



DEFENSE  **FORUM**

19-21 APRIL 2022 | LAUREL, MD
Secret/NOFORN

ACCELERATING MODERNIZATION FOR OPERATIONAL RELEVANCE

aiaa.org/defense

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WELCOME TO DEFENSE FORUM

The 2022 AIAA DEFENSE Forum Executive Steering Committee (ESC) and Technical Program Committee (TPC) are excited to welcome you back to the AIAA DEFENSE Forum. We have worked hard to put together the high-level, technical and in-depth discussions centered around the theme

ACCELERATING MODERNIZATION FOR OPERATIONAL RELEVANCE.

We hope the program, the defense industry leaders, topics, and discussions inspire you.

We welcome your feedback! Should you have any questions or comments, please see the AIAA staff at the registration desk, or talk with any of the ESC or TPC members.

Enjoy the forum and make it a great week!

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FORUM OVERVIEW

	TUESDAY 19	WEDNESDAY 20	THURSDAY 21	FRIDAY 22	
0730 hrs	Continental Breakfast	Continental Breakfast	Continental Breakfast	Continental Breakfast	
0800 hrs	Keynote: Technology Vision for an Era of Competition <i>The Hon Heidi Shyu</i>	Keynote Panel: Technological Advantage in an Era of Competition	Keynote Panel: From Bench to Battlefield	Course: Non-Intrusive Laser-Based Diagnostic Techniques for Hypersonic Flows Separate Registration Required Please see the AIAA Registration Desk for details and to register	
0830 hrs	Keynote: Threat Briefing: China - Russia: Approach to Emerging and Disruptive Technology <i>Robert Heathcock</i>				
0900 hrs					
0930 hrs	Networking Coffee Break	Networking Coffee Break	Networking Coffee Break		
1000 hrs	DEW-01: HEL Integration onto a Tactical Aircraft GNC-01: Guidance, Navigation, & Control WSE-01: Morphing Weapons Technology WSE-06: Design & Evaluation of Flight Systems	AMD-01: Air & Missile Defense I AUT-01: Autonomy & Secure Communications Networking DEW-02: Counter UAS HPM Technology & Demos SYS-01: Space Systems WSE-03: Testing & Evaluation II - Flight Testing	HYP-02: High-Maneuverability & Hypersonic Systems & Technologies II - Flowfield Phenomenology HYP-03: University Consortium for Applied Hypersonics (UCAH) Technical Panel SDA-01: System & Decision Analysis for National Security SDA-02: Advanced Technologies in Wargaming Concepts WSE-05: Modeling & Simulation		
1030 hrs					
1100 hrs					
1130 hrs					
1200 hrs					
1230 hrs	Lunch Available 1200-1300 hrs	Lunch Available 1200-1300 hrs	Lunch Available 1200-1300 hrs		
1300 hrs	AP-01: Advanced Prototypes RUS-01: Robotic & Unmanned Systems SMS-01: Strategic Missiles WSE-02: Testing & Evaluation I - Ground Testing	AMD-02: Air & Missile Defense II DEW-03: HPM Effects & Panel Session HYP-01: High-Maneuverability Systems & Technologies 1-Vehicle System Design SUR-01: Survivability WSE-04: Testing & Evaluation III - Test Techniques	S&T Wargaming Demo Tabletop Exercise: Emerging Disruptive Technologies		
1330 hrs					
1400 hrs				Networking Coffee Break	
1430 hrs					
1500 hrs			Wargaming Tabletop Exercise, cont.		
1530 hrs	Networking Coffee Break	Networking Coffee Break			
1600 hrs	Keynote Panel: Operating at the Technological Edge	Keynote Panel: AI-Enabled Capability			
1630 hrs					
1700 hrs					
1730 hrs					
1800 hrs	Networking Reception				

GROW
Technical Career Development

CONNECT
Networking

DISCOVER
High Level

GENERAL & SECURITY INFORMATION

AIAA Technical Committee Meetings

TUESDAY, 19 APRIL, 1800 HRS

Airborne Directed Energy Systems Integration Committee
Kossiakoff Center Classrooms

WEDNESDAY, 20 APRIL, 1800 HRS

Missile Systems Technical Committee
Kossiakoff Center Classrooms

WEDNESDAY, 20 APRIL, 1800 HRS

Weapons Systems Effectiveness Technical Committee
Kossiakoff Center Classrooms

Employment Opportunities

AIAA members can post and browse resumes, browse job listings, and access other online employment resources by visiting the AIAA Career Center at aiaa.org/careers.

Membership

AIAA is your vital lifelong link to the collective creativity and brainpower of the aerospace profession and a champion for its achievements. aiaa.org/membership

Nondiscriminatory Practices

AIAA accepts registrations irrespective of race, creed, sex, color, physical handicap, and national or ethnic origin.

Event Health and Safety Policies

The health and safety of all participants is AIAA's top priority as we come back together again. For everyone's protection, in conjunction with the facility, we have put the following protocols in place.

Required:

- › Proof of full vaccination or Negative Covid test
- › Completion of Daily Health Questionnaire
- › Masks while indoors except when actively eating or drinking
- › Speakers at the podium may be unmasked while speaking

Forum Health and Safety Precautions:

- › Social distancing will be observed as possible within the facility
- › Please be respectful of each individual's personal space and comfort level
- › Food and beverage will be provided in individual packaging where possible
- › Seating in the lunch area will be reduced to 6-7 per table
- › Lunch will be available for approximately 90 minutes to allow for a flow through the lines and for seating
- › Hand sanitizer stations are placed around the facility
- › Masks are available at the AIAA table should you need one
- › Disinfecting wipes will be available throughout the facility

Any questions or issues, please let an AIAA staff person know.



Attendance at this forum is restricted to U.S. citizens who possess a final SECRET security clearance or higher verified by the Security Office Coordinator.

Security Badge

A security conference badge AND a photo ID is required for admittance to the forum sessions. Badges must be worn at all times during the forum and upon entering any restricted areas of the forum.

Security Restrictions

Electronic Devices or electronic equipment of any kind are prohibited in ALL session rooms. This includes, but is not limited to: Smartwatches, Fitbits or other fitness trackers, laptops, cameras, PEDs (Personal Digital Assistants), Cellular Telephones, Two-Way Pagers, Recording Devices. One-way pagers must be placed on vibrate during sessions.

Hearing aids must be placed in airplane mode while inside session rooms.

Note-taking is not permitted in or around the forum sessions. Books, magazines, fliers, brochures, and other paper products will **NOT** be allowed in the session rooms.

Luggage, briefcases, oversized purses, and other large cases will not be allowed in the forum area. Please leave these items in your car or hotel as storage is not available at the Kossiakoff Center. Small handbags, purses, and personal possessions will be inspected upon entry into the conference area.

Security spot checks may be made at any time.

PROCEEDINGS AND JOURNAL ARTICLES

AIAA and the Defense Technical Information Center (DTIC) are excited to offer two opportunities for you to publish your work from the forum:

1. Conference Proceedings

DTIC will share proceedings from the AIAA DEFENSE Forum on a separate DTIC webpage dedicated to the forum (page creation by DoD Techipedia). More than 750,000 users access information available on the DTIC website.

- › All unclassified AIAA DEFENSE Forum presentations will be automatically collected and submitted to DTIC.
 - **If you do not want your presentation to be submitted, please see an AIAA staff member at the registration desk, or email tobeyj@aiaa.org.**
- › Classified presentations must be submitted directly to DTIC; go to <https://discover.dtic.mil/submit-documents/> and follow the instructions.
 - Once materials have been successfully submitted, you will receive an accession number from DTIC
 - Please provide the accession number to AIAA: email tobeyj@aiaa.org
- › Timeline:
 - Presentations due to DTIC: COB 6 May 2022
 - Proceedings will be available in early June

2. Special AIAA DEFENSE Forum edition of the *Journal of DoD Research and Engineering (JDR&E)*

In partnership with DTIC, AIAA is offering AIAA DEFENSE Forum attendees the opportunity to publish their classified and controlled unclassified research in a peer-reviewed journal. The *JDR&E* ensures rigorous peer review of all published scientific research in technical research areas that advance the development of priority technologies and support the department's focus on building a more lethal force. It is available to authorized users across the U.S. government, particularly the Department of Defense (DoD). As a secure and controlled-access publication, the *JDR&E* protects militarily critical innovations while building connections throughout the DoD research and engineering community. The journal is distributed to more than 65,000 DTIC users.

