DEFENSE FORUM

14–16 September 2021 | Laurel, MD

SHARPENING THE COMPETITIVE EDGE THROUGH AEROSPACE INNOVATION

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WELCOME TO DEFENSE FORUM

The 2021 AIAA DEFENSE Forum Executive Steering Committee (ESC) and Technical Program Committee (TPC) are excited to welcome you back to in-person events. We have worked hard to put together the high-level technical and in-depth discussions centered around the theme **SHARPENING THE COMPETITIVE EDGE THROUGH AEROSPACE INNOVATION**.
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!

TABLE OF CONTENTS

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AIAA SHAPING THE FUTURE OF AEROSPACE

The American Institute of Aeronautics and Astronautics (AIAA) is the world's largest aerospace technical society. With nearly 30,000 individual members from 91 countries, and 100 corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense. For more information, visit aiaa.org, or follow us on Twitter @AIAA.

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FORUM OVERVIEW

	TUESDAY 14	WEDNESDAY 15	THURSDAY 16
0730 hrs	Continental Breakfast	Continental Breakfast	Continental Breakfast
0800 hrs	Keynotes Operational Needs & Military Requirements *John Matyjas, Air Combat Command* Leveraging Innovation to Advance Missile Defense *RDML Tom Druggan, USN, Missile Defense Agency*	Technological Overmatch: The Critical Role of DoD R&D Panel	Advanced Technology: Industry Prime Contractors Panel
0830 hrs			
0900 hrs			
0930 hrs	Missile Systems Award Presentation / Networking Coffee Break	Networking Coffee Break	Networking Coffee Break
1000 hrs	AP-01: Advanced Prototypes I DEW-01: Integration of an HEL onto a Combat UAV GNC-01: Guidance, Navigation, Control and Estimation I SYS-01: Space Systems WSE-02: Weapons Systems Effectiveness: Test and Evaluation I	AMI-01: Autonomy and Machine Intelligence SMS-01: Sea-Based Strategic Missiles I: Mission Effectiveness WSE-04: Weapons Systems Effectiveness: MS&A	HYTASP-04: Hypersonic Flight and Trajectories SMS-04: Strategic Missiles: Launch Systems WSE-05: Weapons Systems Effectiveness: Laser Lethality I
1030 hrs			
1100 hrs			
1130 hrs			
1200 hrs			
1230 hrs	Lunch Available 1130-1300 hrs	Lunch Available 1130-1300 hrs	Lunch Available 1130-1300 hrs
1300 hrs	DEW-02: HEL Systems and Sensors GNC-02: Guidance, Navigation, Control and Estimation II HYTASP-01: Hypersonics SMS-03: Ground-Based Strategic Missiles WSE-03: Weapons Systems Effectiveness: Test and Evaluation II	DEW-04: HEL Lethality Measurements HYTASP-02: Hypersonic Propulsion RUWS-01: Robotic and Unmanned Weapon Systems SMS-02: Sea-Based Strategic Missiles II: Enabling Technology WSE-01: Morphing Weapons Technology	HYTASP-03: Hypersonic Phenomenology MD-01: Missile Defense SDA-02: Strategic Decision Analysis for National Security II SUR-01: Survivability WSE-06: Weapons Systems Effectiveness: Laser Lethality II
1330 hrs			
1400 hrs			
1430 hrs			
1500 hrs			
1530 hrs	Networking Coffee Break	Defense Industry Leadership Series Keynote *Bryan Rosselli, Raytheon Missiles and Defense*	Air Force Futures Agile Gaming Demo: Hypersonics 2030
1600 hrs	Systems Engineering for the Digital Battlespace *Ron Sega, Army Futures Command* DoD Digital Engineering Strategy and Implementation Panel	Space Asset Protection Panel	
1630 hrs			
1700 hrs			
1730 hrs	Wright Brothers Lecture: Hypersonics for National Security: Conventional Prompt Strike *Walt Rutledge, CENTRA Technologies*		
1800 hrs			
1830 hrs	Reception		
1900 hrs			

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Technical Career Development

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Networking

DISCOVER
High Level

GENERAL & SECURITY INFORMATION

AIAA Technical Committee Meetings

TUESDAY, 14 SEPTEMBER, 1800 HRS
Airborne Directed Energy Systems Integration Committee
Homewood Suites, Hopkins West Room

WEDNESDAY, 15 SEPTEMBER, 1800 HRS
Missile Systems Technical Committee
Homewood Suites, Hopkins East Room

WEDNESDAY, 15 SEPTEMBER, 1800 HRS
Weapons Systems Effectiveness Technical Committee
Homewood Suites, Hopkins West Room

Event Health and Safety Policies

The health and safety of all participants is AIAA's top priority as we come back together in person for the first time in 19 months. 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
- Daily temperature check
- 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
- Seating in the auditoriums will be every other seat
- Food and beverage will be provided in individual packaging
- Seating in the lunch area will be reduced to 5-6 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 placed in the back of all meeting rooms, and at the registration and AIAA tables in the lobby

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

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.

