



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

MEETING INVITATION

71st JANNAF Propulsion Meeting (JPM)

Programmatic and Industrial Base Meeting (PIB)

18th Modeling and Simulation (MSS)

14th Liquid Propulsion (LPS)

13th Spacecraft Propulsion (SPS)

JOINT SUBCOMMITTEE MEETING

6-9 MAY 2024 // OKLAHOMA CITY, OKLAHOMA

Sheraton Oklahoma City Downtown

**Includes Registration
& Hotel Info**

Discounted registration
deadline: 5 April

Distribution Statement A: Approved for public release; Distribution is unlimited. AFRL-2024-1312

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**YOU ARE
INVITED TO
ATTEND THE
MAY 2024
MEETING
OF THE JOINT
ARMY-NAVY-
NASA-
AIR FORCE
(JANNAF)
INTERAGENCY
PROPULSION
COMMITTEE.**

This meeting will consist of the 71st JANNAF Propulsion Meeting, Programmatic and Industrial Base Meeting and the Joint Meeting of the 18th Modeling and Simulation, 14th Liquid Propulsion, and 13th Spacecraft Propulsion subcommittees. The meeting will be held Monday through Thursday, 6 - 9 May 2024, at the Sheraton Oklahoma City Downtown in Oklahoma City, OK.

Attend and choose from over 250 presentations in 54 technical sessions, workshops, specialist sessions and keynote presentations!



The Program Chair for the meeting is Ms. Christina A. Blankenship, DEVCOM Aviation & Missile Center, Redstone Arsenal, AL. 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.

Johns Hopkins University Whiting School of Engineering Energetics Research Group (JHU WSE ERG) provides technical and administrative support to the JANNAF Interagency Propulsion Committee.

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

JANNAF PROPULSION MEETING

The JANNAF Propulsion Meeting (JPM) encompasses research and applications at the systems level. The JPM is held each year in conjunction with standing JANNAF subcommittee meetings on a rotating basis. The scope of the 71st JPM in 2024 spans six mission areas (MA): Tactical Propulsion; Missile Defense/Strategic Propulsion; Propulsion Systems for Space Access; Gun and Gun-Launched Propulsion; Propulsion and Energetics Test Facilities; and Sensors for Propulsion Measurement Applications.

PROGRAMMATIC AND INDUSTRIAL BASE

The Programmatic and 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.

MODELING AND SIMULATION SUBCOMMITTEE

The 18th Modeling and Simulation Subcommittee (MSS) provides an overarching focus on M&S across all disciplines related to JANNAF Interagency simulation-based acquisition of propulsion systems for aerospace plane, hypersonic aircraft, rocket-based space-access systems, high-speed missiles, and in-space propulsion systems, and gun propulsion systems. The MSS pursues this focus through Model-Based Engineering, Integrated Health Management, Simulation Credibility: Verification, Validation, and Risk, and Modeling and Simulation of System Autonomy. The MSS is focused on these topics, seeking to advance modeling and simulation capabilities for the propulsion community.

LIQUID PROPULSION SUBCOMMITTEE

The JANNAF 14th Liquid Propulsion Subcommittee meeting will include sessions in six general technical areas: liquid engine systems; liquid combustion subsystems and components; liquid propellant feed and pressurization systems; advanced materials for liquid propulsion applications; rotating detonation rocket engines, and propulsion-induced environments and structural and thermal loads.

SPACECRAFT PROPULSION SUBCOMMITTEE

The charter of the Spacecraft Propulsion Subcommittee addresses technical problems and issues of national needs associated with technology materials applied to space-based primary or auxiliary propulsion. These issues (for both system and component level) include design, development, materials, lifetime, performance, ground testing, flight testing, validation, qualification, spacecraft integration, fabrication processes, standards and cost. Sessions during the 13th SPS meeting will focus on the full array of spacecraft propulsion technology interests

HOTEL INFORMATION

All sessions will be conducted at the Sheraton Oklahoma City Downtown in Oklahoma City, OK. The hotel is conveniently located at 1 North Broadway Avenue, Oklahoma City, Oklahoma 73102. The hotel is conveniently located within a short walk or street car ride to numerous options for dining, sightseeing, entertainment, and shopping. It is also 15 minutes from the Will Rogers World Airport.

The discounted JANNAF room rate for all attendees is \$110 per night (equal to the GSA FY 2024 per diem rate) for single or double occupancy. Applicable state and local taxes are currently 14.125%. Those eligible for tax exemption for lodging can access requisite instructions on the [Hotel page](#) of the website.

These discounted rooms are limited and will be held for JANNAF attendees until the reservation deadline of Friday, 19 April at 11:59 p.m. CDT, or until they sell out—whichever comes first. Each individual is responsible for their own reservation. Reservations may be made either on the Web (recommended) or by telephone (link and phone number provided on the [Location/Hotel page](#) of the meeting website).