- › Authors will submit manuscripts directly to DTIC and not to AIAA
 - All submitters must be registered before submission (<https://reg.dtic.mil/DTICRegistration/rejournal>).
 - To submit a NIPR article, visit the JDR&E Workflow at <https://rejournal.dtic.mil/journal/faces/idea/viewIdeaList.faces>.
 - To submit a SIPR article, visit the JDR&E classified site at <https://www.dodtechipedia.smil.mil/dodwiki/x/HgAFD>.
 - Submissions must note that it is for "AIAA DEFENSE September 2022 Issue"
 - Authors can submit names and email addresses of potential peer reviewers
- › Manuscripts from DoD and DoE employees and contractors are welcome
- › Each article must be authored by or include one government employee as a co-author
- › Submissions are subject to three peer reviews prior to final acceptance
- › Timeline:
 - Manuscripts due: COB 27 May (but earlier is appreciated)
 - Peer review complete: COB 15 June
 - Journal published: September 2022
- › See the **JDR&E author template** for additional information; available at <https://www.aiaa.org/defense/presentations-papers/technical-presenter-resources/proceedings-and-journal-articles>

Additionally, peer reviewers are needed for JDR&E submissions.

To participate, or if you have any questions, contact tobeyj@aiaa.org.

KEYNOTE SESSIONS

All sessions are in the Auditorium unless otherwise noted.



TUESDAY, 19 APRIL

0800-0845 hrs

Technology Vision for an Era of Competition

KEYNOTE SPEAKER:

The Honorable Heidi Shyu, Under Secretary of Defense for Research and Engineering

0845-0930 hrs

Threat Briefing: China – Russia: Approach to Emerging and Disruptive Technology

KEYNOTE SPEAKER:

Robert Heathcock, Senior Defense Intelligence Expert for Intelligence Support to Acquisition, Defense Intelligence Agency

1600-1730 hrs

Operating at the Technological Edge

How do we translate concepts, mission capability needs, and requirements into effective solutions? How can we accelerate technology development for multi-domain operations? Hear from the senior leaders as they describe how they take existing solutions, new innovations, and emerging technologies and use them as tools to accomplish the mission.

MODERATOR:

Victoria Coleman, Chief Scientist, U.S. Air Force

PANELISTS:

Leslie Babich, Director, SOFWERX

Jeffrey Boulware, Technical Director and Deputy Division Chief, Joint Integrated Air and Missile Defense Organization (JIAMDO)

Kathleen Cooper, Associate Director, Capability and Resource Integration, U.S. Strategic Command/J8A

WEDNESDAY, 20 APRIL

0800-0930 hrs

Technological Advantage in an Era of Competition

How can we take research and apply it to technologies for the warfighter? Hear from agency and laboratory leaders about their current and future projects, upcoming opportunities, and how they transition ideas to technological advantages.

MODERATOR:

Anthony Mitchell, Vice President, Advanced Technology and Strategy, CAES

PANELISTS:

Shari Feth, Director, Innovation, Science and Technology, Missile Defense Agency

George Foster, Distinguished Engineer for Combat Control, Naval Surface Warfare Center - Dahlgren

Alexander Kott, Chief Scientist and Senior Research Scientist – Cyber Resiliency, DEVCOM Army Research Laboratory

Sarah Muccio, Acting Chief Scientist, Information Directorate, Air Force Research Laboratory

1600-1730 hrs

AI-Enabled Capability

“Incorporating these technologies in military systems that collaborate with warfighters will facilitate better decisions in complex, time-critical, battlefield environments; enable a shared understanding of massive, incomplete, and contradictory information; and empower unmanned systems to perform critical missions safely and with high degrees of autonomy.” (DARPA: <https://www.darpa.mil/work-with-us/ai-next-campaign>). Hear from government leaders on lessons learned from artificial intelligence applications and implementation.

MODERATOR:

Jean-Charles Ledé, Autonomy Technology Advisor, Air Force Research Laboratory

PANELISTS:

Yevgeniya “Jane” Pinelis, Chief of AI Assurance, Department of Defense Joint Artificial Intelligence Center (JAIC)

Lael Rudd, Program Manager, DARPA Tactical Technology Office

Gurpartap “GP” Sandhoo, Deputy Director, Intelligence Advanced Research Projects Activity (IARPA)

Brian Pierce, Visiting Research Scientist, Applied Research Laboratory for Intelligence and Security, University of Maryland

THURSDAY, 21 APRIL

0800-0930 hrs

From Bench to Battlefield

Industry leaders respond to modernization priorities and have a candid discussion on AI-enabled capability.

MODERATOR:

Debra Emmons, Vice President, Chief Technology Officer, The Aerospace Corporation

PANELISTS:

Laura J. McGill, Deputy Laboratories Director, and Chief Technology Officer, Nuclear Deterrence, Sandia National Laboratories; AIAA President-Elect

Jay Meil, Chief Data Scientist, SAIC Artificial Intelligence Innovation Factory

Eliahu “Eli” Niewood, Vice President, Intelligence and Cross-Cutting Capabilities, The MITRE Corporation

Philip Perconti, Chief Technology Officer, Leonardo DRS

1100-1230 hrs

Panel: HYP-03: University Consortium for Applied Hypersonics

LOCATION: Parsons Auditorium

1130-1230 hrs

SDA-02 Panel: Integrating Advanced Technologies Into Warfighting Concepts

MODERATOR:

Lt Col Jeffrey Komives, USAF, Warfighter Integration Lead, OUSD(R&E) PD-Hypersonics, Airpower Strategist, Air Force Futures (HAF A5/7)

PANELISTS:

Mitchell Reed, J8 Studies, Analysis and Gaming Division, The Joint Staff

Benjamin Schechter, Senior Wargame Analyst, SPA, Inc.

LTC James Williams, USA, J8 Studies, Analysis and Gaming Division, The Joint Staff

1300-1630 hrs

S&T Wargaming Demo: Emerging Disruptive Technologies

LOCATION: Dining Area

Join us for a modified demonstration of a strike game. The demo game will examine how to prosecute various targets using different combinations of platforms and munitions. The demo has been modified to account for a larger group of participants and is meant to highlight the quick-turn development and execution key for successful agile games through the lens of emerging disruptive technologies. Players do not need to have any prior experience in wargaming or specific subject matter areas.



The background features silhouettes of two soldiers in a field against a cloudy sky. A network of white lines and nodes is overlaid on the scene, with a larger, more detailed network structure on the left side. The overall color palette is dark blue and purple.