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 is required for admittance to the forum sessions. Each attendee will be required to produce a driver's license, military I.D., or company photo I.D. prior to receiving a forum badge. Badges must be worn at all times during the forum.

Security Restrictions

Electronic devices or electronic equipment of any kind—including cell phones, radios, personal fitness devices, PDAs, laptops, tablets, cameras, video/audio recording equipment, and two-way pagers and devices—are NOT allowed in the session rooms. One-way pagers must be placed on vibrate during the sessions.

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, 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.

NEW THIS YEAR!

AIAA DEFENSE Forum Proceedings published through DTIC

AIAA DEFENSE Forum presenters have the option to publish their presentation and/or a paper as part of conference proceedings, through the Defense Technical Information Center (DTIC).

DTIC will publish proceedings from the AIAA DEFENSE Forum on a separate AIAA DEFENSE Forum webpage available on www.dtic.mil. More than 750,000 users access information available on the DTIC website.

- Presenters may submit their presentation (PowerPoint or PDF) or a manuscript directly to DTIC (not to AIAA)
  - Manuscripts should follow the AIAA manuscript template
  - See the DTIC submission website for more information: **https://discover.dtic.mil/submit-documents/**
- Materials may be unclassified, ITAR, or classified up to SECRET/NOFORN
- Submissions must be related to DoD- or DoE-funded research
  - Submitters must have a valid CAC account
- Once materials have been successfully submitted, you will receive an accession number from DTIC
  - Please provide the accession number to AIAA
    - Accession numbers are provided via web pop-up and email notifications, and follow this format: AD####
    - You may email the number to **conferences@aiaa.org**
    - You may bring it onsite to the AIAA DEFENSE Forum and give it to a staff member at the registration desk
- Timeline:
  - Presentation or manuscript due to DTIC: 2000 hrs ET, 24 September 2021
  - Proceedings available online: 29 October

ENROLL IN UPCOMING AIAA COURSES

ONLINE SHORT COURSE

Hypersonic Propulsion Concepts: Design, Control, Operation, and Testing

12 October – 4 November 2021
(4 Weeks, 8 Lectures, 16 Hours)

Tuesday and Thursday

1300–1500 hrs EDT

This new 16-hour online course, instructed by experts from AIAA's High Speed Air-Breathing Propulsion Technical Committee, will introduce participants to the most important fundamentals of the technical discipline. Starting with an introduction and theoretical background, the course will quickly move into various practical applications and concepts.

COURSE FEES

$995 USD AIAA Member

$495 USD AIAA Student Member

$1,295 USD Nonmember

ONLINE SHORT COURSE

Understanding Cybersecurity in the Space Domain

6–8 October 2021

1100–1700 Eastern Time

This course examines the practical issues of developing and sustaining a secure cyber environment through all phases of the space mission lifecycle. The SpaDoCs Framework provides a comprehensive and systematic model for understanding and tackling all critical issues of cybersecurity in the space domain.

COURSE FEES

$995 USD AIAA Member

$495 USD AIAA Student Member

$1,195 USD Nonmember

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All students will receive an AIAA Certificate of Completion at the end of the course.
Cancellation Policy: A refund less a $50.00 cancellation fee will be assessed for all cancellations made in writing prior to 7 days before the start of the event. After that time, no refunds will be provided.

Please contact Jason Cole at jasonc@aiaa.org if you have questions about the course or group discounts (for 5+ participants).

PLENARY SESSIONS

All sessions are in the Auditorium.

TUESDAY, 14 SEPTEMBER

0800–0845 hrs

Operational Needs and Military Requirements

The 2018 National Defense Strategy is clear that a more lethal force and technological innovation are key to generating a decisive and sustained advantage. What do our warfighters need from the aerospace community to become a "more lethal, resilient, and rapidly innovating Joint Force" in an era of multi-domain warfare?