Note that the JANNAF discounted room rate is offered beginning Sunday, 5 May through the night of Friday, 10 May, until rooms in the JANNAF block are sold out. Based upon availability, the hotel will honor the JANNAF discounted rate for up to two days pre- and post-meeting for those who wish to extend their stay.

Please be sure to utilize the reservation link provided on the [Location/Hotel page](#) of the website when booking your reservation. Not only does this ensure that you receive the applicable discounted rate, but it also helps JANNAF to meet its obligation to the hotel, avoid penalties, and keep meeting costs down.

MAKING RESERVATIONS

Click on the reservation link on the [Location/Hotel page](#) of the meeting website to make your reservation. Using this link is recommended as it will give you direct access to the JANNAF discounted room block. For additional reservation assistance, please call 1-800-325-3535. When calling, be sure to provide the group code (DoD JANNAF) to be eligible for the May 2024 JANNAF Conference discounted rate.

Need to cancel or change your reservation? Policies pertaining to room reservation cancellation and early departure are provided on the [Location/Hotel page](#) of the meeting website and in your reservation confirmation email.



TRANSPORTATION & PARKING

The [Will Rogers World Airport \(OKC\)](#) is located just 15 minutes from the hotel. Ground transportation costs are approximately \$14-20 for a taxi or rideshare from the airport to the hotel. More information can be found on the airport's website. Rental cars are available at the airport, and self-parking at the garage adjacent to the hotel is discounted at \$8/day for JANNAF attendees. The [OKC Streetcar](#) stops just steps from the hotel's front entrance and is your gateway to exploring Oklahoma City for just \$1/ride or \$3 for a day pass. Hotel parking information can be found on the [Transportation page](#) of the meeting website.

MEETING SITE

All sessions will be held at the Sheraton Oklahoma City Downton in Oklahoma City, OK. For attendance at this meeting, please see the Security/Attendance Requirements on this page and Registration instructions on page 7.

SECURITY/ATTENDANCE REQUIREMENTS

THE OVERALL SECURITY CLASSIFICATION OF THIS MEETING IS UNCLASSIFIED.

To qualify to attend this meeting, all attendees must be U.S. citizens 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. No foreign nationals will be permitted to attend.

Questions concerning attendance eligibility should be directed to Mionna Sharp at (410) 992-7300, ext. 224 or msharp@erg.jhu.edu.

ATTENTION DoD

Based on current conference guidance and consultation with various service conference POCs, there is no longer a need for DoD meeting approval. U.S. Government organizations should follow their organization's internal guidance with respect to meeting attendance. Please note JANNAF functions are accomplished consistent with the approved JANNAF Charter (available on the May meeting website). Questions concerning this should be directed to the TEC Chair, Frank Tse, at frank.c.tse.civ@us.navy.mil.

REGISTRATION STEPS

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 complete this process:

1. Complete the [registration form](#) for the meeting (login to your JANNAF Secure Portal account is required).
2. Pay the registration fee (Portal account NOT required).

Go to the [Registration Steps page](#) for links to complete your meeting registration, and for additional information.

You are encouraged to register early (on or before 5 April) to take advantage of the discounted registration fee. Please pre-register no later than 19 April so that we may properly prepare for your participation and communicate accurate attendance figures to the hotel and vendors. *After 19 April, on-site registration using your own device will be required.*

Register on or before 5 April for the lowest rate.

Follow instructions above and on page 7.

REGISTRATION FEE

Register and pay the registration fee by Friday, 5 April at 11:59 p.m. EDT to take advantage of the lowest fee. 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*.

Payment Received	Regular Attendee	Student*
<i>on or before 4/5/24</i>	\$1,200.00	\$400
<i>4/6/24 or later</i>	\$1,350.00	\$400

*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 [University Registration Information page](#).

Registration payment is recommended by credit card (VISA, MasterCard, American Express) using the Registration Payment site available online. Go to the [Registration Steps page](#) of the meeting website, and click on "Registration Payment." Alternative forms of payment include check payable to JHU WSE Energetics Research Group, or purchase order (government only).

Payment of the registration fee may be completed as soon as permitted, but should be completed on or before Friday, 5 April 2024 to obtain the lowest registration fee. Credit card payments made electronically via the Web will be charged immediately; a receipt will be sent to you via email from meetings@erg.jhu.edu. To facilitate delivery of this and other meeting-related communication, you are urged to add "@erg.jhu.edu" to the list of accepted email domains in your email client.

CANCELLATION POLICY

Please note our cancellation policy.

Written (email) cancellations submitted on or before 5 April 2024 will receive a full refund minus an administrative fee of \$75.00. Cancellations made after 5 April 2024 **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.

ON-SITE REGISTRATION / CHECK-IN

The JANNAF Registration desk will be located on the 2nd floor of the Sheraton Oklahoma City Downtown. Government-issued photo identification is required upon registration or check-in. The desk will be open:

Monday	10:00 a.m.	-	5:00 p.m.
Tuesday	7:00 a.m.	-	5:00 p.m.
Wednesday	7:00 a.m.	-	5:00 p.m.
Thursday	7:00 a.m.	-	5:00 p.m.