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MATRIX

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Tuesday

Tuesday, 19 April 2022				
1-PLNRY-1&2 0800 - 0930 hrs	Keynote: Technology Vision for an Era of Competition Keynote: (U) China-Russia: Approach to Emerging and Disruptive Technology			Auditorium
0800—845 hrs Keynote: Technology Vision for an Era of Competition The Honorable Heidi Shyu, Under Secretary of Defense for Research and Engineering				
0845-0930 hrs Keynote: (U) China-Russia: Approach to Emerging and Disruptive Technology Robert Heathcock, Senior Defense Intelligence Expert for Intelligence Support to Acquisition, Defense Intelligence Agency				
Tuesday, 19 April 2022				
2-DEW-1	HEL Integration onto a Tactical Aircraft			Auditorium
Chaired by: M. NEICE, Directed Energy Professional society				
1000 hrs AIAA-Defense2022-9000 HEL Integration onto a Tactical UAV M. Neice, DEPS, Albuquerque, NM; D. Wittich, Air Force Research Laboratory, Kirtland AFB NM, NM				
Tuesday, 19 April 2022				
3-GNC-1	Guidance, Navigation and Control			Room 5/6
Chaired by: M. MCFARLAND, Raytheon Missiles & Defense and M. NIESTROY, Lockheed Martin Aeronautics				
1000 hrs AIAA-Defense2022-9001 New Optimal Feedback Control Paradigms for a Hypersonic Missile B. Conway, C. Chilan, University of Illinois Urbana-Champaign, Urbana, IL	1030 hrs AIAA-Defense2022-9002 Autopilot Synthesis and Analysis using H-infinity Optimal Control G. Cruz, A. Damany, L. Hood, Sandia National Laboratories, Albuquerque, NM	1100 hrs AIAA-Defense2022-9003 Real-Time Ortho-Mosaicking for Awareness and Navigation T. Jennings, D. Stouch, N. Haddad, C. Hogan, Charles River Analytics Inc, Cambridge, MA	1130 hrs AIAA-Defense2022-9004 Applications of Functional Shape Analysis to Motion Primitives for Trajectory Extrapolation J. Jones, Sandia National Laboratories, Albuquerque, NM	1200 hrs AIAA-Defense2022-9005 Achieving Controller Stability Guarantees for Hypersonic Vehicles via Nonlinear Programming for Automatic Gain Selection G. Bennett, Sandia National Laboratories, Albuquerque, NM
Tuesday, 19 April 2022				
4-WSE-1	Morphing Weapons Technology			Room 3/4
Chaired by: A. CASH, Dynetics, Inc. and A. DIGGS, Air Force Research Laboratory				
1000 hrs AIAA-Defense2022-9006 Advancement of Missile Articulation Technology Readiness with Supersonic Sled Test T. Mason, B. Dickinson, Air Force Research Laboratory Munitions Directorate, Eglin AFB, FL	1030 hrs AIAA-Defense2022-9007 Design and Optimization of a Morphing Missile Mechanism R. Beblo, Air Force Research Laboratory Aerospace Systems Directorate, Wright-Patterson AFB, OH	1100 hrs AIAA-Defense2022-9008 Design and Optimization of High-Temperature Load-Bearing Skins for Cylindrical Morphing Missile Bodies A. Hilmas, B. Lam, C. Kassner, G. Frank, W. Chapkin, Air Force Research Laboratory Materials & Manufacturing Directorate, Wright-Patterson AFB, OH; E. McGill, Air Force Research Laboratory Aerospace Systems Directorate, Wright-Patterson AFB, OH; et al.	1130 hrs AIAA-Defense2022-9009 An Introduction to Surface Morphing and Adaptive Structures for Hypersonics J. Maxwell, U.S. Naval Research Laboratory, Washington, D.C.	1200 hrs AIAA-Defense2022-9010 Wind Tunnel Test of Control Systems for High Speed Stratospheric Maneuverability J. Schoneman, E. Blades, ATA Engineering, Inc., Huntsville, AL; K. Casper, Sandia National Laboratories, Albuquerque, NM; M. Landers, Dynetics Inc, Huntsville, AL

Tuesday, 19 April 2022				
5-WSE-6		Design and Evaluation of Flight Systems		Room 7/8
Chaired by: R. ADDIS, Lawrence Livermore National Laboratory				
1000 hrs AIAA-Defense2022-9011 Evaluation of Asymmetric Detonations through Digital Twin Machine Learning E. O'Hare, M. Barsotti, Protection Engineering Consultants, San Antonio, TX; D. Chambers, A. Garza, Southwest Research Institute, San Antonio, TX; M. Tarbell, Midland Research, Hotchkiss, CO; E. Scarborough, Air Force Research Laboratory, Eglin AFB, FL; et al.	1030 hrs AIAA-Defense2022-9012 Flight Modeling in Support of Engineering Analysis at LLNL C. Knisely, B. Perfect, B. McPolin, Lawrence Livermore National Laboratory, Livermore, CA	1100 hrs AIAA-Defense2022-9013 Evaluation of Environmental Conditions from a High Resolution WRF Atmospheric Model B. Perfect, L. Diaz Isaac, H. Beydoun, D. Driver, J. Osuna, Lawrence Livermore National Laboratory, Livermore, CA	1130 hrs AIAA-Defense2022-9014 Thermo-mechanical Environment Characterization of Hypersonic Systems using a 3-DoF Trajectory Optimization Tool Y. Li, C. Knisely, Lawrence Livermore National Laboratory, Livermore, CA; J. Cook, Former LLNL, Livermore, CA	1200 hrs AIAA-Defense2022-9015 A High-resolution Imaging System for Ballistic Reentry Vehicles: Capability Development and Results S. Jensen, B. Perfect, A. Vella, T. Jones, P. Breitenbucher, Lawrence Livermore National Laboratory, Livermore, CA
Tuesday, 19 April 2022				
6-AP-1		Advanced Prototypes		Room 7/8
Chaired by: R. FONTAINE, MIT Lincoln Laboratory and A. SCOURAS, MIT Lincoln Laboratory and D. NEWMAN, Boeing Defense, Space & Security				
1300 hrs AIAA-Defense2022-9016 Decreasing Size, Weight, and Power of Opto-Mechanical Assemblies Using Single-Crystal Silicon C. Roll, Massachusetts Institute of Technology Lincoln Laboratory, Lexington, MA	1330 hrs AIAA-Defense2022-9018 Rapid Development of Low-Cost On-Orbit Laser Guide Star Payload A. Sandberg, Z. Palmer, J. Kiers, A. Mankame, L. Liu, Massachusetts Institute of Technology Lincoln Laboratory, Lexington, MA	1400 hrs AIAA-Defense2022-9019 Methodology for the Creation of Concurrent Technology Development and Deployment Scheduling for System of System Architectures A. Sanders, Sandia National Laboratories, Livermore, CA	1430 hrs AIAA-Defense2022-9020 Digital Twinning for Aerospace & Defense Applications S. Carlson, F. Schirmeister, Cadence Design Systems Inc, San Jose, CA	
Tuesday, 19 April 2022				
7-RUS-1		Robotic and Unmanned Systems		Room 5/6
Chaired by: M. MCFARLAND, Raytheon Missiles & Defense and N. NIGAM, BlueHalo Labs				
1300 hrs AIAA-Defense2022-9021 Design and Test of 2-Stage Sub-Scale Airdroppable Payloads. H. Richards, US Air Force Academy, USAF Academy, CO	1330 hrs AIAA-Defense2022-9022 Radiation Localization Using UAV Sensing D. Stouch, M. Kwan, P. Franklin, R. Wronski, U. Balasuriya, Charles River Analytics Inc, Cambridge, MA; S. Motakef, CapeSym Inc, Natick, MA; et al.	1400 hrs AIAA-Defense2022-9024 Adversarial Motion Planning for Military Aerospace Systems A. Mazumdar, Georgia Institute of Technology, Atlanta, GA	1430 hrs AIAA-Defense2022-9023 Adopting Model Based Systems Engineering to Streamline Next-Generation Defense Aviation A. Duman, Skydweller Aero Inc., Oklahoma City, OK	
Tuesday, 19 April 2022				
8-SMS-1		Strategic Missiles		Auditorium
Chaired by: A. EDSALL, The Charles Stark Draper Laboratory, Inc. and M. OLMOS, Northrop Grumman Corporation				
1300 hrs AIAA-Defense2022-9025 Advancements in Strategic Missile CFD for Improved Workflow, Accuracy, and Speed Using ANSYS Fluent J. Murdock, M. Lively, Northrop Grumman Space Systems, Roy, UT	1330 hrs AIAA-Defense2022-9026 Silo Fly-Out Simulations for Tight Clearance Launches J. Murdock, Northrop Grumman Space Systems, Roy, UT	1400 hrs AIAA-Defense2022-9027 In-Flight External Acoustic Load Simulations for Strategic Missiles A. Krystek, Northrop Grumman Space Systems, Roy, UT		
Tuesday, 19 April 2022				
9-WSE-2		Testing and Evaluation I - Ground Testing		Room 3/4
Chaired by: I. CHOCHRON, Southwest Research Institute				
1300 hrs AIAA-Defense2022-9028 High-speed wind tunnels and applied research at UArizona J. Little, S. Craig, The University of Arizona Graduate College, Tucson, AZ	1330 hrs AIAA-Defense2022-9029 Design of a Mach-8 Quiet Tunnel at Purdue University B. Chynoweth, S. Schneider, Purdue University, West Lafayette, IN; G. Candler, University of Minnesota Twin Cities, Minneapolis, MN; J. Korte, Analytical Mechanics Associates, Hampton, VA	1400 hrs AIAA-Defense2022-9030 Improving Performance of Hypersonic Quiet Tunnels B. Chynoweth, A. Lay, S. Schneider, J. Jewell, Purdue University, West Lafayette, IN	1430 hrs AIAA-Defense2022-9031 Updates on CUBRC Hypersonic Ground Test Capability Enhancements and Demonstrations T. Wadhams, A. Dufrene, R. Parker, M. MacLean, Z. Carr, S. Mosher, CUBRC, Buffalo, NY	1500 hrs AIAA-Defense2022-9032 Long-Duration High-Enthalpy Test Developments A. Dufrene, T. Wadhams, CUBRC, Buffalo, NY