KEYNOTE SPEAKER:
John Matyjas, Scientific Adviser to the Commander, Air Combat Command

0845–0930 hrs

Leveraging Innovation to Advance Missile Defense

"The United States must outpace existing and potential rogue state and rogue actor offensive missile capabilities. To do so, the country will continue to sustain, modernize and expand the Missile Defense System and pursue the rapid, yet measured, development of advanced missile defense concepts and technologies for homeland and regional defense." (Missile Defense Agency Director's Vision and Intent, p. 3) How can government, industry, and academia work together to advance critical missile defense capabilities?

KEYNOTE SPEAKER:
RDML Tom Druggan, USN, Program Executive, Aegis Ballistic Missile Defense, Missile Defense Agency

0930–0935 hrs

2021 AIAA Missile Systems Award Presentation

"For over four decades of technical contributions and outstanding leadership in the advancement of missile systems technologies."

RECIPIENT:
Ralph H. Klestadt, Principal Engineering Fellow, and Chief Engineer, Hypersonics Advanced Technologies, Raytheon Missiles & Defense

1600–1620 hrs

Systems Engineering for the Digital Battlespace

Before we explore digital engineering and its opportunities, we need to take a step back and consider the human element. What is required to build technology in digital environments, and how do we quickly, safely, and affordably design and produce systems for the warfighter? Dr. Sega will examine the "why" behind digital engineering, and set the stage for the following panel session.

SPEAKER:
Ronald Sega, Chief Technology Officer, U.S. Army Futures Command

1620–1730 hrs

DoD Digital Engineering Strategy and Implementation

As we enter into the fourth industrial revolution, this new digital era offers the opportunity to transform warfighting technologies and their development. To do so requires a new approach to systems engineering. More than two years after the Digital Engineering Strategy was released by DoD, hear how the Services are embracing digital tools and techniques, and what the next steps are for implementation.

MODERATOR:
Dan Heller, Vice President, Corporate Engineering, Lockheed Martin

PANELISTS:
Thomas C. Fu, Head, Mission Capable, Persistent and Survivable Naval Platforms Department, Office of Naval Research

Stephanie L. Possehl, Acting Deputy Director for Engineering and Director for Engineering Policy and Systems, Office of the Under Secretary of Defense for Research and Engineering

Rob Wallace, Technical Director, U.S. Army Engineer Research and Development Center (ERDC) Information Technology Laboratory (ITL)

1730–1830 hrs

AIAA Wright Brothers Lecture in Aeronautics

"Hypersonics for National Security: Conventional Prompt Strike"

KEYNOTE:
Walter Rutledge, Senior Technical Advisor, CENTRA Technologies

WEDNESDAY, 15 SEPTEMBER

0800–0930 hrs

Technological Overmatch: The Critical Role of DOD R&D

"Innovation without execution is hallucination." DoD Research and Development (R&D) is charged with taking fundamental research and applying it to technologies for the warfighter. Hear about current and future projects, upcoming opportunities, and how these organizations enable the research community to transition ideas to technological advantages.

MODERATOR:
Laura J. McGill, Deputy Laboratories Director, and Chief Technology Officer, Nuclear Deterrence, Sandia National Laboratories

PANELISTS:
Patrick Baker, Director, DEVCOM Army Research Laboratory

Douglas Blake, Acting Executive Director, Office of Naval Research

Timothy Bunning, Chief Technology Officer, Air Force Research Laboratory

1530–1600 hrs

Defense Industry Leadership Series: How Digital Technologies are Driving Change in Defense

In today's global threat environment, speed to the battlefield is just as important as speed on the battlefield. Digital technologies, and the data threads they create, are helping drive transformative change throughout the defense industry, from how we envision and field solutions to how we interact with customers and warfighters. In his talk, Bryan Rosselli will offer key insights into Raytheon Missiles & Defense's unique digital transformation journey and how it's accelerating the pace of innovation and performance, strengthening customer partnerships, and helping industry and government leaders reimagine the DoD's acquisition process.

KEYNOTE SPEAKER
Bryan Rosselli, Vice President, Business Transformation & Execution, Raytheon Missiles & Defense

1600–1730 hrs

Space Asset Protection

While the Interim National Security Strategic Guidance released in March calls for ensuring the "safety, stability and security of outer space activities" (p. 17), much work remains to be done to protect our space assets. It's time to protect our nation's space-based systems by designating them as critical infrastructure. Without adequate security, cyberattackers can cause them to malfunction, send false information or collide, potentially creating a debris field that could linger for decades. Worse, cyberattackers could simulate an attack on military systems, sparking an international — possibly nuclear — confrontation." (Ed Swallow and Sam Visner, "It's time to declare space systems as critical infrastructure," POLITICO, April 2, 2021) How do the various commands, agencies, and organizations involved cooperate; how can the defense community support; and what new policies, products, and solutions are needed to secure space assets?