HEALTH AND SAFETY

The health of attendees and staff remains our top priority. If you are registered to attend but feel unwell, please stay home or in your hotel room and contact ERG for further guidance. Participants opting to wear face masks are asked to bring their own masks to use throughout the meeting. All attendees are asked to be respectful of their colleagues' decision with regard to masking.

JANNAF PRELIMINARY PROGRAM - MAY 2024

ATTIRE

There is no official dress code for JANNAF meetings; however, business or business casual attire is suggested. When packing, keep in mind that it can be difficult to regulate the temperature in meeting rooms to everyone's liking, and any changes may not be noticeable quickly, so it is best to bring a light sweater or jacket and dress in layers.

DINING

Approximately one and one-half hours for lunch has been built into the program each full day. A variety of dining options are available in the hotel and within a 5-10 minute walk or streetcar ride from the hotel. The hotel also offers room service for breakfast and dinner. Maps of nearby dining options have been provided on the [May meeting website](#) and will be available in the JANNAF registration area.

NETWORKING ROOM

One Broadway Ballroom in the hotel will serve as the JANNAF networking area; light morning refreshments, a mid-morning coffee break, and light mid-afternoon refreshments will be served at the times stated in the Schedule at a Glance on pages 17 - 20. This area will be open each day of the meeting. Please note that scheduled breaks are included in the session agendas where time permits.

ATTENDEE NETWORKING HOUR

Kick off your evening on Wednesday, 8 May by joining us for the attendee networking hour starting at 5:30 p.m. to connect with other attendees in an informal and relaxed environment. The networking hour aims to encourage interaction amongst peers and forge lasting relationships between both

seasoned attendees and newcomers within the community. Light refreshments and a cash bar will be available to fuel your conversations and connections.

There is no charge for meeting attendees to participate in the networking hour. Attendees simply wear their badge for access. This is an attendee-only event.

Continue your networking after this event at the hotel's Aria Lounge or outdoor Patio Vibe. Or take advantage of the [OKC Streetcar](#) to experience some of the city's nearby dining and nightlife with your JANNAF colleagues.

WHY ATTEND A JANNAF MEETING?

Attendees of recent in-person 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 ability 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

EARLY CAREER WORKING GROUP

There will be a meeting of the new JANNAF Early Career Working Group (ECWG) on Monday, 6 May, from 11:00 a.m. – 12:00 p.m. in the Kiamichi room (2nd floor of hotel). Check-in early at the registration desk (opens at 10:00 a.m. on Monday) to get your badge and then take advantage of the opportunity to meet and network with other early career attendees. There will be a quick primer on JANNAF as an organization, followed by discussions regarding participant expectations for the group. Topics of interest for discussion include the structure and historical perspectives of JANNAF, mentorship, leadership, and connecting young professionals.

VIRTUAL READING ROOM

Pre-publication copies of papers that are publicly releasable, DoD Distribution Statement C, or CUI/FEDCON, will be available to read in the virtual Reading Room beginning at 1:30 p.m. on Monday, 6 May. You are encouraged to bring your own device for convenient 24/7 access to papers via the virtual Reading Room during the meeting until 6:00 p.m. Thursday. More details will be provided in the Final Program. Reproduction of Reading Room papers is not permitted.

SIDE MEETINGS

A limited number of small meeting rooms are available for JANNAF-related side meetings. Audiovisual equipment will not be provided. Please contact Shelley Cohen at scohen@erg.jhu.edu to reserve a room as soon as possible. Requests may also be made on-site during the meeting if space is available. Rooms must be reserved and will be assigned on a first-come, first-served basis.

PROGRAM CHANGES

Printed meeting programs will be distributed to attendees upon registration/check-in on-site. The most current version of the Final Program, reflecting changes made after the program has been sent to the printer and throughout the week of the meeting, can be accessed online by scanning the QR code printed on the inside cover of the printed program and posted throughout the meeting space. Changes to the Final Program will also be posted on touch screen monitors in the Registration area. Attendees should regularly check for program updates. **Final Programs are CUI and Distribution Statement C and should be secured when not in your possession.**

MEETING PROCEEDINGS

Proceedings from this meeting will be published by the JHU WSE Energetics Research Group. Papers and presentations will be provided complimentary to attendees of this meeting who have paid the full registration fee. Attendees will have access to these materials 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) 992-7302, ext. 215 / scohen@erg.jhu.edu or Atashia Allen at (410) 992-7302, ext. 204 / aallen@erg.jhu.edu.

Questions that pertain to obtaining a JANNAF Secure Portal account (registration prerequisite) should be directed to Mionna Sharp at (410) 992-7300, ext. 224 / msharp@erg.jhu.edu.