Tuesday, 19 April 2022		
10-PLNRY-3 1600 - 1730 hrs	Keynote Panel: Operating at the Technological Edge	Auditorium
How do we translate concepts, mission capability needs, and requirements into effective solutions? How can we accelerate technology development for multi-domain operations? Hear from the senior leaders as they describe how they take existing solutions, new innovations and emerging technologies and use them as tools to accomplish the mission.		
Moderator: Victoria Coleman, Chief Scientist, U.S. Air Force		
Leslie Babich Director SOFWERX	Jeffrey Boulware Technical Director and Deputy Division Chief Joint Integrated Air and Missile Defense Organization (JIAMDO)	Kathleen Cooper Associate Director, Capability and Resource Integration U.S. Strategic Command/J8A

Wednesday

Wednesday, 20 April 2022		
11-PLNRY-4 0800 - 0930 hrs	Keynote Panel: Technological Advantage in an Era of Competition	Auditorium
Moderator: Anthony Mitchell, Vice President, Advanced Technology and Strategy, CAES		
Panelists:		
Alexander Kott Chief Scientist and Senior Research Scientist - Cyber Resiliency DEVCOM Army Research Laboratory	Shari Feth Director, Innovation, Science and Technology Missile Defense Agency	George Foster Distinguished Engineer for Combat Control Naval Surface Warfare Center
Sarah Muccio Acting Chief Scientist, Information Directorate Air Force Research Laboratory		

Wednesday, 20 April 2022		
12-AMD-1	Air and Missile Defense I	Parsons Auditorium
Chaired by: R. GAMBLE, Axient Corporation and D. FOX, Lockheed Martin Missiles and Fire Control		
1000 hrs AIAA-Defense2022-9033 Integrated Air and Missile Defense Requirements Prioritization J. Boulware, US Department of Defense, Washington, D.C.	1030 hrs AIAA-Defense2022-9034 Assessment of HGV Defense Concepts with Reinforcement Learning J. Ofarill, S. Hartley, T. Janik, T. Moeller, I. Fernandez, MTSI, Huntsville, AL	1100 hrs AIAA-Defense2022-9035 Quantifying effectiveness of select non-kinetic defensive measures against emerging hypersonic missile threats W. Diehl, A. Magill, D. Tadas, N. Tesny, US Army Research Laboratory, Adelphi, MD
1130 hrs AIAA-Defense2022-9036 Missile Intercept Lethality and Debris Fall M. Harmon, Lockheed Martin Missiles and Fire Control, Dallas, TX	1200 hrs AIAA-Defense2022-9037 Evolved Artificial Intelligence for First-Order Conceptual Missile Design Optimization (U) R. Allen, Lone Star Aerospace, Addison, TX	

Wednesday, 20 April 2022		
13-AUT-1	Autonomy and Secure Communications Networking	Room 7/8
1000 hrs AIAA-Defense2022-9038 Swarming Munitions vs. IADS Deception and Perception Strategies M. Don, M. Hamaoui, A. Magill, L. Fairfax, B. Reily, US Army Research Laboratory, Adelphi, MD; C. Reardon, University of Denver, Denver, CO; et al.	1030 hrs AIAA-Defense2022-9039 Neural Networks applied to CFD surface data prediction for CSD coupling M. Amiraux, Corvid Technologies, Mooresville, NC	1100 hrs AIAA-Defense2022-9040 Obfuscative Reinforcement Learning for Aerospace Vehicles J. Pagan, M. Sparapany, Sandia National Laboratories, Albuquerque, NM
1130 hrs AIAA-Defense2022-9041 Vibrometry based vehicle detection and classification D. Stouch, M. Kwan, T. Jennings, A. Balasuriya, Charles River Analytics Inc, Cambridge, MA	1200 hrs AIAA-Defense2022-9042 AI edge enabled Medium Altitude UAS N. Ryan, Navmar Applied Sciences Corporations, Warminster, PA	

Wednesday, 20 April 2022		
14-DEW-2	Counter UAS HPM Technology and Demo's	Auditorium
Chaired by: G. WOOD		
1000 hrs AIAA-Defense2022-9043 OSPRES Effects Testing, Source Development and Demonstration Update J. Harp, T. Fields, A. Caruso, University of Missouri-Kansas City, Kansas City, MO	1030 hrs AIAA-Defense2022-9044 RF Hardening of an Acoustically Quiet UAV for Airborne HPM Attacks S. Seagraves, R. Butler, T. Fields, J. Harp, R. Allen, University of Missouri-Kansas City, Kansas City, MO	1100 hrs AIAA-Defense2022-9045 PTERA: Source and Aircraft Development for Airborne HPM Effector Attack T. Fields, R. Allen, A. Caruso, University of Missouri-Kansas City, Kansas City, MO
1130 hrs AIAA-Defense2022-9046 Live-Fire HPM Testing, Forensics, and Analysis across Multiple Bands T. Fields, S. Karnes, C. Smith, University of Missouri-Kansas City, Kansas City, MO	1200 hrs AIAA-Defense2022-9047 Laser Engagement analysis for Base Defense E. Ahn, M. Sheyka, Air Force Research Laboratory, Kirtland AFB, NM	

Wednesday, 20 April 2022				
15-SYS-1		Space Systems		Room 5/6
Chaired by: M. MCFARLAND, Raytheon Missiles & Defense and U. SHANKAR, The Johns Hopkins University Applied Physics Laboratory				
1000 hrs AIAA-Defense2022-9048 Maturation of High Performance ASCENT Thruster Technology S. Leathers, Air Force Research Laboratory Aerospace Systems Directorate, Edwards AFB, CA	1030 hrs AIAA-Defense2022-9049 Possible Orbital Logistics Architectures E. Sichler, Air Force Research Laboratory, Edwards AFB, CA	1100 hrs AIAA-Defense2022-9050 GEO Belt Surge Logistics: An Application of the Capacitated Orbital Vehicle Routing Problem for Propulsive Requirements F. O'Brien, Air Force Research Laboratory, Edwards AFB, CA	1130 hrs AIAA-Defense2022-9051 Theater Persistent Coverage Analysis V. Ong, Air Force Research Laboratory, Edwards AFB, CA	
Wednesday, 20 April 2022				
16-WSE-3		Testing and Evaluation II - Flight Testing		Room 3/4
Chaired by: A. DIGGS, Air Force Research Laboratory and A. CASH, Dynetics, Inc.				
1000 hrs AIAA-Defense2022-9052 Recent Flight Testing of Hypersonic Projectiles M. Libeau, B. Fan, G. Ryan, Naval Surface Warfare Center Dahlgren Division, Dahlgren, VA	1030 hrs AIAA-Defense2022-9053 HOT for Hypersonics: Low-Cost Sounding Rocket Test Platform for Rapid Tech Maturation B. Wiberg, B. English, A. Roesler, L. Jones, Sandia National Laboratories, Albuquerque, NM	1100 hrs AIAA-Defense2022-9054 Proven Systems for Suborbital Flight Testing of Space and Defense Technology E. Libby, Peraton Inc, Herndon, VA	1130 hrs AIAA-Defense2022-9055 Adversarial Assessment of Target Discrimination Systems R. Barnes, I. Fernandez, S. Hartley, T. Janik, T. Mims, T. Moeller, MTSI, Huntsville, AL; et al.	
Wednesday, 20 April 2022				
17-AMD-2		Air and Missile Defense II		Parsons Auditorium
Chaired by: R. GAMBLE, Axient Corporation and D. FOX, Lockheed Martin Missiles and Fire Control				
1300 hrs AIAA-Defense2022-9056 FTM-33 Guided Oriole Target Vehicle I. Ereksan, Sandia National Laboratories, Albuquerque, NM; N. Shoemaker, Kratos Defense and Security Solutions, San Diego, CA; J. Madsen, M. Knarr, Sandia National Laboratories, Albuquerque, NM; A. Blazek, W. Montag, Kratos Defense and Security Solutions, San Diego, CA; et al.	1330 hrs AIAA-Defense2022-9057 6DOF Simulation and Analysis of Threat Flight Vehicles A. Murray, I. Ereksan, A. Damany, N. Grady, Sandia National Laboratories, Albuquerque, NM	1400 hrs AIAA-Defense2022-9058 An Aerodynamic Model for Tracking Hypersonic Glide Vehicles M. Jacobs, J. Chan, N. Nguyen, M. Chan, Lockheed Martin Space Systems Co, Sunnyvale, CA		
Wednesday, 20 April 2022				
18-DEW-3		HPM Effects and Panel Session		Auditorium
Chaired by: G. WOOD				
1300 hrs AIAA-Defense2022-9059 Variable Bandwidth HPM UAS Effects Testing E. Gasta, J. Harp, T. Fields, University of Missouri-Kansas City, Kansas City, MO	1330 hrs AIAA-Defense2022-9060 Surface and Airborne HPM Effector Capabilities Realized by Computational Wargaming M. Richman, N. Petersen, M. Mardikes, A. Stark, C. Smith, T. Fields, University of Missouri-Kansas City, Kansas City, MO	1400 hrs Panel HPM Effects Against Airborne Threats		
Wednesday, 20 April 2022				
19-HYP-1		High-Maneuverability and Hypersonic Systems and Technologies I - Vehicle System Design		Room 5/6
Chaired by: J. MCINTIRE, MIT Lincoln Laboratory and J. RHOADS, Lockheed Martin Aeronautics				
1300 hrs AIAA-Defense2022-9061 Development of a Hypersonic Controls Testbed in the Sandia Hypersonic Wind Tunnel K. Casper, E. Johnson, J. Firth, Sandia National Laboratories, Albuquerque, NM; A. Mazumdar, Georgia Institute of Technology, Atlanta, GA; J. Fulton, M. Noel, Sandia National Laboratories, Albuquerque, NM; et al.	1330 hrs AIAA-Defense2022-9062 Conceptual Design of a Reusable Scramjet-Powered Hypersonic Vehicle for Global Military Missions M. Schaffer, S. Bornstein, J. Bradford, SpaceWorks Enterprises, Inc., Atlanta, GA	1400 hrs AIAA-Defense2022-9063 Optimal Control with Chaotic Signals and Quantification of Benefit against Threat Models M. Sparapan, J. Pagan, Sandia National Laboratories, Albuquerque, NM	1430 hrs AIAA-Defense2022-9064 Developing a Model of Hypersonic Weather Environments for Vibrational Response S. Beresh, B. Robbins, P. Coffin, L. DeChant, K. Daniel, D. Guildenbecher, Sandia National Laboratories, Albuquerque, NM	