MODERATOR:
Jamie Morin, Executive Director, Center for Space Policy and Strategy; Vice President, Defense Systems Operations, The Aerospace Corporation

PANELISTS:
Col Brian Bracy, USSF, Chief (Acting), Systems Engineering and Architecture, Office of the Portfolio Architect, Space Systems Command

Roberta Ewart, Chief Scientist, Space Systems Command

Ronald Keen, Senior Energy Advisor, National Risk Management Center, Cybersecurity and Infrastructure Security Agency, Department of Homeland Security

Samuel Visner, Director, National Cybersecurity Federally Funded Research and Development Center, MITRE; Board Member, Space Information Sharing and Analysis Center (ISAC)

THURSDAY, 16 SEPTEMBER

0800–0930 hrs

Advanced Technology: Industry Prime Contractors Panel

Maintaining the Department's technological advantage will require changes to industry culture, investment sources, and protection across the National Security Innovation Base" (National Defense Strategy [Unclassified], p. 3). The sense of urgency is driving a new environmental dynamic in industry, but how can we accelerate through the "valley of death"? Industry leaders respond to DoD modernization priorities and address requirements for fielding technologies at the speed of relevance.

MODERATOR:
Todd Nygren, Senior Vice President, Engineering and Technology Group, The Aerospace Corporation

PANELISTS:
Timothy Barton, Dynetics Group CTO, Leidos

Naveed Hussain, Chief Technology Officer, Vice President, and General Manager, Boeing Research & Technology

Tom Pieronek, Vice President and Chief Technology Officer, Research, Technology and Engineering, Northrop Grumman Aeronautics Systems

Steven Walker, Vice President and Chief Technology Officer, Lockheed Martin

John C. Zolper Sr., Principal Engineering Fellow, Defense Technology Strategy, Raytheon Technologies

1530–1830 hrs

Air Force Futures Agile Gaming Demo: Hypersonics 2030

The Air Force Futures Agile Wargaming Team will be providing 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, as agile games typically average 6–9 players for 3-hour sessions. This game and the surrounding conversation are meant to highlight the quick-turn development and execution key for successful agile games through the lens of conceptual hypersonics. Players do not need to have any prior experience in wargaming or hypersonics.

Tuesday

Tuesday, 14 September 2021

1-PLNRY-1 0800 - 0930 hrs	Plenary 1: Operational Needs and Military Requirements Plenary 2: Leveraging Innovation to Advance Missile Defense	Auditorium

Plenary 1: Operational Needs and Military Requirements

Speaker: John Matyjas, Scientific Adviser to the Commander, Air Combat Command

The 2018 National Defense Strategy is clear that a more lethal force and technological innovation are key to generating a decisive and sustained advantage. What do our warfighters need from the aerospace community in order to become a "more lethal, resilient, and rapidly innovating Joint Force" in an era of multi-domain warfare?

Plenary 2: Leveraging Innovation to Advance Missile Defense

Speaker: RDML Tom Druggan, USN, Program Executive, Aegis Ballistic Missile Defense, Missile Defense Agency

"The United States must outpace existing and potential rogue state and rogue actor offensive missile capabilities. To do so, the country will continue to sustain, modernize and expand the Missile Defense System and pursue the rapid, yet measured, development of advanced missile defense concepts and technologies for homeland and regional defense." (Missile Defense Agency Director's Vision and Intent, p. 3) How can government, industry and academia work together to advance critical missile defense capabilities?

Tuesday, 14 September 2021

2-AWARD-1 0930 - 0940 hrs	2021 AIAA Missile Systems Award Presentation	Auditorium

Ralph H. Klestadt

Principal Engineering Fellow, Chief Engineer, Hypersonics Advanced Technologies
Raytheon Missiles & Defense

"For over four decades of technical contributions and outstanding leadership in the advancement of missile systems technologies."

