MEETING INVITATION

6-16 DECEMBER 2021  //  VIRTUAL EDITION

47th Structures & Mechanical Behavior (SMBS)
43rd Propellant & Explosives Development & Characterization (PEDCS)
34th Rocket Nozzle Technology (RNTS)
32nd Safety & Environmental Protection (SEPS)
JOINT SUBCOMMITTEE MEETING
Programmatic & Industrial Base Meeting (PIB)

Distribution Statement A: Approved for public release; Distribution is unlimited. AFRL-2021-3023
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YOU ARE INVITED TO ATTEND THE DECEMBER 2021 VIRTUAL MEETING OF THE JOINT ARMY-NAVY-NASA-AIR FORCE (JANNAF) INTERAGENCY PROPULSION COMMITTEE.

The virtual meeting will consist of the Joint Meeting of the 47th Structures and Mechanical Behavior, 43rd Propellant and Explosives Development and Characterization, 34th Rocket Nozzle Technology, and 32nd Safety and Environmental Protection Subcommittees, and Programmatic and Industrial Base Meeting, to be held Monday through Friday, 6 - 10 December 2021, and Monday through Thursday, 13 - 16 December 2021.

The Program Chair for the meeting is Dr. David R. Mattie, AFRL/711 Human Performance Wing, Wright-Patterson AFB, OH. A complete list of Program Committee Members can be found on pages 11-14.

The JANNAF Interagency Propulsion Committee coordinates fundamental research, exploratory development, and advanced developmental programs; standardizes procedures for nomenclature; promotes and facilitates the exchange of technical information; and accomplishes problem solving in the areas of joint agency interest on propulsion systems for missiles, rockets, boosters, spacecraft, satellites, and guns.

JANNAF MEETING INVITATION - DECEMBER 2021

JANNAF subcommittees focus their resources on technical issues of interest to the JANNAF agencies.

**STRUCTURES & 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.

**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.

**PROPELLANT & EXPLOSIVES DEVELOPMENT & 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.

**MEETING SCOPE**

**SAFETY & ENVIRONMENTAL PROTECTION SUBCOMMITTEE**

SEPS is focused on issues related to the human health, safety and environmental impacts associated with the manufacture, storage and use of propellants, explosives and pyrotechnics. Papers are invited that address all health effects associated with energetic compounds, precursors, combustion products, and waste products as well as safety concerns present during their intentional use, demilitarization, and accidents. New and emerging areas of interest include additive manufacturing (3D Printing) of energetic materials, nanomaterials, insensitive high explosive formulations, and brain injury due to exposure to blast and overpressure.

**PROGRAMMATIC AND INDUSTRIAL BASE**

The JANNAF Programmatic and Industrial Base (PIB) Committee was created with the approval of the JANNAF Charter by the Department of Defense and the National Aeronautics and Space Administration in 2014. Its focus is on providing a mechanism for DoD and NASA to collaboratively identify and manage risks and issues within the propulsion industrial base, and to work together to solve them. This requires an integrated understanding of each program’s plans and key decision points, and how those decisions may impact the propulsion industrial base. PIB areas of interest include integrated program plans and key decision points; industrial base assessments; risks and opportunities with respect to skills, knowledge, and experience; identification of commonality, innovative acquisition, and partnership opportunities; integrated assessments to identify rocket propulsion industrial base (RPIB) rationalization opportunities; special actions from senior agency, department, or Executive Office of the President (EOP) leadership; and information provided to decision makers for either situational awareness or policy decisions.

VIRTUAL PLATFORM
DoD-approved Microsoft Teams is a web-based collaboration tool. It meets DoD security requirements for presentation and discussion of ITAR-restricted material (IL5 compliant), and has DoD-wide approvals and authorizations for configuration and use. During JANNAF virtual sessions, live Q&A will be facilitated as time permits; guidance will be provided during each session.

TECHNICAL SPECIFICATIONS
Technology Requirements for participation in this meeting have been posted on the Technology Requirements page of the meeting website. Dial-in participation by phone is not supported for this meeting, so it is important that you read these requirements and act quickly to follow them to ensure you are able to participate via a Chromium-based web browser.

Performance of the DoD-approved Microsoft Teams platform can be negatively impacted by an individual’s internet connection, security settings on their computer or network, organization IT policies, and more. For this reason, ERG has developed a detailed list of steps to optimize your experience during the virtual JANNAF meeting. You are strongly urged to review and follow the technical guidance as far in advance of the meeting’s start date as possible to ensure that your computer, network, and organizational IT policies will allow for your seamless participation. This is important for all participants, but especially for those who have not previously used the DoD-approved version of Microsoft Teams. There is no need to wait until your registration is complete to review and implement these guidelines.