UPCOMING JANNAF MEETINGS

71st JANNAF Propulsion Meeting
Programmatic and Industrial
Base Meeting

18th Modeling and Simulation
14th Liquid Propulsion
13th Spacecraft Propulsion
Joint Subcommittee Meeting

6 - 9 May 2024
Oklahoma City, OK

49th Structures and Mechanical Behavior

45th Propellant and Explosives
Development and Characterization

34th Safety and Environmental Protection

2nd High Temperature Material Applications

Joint Subcommittee Meeting

Programmatic and Industrial
Base Meeting

9 - 13 December 2024

Location TBA

72nd JANNAF Propulsion Meeting
Programmatic and Industrial
Base Meeting

53rd Combustion

41st Airbreathing Propulsion

41st Exhaust Plume and Signatures

35th Energetic Systems Hazards

19th Modeling and Simulation

Joint Subcommittee Meeting

Spring 2025
Dates & Location TBA

PROGRAM COMMITTEE MEMBERS

Program Chair

Ms. Christina A. Blankenship
DEVCOM Aviation & Missile Center
Redstone Arsenal, AL

JANNAF Propulsion Meeting

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Air Force Research Laboratory
Wright-Patterson AFB, OH

Dr. Jeremy R. Rice
DEVCOM Aviation & Missile Center
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Mission Area I: Tactical Propulsion

Dr. Jeremy R. Rice
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Mission Area II: Missile Defense / Strategic Propulsion

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Programmatic and Industrial Base Meeting

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Mission Area I: Model-Based Engineering

Mr. Sahil Kabra
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China Lake, CA

Mr. Adrian M. Blot
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Mr. James T. Singleton
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Dr. Richard Hatch
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Promontory, UT

Mission Area III: Simulation Credibility: Verification, Validation, and Risk

Dr. Robert A. Baurle
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Dr. Timothy A. Eymann
Air Force Research Laboratory
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Mission Area IV: Modeling and Simulation of System Autonomy

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Liquid Propulsion Subcommittee

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Mission Area I: Liquid Engine Systems

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Mission Area II: Liquid Combustion Subsystems and Components

Mr. Thomas W. Teasley
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Dr. Levon Gevorkyan
The Aerospace Corporation
El Segundo, CA

Mission Area III: Liquid Propellant Feed and Pressurization Systems

Mr. James L. Cannon
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Mr. Robert N. Bernstein
Air Force Research Laboratory
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Mission Area IV: Advanced Materials for Liquid Propulsion Applications

Mr. Clyde S. Jones
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Mr. Jamie B. Malak
Air Force Research Laboratory
Edwards AFB, CA

Mission Area V: Rotating Detonation Rocket Engines

Mr. Eric J. Paulson
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Mission Area VI: Propulsion-Induced Environments and Structural and Thermal Loads

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Air Force Office of Scientific Research
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Mission Area III: Cube / Nano Satellite Propulsion

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Mission Area IV: Future Technologies

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DR. JONATHAN E. JONES

NASA Technical Fellow for Propulsion

NASA Engineering and Safety Center

Huntsville, AL

Dr. Jonathan E. Jones currently serves as the NASA Technical Fellow for Propulsion. Dr. Jones began his NASA career at Marshall Space Flight Center (MSFC) in 1999 as an aerospace engineer in the Space Transportation Directorate's Propulsion Research Center where he led multiple studies and experiments of advanced propulsion systems. He was the Technical Lead for NASA's decadal planning activities creating roadmaps for chemical, electric, and nuclear propulsion technology maturation. He is an expert in advanced diagnostic techniques and has published

experimental results of propulsion system performance in electron cyclotron resonance thrusters, laser lightcraft, Hall thrusters, plasma sails, pulsed detonation engines, and gun launch systems.

Dr. Jones served as the Ballistics' Team Lead during the closeout of the Space Shuttle Program and formulation of the Constellation Program. In 2011, Dr. Jones served as the propulsion lead for Team 3 during the Requirements Analysis Cycle for the Space Launch System (SLS). At the conclusion of the RAC study, Dr. Jones became the Technical Assistant for the Solid Propulsion Systems Division where he oversaw research, development, and educational outreach.

Dr. Jones is a strong advocate of lunar exploration. Shortly after the call to return to the moon, he was selected to serve as the Deputy Chief Engineer for the Human Landing System. During formulation, selection, and protests leading to the Option A award, Dr. Jones played a key role in HLS's success. He helped formulate the adjudication process which allowed providers to demonstrate that their best practices and standards met the intent of NASA standards. He advocated with NASA's OCE for a collaborative approach enabling the best of government and industry to synergistically solve key challenges facing a return to the moon.

Before coming to NASA, Jonathan was the Von Braun Propulsion Fellow at the University of Alabama in Huntsville where he earned his PhD. He also holds a master's degree in Mechanical Engineering from Utah State University, and a bachelor's degree in Physics from Brigham Young University. He currently serves as a member of the JANNAF Technical Executive Committee.