Tuesday, 14 September 2021

3-AP-1	Advanced Prototypes			Parsons Auditorium
Chaired by: R. FONTAINE, MIT Lincoln Laboratory and A. SCOURAS, MIT Lincoln Laboratory				
1000 hrs AIAA-Defense2021-9000 **Reduced Acoustic Signature Propellers** K. Quigley, R. Fontaine, T. Sebastian, D. Maurer, J. Belarge, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; P. Sharpe, Massachusetts Institute of Technology, Cambridge, MA	1030 hrs AIAA-Defense2021-9001 **Enabling Next-Generation Leading Edge Design with Cold Spray Additive Manufacturing** I. Nault, G. Ferguson, DEVCOM Army Research Laboratory, Aberdeen Proving Ground, MD	1100 hrs AIAA-Defense2021-9002 **Application of Model-Based Systems Engineering to Test Program Planning and Analysis** D. Barnes, Systems Planning and Analysis, Inc., Alexandria, VA	1130 hrs AIAA-Defense2021-9003 **Effects of Wing Deformation on LauncherOne Store-Separation Predictions** C. Acuff, NASA Dryden Flight Research Center, Edwards, CA; N. Johnson, New Horizons Aeronautics, LLC, Edwards, CA; K. Powers, Q. Murphy, Virgin Orbit, LLC, Long Beach, CA	1200 hrs AIAA-Defense2021-9004 **Validation of LauncherOne Drop Test Predictions Using Flight Test Data** C. Acuff, NASA Dryden Flight Research Center, Edwards, CA; K. Powers, Q. Murphy, Virgin Orbit, LLC, Long Beach, CA

Tuesday, 14 September 2021

4-DEW-1 1000–1230 hrs	Integration of an HEL onto a Combat UAV	Room 5/6
Chaired by: M. NEICE, Directed Energy Professional Society		

AIAA-Defense2021-9005

Integration of a High Energy Laser onto a Combat UAV

M. Neice, Directed Energy Professional Society, Albuquerque, NM

Tuesday, 14 September 2021

5-GNC-1 / 6-SYS-1	Guidance, Navigation, Control, and Estimation I / Space Systems			Room 3/4
Chaired by: U. SHANKAR, The Johns Hopkins University Applied Physics Laboratory / M. MCFARLAND, Raytheon Missiles & Defense				
1000 hrs AIAA-Defense2021-9006 **Multilevel Data Integration with Applications in Sensor Networks** J. Spall, Johns Hopkins University Applied Physics Laboratory, Laurel, MD; L. Wang, Johns Hopkins University, Baltimore, MD	1030 hrs AIAA-Defense2021-9007 **Comparison of Constraint Learning Methods for Rapid, Autonomous Trajectory Generation** L. Hood, A. Damany, J. Fan, A. Stempeck, A. Strong, Sandia National Laboratories, Albuquerque, NM	1100 hrs AIAA-Defense2021-9008 **SciBox - a Realtime Autonomous Satellite Constellation Management System** T. Choo, Johns Hopkins University Applied Physics Laboratory, Laurel, MD		

Tuesday, 14 September 2021				
7-WSE-2	**Weapon Systems Effectiveness: Test and Evaluation I**			**Auditorium**
Chaired by: N. MORLEY, Air Force Reseach Laboratory and T. WADHAMS, CUBRC				
1000 hrs AIAA-Defense2021-9009 **Ground Testing and Computation of the HIFiRE-5B Configuration to Evaluate Boundary Layer Transition** T. Wadhams, CUBRC, Buffalo, NY	1030 hrs AIAA-Defense2021-9010 **Leveraging Multi-fidelity Aerodyanmic Databasing to Efficiently Represent a Hypersonic Design Space** K. Quinlan, S. Movva, Lawrence Livermore National Laboratory, Livermore, CA	1100 hrs AIAA-Defense2021-9011 **Dynamic Lethality Rodeo: Modular Testing at Hypersonic Velocity** M. Pinto, Lawrence Livermore National Laboratory, Livermore, CA	1130 hrs AIAA-Defense2021-9012 **Prototype Development and Results for a Long-Duration Hypervelocity Test Capability** A. Dufrene, J. Peace, R. Kielb, M. MacLean, T. Wadhams, CUBRC, Buffalo, NY	1200 hrs AIAA-Defense2021-9013 **Sensor Placement Optimization Using a Greedy Algorithm** B. Johnson, Air Force Research Laboratory, Kirtland AFB, NM; A. Lee, AETC, Keesler AFB, MS; C. Smith, Air Force Research Laboratory, Kirtland AFB, NM