DoD TEAMS TEST SESSIONS
To help participants identify technical issues and become familiar with the DoD-approved Microsoft Teams platform, DoD Teams Testing Sessions will be hosted at the following dates and times:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
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<tbody>
<tr>
<td>Wednesday, 1 December</td>
<td>1:30 p.m. - 3:00 p.m. EST</td>
</tr>
<tr>
<td>Thursday, 2 December</td>
<td>1:30 p.m. - 3:00 p.m. EST</td>
</tr>
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</table>

Links to all testing sessions will be provided after you have completed your registration form. Participants who have not previously used the DoD-approved version of Microsoft Teams are strongly urged to join one of these DoD Teams test sessions to verify the ability to log in and join the session, that your audio settings are correct, and that you are able to identify any issues early enough for your local IT staff to provide support. ERG is unable to assist with issues specific to your computer, network, or organizational IT policies. These matters must be addressed by the user with their local IT support.

JOINING SESSIONS
Attendees are asked to join any session they plan to attend a minimum of 30 minutes prior to the scheduled start time. This will allow the hosts of each session to confirm the identity of each attendee before allowing admission into the virtual meeting room.

The link to each day’s sessions will be made available on the morning of those sessions only to attendees who have fully completed the registration process (online registration form and online registration payment are both complete). This information will be stored within a secure location in the JANNAF Portal.

VIRTUAL MEETING SECURITY GUIDELINES

As a registered attendee of this ITAR restricted meeting, you have a personal responsibility to help protect the data exchanged at this event. This includes managing your electronic devices (phones, computers, cameras, tablets, smart speakers, smart watches, etc.), as well as your conversations and use of the virtual chat feature responsibly. Aside from security concerns, prudent and responsible use of these devices extends basic courtesy to other attendees and speakers.

Please follow these basic guidelines at this meeting:

- Use headphones when listening via computer to limit the potential for presentation eavesdropping
- Be aware of your surroundings. Be sure you are in a private location while participating in the meeting.
- Absolutely no personal videotaping, recording, or screenshots will be permitted at any time.
- Virtual participation is for registered meeting attendees only. DO NOT share meeting links.
- Additional guidelines will be provided to you after registration.

Sharing of restricted JANNAF Meeting Information to an unregistered individual is a reportable offense. This includes but is not limited to:

- Virtual Reading Room Files
- Session connection information

If they occur, such security violations will be reported to the following entities affiliated with the responsible party (where applicable):

- Facility Security Officer (FSO)
- Defense Counterintelligence and Security Agency (DCSA) Industrial Security Representative (ISR)
- Cybersecurity and Infrastructure Security Agency (CISA)
- For Contractors: Government Sponsoring Official (GSO)

SECURITY/ATTENDANCE REQUIREMENTS

THE OVERALL SECURITY CLASSIFICATION OF THIS MEETING IS UNCLASSIFIED.

To qualify to attend this meeting, all attendees must be employed by a DoD, DoE, or NASA facility, or with a DoD, DoE, or NASA contractor facility eligible for receipt of militarily-critical technical data. All attendees must also be invited U.S. citizens qualified to receive unclassified, limited-distribution information. No foreign nationals are permitted to attend.

Questions concerning attendance eligibility should be directed to the JHU WSE ERG Facility Security Team: Tricia Frey at (410) 992-7300, ext. 222 / tfrey@erg.jhu.edu OR Mary Gannaway at (410) 992-7304, ext. 211 / mgannaway@erg.jhu.edu.

REGISTRATION

Registration is now open. Complete the Registration Form at least 3 business days prior to the first day you plan to attend the meeting. If you don’t currently have a JANNAF Secure Portal account, you are strongly urged to complete the registration process much sooner.

To register, you must first have a JANNAF Secure Portal account. Please visit the Registration section of the meeting website for additional information and important links.

Registration for this JANNAF meeting is a two-part process; to register:

1. Complete the online registration form for the meeting - first log in to your JANNAF Secure Portal account.
2. Pay the registration fee (Portal account NOT needed).

Additional information and important links for completing meeting registration can be found on the Registration Steps page.

VISIT HTTPS://WWW.JANNAF.ORG/MTGS/2021Dec/PAGES/INDEX.HTML
REGISTRATION FEE

Early registration is strongly recommended. Register and pay the registration fee by Monday, 22 November at 11:59 p.m. EST to take advantage of the discounted early registration fee. The regular registration fee goes into effect on 23 November at 12:00 a.m. EST. For details of what the registration fee includes, please go to the Registration Fee page of the meeting website. Please reference the registration fee chart below to determine the amount applicable to your registration. The dates noted below are based on payment being received.

<table>
<thead>
<tr>
<th>Payment Received</th>
<th>Regular Attendee</th>
<th>Student*</th>
</tr>
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<tbody>
<tr>
<td>on or before 11/22/21</td>
<td>$650.00</td>
<td>$125</td>
</tr>
<tr>
<td>11/23/21 or later</td>
<td>$775.00</td>
<td>$225</td>
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* A discounted registration fee is offered for full time students, interns, and cooperative education students. Students must meet the security/attendance requirements noted on p. 6 as well as the additional requirements on the Student Registration Information page.

Cancellation Policy

Please note our cancellation policy.

Written (email) cancellations submitted on or before 22 November 2021 will receive a full refund minus an administrative fee of $50.00. Cancellations made after 22 November 2021 will not be refunded. Substitutes are welcome as long as the request for substitution is from the original attendee; attendance eligibility is appropriately met by the substitute; and the original and substitute attendee are from the same organization to facilitate transfer of registration funds. Please contact Shelley Cohen via email (scohen@erg.jhu.edu) to transfer or cancel your registration.

