to include system performance benefits of thrust management control or thrust vector control; control techniques, to include control systems, control algorithms, actuation methods or mechanisms; thrust management control via pulsing, and motor extinguishment and re-ignition; pintle controlled nozzles; VAN (variable area nozzle) designs; nozzle designs that incorporate thrust vector control (exclusive of jet vane systems) as well as thrust level control; developments in jet vane/tab, moveable nozzle, hot gas valve, probe, fluid injection, or any other standard or novel TVC technologies; TVC applications of micro-electromechanical systems (MEMS); and component and system test results.

Mission Area IV: Innovative Nozzle Materials

Chair: Mr. Matthew L. Shewmaker, NAWCWD/China Lake, CA

Telephone: (760) 939-7435

Email: matthew.shewmaker@navy.mil

Specific topics of interest include new/innovative materials addressing the following area(s) for aluminized, reduced-smoke or minimum-smoke solid rocket motors:

- Lightweight and high temperature capability components
- Low erosion materials for use as liners or monolithic components
- Structural insulators
- Manufacturing techniques
- Reduced cost for advanced/high temperature materials

Mission Area V: Damage Tolerance / Fracture for Non-Metallic Materials [Joint Mission Area with SMBS]

Chair: Dr. David E. Richardson, Orbital ATK/Brigham City, UT

Telephone: (435) 863-1358

Email: david.richardson@orbitalatk.com

This mission area will focus on experimental and modeling studies into damage tolerance and/or fracture pertaining to non-metallic materials which can be used on space systems such as rocket motors or re-entry vehicles. Examples of areas of research could include investigation into fracture behavior of propellants, liners, insulation, adhesives, nozzle ablative liners, re-entry insulators, etc. Emphasis will be placed on material characterization of flaw behavior and analytical methods used to simulate these behaviors. Areas of study would include propagation, arrest, and fatigue and related topics. Current and historical investigations into anomalies and failures as related to damage tolerance and fracture will also be addressed.

Rocket Nozzle Technology Subcommittee Chair

Mr. J. Robert Esslinger, AMRDEC/Redstone Arsenal, AL

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CADRE Technical Representative

Mr. David B. Owen, JHU-CADRE/Columbia, MD

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Email: dowen@cadre.jhu.edu

SEPS MISSION AREAS

The 28th Safety and Environmental Protection Subcommittee sessions will be organized into the topic areas described below. Please submit your abstract according to the interest area. Topics to highlight:

Mission Area I: Toxicology

Co-Chairs: Dr. David R. Mattie, AFRL, 711HPW/Wright-Patterson AFB, OH

Telephone: (937) 904-9569

Email: david.mattie@us.af.mil

Dr. Mark S. Johnson, Army Public Health Command/Aberdeen Proving Ground, MD

Telephone: (410) 436-5081

Email: mark.s.johnson@us.army.mil

Toxicology of propellants, propellant ingredients, propellant combustion products, and related subjects. Also of interest are the use of risk assessment methodologies in the management of toxic hazards and the rationale for the establishment of toxic material exposure criteria for the workplace and the environment.

Mission Area II: Atmospheric Dispersion Modeling and Hazards Assessment

Chair: Mr. Daniel E. Strub, 30th Space Wing/Vandenberg AFB, CA

Telephone: (805) 605-2407

Email: daniel.strub@us.af.mil

Atmospheric dispersion modeling and hazards assessment applied to propulsion activities. Subjects of interest include modeling transport and diffusion of propellant spills including both dense and trace gases, chemically reactive species, and aerosols; wind flow and dispersion modeling in complex terrain; model validation; source modeling; ozone depletion, ground cloud dispersal, and acid rain from launch vehicles; and models for emergency response systems. Experimental or theoretical work on other atmospheric hazards such as thunderstorms, lightning, wind shear, and precipitation are also welcome.

Mission Area III: Instrumentation

Chair: Dr. Karen L. Mummy, Naval Medical Research Unit - Dayton/Wright-Patterson AFB, OH

Telephone: (937) 904-9474

Email: karen.mummy@us.af.mil

Instrumentation requirements, basic research, and hardware development of equipment used to measure hazardous environments. Presentations regarding work done in the

measurement of hypergolic or other hazardous propellant vapors, oxygen/hydrogen propellant vapors, hydrochloric acid and other propellant combustion products, and other chemical hazards of interest to the propulsion community are sought.

Mission Area IV: Environmental

Co-Chairs: Dr. William S. Eck, US Army Public Health Command/Aberdeen Proving Ground, MD

Telephone: (410) 436-7169

Email: william.s.eck.civ@mail.mil

Ms. Kimberly A. Watts, RDECOM/Aberdeen Proving Ground, MD

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Environmental issues that address any of the following: permitting requirements; hazardous waste treatment; water and air pollution prevention and control technologies involving energetic material production and use; waste minimization; operational ingredient reclamation or recycling in the production of energetic materials; environmental effects on flora and fauna resulting from propulsion-related activities; and impact of emerging environmental regulations on energetic materials operations.

Mission Area V: Industrial Hygiene

Co-Chairs: Ms. Lindsey Kneten, Army Public Health Command/Aberdeen Proving Ground, MD

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CPT Kenneth Kirk, AFRL, 711HPW/Wright-Patterson AFB, OH

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Industrial hygiene aspects of energetic material production, transportation, use, and disposal. Areas of interest include personal protective strategies and equipment used in manufacturing and handling operations; ingredient and product monitoring methods and experience; operational ventilation strategies and experience; hazardous materials control; hazardous waste management; substitution of less hazardous materials in industrial processes and maintenance; and hazardous materials information, including labeling and material safety data sheets.