As the keynote presenter at the May JANNAF meeting, the title of Dr. Jones' talk is, "**Lighting Up the Right Brain: Flying Safely and Shaping the Future.**" Dr. Jones will take a journey through the triumphs and tragedies of space exploration and rocket development, highlighting the importance of an active corpus collosum.

All attendees are invited to participate. **The Keynote Address begins at 8:00 a.m. on Tuesday, 7 May in the Century Ballroom** on the 2nd floor of the Sheraton Oklahoma City Downtown. Award presentations will immediately follow the Keynote Address.

PROGRAM HIGHLIGHTS

JANNAF Propulsion Subcommittee

The JPM will be hosting 10 sessions spanning topics of interest in Air Breathing, Gun, Solid, Liquid Propulsion, Testing, and Propellant Development. The wide coverage of topics include "Solid Propellant Development and Evaluation" (1S), "Future Space Systems and Propulsion Components" (2D and 2S) which will include Bruce Askins' presentation on the Space Launch System as the program marches forward to the Moon. Other papers within this group will include a survey of foreign engine manufacturers of LNG and CH4 engines. Tuesday will include a session on "Advanced Topics in Tactical Propulsion" (2E). On Wednesday, JPM will focus on "Sensors and Measurements for Propulsion Applications" (3D) and on "Rocket Testing" (3S). The latter will be the first offering from JPM Mission Area V in several years. Thursday will host four JPM sessions in "Ramjet Propulsion" (4D), "Propulsion for Tactical Systems (4S), and "Propellants and Propelling Charges for Solid Propellant Guns" (4G and 4V).

Programmatic and Industrial Base

The Programmatic and Industrial Base (PIB) will present a specialist session on Space Access, Mobility, and Logistics (3A) on Wednesday, 8 May.

WHAT ARE PANEL MEETINGS AND WHY ATTEND THEM?

Subcommittee Panels represent the primary mechanism for collaboration in technical areas of joint interest to JANNAF agencies, the industry, and academia. If you are interested in participating in JANNAF tasks or wish to learn about potential areas for collaboration, then please look through the meeting Schedule at a Glance (pages 17-20) for panel meetings that align with your interests.

Modeling and Simulation Subcommittee

During this 18th meeting of the Modeling and Simulation Subcommittee (MSS), MSS will be hosting 7 technical sessions, two panel meetings, a Plenary speaker from Northrup Grumman Corporation, and a specialist session on digital engineering capabilities for rocket test stand operation. MSS will host a session on Monday, 6 May (1U) entitled, "System Level Modeling and Model Based Systems Engineering", which will be followed by a panel meeting on that topic. Adhering to tradition, on Tuesday after the keynote presentation MSS will host a plenary speaker, Dr. Mark Ewing, Director of Design and Analytics supporting development and validation of new rocket motors at Northrop Grumman Propulsion Systems. As an internationally recognized expert in rocket propulsion and uncertainty quantification, Dr. Ewing will present his perspective on modern modeling and simulation functionality. On Tuesday afternoon, there will be a very informative session on "Computational Modeling and Machine Learning" (2U). The Wednesday morning MSS offering is a specialist session dealing with "Digital Engineering for Test Operations" (3F). This specialist session will host presentations from DoD, Academia, and the commercial sector. MSS Mission Area III: Simulation Credibility will conduct a session on various computational studies dealing with subjects from modeling turbulence effects on inlet ducting to hypersonic flow (3U). At the end of the session, there will be a panel meeting on Simulation Credibility. On Thursday, MSS will present a session on "Model Verification and Validation" (4E Part 2), and will also conduct a session on "Modeling and Simulation of Hypersonic Vehicles" (4F) to be followed by Session 4U continuing the discussion of Simulation Credibility and various "Experimental Studies".

PROGRAM HIGHLIGHTS

Liquid Propulsion Subcommittee

The Liquid Propulsion Subcommittee will be hosting 18 sessions. Among those will be two specialist sessions: (1) Additive Manufacturing for Propulsion Systems Tutorial and (2) Rotating Detonation Rocket Engine (RDRE) Development Progress, Gaps, and Lessons Learned. In addition to the specialist sessions, the RDRE Mission Area V will conduct three technical sessions (3P, 4A, and 4P). LPS recently added a new Mission Area VI titled “Propulsion-Induced Environments and Structural and

Thermal Loads” which considers modeling, analysis, testing, design, and validation aspects. The new mission area will conduct two technical sessions (2T and 3E).

Spacecraft Propulsion Subcommittee

The Spacecraft Propulsion Subcommittee (SPS) will be hosting a 2-part workshop on Electric Propulsion Operation in the Space Environment (EPOSE VII) (3C and 3R). In addition, SPS will be holding a panel meeting for Micropropulsion Technologies, Development Programs, Missions, and Requirements (2V).