Networking

Although this virtual JANNAF meeting won’t replicate the full range of networking opportunities inherent at an in-person JANNAF meeting, during the registration process, attendees have the option of sharing topics they’re interested in discussing with others. This information will be included in the attendee list, accessible to registered attendees only. Attendees then may contact one another to arrange conversations at their mutual convenience. Additionally, as time permits at the end of each session, participants are welcome to continue discussion within the platform.

Virtual Reading Room

Papers submitted prior to and during the meeting and presented in the technical sessions will be available to read via the JANNAF Virtual Reading Room (Distribution Statement A and C only). Presentation files will not be included. A link to the Virtual Reading Room will be provided in a secure location for registered attendees (both registration form and payment must be complete) once the meeting has begun. Reproduction of Reading Room papers is not permitted.

**PROGRAM CHANGES**

The Preliminary Program will be updated with any changes once per week until the Final Program is posted on the meeting website the week before the meeting. Login to your JANNAF Secure Portal account is required to access both the Preliminary and Final Programs. Note that the Preliminary and Final Programs are Distribution Statement C and are intended for use by the attendee only. Any print-outs of the program should be secured when not in your possession. Each day’s agenda, incorporating all known changes for that day, will be posted each morning within the registered attendee-only secure location on the JANNAF website.

**MEETING PROCEEDINGS**

Proceedings from this meeting will be published by the JHU WSE Energetics Research Group. Papers submitted or presentations (if a paper is not submitted) will be provided complimentary to attendees of this meeting who have paid the full registration fee. Attendees will have access to these proceedings beginning approximately 12 weeks following the meeting via the JANNAF Digital Online Collection (JDOC) Database accessible through your account on the JANNAF Secure Portal. This benefit is not available for student attendees.

**QUESTIONS**

Questions concerning this program and/or payment of the registration fee should be directed to Shelley Cohen at (410) 992-7300, ext. 215 / scohen@erg.jhu.edu OR Gabrielle Delisle-Ballard at (410) 992-7300, ext. 208 / gdelisle@erg.jhu.edu.

Questions pertaining to registering via the JANNAF Secure Portal or accessing the online Registration Form should be directed to Tricia Frey at (410) 992-7300, ext. 222 / tfrey@erg.jhu.edu OR Mary Gannaway at (410) 992-7304, ext. 211 / mtg@jhu.edu.

**WHY ATTEND A JANNAF MEETING?**

Attendees of recent JANNAF meetings were surveyed to determine what they find to be the most valuable benefits of JANNAF meeting attendance. Their responses included:

- The opportunity to present limited distribution papers to a technical audience including government, industry, and academia
- The capability to engage in valuable discussion with peers
- Networking opportunities with other experts in the propulsion community outside of their usual sphere
- New members of the community have the ability to obtain priceless experience, knowledge, and community connections
- Technical interchange that allows them to stay abreast of community trends and innovations

UPCOMING JANNAF MEETINGS

47th Structures & Mechanical Behavior
43rd Propellant & Explosives Development & Characterization
34th Rocket Nozzle Technology
32nd Safety & Environmental Protection
Joint Subcommittee Meeting
Programmatic & Industrial Base Meeting
6 - 16 December 2021
DoD-Approved Microsoft Teams

69th JANNAF Propulsion Meeting
Programmatic and Industrial Base Meeting
51st Combustion
39th Airbreathing Propulsion
39th Exhaust Plume & Signatures
33rd Energetic Systems Hazards
16th Modeling and Simulation
Joint Subcommittee Meeting
6 - 10 June 2022
Newport News, VA

13th Liquid Propulsion
12th Spacecraft Propulsion
Joint Subcommittee Meeting
Programmatic & Industrial Base Meeting
December 2022
Location TBA

VISIT HTTPS://WWW.JANNAF.ORG/MTGS/2021DEC/PAGES/INDEX.HTML
PROGRAM COMMITTEE MEMBERS

Program Chair

Dr. David R. Mattie
AFRL/711 Human Performance Wing
Wright-Patterson AFB, OH

Structures and Mechanical Behavior Subcommittee

Technical Steering Group Chair
Mr. Robert W. Pritchard
Naval Air Warfare Center - Weapons Division
China Lake, CA

JANNAF Executive Committee Liaison
Mr. Frank C. Tse
Naval Surface Warfare Center-Indian Head Division
Indian Head, MD

JHU WSE ERG Technical Representatives
Mr. Bryan DeHoff
Aerospace Technical Services
West Chester, OH

Mission Area I: Service Life / Missile Sustainment
Mr. Geoffrey E. Trapp
Air Force Research Laboratory
Edwards AFB, CA

Mission Area II: Materials Properties and Characterization
Mr. David J. Braithwaite
Northrop Grumman Corporation
Brigham City, UT

Mission Area III: Structural Analysis and Design
Dr. Brian C. Liechty
Northrop Grumman Corporation
Brigham City, UT