Wednesday, 20 April 2022				
20-SUR-1	Survivability			Room 7/8
Chaired by: C. McALLISTER, Joint Aircraft Survivability Program Office				
1300 hrs AIAA-Defense2022-9065 Survivability Trade Tree Analysis R. Ewart, US Space Force, El Segundo, CA	1330 hrs AIAA-Defense2022-9066 Integrated Thermal-Armor Self-Healing Protection for High-Speed Vehicles D. King, S. Storck, D. Zhang, D. Eby, M. Shanaman, Johns Hopkins Applied Physics Laboratory, Laurel, MD			

Wednesday, 20 April 2022				
21-WSE-4	Testing and Evaluation III - Test Techniques			Room 3/4
1300 hrs AIAA-Defense2022-9067 The Use of Multiphysics Toolsets for Aerothemoelastic Prediction and Structural Design C. Ostoich, J. Schoneman, P. Shah, T. Hill, E. Blades, M. Nucci, ATA Engineering, Inc, San Diego, CA; et al.	1330 hrs AIAA-Defense2022-9068 The current evolution of the multiwavelength aero-optic measurement suite at the LENS facilities. R. Parker, CUBRC, Buffalo, NY	1400 hrs AIAA-Defense2022-9070 Using Machine Learning to Automate the Analysis of T&E Data J. Del Vecchio, CUBRC, Inc, Buffalo, NY; K. Sanchez, C4T, Oxnard, CA		

Wednesday, 20 April 2022				
22-PLNRY-5	Keynote Panel: AI-Enabled Capability			Auditorium
1600 - 1730 hrs	"Incorporating these technologies in military systems that collaborate with warfighters will facilitate better decisions in complex, time-critical, battlefield environments; enable a shared understanding of massive, incomplete, and contradictory information; and empower unmanned systems to perform critical missions safely and with high degrees of autonomy." (DARPA: https://www.darpa.mil/work-with-us/ai-next-campaign). Hear from government and academic leaders on lessons learned from artificial intelligence applications and implementation.			
Moderator: Jean-Charles Ledé, Autonomy Technology Advisor, AFRL				
Panelists:				
Lt Col Raven LeClair, USAF Joint Strike Fighter Experimental Test Pilot	Brian Pierce Visiting Research Scientist Applied Research Laboratory for Intelligence and Security, University of Maryland	Yevgeniya "Jane" Pinelis Chief of AI Assurance Department of Defense Joint Artificial Intelligence Center (JAIC)	Lael Rudd Program Manager DARPA Tactical Technology Office	Gurpartap "GP" Sandhoo Deputy Director Intelligence Advanced Research Projects Activity (IARPA)

Thursday

Thursday, 21 April 2022				
23-PLNRY-6	Keynote Panel: From Bench to Battlefield			Auditorium
0800 - 0930 hrs	Industry leaders respond to modernization priorities and have a candid discussion on AI-Enabled Capability.			
Moderator: Debra Emmons, Vice President, CTO, The Aerospace Corporation				
Panelists:				
Laura McGill Deputy Laboratories Director Chief Technology Officer, Nuclear Deterrence Sandia National Laboratories	Eliahu (Eli) Niewood Vice President Intelligence and Cross-Cutting Capabilities The MITRE Corporation	Philip Perconti CTO Leonardo DRS	Jay Meil Chief Data Scientist SAIC Artificial Intelligence Innovation Factory	

Thursday, 21 April 2022				
24-HYP-2		High-Maneuverability and Hypersonic Systems and Technologies II - Flowfield Phenomenology		Parsons Auditorium
Chaired by: J. MCINTIRE, MIT Lincoln Laboratory and J. RHOADS, Lockheed Martin Aeronautics				
1000 hrs AIAA-Defense2022-9071 Computational Analysis of the Radiative Emissions of an Ablating Hypersonic Vehicle and Wake R. MacDermott, Air Force Institute of Technology, Wright-Patterson AFB, OH	1030 hrs AIAA-Defense2022-9072 Long-Range RF Passive Detection of Threat B. Sheeks, Massachusetts Institute of Technology Lincoln Laboratory, Lexington, MA			
Thursday, 21 April 2022				
25-SDA-1		System and Decision Analysis for National Security		Auditorium
Chaired by: J. LAFLEUR, Sandia National Laboratories and B. STEINFELDT, Sandia National Labs and K. LABBE, Systems Planning and Analysis				
1000 hrs AIAA-Defense2022-9073 How to "Measure" Deterrence: the Nuclear-Armed Sea-Launched Cruise Missile Analysis of Alternatives J. Braun, Systems Planning Analysis Inc, Alexandria, VA	1030 hrs AIAA-Defense2022-9074 Creating a Virtual Space Environment for Complex Scenario Building and Astrodynamics in Augmented Reality D. Stouch, R. Hyland, L. Bird, S. Latiff, K. Brady, S. Timberlake, Charles River Analytics Inc, Cambridge, MA; et al.			
Thursday, 21 April 2022				
26-WSE-5		Modeling and Simulation		Room 3/4
Chaired by: R. ADDIS, Lawrence Livermore National Laboratory				
1000 hrs AIAA-Defense2022-9075 Improving Kill Chain Effectiveness Assessments with the Raytheon Weapon Server S. Baba, P. Breeden, Raytheon Missiles & Defense, Tucson, AZ	1030 hrs AIAA-Defense2022-9076 Hierarchical Kriging for Rapid Hypersonic Vehicle Design E. Dreyer, J. Murray, T. Lavin, Sandia National Laboratories, Albuquerque, NM	1100 hrs AIAA-Defense2022-9077 Adjoint Simulation with Nonlinear Constraint Approximations W. Dyer, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1130 hrs AIAA-Defense2022-9078 Hunter-Killer C-Swarm Task Assignment using Genetic Algorithms E. Gasta, C. Smith, T. Fields, University of Missouri-Kansas City, Kansas City, MO	
Thursday, 21 April 2022				
27-HYP-3 1100 - 1230 hrs		University Consortium for Applied Hypersonics (UCAH) Technical Panel		Parsons Auditorium
Thursday, 21 April 2022				
28-SDA-2 1100 - 1230 hrs		Integrating Advanced Technologies Into Warfighting Concepts		Auditorium
Moderator: Lt Col Jeffrey Komives, USAF, Warfighter Integration Lead, OUSD(R&E) PD-Hypersonics, Airpower Strategist, Air Force Futures (HAF A5/7)				
Panelists:				
<p style="text-align: center;">Mitchell Reed J8 Studies, Analysis and Gaming Division The Joint Staff</p>		<p style="text-align: center;">Benjamin Schechter Senior Wargame Analyst SPA, Inc.</p>		<p style="text-align: center;">LTC James Williams, USA J8 Studies, Analysis and Gaming Division The Joint Staff</p>
Thursday, 21 April 2022				
29-PLNRY-7 1300 - 1630 hrs		S&T Wargaming Demo: Emerging Disruptive Technologies		Auditorium
Join us for a modified demonstration of a strike game. The demo game will examine how to prosecute various targets using different combinations of platforms and munitions. The demo has been modified to account for a larger group of participants, and is meant to highlight the quick-turn development and execution key for successful agile games through the lens of emerging disruptive technologies. Players do not need to have any prior experience in wargaming or specific subject matter areas.				