TECHNICAL PROGRAM

This year’s technical program currently consists of more than 250 presentations in 45 technical sessions; 5 specialist sessions; 2 workshops; and 6 panel meetings. A detailed daily schedule of all sessions, workshops, meetings, and networking activities is provided below and continues through page 20. Detailed agendas of the technical sessions, specialist sessions, and workshops (if available) are listed in the Program Section of the Preliminary Program beginning on page 21.

Please note that the agendas of 8 technical sessions begin with at least one presentation that is restricted at either distribution statement B (U.S. Government only) or D (DoD and DoD Contractors only). Sessions with at least one restricted presentation are indicated in the Schedule at a Glance below and through page 20 with “Open *”. Please review the detailed session agendas on pages 21 - 45 in the Preliminary Program for additional information about the restricted talks and who is eligible to attend them.

A Schedule Color Key has been provided on pages 18, 19, and 20.

SCHEDULE - Monday, 6 May					
10:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open			2nd Floor Foyer	
10:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Frontier	Open
10:00 a.m. - 11:00 a.m.	Networking Area Refreshments			One Broadway	Open
11:00 a.m. - 12:00 p.m.	Early Career Working Group Meeting			Kiamichi	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - On Your Own				
12:45 p.m. - 1:00 p.m.	Session Chair Meeting (Monday Sessions)			Red Carpet	Closed
1:30 p.m. - 24 Hours	Virtual Reading Room (24/7 virtually with your own device)			Virtual	Open
1:30 p.m. - 6:05 p.m.	Monday Afternoon Technical Sessions, Specialist Session, and Panel Meeting				
1:30 p.m. - 5:00 p.m.	IP	LPS	<i>SPECIALIST SESSION:</i> Additive Manufacturing for Propulsion Systems	18th Century	Open
1:30 p.m. - 5:05 p.m.	IQ	LPS	Propellant Characterization and Performance - I	19th Century	Open
1:30 p.m. - 4:35 p.m.	IR	SPS	Nuclear Thermal Propulsion	20th Century	Open
1:30 p.m. - 3:05 p.m.	IS	JPM	Solid Propellant Development and Evaluation	Plaza North	Open
1:30 p.m. - 3:35 p.m.	IT	LPS	New Engine Concepts and Developments	Plaza South	Open
1:30 p.m. - 5:35 p.m.	IU	MSS	System Level Modeling and Model Based Systems Engineering	Green Country	Open
5:35 p.m. - 6:05 p.m.	IU	MSS	<i>PANEL MEETING:</i> Model Based Engineering	Green Country	Open
1:30 p.m. - 4:35 p.m.	IV	SPS	Small Satellite Propulsion - I	Kiamichi	Open
3:05 p.m. - 4:05 p.m.	Networking Area Refreshments			One Broadway	Open

JANNAF PRELIMINARY PROGRAM - MAY 2024

SCHEDULE - Tuesday, 7 May					
7:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open			2nd Floor Foyer	
7:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Frontier	Open
7:00 a.m. - 8:00 a.m.	Networking Area Refreshments			One Broadway	Open
7:15 a.m. - 7:30 a.m.	Session Chair Meeting (Tuesday sessions)			Red Carpet	Closed
8:00 a.m. - 10:00 a.m.	KEYNOTE ADDRESS: Dr. Jonathan E. Jones - NASA Engineering and Safety Center, Huntsville, AL, to be followed by Awards and Announcements			Century Ballroom	Open
24 hours	Virtual Reading Room (available 24/7 virtually with your own device)			Virtual	Open
9:30 a.m. - 10:00 a.m.	Networking Area Refreshments			One Broadway	Open
10:00 a.m. - 5:00 p.m.	JANNAF Technical Executive Committee Meeting			Great Plains	Closed
10:00 a.m. - 12:05 p.m.	Tuesday Morning Technical Sessions, Specialist Session, and Panel Meeting				
10:00 a.m. - 12:05 p.m.	2A	LPS	<i>SPECLIAST SESSION</i> : Rotating Detonation Rocket Engine Development Progress, Gaps, and Lessons Learned	18th Century	Open
10:00 a.m. - 11:35 a.m.	2C	SPS	Electric Propulsion Ground Facility Effects Research	20th Century	Open
10:00 a.m. - 12:05 p.m.	2D	JPM	Future Space Systems and Propulsion Components - I	Plaza North	Open
10:00 a.m. - 11:05 a.m.	2E	JPM	Advanced Topics in Tactical Propulsion	Plaza South	Open
10:00 a.m. - 11:00 a.m.	2F Part 1	MSS	<i>SPECIALIST SESSION</i> : MSS Plenary	Green Country	Open
11:00 a.m. - 11:35 a.m.	2F Part 2	MSS	Digital Engineering Processes	Green Country	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - On Your Own				
1:30 p.m. - 6:05 p.m.	Tuesday Afternoon Technical Sessions and Panel Meetings				
1:30 p.m. - 2:35 p.m.	2P Part 1	LPS	Turbomachinery and Valve Design, Analysis, and Testing	18th Century	Open
3:00 p.m. - 4:35 p.m.	2P Part 2	LPS	Propellant Tank Systems Design, Analysis, and Testing	18th Century	Open
1:30 p.m. - 4:05 p.m.	2Q	LPS	Propellant Characterization and Performance - II	19th Century	Open
4:35 p.m. - 5:35 p.m.	2Q	LPS	<i>PANEL MEETING</i> : Hydrocarbon Fuels	19th Century	Open
1:30 p.m. - 6:05 p.m.	2R	SPS	Electric Propulsion Subsystem Research and Development	20th Century	Open *
1:30 p.m. - 4:35 p.m.	2S	JPM	Future Space Systems and Propulsion Components - II	Plaza North	Open
1:30 p.m. - 5:05 p.m.	2T	LPS	Propulsion-Induced Environments and Loads - Liftoff and Landing	Plaza South	Open
1:30 p.m. - 4:35 p.m.	2U	MSS	Computational Modeling and Machine Learning	Green Country	Open *
1:30 p.m. - 4:35 p.m.	2V	SPS	Small Satellite Propulsion - II	Kiamichi	Open
5:05 p.m. - 6:05 p.m.	2V	SPS	<i>PANEL MEETING</i> : Micropropulsion Technologies, Development Programs, Missions and Requirements	Kiamichi	Open
3:05 p.m. - 4:05 p.m.	Networking Area Refreshments			Grand Ballroom C	Open