Mr. Colton Cevering
Northrop Grumman Corporation
Brigham City, UT

Mission Area IV: Experimental Structural and Mechanical Analysis and Test Methods
Mr. Kyle M. Beckett
Naval Surface Warfare Center-Indian Head Division
Indian Head, MD

Mission Area V: Nondestructive Evaluation
Mr. Scott H. McClain
DEVCOM Armaments Center
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Propellant and Explosives Development and Charaterization Subcommittee

Technical Steering Group Chair
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JHU WSE Energetics Research Group
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Mission Area II: Explosive Development and Characterization
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Picatinny Arsenal, NJ
Dr. Leanna M. Minier
Air Force Research Laboratory
Eglin AFB, FL

Mission Area III: Propellant and Explosives Process Engineering
Dr. Jamie B. Neidert
DEVCOM Aviation & Missile Center
Redstone Arsenal, AL
Mr. Charles R. Painter
Naval Surface Warfare Center-Indian Head Division
Indian Head, MD

Mission Area IV: Energetic Materials Characterization and Raw Material Obsolescence
Mr. Christopher A. Marshall
DEVCOM Aviation & Missile Center
Redstone Arsenal, AL

Mission Area V: Solid Propellant Ingredients and Formulations
Dr. Gregory W. Drake
DEVCOM Aviation & Missile Center
Redstone Arsenal, AL
Dr. Nirupam J. Trivedi
DEVCOM Army Research Laboratory
Aberdeen Proving Ground, MD

Mission Area VI: Propellant and Explosive Surveillance and Aging
Dr. Kerry A. Clark
Naval Surface Warfare Center-Indian Head Division
Indian Head, MD

Mission Area VII: Gun Propulsion
Dr. Kirstin F. Warner
DoD Explosive Safety Board
Alexandria, VA
Ms. Christine D. Knott
Naval Surface Warfare Center-Indian Head Division
Indian Head, MD

Mission Area VIII: Green Energetic Materials (GEM) [Joint Mission Area with SEPS]
Mr. Noah Lieb
Jensen Hughes
Baltimore, MD
Dr. Jesse J. Sabatini
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Aberdeen Proving Ground, MD
Dr. Sara K. Pliskin
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Rocket Nozzle Technology Subcommittee

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NASA Marshall Space Flight Center
Huntsville, AL

Technical Steering Group Deputy Chair
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Redstone Arsenal, AL

JHU WSE ERG Technical Representative
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Aerospace Technical Services
West Chester, OH

Mission Area I: Nozzle Thermal, Structural, Fluids Analysis and Modeling
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NASA Marshall Space Flight Center
Huntsville, AL

Mission Area II: Nozzle Design, Test and Evaluation
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Mission Area III: Thrust Control
Mrs. Cheryl R. Steely
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Ms. Laina V. Gilmore
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Edwards AFB, CA

Mission Area IV: Innovative Nozzle Materials and Manufacturing
Ms. Jennifer I. Richman
DEVCOM Aviation & Missile Center
Redstone Arsenal, AL
Ms. Sarah A. Howse
NASA Marshall Space Flight Center
Huntsville, AL

Safety and Environmental Protection Subcommittee

Technical Steering Group Chair
Dr. Karen L. Mumy
Naval Medical Research Unit-Dayton
Wright-Patterson AFB, OH

Technical Steering Group Deputy Chair
Dr. Jeanne Hartzell
Naval Ordnance Safety and Security Activity
Indian Head, MD

JANNAF Executive Committee Liaison
Dr. Rose A. Pesce Rodriguez
DEVCOM Army Research Laboratory
Aberdeen Proving Ground, MD

JHU WSE ERG Technical Representative
Mr. William A. Bagley
JHU WSE Energetics Research Group
Columbia, MD

Mission Area I: Toxicology
Dr. David R. Mattie
AFRL/711 Human Performance Wing
Wright-Patterson AFB, OH
Dr. Mark S. Johnson
Army Public Health Center
Aberdeen Proving Ground, MD

Mission Area II: Atmospheric Dispersion Modeling and Hazards Assessment
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Space Launch Delta 30 (SLD 30)
Vandenberg AFB, CA
Dr. Josephine Covino
DoD Explosives Safety Board
Alexandria, VA

Mission Area III: Instrumentation
Dr. Karen L. Mumy
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Wright-Patterson AFB, OH

Mission Area IV: Environmental
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Indian Head, MD
Dr. William S. Eck
Army Public Health Center
Aberdeen Proving Ground, MD

Mission Area V: Industrial Hygiene
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Army Public Health Center
Aberdeen Proving Ground, MD
Lt. Cmdr. N. Cody Schaal
Naval Medical Research Unit-Dayton
Wright-Patterson AFB, MD

Mission Area VI: Range Safety and Explosives Safety
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Space Launch Delta 30 (SLD 30)
Vandenberg AFB, CA
Dr. Josephine Covino
DoD Explosives Safety Board
Alexandria, VA
Mission Area VII: Green Energetic Materials (GEM) [Joint Mission Area with PEDCS]
  Mr. Noah Lieb
  Jensen Hughes
  Baltimore, MD
  Dr. Jesse J. Sabatini
  DEVCOM Army Research Laboratory
  Aberdeen Proving Ground, MD
  Dr. Sara K. Pliskin
  Naval Surface Warfare Center, Crane Division
  Crane, IN