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POST-FORUM COURSE

Non-Intrusive Laser-Based Diagnostic Techniques for Hypersonic Flows

Friday, 22 April 2022

Kossiakoff Center at Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland
0830-1630 hrs

AIAA MEMBER / GOVERNMENT
EMPLOYEES - \$399
NON-MEMBER - \$499

High-speed vehicles are subject to complex fluid effects including shocks, turbulence, real gas effects such as dissociation and nonequilibrium energy distributions, high-temperature gas-surface reactions, and combustion. Due to these complexities, detailed experimental measurements are necessary for the successful design and optimization of supersonic and hypersonic vehicles. However, most of these phenomena are difficult or impossible to study using surface measurements due to their limited domain or physical probe-based techniques that inherently perturb the environment they aim to study. In contrast, optical and spectroscopy-based techniques offer the ability to make off-body measurements with little-to-no system perturbation of qualitative and quantitative flow properties including velocity, gas temperature, and species densities. This course provides background theory on several spectroscopy techniques, technology required to execute measurements, and examples of how they have been implemented previously for large-scale wind tunnel testing.

Learning Objectives

- › Learn basic theory related to gas-phase spectroscopy that rely on either natural luminescence in reacting gases or laser-based excitation.
- › Understand basic light-matter interactions including absorption, emission, and light-scattering.
- › Receive an introduction on linear and nonlinear spectroscopy methods.
- › Learn about the state-of-the-art technology available for optical measurements of reacting flows.
- › Gain an appreciation for the complexities encountered when applying laser- and optical-based measurements for both ground-based testing and in-flight flow sensors.

Course Outline

- › Spectroscopy Fundamentals:
 - Emission
 - Absorption
 - Raman
- › Advanced Laser Techniques:
 - Laser absorption spectroscopy (LAS)
 - Planar laser-induced fluorescence (PLIF)
 - Coherent anti-Stokes Raman scattering (CARS)
- › High-Speed Lasers and Applications:
 - Fixed and tunable sources for various techniques
 - Applications to high-speed reacting and non-reacting flows
- › Implementation of Diagnostic Techniques in Experimental Hypersonic Systems



Please note that although this course is being held as part of the 2022 AIAA DEFENSE Forum, it is UNRESTRICTED. All material will be at the Distribution A level. To sign up for this course, please visit the registration desk.



2023 AIAA DEFENSE FORUM CALL FOR PRESENTATIONS

ADVANCED PROTOTYPES

Innovative engineering solutions are necessary to field advanced systems that provide the DoD with new and improved capabilities in both modern and future mission spaces. Novel approaches to thermal management, structural and aerodynamic design, power and control devices, optics, manufacturing processes, and other related areas can help make conceptual systems a reality. Briefings are solicited for a session highlighting hardware; the engineering, manufacturing, and assembly challenges associated with building and fielding advanced prototypes in areas of interest to the DoD.

AIR AND MISSILE DEFENSE

Air and missile defense requirements continue to broaden as new threats emerge on land, sea, air, and space. Technical briefings are sought on existing, newly deployed, and emerging concepts for missile defense. Effective air and missile defense assimilates a wide range of capabilities across the air and missile defense timeline and system, and, as such, briefings are requested on threat detection and characterization, air and missile defense subsystems such as interceptors or command/control, and integrated air and missile defense systems to defeat multiple threat types. Other innovative topics not included in the subtopic list will also be considered.

AUTONOMY, COLLABORATIVE ENGAGEMENT, AND MACHINE INTELLIGENCE

In 2016 the Defense Science Board conducted a study at the request of the Undersecretary of Defense for AT&L that concluded “that there are both substantial operational benefits and potential perils associated with the use of autonomy” in defense systems. The Board also articulated that the rapid advance of enabling technologies and commercial applications was providing significant opportunities for the DoD. This study concluded that “DoD must accelerate its exploitation of autonomy—both to realize the potential military value and to remain ahead of adversaries who also will exploit its operational benefits.”

In 2019, the DoD released its Artificial Intelligence (AI) Strategy following national AI initiatives highlighted by a Presidential Executive Order. The centerpiece of DoD’s strategy was the creation of the Joint AI Center (JAIC), with focus on the applications and infrastructure of machine learning (ML) to DoD problems. Today we find that the maturation of autonomy and machine intelligence technology has yet to reach critical mass for use in many franchise DoD programs. In this track, we explore the challenges associated

with autonomy and machine intelligence, especially focusing on maturation and deployment of technologies and techniques that will help engender trust in systems leveraging stochastic, nondeterministic autonomous capabilities.

CYBER AND COMPUTING SYSTEMS

Papers are sought on the theoretical and practical use of software, hardware, computer, and information systems at both a technical and policy level of aerospace and defense applications, focusing on aerospace computing; cybersecurity to include information assurance, program protection, & risk management; parallel, GPU, multicore and high-performance computing; embedded and autonomous systems; and survivable computing in extreme environments.

DIRECTED ENERGY WEAPONS

Directed energy (DE) weapons are emerging for defense applications. This session will look at DE capabilities that can be implemented in an airborne environment, for both defensive and offensive operations. Presentations are solicited for laser DEW, RF and microwave DEW, and any other form of airborne DEWs. In addition to the weapon source technology, other technologies as they relate to airborne DE are important such as: primer power, thermal management, beam control, beam propagation, command and control, sensors, and lethality. Of particular interest are DEW systems, how DEWs fit within a system of systems concept and how DEWs affect operational scenarios. Briefings are sought on the use of DEWs that address the capabilities listed below.

GUIDANCE, NAVIGATION, CONTROL, AND ESTIMATION

Current and future defense systems rely more than ever on advanced guidance, navigation, control, and estimation to achieve precision, reliability, and autonomy in challenging adversarial environments. Unmanned platforms, missiles, spacecraft, and even manned vehicles, ground support systems, and data networks are achieving unprecedented levels of performance and robustness by leveraging breakthroughs in components, machine learning, computer vision, cooperative/distributed algorithms, autonomous navigation, optimal guidance, feedback control, sensor fusion, and other technical areas. Presentations describing such advances in algorithms, software, and hardware are solicited, as are presentations on alternative position, navigation, and timing (PNT); novel applications; improvements to existing systems; field test results; and lessons learned.

HIGH-MANEUVERABILITY AND HYPERSONIC SYSTEMS AND TECHNOLOGIES

Presentations are solicited for a session addressing hypersonic and high-speed flight systems and technologies. This call is intended to include systems that utilize a significant phase of hypersonic flight within the atmosphere including hypersonic ISR vehicles, hypersonic cruise missiles, gun-launched hypervelocity projectiles, and hypersonic boost-glide vehicles. There is interest in concepts using sustained air-breathing propulsion, rocket-boosted vehicles with significant unpowered glide capabilities, and innovative hybrid propulsion systems. There is particular interest in key enabling air vehicle technologies as well as end-to-end system concepts that bring revolutionary military capabilities to the warfighter and the enabling technologies necessary for mission success with high-speed systems.