Schedule Color Key			
	Meeting Services		Concurrent Sessions or Panel Meetings
	Networking Opportunities		Session Details
	Closed Meetings		Panel Meetings
"Open *" indicates a session with at least one presentation restricted at B or D			

JANNAF PRELIMINARY PROGRAM - MAY 2024

SCHEDULE - Wednesday, 8 May

7:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open			2nd Floor Foyer	
7:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Frontier	Open
7:00 a.m. - 8:00 a.m.	Networking Area Refreshments			One Broadway	Open
7:15 a.m. - 7:30 a.m.	Session Chair Meeting (Wednesday sessions)			Red Carpet	Closed
24 hours	Virtual Reading Room (available 24/7 virtually with your own device)			Virtual	Open
8:00 a.m. - 12:10 p.m.	Wednesday Morning Technical Sessions, Specialist Sessions, and Workshop				
8:30 a.m. - 12:10 p.m.	3A	PIB	<i>SPECIALIST SESSION</i> : Space Access Mobility and Logistics	18th Century	Open
8:00 a.m. - 9:35 a.m.	3B Part 1	LPS	Engine Production and Manufacturing Advancements	19th Century	Open
10:00 a.m. - 11:35 a.m.	3B Part 2	LPS	Additively Manufactured Component Development and Test	19th Century	Open
8:00 a.m. - 12:05 p.m.	3C	SPS	<i>WORKSHOP</i> : Electric Propulsion Operation in the Space Environment and Facility Interactions VI (EPOSEVII) - I	20th Century	Open
8:00 a.m. - 11:35 a.m.	3D	JPM	Sensors and Measurements for Propulsion Applications	Plaza North	Open*
8:00 a.m. - 10:05 a.m.	3E	LPS	Propulsion-Induced Environments and Loads - Propellant Dynamics	Plaza South	Open
8:00 a.m. - 12:00 p.m.	3F	MSS	<i>SPECIALIST SESSION</i> : Digital Engineering for Test Operations	Green Country	Open
8:00 a.m. - 10:05 a.m.	3G	SPS	Spacecraft Propulsion Systems	Kiamichi	Open
9:35 a.m. - 10:35 a.m.	Networking Area Refreshments			One Broadway	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - On Your Own				
12:00 p.m. - 1:15 p.m.	MSS Technical Steering Group Meeting			Red Carpet	Closed
12:00 p.m. - 1:30 p.m.	LPS Technical Steering Group Meeting			Great Plains	Closed
1:30 p.m. - 5:05 p.m.	Wednesday Afternoon Technical Sessions, Specialist Sessions, and Panel Meeting				
1:30 p.m. - 4:35 p.m.	3P	LPS	Rotating Detonation Rocket Engines - I	18th Century	Open
2:00 p.m. - 3:35 p.m.	3Q	LPS	Advanced Materials for Liquid Propulsion Applications	19th Century	Open
1:30 p.m. - 5:05 p.m.	3R	SPS	<i>WORKSHOP</i> : Electric Propulsion Operation in the Space Environment and Facility Interactions VI (EPOSEVII) - II	20th Century	Open
1:30 p.m. - 5:05 p.m.	3S	JPM	Rocket Testing	Plaza North	Open *
1:30 p.m. - 3:05 p.m.	3T	LPS	Ignition and Dynamics	Plaza South	Open
3:35 p.m. - 5:05 p.m.	3T	LPS	<i>PANEL MEETING</i> : Combustion Stability	Plaza South	Open
1:30 p.m. - 3:35 p.m.	3U	MSS	Simulation Credibility: Computational Studies	Green Country	Open*
3:35 p.m. - 4:35 p.m.	3U	MSS	<i>PANEL MEETING</i> : Simulation Credibility	Green Country	Open
1:30 p.m. - 5:05 p.m.	3V	SPS	Other Propellants	Kiamichi	Open
3:05 p.m. - 4:05 p.m.	Networking Area Refreshments			One Broadway	Open
5:30 p.m. - 7:00 p.m.	Attendee Networking Hour JANNAF Badge required (<i>this event is for attendees only</i>)			2nd Floor Foyer	Open