Tuesday, 14 September 2021				
8-DEW-2	**HEL Systems and Sensors**			**Auditorium**
Chaired by: G. WOOD, Johns Hopkins University Applied Physics Laboratory				
1300 hrs AIAA-Defense2021-9014 **Design, Development and Wind-Tunnel Testing of an Aero-Optical Flow Control Approach** M. Rennie, E. Jumper, University of Notre Dame, Notre Dame, IN	1330 hrs AIAA-Defense2021-9015 **Cognitive Laser - Automated Decision Aid for Laser Weapon Systems** B. Johnson, Naval Postgraduate School, Monterey, CA	1400 hrs AIAA-Defense2021-9016 **Event-Based Sensors for Directed Energy Battle Damage Assessment** J. Cox, University of Arizona, Tucson, AZ; N. Morley, Air Force Research Laboratory, Albuquerque, NM		

Tuesday, 14 September 2021				
9-GNC-2	**Guidance, Navigation, Control, and Estimation II**			**Parsons Auditorium**
Chaired by: M. MCFARLAND, Raytheon Missiles & Defense and U. SHANKAR, The Johns Hopkins University Applied Physics Laboratory				
1300 hrs AIAA-Defense2021-9017 **Collaborative Engagement Research at CCDC-ARL** M. Don, B. Allik, L. Fairfax, M. Grabner, M. Hamaoui, C. Miller, Army Research Laboratory, Adelphi, MD; et al.	1330 hrs AIAA-Defense2021-9019 **Reach-Avoid Games via Coverage Control on Capture Surface** P. Rivera, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1400 hrs AIAA-Defense2021-9020 **Optimal Integrated Guidance and Control of a Tactical Missile** D. Ridgely, Raytheon Company, Tucson, AZ		

Tuesday, 14 September 2021				
10-HYTASP-1	**Hypersonics**			**Room 3/4**
Chaired by: J. RHOADS, Lockheed Martin Aeronautics and J. MCINTIRE, MIT Lincoln Laboratory				
1300 hrs AIAA-Defense2021-9021 **Flight Data for Hypersonic Boundary-Layer Transition on Maneuvering Reentry Vehicles: Towards Mechanism-Based Prediction Methods** S. Schneider, Purdue University, West Lafayette, IN	1330 hrs AIAA-Defense2021-9022 **Risk Reduction and Design Trade Studies for a Mach-8 Quiet Tunnel at Purdue University** B. Chynoweth, S. Schneider, H. Ahlquist, Purdue University, West Lafayette, IN	1400 hrs AIAA-Defense2021-9023 **Aerodynamic heating experiments and computations around swept fins at Mach 4** S. Craig, J. Little, University of Arizona, Tucson, AZ; S. Wernz, Raytheon Missiles & Defense, Tucson, AZ		

Tuesday, 14 September 2021				
11-SMS-3	**Ground-Based Strategic Missiles**			**Room 5/6**
Chaired by: M. OLMOS, Northrop Grumman Corporation				
1300 hrs AIAA-Defense2021-9025 **High Speed Sled Testing of a Strategic Grade Advanced Inertial Measurement Unit (AIMU) for Boost Applications** M. Dubois, Honeywell International, Inc., Clearwater, FL	1330 hrs AIAA-Defense2021-9026 **Artificial Intelligence Approaches to Scheduling ICBM Maintenance** A. French, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1400 hrs AIAA-Defense2021-9027 **Rapidly Developed Launch Monitors for Sea-Based Missile Defense** J. Herdy, CFD Research Corporation, Madison, AL	1430 hrs AIAA-Defense2021-9028 **Application of Strategies to Accelerate Safety Processes in DoD Accelerated Acquisition Programs** S. Sells, G. Sweany, Systems Planning and Analysis, Inc., Alexandria, VA	

Tuesday, 14 September 2021				
12-WSE-3	Weapon Systems Effectiveness: Test and Evaluation II			Room 7/8
Chaired by: T. WADHAMS, CUBRC and M. DOWNEY				
1300 hrs AIAA-Defense2021-9029 **Accuracy, Efficiency, and Transparency in Environmental Data Analysis** C. Haynes, D. Harvey, S. Taylor, Los Alamos National Laboratory, Los Alamos, NM	1330 hrs AIAA-Defense2021-9030 **Proton Radiography for Density Movies of Dynamic Exploding Events** K. Prestridge, Los Alamos National Laboratory, Los Alamos, NM	1400 hrs AIAA-Defense2021-9031 **Suborbital Sounding Rocket and Missile Testing of Space and Defense Technology** E. Libby, R. Weaver, R. Maddox, R. Stanfield, N. Cranor, H. Cherrix, Peraton Corporation, Herndon, VA	1430 hrs AIAA-Defense2021-9032 **The challenges of developing High Energy Laser (HEL) test and evaluation (TE) systems integrated into representative threats for the purpose of assessing lethality.** D. Ward, SemQuest Inc., Colorado Springs, CO	