ROBOTIC AND UNMANNED SYSTEMS

With the maturing and miniaturization of applicable technologies, autonomous and unmanned systems have new capabilities increasing their popularity within the U.S. military. Robotic, unmanned systems offer affordable, capable fighting machines with less risk to their operators. Applications for these systems include C3, ISR, weapons systems platforms, and ground/air safety. Autonomy enables robot capability to execute tedious and hazardous tasks not specifically planned or designed. Autonomous robots can be tasked when factors are unknown, or when the geological environment cannot be anticipated. Policies and technologies are needed to bind unmanned systems’ operational space; tools and testing are needed to characterize performance limits of capability/robot competence.

SECURE COMMUNICATIONS NETWORKING

Secure communications networking is the backbone of the Department of Defense’s Joint All-Domain Command and Control (JADC2) concept. The committee is seeking briefings on enabling technologies, concepts, and systems.

SPACE ACCESS

Access to, and freedom of operations in, space is critical to national security. The committee is seeking briefings on delivery systems, offensive capabilities and boosters, short and long range space launch, and space traffic management.

SPACE SYSTEMS

Space systems are in the defense news daily, spanning topics from acquisition to user services to resiliency and survivability. Space systems are the basis for U.S. assured access to space, consisting of launch vehicles, spacecraft, payloads, ground support equipment, launch operations and ranges, and test hardware used in ground testing and operations. Space systems

also include operations centers to maintain space vehicles or spacecraft on orbit. With current defense reliance on non-U.S. space systems, and the failures of certified space systems, assured access to space is a growing concern. The size and type of space systems is changing, and the defense community is increasingly leveraging commercial capabilities. Space systems require rigorous developmental test and evaluation due to the harsh launch, landing, and operational space environment, and must function from the first time to every time called upon. Emphasis is on rapid and effective fielding of space assets and compressed space acquisition cycles. Submissions are solicited that address any of these aspects of state-of-the-art military space systems.

STRATEGIC MISSILE SYSTEMS

Presentations are solicited for sessions for strategic missile systems, focusing on future requirements, development of new technical and operational concepts, modernization and sustainment of existing weapon systems, lowering lifecycle costs, and application of innovative engineering and manufacturing processes. Challenges include lowering future cost of ownership, mitigating technology obsolescence and industrial base evolution, providing flexibility, diversity, responsiveness, accuracy, and survivability for long-term effectiveness, and assuring safety, security, and reliability. Technical presentations are solicited for engineering, science, and technology developments applicable to fire control and launch systems, missiles, and reentry vehicles.

SURVIVABILITY

The Survivability Technical Committee (SURTC) promotes the research and development of new technologies that define the state of the art in survivability. Survivability is the capability of a system to avoid or withstand a hostile environment (man-made or otherwise). Therefore, the survivability discipline forms part of the systems engineering process and is affected by all other engineering disciplines, such as materials (e.g., armor applications) and structures (e.g., resilient structures). The SURTC is looking to the future as game changers emerge and revolutionize the discipline, and is particularly interested in advanced materials and structures for survivability.

SYSTEM AND DECISION ANALYSIS FOR NATIONAL SECURITY

National security decision makers often turn to system-level decision analyses to help them evaluate the differences in cost, risk, and benefit of alternative future options. These analyses usually include some of the following elements: definition of objectives, criteria, and metrics; brainstorming, definition, and enumeration of alternative systems or approaches; modeling and evaluation of alternatives against criteria; and conversion of multi-criteria analyses into overall alternative evaluations and recommendations. This topic area seeks to bring together professionals from throughout the defense industry to share methods, lessons learned, and insights in system-level decision analysis gained during national security work.

SYSTEM PERFORMANCE MODELING AND SIMULATION

Measurement, analysis, modeling, and simulation is critical to understanding the capabilities and limitations of our systems across the battlespace. Briefings are solicited for new and innovative analysis techniques, high fidelity and fast-running models, component and system simulations, algorithms, threat/target modeling techniques, technology development, and design maturity. Systems of interest span kinetic, hypersonic, and directed energy weapons across the Army, Navy, Air Force, and Missile Defense Agency.

TACTICAL MISSILES

Presentations are solicited on advances in the research, development, test, and evaluation of Joint, Army, Navy, and Air Force tactical missiles. Papers may address components or systems. Papers are solicited for sessions on tactical surface-to-surface, air-to-air, and air-to-ground missile systems. This topic area is intended to bring together technology developers and customers of all types to share not only new technology developments and results from analysis, simulation, and testing, but also operational lessons learned. Papers may address testing, design, and or analyses of systems, subsystems, components, software, or algorithms.

TEST AND EVALUATION

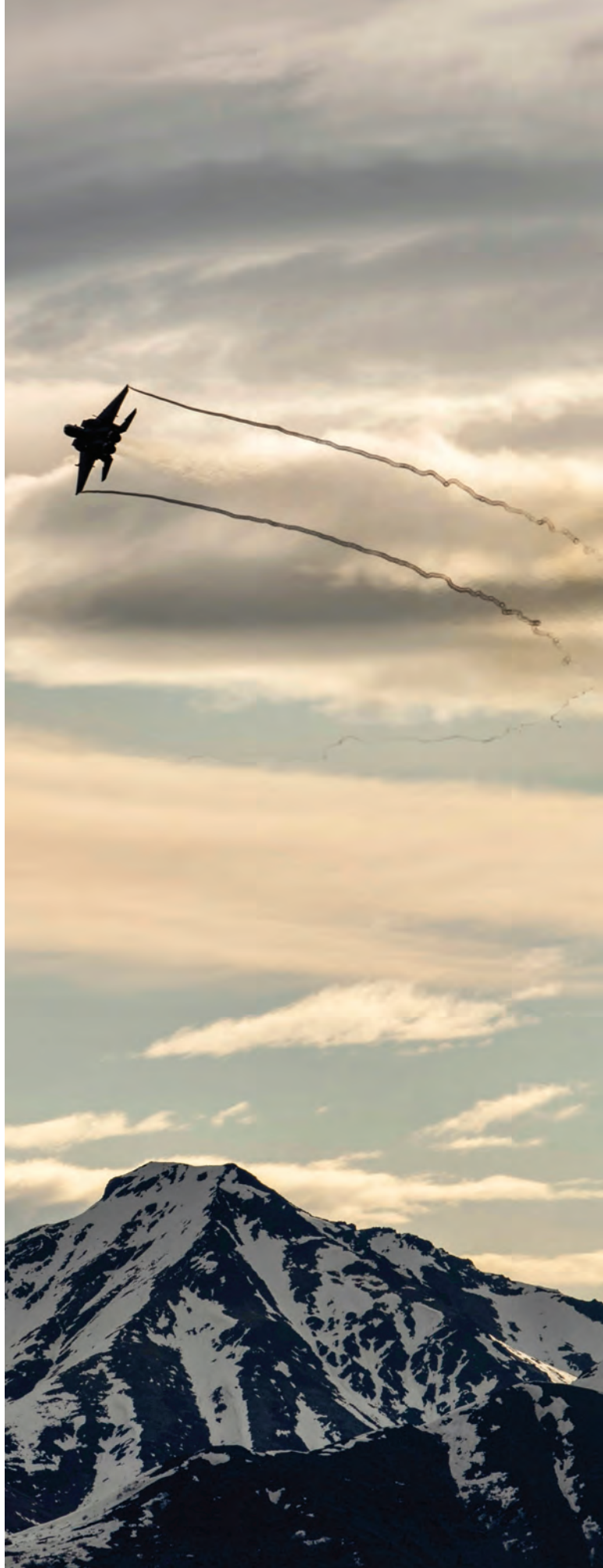
Testing and evaluation, from phenomenology to operational, provides confirmation of the effectiveness of our weapon systems and anchors our models and simulations. There have been many recent efforts to modernize testing infrastructures and develop low cost, high value techniques. This technical area invites participants in those efforts to highlight their achievements, results and plans by providing presentations highlighting recent test events and development efforts. Of particular interest are papers discussing new test venues, equipment, techniques, novel instrumentation, and data collection methods for flight, ground, arena, gun, wind tunnel, and anechoic chamber tests. Additionally, data management, utilization, and performance criteria development and lessons learned are also of interest.