Schedule Color Key

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

"Distro D" and "Open *" indicate a session with at least one presentation restricted at B, D, or E

JANNAF PRELIMINARY PROGRAM - MAY 2024

SCHEDULE - Thursday, 9 May

7:00 a.m. - 5:00 p.m.	On-Site Check-In and Registration Desk Open			2nd Floor Foyer	
7:00 a.m. - 5:00 p.m.	I.T. Office Open (for Presenters and Session Chairs needing technical assistance)			Frontier	Open
7:00 a.m. - 8:00 a.m.	Networking Area Refreshments			One Broadway	Open
7:15 a.m. - 7:30 a.m.	Session Chair Meeting (Thursday sessions)			Red Carpet	Closed
24 Hours - 5:30 p.m.	Virtual Reading Room (available 24/7 virtually with your own device)			Virtual	Open
8:00 a.m. - 12:05 p.m.	Thursday Morning Technical Sessions and Panel Meeting				
8:00 a.m. - 10:05 a.m.	4A	LPS	Rotating Detonation Rocket Engines - II	18th Century	Open
10:05 a.m. - 11:05 a.m.	4A	LPS	<i>PANEL MEETING</i> : Rotating Detonation Rocket Engine	18th Century	Open
8:00 a.m. - 11:35 a.m.	4B	LPS	Engine Ground Testing and Flight Demonstration	19th Century	Open
8:00 a.m. - 10:05 a.m.	4C	SPS	ASCENT Chemical Propulsion - I	20th Century	Open
8:00 a.m. - 10:05 a.m.	4D	JPM	Ramjet Propulsion	Plaza North	Open *
8:00 a.m. - 10:05 a.m.	4E Part 1	SPS	Hall Thruster Research and Development	Plaza South	Open
11:00 a.m. - 11:35 a.m.	4E Part 2	MSS	Model Verification and Validation	Plaza South	Open
8:00 a.m. - 12:05 p.m.	4F	MSS	Modeling and Simulation of Hypersonic Vehicles	Green Country	Open
8:00 a.m. - 12:05 p.m.	4G	JPM	Propellants and Propelling Charges for Solid Propellant Guns - I	Kiamichi	Open
9:00 a.m. - 11:30 a.m.	PIB Large Liquid Propulsion Working Group Meeting			Red Carpet	Closed
9:35 a.m. - 10:35 a.m.	Networking Area Refreshments			Grand Ballroom C	Open
12:00 p.m. - 1:30 p.m.	Lunch Break - On Your Own				
12:00 p.m. - 1:15 p.m.	JPM Program Committee Meeting			Executive Boardroom	Closed
12:00 p.m. - 5:30 p.m.	PIB Executive Committee Meeting			Red Carpet	Closed
1:30 p.m. - 5:35 p.m.	Thursday Afternoon Technical Sessions				
1:30 p.m. - 5:35 p.m.	4P	LPS	Rotating Detonation Rocket Engines - III	18th Century	Open
1:30 p.m. - 5:05 p.m.	4Q	LPS	Combustion Device Modeling and Test	19th Century	Open
1:30 p.m. - 4:35 p.m.	4R	SPS	ASCENT Chemical Propulsion - II	20th Century	Open
1:30 p.m. - 4:35 p.m.	4S	JPM	Propulsion for Tactical Systems	Plaza North	Open *
1:30 p.m. - 2:35 p.m.	4T Part 1	SPS	Cathode Technology	Plaza South	Open
3:30 p.m. - 4:35 p.m.	4T Part 2	SPS	HALL Thruster Modeling and Simulation	Plaza South	Open
2:00 p.m. - 5:05 p.m.	4U	MSS	Simulation Credibility: Experimental Studies	Green Country	Open *
1:30 p.m. - 5:05 p.m.	4V	JPM	Propellants and Propelling Charges for Solid Propellant Guns - II	Kiamichi	Open *
3:05 p.m. - 4:05 p.m.	Networking Area Refreshments			One Broadway	Open

Schedule Color Key

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

"Distro D" and "Open *" indicate a session with at least one presentation restricted at B, D, or E