Mission Area VI: Range Safety and Explosives Safety

Chair: Mr. Daniel E. Strub, 30th Space Wing/
Vandenberg AFB, CA

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Email: daniel.strub@us.af.mil

Range safety and explosives safety issues relevant to launch range safety risk assessments and other energetic material safety problems. Papers are sought that address hazards inherent in solid and liquid propellant/explosive/ pyrotechnic (PEP) materials manufacturing, processing, handling, storage, use and disposal; liquid and solid propellant explosive hazards; air blast effects; quantity-distance criteria; shielding; and the hazards of damaged or aged propellants.

Mission Area VII: Environmental, Safety and Occupational Health of Insensitive Munitions

Chair: Dr. Kimberly Y. Spangler, ARDEC/Picatinny Arsenal, NJ

Telephone: (973) 724-3156

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Packaging, handling, and transportation aspects of propellants and related items, including both technical and regulatory requirements.

Mission Area VIII: Green Energetic Materials (GEM) Joint PEDCS - SEPS Mission Area

Co-Chairs: Mr. Noah Lieb, Jensen Hughes/Baltimore, MD

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Email: nlieb@jensenhughes.com

Dr. Jesse J. Sabatini, ARL/Aberdeen Proving Ground, MD

Telephone: (410) 278-0235

Email: jesse.j.sabatini.civ@mail.mil

Dr. Sara K. Pliskin, NSWC/Crane, IN

Telephone: (812) 854-3190

Email: sara.pliskin@navy.mil

Papers are sought on the development of environmentally sustainable energetic ingredients, formulations, and processing technologies with an emphasis on the following: Reduction of impacts from energetic materials and unexploded ordnance on military ranges, manufacturing and demilitarization facilities; Enhancement of recycling, recovery, reuse and reduction of waste; and Response to specific impacts that environmental regulations have had on military readiness, such as limiting training with live ordnance, outsourcing of manufacturing overseas or explicit banning of the use of specific materials.

Mission Area IX: Demilitarization, Reclamation, and Reuse Technologies

Co-Chairs: Dr. Randall J. Cramer, Navy Ordnance
Environmental Support Office/Indian Head, MD

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Email: randall.cramer@navy.mil

Dr. Sara K. Pliskin

Telephone: (812) 854-3190

Email: sara.pliskin@navy.mil

Demilitarization, reclamation, and reuse technologies for propellant, explosive, and pyrotechnic (PEP) materials. Interest areas include: thermal degradation/treatment and incineration of PEP materials; chemical or mechanical separation, reclamation, and neutralization technologies; technologies that utilize sub- or super-critical fluids for reclamation or oxidation of PEP materials; biodegradation technology; reuse of energetic materials or ingredients for military and commercial applications; and regulations that address traditional disposal options, such as open burning/open detonation and static firing.

Mission Area X: Review of Accidents and Incidents

Chair: Mr. Daniel E. Strub, 30th Space Wing/
Vandenberg AFB, CA

Telephone: (805) 605-2407

Email: daniel.strub@us.af.mil

Review of accidents and incidents involving propellant manufacturing, storage, transportation, use, hazardous material spills, and transportation accident response. Topics of interest include lessons learned, post-accident procedures for liquid propellant spills, propellant spill response systems, spill mitigation activities, and transportation accident response computer systems.

Safety and Environmental Protection Subcommittee Chair

Dr. Mark S. Johnson, Army Public Health Command/
Aberdeen Proving Ground, MD

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CADRE Technical Representative

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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 CADRE Technical Liaison or Shelley Cohen at scohen@cadre.jhu.edu. This form must be submitted to CADRE by the **extended deadline of Monday, 6 July 2015**. The agenda and invitation list is due **Monday, 17 August 2015**, and must be approved no later than **Monday, 26 October 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 CADRE. 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 CADRE 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 extended deadline for submission of a Specialist Session request is **6 July 2015**. If you have any questions about planning a Specialist Session please contact your CADRE Technical Liaison or Shelley Cohen at scohen@cadre.jhu.edu.

JANNAF AWARDS PROGRAM

In the tradition of recognizing the outstanding achievements of the propulsion community, the JANNAF Executive Committee and the Structures and Mechanical Behavior (SMBS), Propellant and Explosives Development and Characterization (PEDCS), Rocket Nozzle Technology (RNTS), and Safety and Environmental Protection (SEPS) 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 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 CADRE technical representative no later than **Monday, 5 October 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 CADRE technical representative.

As a reminder: student authors must conform to the same JANNAF eligibility requirements as other authors, per the Attendance policy 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 CADRE 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 CADRE by **5 October 2015**. The Best Student Paper Award will be presented at the JANNAF meeting at which the paper is given.

UPCOMING JANNAF MEETINGS

Green Monopropellant Alternatives to Hydrazine JANNAF / NIRPS Joint Technical Interchange Meeting

4 - 5 August 2015
Huntsville, Alabama

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

7 - 11 December 2015
Location TBA

63rd JANNAF Propulsion Meeting / Programmatic and Industrial Base / 47th Combustion / 35th Airbreathing Propulsion / 35th Exhaust Plume and Signatures / 29th Propulsion System Hazards Joint Subcommittee Meeting

Spring 2016
Location TBA