Mission Area VIII: Demilitarization, Reclamation, and Reuse Technologies
  Mr. William A. Bagley
  JHU WSE Energetics Research Group
  Columbia, MD

Mission Area IX: Review of Accidents and Incidents
  Mr. Daniel E. Strub
  Space Launch Delta 30 (SLD 30)
  Vandenberg AFB, CA

Programmatic and Industrial Base

PIB Executive Committee Co-Chairs
  Dr. Christine M. Michienzi
  OUSD(AT&L)/DASD
  Alexandria, VA
  Dr. Thomas M. Brown
  NASA Marshall Space Flight Center
  Huntsville, AL

JHU WSE ERG Technical Representative
  Mr. Kirk V. Sharp
  JHU WSE Energetics Research Group
  Long Beach, MS

JANNAF Meeting Manager
  Shelley S. Cohen
  JHU WSE Energetics Research Group
  Columbia, MD

Meetings and Communications Assistant
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  JHU WSE Energetics Research Group
  Columbia, MD

Security Officer
  Mary T. Gannaway
  JHU WSE Energetics Research Group
  Columbia, MD

Assistant Security Officer
  Tricia Frey
  JHU WSE Energetics Research Group
  Columbia, MD

Lt Col Justin L. Beltz, serves as the Chief of the US Space Force Launch Enterprise Small Launch and Targets Division at Kirtland Air Force Base, New Mexico. As the keynote presenter at this year’s virtual conference, the title of Lt Col Beltz's talk is, “Expanding Opportunities in Small and Responsive Launch.” The US Space Force Launch Enterprise provides a spectrum of launch solutions to meet the full range of National Security Space needs. The small and responsive launch segment is an exciting part of this spectrum, leveraging a burgeoning industrial base to bring unprecedented flexibility, increased competition, and rapid growth in capability. In partnership with industry, the Launch Enterprise has achieved groundbreaking successes, with even greater opportunities on the horizon.

As Division Chief, Lt Col Beltz leads the Rocket Systems Launch Program in providing mission planning, payload integration, vehicle acquisition, processing, launch operations, booster storage and disposition, aging surveillance, maintenance, and logistics support for selected Department of Defense responsive small and RDT&E launches.

Prior to his current position, the Lt Col served as Chief, Congressional and Media Affairs, Directorate of Space Programs, Assistant Secretary of the Air Force (Acquisition, Technology & Logistics), Washington, D.C. He also served as Chief, Rocket Acquisition Branch, Office of Space Launch, National Reconnaissance Office, Los Angeles AFB; Aide-de-Camp, Space & Missile Systems Center, Los Angeles AFB; Lead, EELV Competitive Acquisitions, Launch Enterprise Systems Directorate, Los Angeles AFB; and Contracts Manager, 9th Contracting Squadron, Beale AFB, California. In 2012, he deployed to Southwest Asia to support OPERATION ENDURING FREEDOM as Operations Officer, CENTCOM Joint Theater Support Contracting Command.

Lt Col Beltz entered the Air Force in 2007 as a graduate of the Reserve Officer Training Corps. He holds a bachelor’s degree in Business Administration from California State University – Fresno, a master’s degree in Business Administration from Boston College, and a master's degree in Military Operational Art & Science from Air University. He has served in a variety of acquisition and contracting positions. He transferred to the Space Force in 2021.

All attendees are invited to participate. The Keynote Address begins at 9:30 a.m. EST on Tuesday, 7 December. The link to Lt Col Beltz’s presentation will be made available that morning to all registered attendees. Plan on logging in at least 30 minutes prior to the scheduled start time. An awards presentation will immediately follow the Keynote Address.
Structures and Mechanical Behavior Subcommittee

The Structures and Mechanical Behavior Subcommittee (SMBS) will host three sessions, one joint specialist session with PEDCS discussed under PEDCS (1A), and one joint session with RNTS (9B) for papers of special interest. SMBS will convene five panel meetings covering a wide spectrum of topics within the SMBS areas of interest. Each panel meeting will allow dialog among attendees to discuss upcoming technical issues and future areas of possible focus for the subcommittee.

Propellant and Explosives Development and Characterization Subcommittee

The Propellant and Explosives Development and Characterization Subcommittee (PEDCS) will convene 14 technical sessions, one two-part workshop, and two specialist sessions to provide a forum for sharing advances in emerging research required to develop, manufacture, and characterize propellants and ingredients. Technical Sessions will address modeling, synthesis, processing, optimization, and characterization of liquid and solid propellants. A joint PEDCS/SMBS Specialist Session (1A) is intended to provide the JANNAF community an overview of recent advances in energetics manufacture with promise to reduce the time and cost of manufacture, remove barriers limiting system performance, and inspire more uses of these technologies than previously envisioned.