WEAPON SYSTEM OPERATIONAL PERFORMANCE

Assessing operational performance of weapon systems ensures mission success for the warfighter and cost effectiveness for the DoD. This topic area focuses on force level, mission level, and weapon system performance assessment.

To view the full call for presentations, please visit aiaa.org/defense.

Additional topics, and session volunteers, are welcome.
Email tobeyj@aiaa.org



MISSILE DESIGN: A COMPREHENSIVE GUIDE

NEW ONLINE COURSE

AIAA's comprehensive online course will cover the most important aspects of missile aerodynamics, propulsion, guidance, lethality, system engineering, and development. The typical values of missile parameters and the characteristics of current operational missiles will be discussed as well as the enabling subsystems and technologies.

DETAILS

- > 15 June-10 August 2022
- > Wednesdays & Thursdays, 1300-1500 hrs ET USA
- > 33 Total Hours
- > Instructed by Eugene L. Fleeman
- > Includes eBook copy of *Missile Design Guide*
- > Cost: \$1,395 USD Members
\$895 USD Student Members
\$1,695 USD Nonmembers



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U.S. INTERNATIONAL TRAFFIC IN ARMS REGULATIONS (ITAR) SESSIONS ARE AT 2022 AIAA AVIATION FORUM
 AIAA offers authors the opportunity to present information that is covered by the U.S. International Traffic in Arms Regulations (ITAR) in U.S. Only sessions during the AIAA AVIATION Forum. These sessions allow discussions on topics and presentations that are not possible in an open forum.

▶ **THIS YEAR'S TOPICS INCLUDE:**

- > Directed Energy
- > Kinetic Weapon Integration
- > U.S. Air Force Transformational Science and Technology

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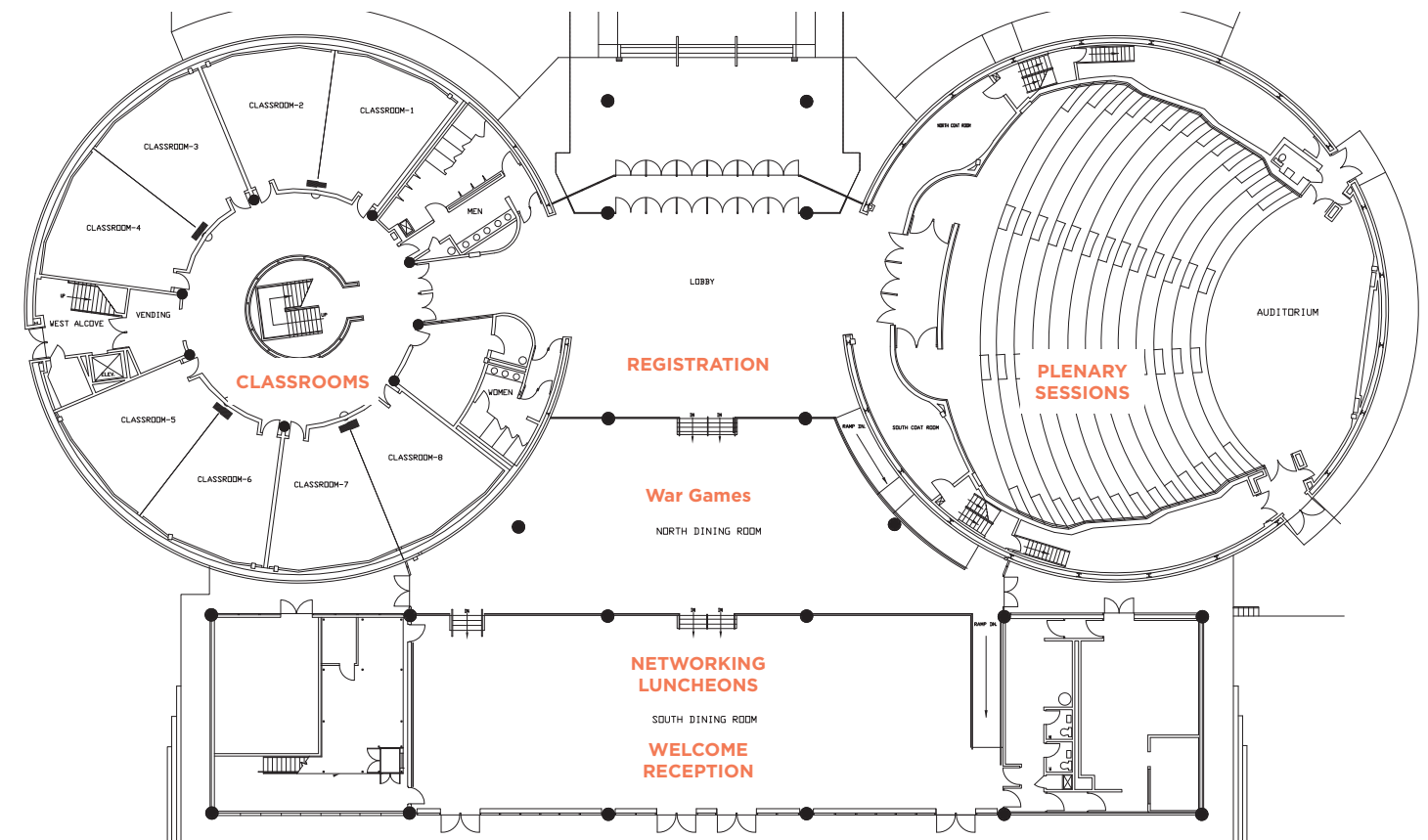
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**Please note these sessions are only available for in-person attendees.*

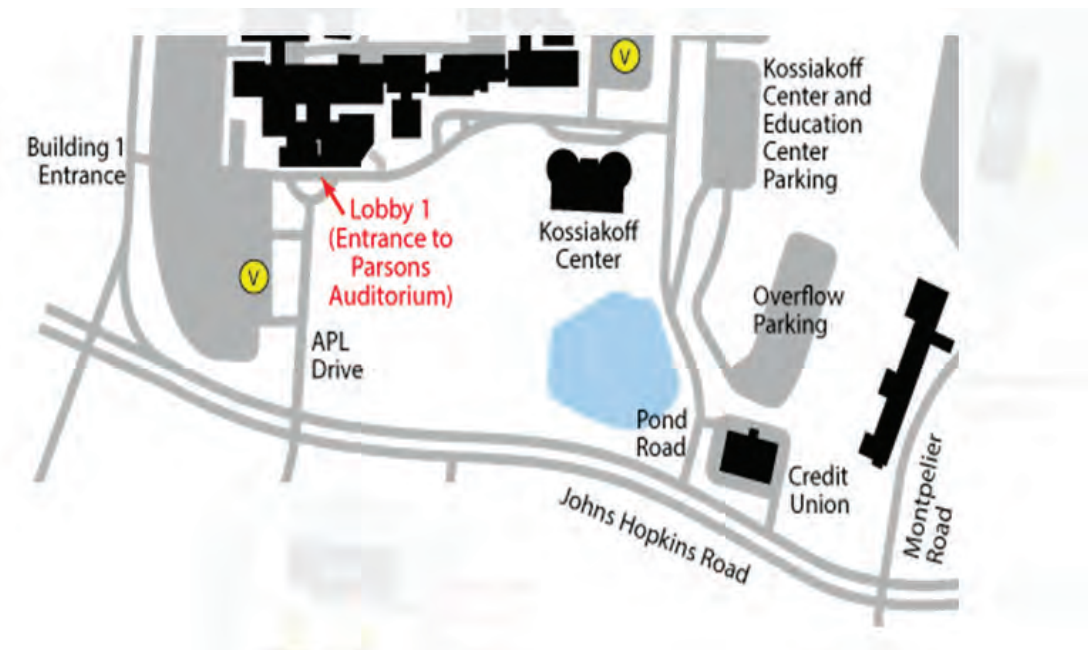


VENUE MAP

**KOSSIAKOFF CENTER
 JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY**



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We look forward to seeing you next year!

11-13 APRIL 2023

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