Tuesday, 14 September 2021		
13-PLNRY-3 1600 - 1730 hrs	Plenary 3: Systems Engineering for the Digital Battlespace Plenary 4: DoD Digital Engineering Strategy and Implementation	Auditorium

Plenary 3: Systems Engineering for the Digital Battlespace

Speaker: Ronald Sega, Chief Technology Officer, Army Futures Command

Before we explore digital engineering and its opportunities, we need to take a step back and consider the human element. What is required to build technology in digital environments, and how do we quickly, safely and affordably design and produce systems for the warfighter? Dr. Sega will examine the "why" behind digital engineering, and set the stage for the following panel session.

Plenary 4: DoD Digital Engineering Strategy and Implementation

As we enter into the fourth industrial revolution, this new digital era offers the opportunity to transform warfighting technologies and their development. To do so requires a new approach to systems engineering. More than two years after the Digital Engineering Strategy was released by DoD, hear how the Services are embracing digital tools and techniques, and what the next steps are for implementation.

Moderator: Dan Heller, Vice President, Corporate Engineering, Lockheed Martin
Panelists:

Stephanie Possehl
Deputy Director for Engineering (Acting) and Director for Engineering Policy and Systems
Office of the Under Secretary of Defense for Research and Engineering

Thomas C. Fu
Head, Mission Capable, Persistent and Survivable Naval Platforms Department
Office of Naval Research

Rob Wallace, Ph.D., PE
Technical Director, US Army Engineer Research and Development Center (ERDC)
Information Technology Laboratory (ITL)

Tuesday, 14 September 2021		
14-AWARD-2 1730 - 1830 hrs	AIAA Wright Brothers Lecture in Aeronautics Award: Hypersonics for National Security: Conventional Prompt Strike	Auditorium

Lecturer: **Walter Rutledge**
Senior Technical Advisor
CENTRA Technologies

Wednesday

Wednesday, 15 September 2021		
15-PLNRY-5 0800 - 0930 hrs	Technological Overmatch: The Critical Role of DoD R&D	Auditorium

"Innovation without execution is hallucination." DoD Research and Development (R&D) is charged with taking fundamental research and applying it to technologies for the warfighter. Hear about current and future projects, upcoming opportunities, and how these organizations enable the research community to transition ideas to technological advantages.

Moderator: Laura McGill, Deputy Laboratories Director, Chief Technology Officer Nuclear Deterrence, Sandia National Laboratories
Panelists:

Patrick Baker
Director
DEVCOM Army Research Laboratory

Douglas Blake
Acting Executive Director
Office of Naval Research

Timothy Bunning
Chief Technology Officer
Air Force Research Laboratory

Wednesday, 15 September 2021				
16-AMI-1	**Autonomy and Machine Intelligence**			**Auditorium**
Chaired by: R. SAMANTA ROY, Lockheed Martin Corporation and B. GRABOWSKI, Raytheon				
1000 hrs AIAA-Defense2021-9033 **Auto-Encoders for CAN Bus Anomaly Detection in Ground Vehicles** E. Novikova, V. Le, M. Yutin, M. Weber, BAE Systems, Arlington, VA	1030 hrs AIAA-Defense2021-9034 **Novel Hypersonic Vehicle Maneuvers via Reinforcement Learning Techniques** A. Raz, George Mason University, Fairfax, VA; K. Ezra, L. Mockus, S. Nolan, W. Levin, Purdue University, West Lafayette, IN; A. Mia, George Mason University, Fairfax, VA; et al.			