The Cylinder Expansion (CylEx) Test Workshop (7C & 8C) will provide an opportunity to discuss the creation of a standard and determine minimum requirements for the cylinder expansion test, with a goal of greater ease of sharing of test data. The Polyglycidyl Nitrate (PGN) Specialist Session (6C) will provide a forum for collaborative discussions of synthesis techniques, programs to support raw material demand, and evaluate alternative enabling chemistries. Additionally, PEDCS will team with the Safety and Environmental Subcommittee (SEPS) to convene the Green Energetics Materials (GEM) Technical Session (4B) and Panel Meeting to address developments in energetic ingredients, formulations, and processing technologies that permit enhanced recycle, recovery, reuse, and waste reduction during manufacture, testing, operation, and demilitarization.

Rocket Nozzle Technology Subcommittee

The Rocket Nozzle Technology Subcommittee (RNTS) will have four sessions, one joint session with SMBS (9B), and three panel meetings to discuss and exchange information on recent technical developments in nozzle thermal, structural and fluids analysis and modelling; nozzle design, test, and evaluation; and thrust control technology. Discussion during the panel meetings will explore new directions of interest and shape future emphasis areas or cross service efforts in the nozzle technology community.

Safety and Environmental Protection Subcommittee

The Safety and Environmental Protection Subcommittee sessions will include presentations which address the toxicity of Insensitive High Explosives (IHE), the potential use of bio-derived thermoplastics for additively manufactured (AM) rocket fuel, and a summary of pending changes to the regulatory status for emerging contaminants tracked by the Office of the Secretary of Defense Emerging Chemicals Program. SEPS will convene a Specialist Session (2B) that features a speaker from U.S. EPA to discuss policies related to open burn open detonation (OB/OD) as well as alternative technologies to OB/OD. In addition, the SEPS Blast Injury Specialist Session (5B) aims to enhance the JANNAF community’s understanding of the impacts of blast pressure exposure from weapon systems to brain health, increase awareness of blast exposure resources and requirements, and better inform decisions for blast risk mitigation.
This year’s technical program currently consists of more than 150 presentations in 24 technical sessions, 5 specialist sessions, and 2 workshops, plus 12 panel meetings. A detailed daily schedule of all sessions, workshops, specialist sessions, meetings, and networking activities is provided below and continues through page 20. Detailed agendas of the technical sessions, workshops, and specialist sessions are listed in the Preliminary Program beginning on page 21 (login to your JANNAF Portal account is required for access).

A Schedule Color Key has been provided on pages 17 - 20.

### TECHNICAL PROGRAM

#### SCHEDULE - Monday, 6 December

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
</tr>
<tr>
<td>11:00 a.m. - 11:05 a.m.</td>
<td>Monday Specialist Session, Technical Sessions, and Panel Meeting</td>
</tr>
<tr>
<td>11:00 a.m. - 2:05 p.m.</td>
<td>1A PEDCS/SMBS SPECIALIST SESSION: Advanced Propulsion and Energetics Manufacturing Technology Open</td>
</tr>
<tr>
<td>11:00 a.m. - 2:05 p.m.</td>
<td>1B PEDCS Liquid Propellants Open</td>
</tr>
<tr>
<td>2:05 p.m. - 3:05 p.m.</td>
<td>1B PEDCS PANEL MEETING: Liquid Propellants Open</td>
</tr>
<tr>
<td>11:00 a.m. - 2:35 p.m.</td>
<td>1C PEDCS Gun Propulsion - I Open</td>
</tr>
<tr>
<td>11:00 a.m. - 2:35 p.m.</td>
<td>1D PEDCS Theory and Modeling of EM Open</td>
</tr>
<tr>
<td>12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Sessions</td>
</tr>
</tbody>
</table>

#### SCHEDULE - Tuesday, 7 December

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m. - 9:30 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Keynote Presentation</td>
</tr>
<tr>
<td>9:30 a.m. - 10:30 a.m.</td>
<td>KEYNOTE ADDRESS: Lt Col Justin Beltz, Chief, U.S. Space Force Launch Enterprise Small Launch and Targets Division JANNAF Announcements and Awards Open</td>
</tr>
<tr>
<td>10:30 a.m. - 11:00 a.m.</td>
<td>Login to Technical Session of Choice</td>
</tr>
<tr>
<td>11:00 a.m. - 3:15 p.m.</td>
<td>Tuesday Specialist Session and Technical Sessions</td>
</tr>
<tr>
<td>11:00 a.m. - 2:35 p.m.</td>
<td>2A PEDCS/SMBS SPECIALIST SESSION: Advanced Propulsion and Energetics Manufacturing Technology - II Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:15 p.m.</td>
<td>2B SEPS SPECIALIST SESSION: Past, Present, and Future of Open Burning and Open Detonation of Waste Military Munitions DoD &amp; DoD Contractors ONLY</td>
</tr>
<tr>
<td>11:00 a.m. - 2:35 p.m.</td>
<td>2C PEDCS Gun Propulsion - II DoD &amp; DoD Contractors ONLY</td>
</tr>
<tr>
<td>11:00 a.m. - 1:35 p.m.</td>
<td>2D PEDCS Synthesis of EMs Open</td>
</tr>
<tr>
<td>12:15 p.m. or 12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Sessions</td>
</tr>
</tbody>
</table>

### Schedule Color Key

- **Meeting Services**: Concurrent Sessions or Panel Meetings
- **Networking Opportunities**: Session Details
- **Closed Meetings**: Panel Meetings

### SCHEDULE - Wednesday, 8 December

**All Times Listed Are Eastern Standard Time**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
</tr>
<tr>
<td>24 hours/day</td>
<td>Virtual Reading Room</td>
</tr>
<tr>
<td>11:00 a.m. - 3:35 p.m.</td>
<td><strong>Wednesday Technical Sessions and Panel Meeting</strong></td>
</tr>
<tr>
<td>11:00 a.m. - 3:35 p.m. 11:00 a.m.</td>
<td>PEDCS Synthesis and Explosive Formulations</td>
</tr>
<tr>
<td>11:00 a.m. - 2:05 p.m. 11:00 a.m.</td>
<td>SEPS Toxicology, Instrumentation and Environmental</td>
</tr>
<tr>
<td>2:05 p.m. - 3:05 p.m. 11:00 a.m.</td>
<td>SEPS PANEL MEETING: Occupational Health and Toxicology/Environmental Protection</td>
</tr>
<tr>
<td>11:00 a.m. - 2:35 p.m.</td>
<td>3C PEDCS Propellant and Explosives Processing - I</td>
</tr>
<tr>
<td>12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Sessions</td>
</tr>
</tbody>
</table>

### SCHEDULE - Thursday, 9 December

**All Times Listed Are Eastern Standard Time**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
</tr>
<tr>
<td>24 hours/day</td>
<td>Virtual Reading Room</td>
</tr>
<tr>
<td>11:00 a.m. - 3:05 p.m.</td>
<td><strong>Thursday Technical Sessions and Panel Meetings</strong></td>
</tr>
<tr>
<td>11:00 a.m. - 3:05 p.m. 11:00 a.m.</td>
<td>PEDCS Modeling and Characterization</td>
</tr>
<tr>
<td>11:00 a.m. - 2:05 p.m. 11:00 a.m.</td>
<td>SEPS Range and Explosives Safety and GEM</td>
</tr>
<tr>
<td>1:05 p.m. - 1:35 p.m. 11:00 a.m.</td>
<td>SEPS PANEL MEETING: Green Energetic Materials</td>
</tr>
<tr>
<td>11:00 a.m. - 2:05 p.m.</td>
<td>4C PEDCS Propellant and Explosives Processing - II</td>
</tr>
<tr>
<td>2:05 p.m. - 3:05 p.m.</td>
<td>4C PEDCS PANEL MEETING: Propellant and Explosives Processing</td>
</tr>
<tr>
<td>12:05 p.m. or 12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Sessions</td>
</tr>
</tbody>
</table>

### SCHEDULE - Friday, 10 December

**All Times Listed Are Eastern Standard Time**

<table>
<thead>
<tr>
<th>Time</th>
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</tr>
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<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
</tr>
<tr>
<td>24 hours/day</td>
<td>Virtual Reading Room</td>
</tr>
<tr>
<td>11:00 a.m. - 3:30 p.m.</td>
<td><strong>Friday Technical Session and Specialist Session</strong></td>
</tr>
<tr>
<td>11:00 a.m. - 3:30 p.m. 11:00 a.m.</td>
<td>PEDCS Energetic Materials Characterization</td>
</tr>
<tr>
<td>11:00 a.m. - 3:00 p.m. 11:00 a.m.</td>
<td>SEPS SPECIALIST SESSION: DoD Blast Exposure in Training Monitoring Program</td>
</tr>
<tr>
<td>12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Sessions</td>
</tr>
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</table>

### Schedule Color Key

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
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<tbody>
<tr>
<td>Meeting Services</td>
<td>Concurrent Sessions or Panel Meetings</td>
</tr>
<tr>
<td>Networking Opportunities</td>
<td>Session Details</td>
</tr>
<tr>
<td>Closed Meetings</td>
<td>Panel Meetings</td>
</tr>
</tbody>
</table>
## SCHEDULE - Monday, 13 December
**All Times Listed Are Eastern Standard Time**

<table>
<thead>
<tr>
<th>Time</th>
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</tr>
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<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
<td></td>
</tr>
<tr>
<td>24 hours/day</td>
<td>Virtual Reading Room</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m. - 3:30 p.m.</td>
<td>Monday Technical Sessions, Panel Meetings, and Specialist Session</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m. - 1:35 p.m.</td>
<td>6A PEDCS Characterizing Material Behavior</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 2:35 p.m.</td>
<td>6B RNTS Nozzle Thermal, Structural, Fluids Analysis and Modeling</td>
<td>Open</td>
</tr>
<tr>
<td>2:35 p.m. - 3:05 p.m.</td>
<td>6B RNTS PANEL MEETING: Nozzle Thermal, Structural, Fluids Analysis and Modeling</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:30 p.m.</td>
<td>6C PEDCS SPECIALIST SESSION: PGN Synthesis and Formulation</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 1:35 p.m.</td>
<td>6D SMBS Materials Properties and Characterization</td>
<td>Open</td>
</tr>
<tr>
<td>1:35 p.m. - 2:35 p.m.</td>
<td>6D SMBS PANEL MEETING: Materials Properties and Characterization</td>
<td>Open</td>
</tr>
<tr>
<td>12:05 p.m. or 12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
<td></td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Sessions</td>
<td></td>
</tr>
</tbody>
</table>

## SCHEDULE - Tuesday, 14 December
**All Times Listed Are Eastern Standard Time**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
<td></td>
</tr>
<tr>
<td>24 hours/day</td>
<td>Virtual Reading Room</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m. - 4:05 p.m.</td>
<td>Tuesday Technical Sessions, Panel Meetings, and Workshop</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m. - 2:05 p.m.</td>
<td>7A PEDCS Propellant Formulations and Processing</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:35 p.m.</td>
<td>7B RNTS Nozzle Design, Test and Evaluation - I</td>
<td>Open</td>
</tr>
<tr>
<td>3:35 p.m. - 4:05 p.m.</td>
<td>7B RNTS PANEL MEETING: Nozzle Design, Test and Evaluation</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:15 p.m.</td>
<td>7C PEDCS WORKSHOP: CylEx Test - I</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 1:35 p.m.</td>
<td>7D SMBS Experimental Structural and Mechanical Analysis and Test Methods</td>
<td>Open</td>
</tr>
<tr>
<td>1:35 p.m. - 2:20 p.m.</td>
<td>7D SMBS PANEL MEETING: Experimental Structural and Mechanical Analysis and Test Methods</td>
<td>Open</td>
</tr>
<tr>
<td>2:05 p.m. - 3:05 p.m.</td>
<td>7D SMBS PANEL MEETING: Service Life/Missile Sustainment</td>
<td>Open</td>
</tr>
<tr>
<td>3:05 p.m. - 3:50 p.m.</td>
<td>7D SMBS PANEL MEETING: Nondestructive and Defect Evaluation</td>
<td>Open</td>
</tr>
<tr>
<td>12:05 p.m. or 12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
<td></td>
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<tr>
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### Schedule Color Key

- **Meeting Services**
- **Concurrent Sessions or Panel Meetings**
- **Networking Opportunities**
- **Session Details**
- **Closed Meetings**
- **Panel, Town Hall, & Working Group Meetings**
### SCHEDULE - Wednesday, 15 December

All Times Listed Are Eastern Standard Time

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agendas, Links/Call-in Info and Login to Session of Choice</td>
<td>Open</td>
</tr>
<tr>
<td>24 hours/day</td>
<td>Virtual Reading Room</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:35 p.m.</td>
<td>Wednesday Technical Sessions, Panel Meetings, and Workshop</td>
<td><strong>DoD &amp; DoD Contractors ONLY</strong></td>
</tr>
<tr>
<td>11:00 a.m. - 3:35 p.m.</td>
<td>8A PEDCS Optimizing and Characterizing Material Response</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 12:05 p.m.</td>
<td>8B RNTS Thrust Control</td>
<td>Open</td>
</tr>
<tr>
<td>12:35 p.m. - 1:35 p.m.</td>
<td>8B RNTS PANEL MEETING: Thrust Control</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:00 p.m.</td>
<td>8C PEDCS WORKSHOP: CylEx Test - II</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 12:35 p.m.</td>
<td>8D SMBS Structural Analysis and Design</td>
<td>Open</td>
</tr>
<tr>
<td>1:05 p.m. - 2:05 p.m.</td>
<td>8D SMBS PANEL MEETING: Structural Analysis and Design</td>
<td>Open</td>
</tr>
<tr>
<td>12:05 p.m. or 12:35 p.m.</td>
<td>Session Break (most sessions - see session agendas)</td>
<td>Open</td>
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<tr>
<td>As Time Permits</td>
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### SCHEDULE - Thursday, 16 December

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<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Download Virtual Session Agenda, Link/Call-in Info and Login to Session</td>
<td>Open</td>
</tr>
<tr>
<td>12:00 a.m. - 3:05 p.m.</td>
<td>Virtual Reading Room</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 3:05 p.m.</td>
<td>Thursday Technical Sessions</td>
<td><strong>DoD &amp; DoD Contractors ONLY</strong></td>
</tr>
<tr>
<td>11:00 a.m. - 3:05 p.m.</td>
<td>9A PEDCS Modeling and Formulations of Energetics</td>
<td>Open</td>
</tr>
<tr>
<td>11:00 a.m. - 1:35 p.m.</td>
<td>9B RNTS/SMBS/ PEDCS U.S. Government Only Session</td>
<td><strong>US Government ONLY</strong></td>
</tr>
<tr>
<td>12:05 p.m. or 12:35 p.m.</td>
<td>Session Break</td>
<td>Open</td>
</tr>
<tr>
<td>As Time Permits</td>
<td>Networking and Open Discussion after Session</td>
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### Schedule Color Key

- **Meeting Services**: Concurrent Sessions or Panel Meetings
- **Networking Opportunities**: Session Details
- **Closed Meetings**: Panel Meetings