Wednesday, 15 September 2021				
17-SMS-1	**Sea-Based Strategic Missiles I - Mission Effectiveness**			**Room 3/4**
Chaired by: S. VAN DYK, Navy Strategic Systems Programs and A. EDSALL, The Charles Stark Draper Laboratory, Inc. and C. CUPPLES, Lockheed Martin Space Systems				
1000 hrs AIAA-Defense2021-9035 **Complexity Systems Theory, Human Conflict and Deterrence: Seeing the Forest through the Trees** W. Kahle, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1030 hrs AIAA-Defense2021-9036 **Evaluating Military Utility of MIRV'ed Ballistic Systems using MDAO** M. Vasek, S. Howell, Systems Planning and Analysis, Inc., Alexandria, VA	1100 hrs AIAA-Defense2021-9037 **Developing Future Technical Leaders: An Applied Training Pipeline Concept** D. Barnes, Systems Planning and Analysis, Inc., Alexandria, VA		

Wednesday, 15 September 2021				
18-WSE-4	**Weapon Systems Effectiveness: MS&A**			**Parsons Auditorium**
Chaired by: R. ADDIS, Lawrence Livermore National Laboratory and A. CASH, Dynetics, Inc.				
1000 hrs AIAA-Defense2021-9038 **Probability of Weapon Effectiveness Experiment (PWEX) Program Summary** Z. George, P. Wallentine, Missile Defense Agency, Albuquerque, NM	1030 hrs AIAA-Defense2021-9039 **Weapons Open Systems Architecture - Three Pillars for successful Open Architecture** C. Neal, Air Force Research Laboratory, Eglin, FL			

Wednesday, 15 September 2021				
19-DEW-4	**HEL Lethality Measurements**			**Auditorium**
Chaired by: M. NEICE, Directed Energy Professional society				
1300 hrs AIAA-Defense2021-9040 **Continuous wave laser induced damage threshold of AMTIR-2, 4, 5 and 7 chalcogenide windows at 1.07 microns** J. McElhenny, CCDC Army Research Laboratory, Adelphi, MD	1330 hrs AIAA-Defense2021-9041 **Summary Results of the Army Space and Missile Defense Command's High Energy Laser Counter-RAM (Rocket, Artillery, Mortar) Lethality Program** G. Romanczuk, AMRDEC, Redstone Arsenal, AL; J. Willis, Modern Technology Solutions, Inc., Huntsville, AL; C. LaMar, U.S. Army Space and Missile Defense Command, Redstone Arsenal, AL; J. West, Radiance Technologies, Huntsville, AL	1400 hrs AIAA-Defense2021-9042 **Comparison of Mortar Vulnerability Estimates to Army Field Tests (Secret)** C. LaMar, U.S. Army Space and Missile Defense Command, Huntsville, AL; C. Malone, Consultant, Pittsburgh, PA; J. West, Radiance Technologies, Huntsville, AL	1430 hrs AIAA-Defense2021-9043 **AEDC Laser Testing** D. Luke, Air Force Research Laboratory, Kirtland AFB, NM	

Wednesday, 15 September 2021				
20-HYTASP-2	**Hypersonic Propulsion**			**Parsons Auditorium**
Chaired by: J. MCINTIRE, MIT Lincoln Laboratory and J. RHOADS, Lockheed Martin Aeronautics				
1300 hrs AIAA-Defense2021-9044 **Parametric Investigation of a Scramjet Compression System** M. Reagans, J. Komives, Air Force Institute of Technology, Wright-Patterson AFB, OH	1330 hrs AIAA-Defense2021-9045 **Insensitive VORTEX® Hybrid Propulsion System Capable of Thrust Modulation and On Demand Termination** B. Pomeroy, D. Staaden, W. Hallum, N. Walker, M. Chiaverini, Sierra Nevada Corporation, Madison, WI	1400 hrs AIAA-Defense2021-9046 **Design and Analysis of Low-Fidelity Scramjet Inlet Characterization Tools** T. Remsing, J. Komives, Air Force Institute of Technology, Wright-Patterson AFB, OH		

Wednesday, 15 September 2021				
21-RUWS-1	**Robotic and Unmanned Weapon Systems**			**Room 7/8**
Chaired by: Z. HALL, US Army CCDC AvMC				
1300 hrs AIAA-Defense2021-9047 **Agile Robotic Systems for Infiltrating Hardened and Deeply Buried Targets** M. Anderson, M. Obenchain, R. Howe, M. Hood, J. Lebrilla, U.S. Air Force Academy, Colorado Springs, CO	1330 hrs AIAA-Defense2021-9048 **Aerial resupply of small teams using Remotely Piloted Aircraft** M. Anderson, E. Dittman, A. Ahern, A. Barnes, D. Rochester, A. Cabigas, U.S. Air Force Academy, Colorado Springs, CO; et al.	1400 hrs AIAA-Defense2021-9049 **Design, Prototype, and Testing of Sub-Scale Airdroppable Payloads from Small Air Vehicles.** H. Richards, U.S. Air Force Academy, Colorado Springs, CO		

Wednesday, 15 September 2021				
22-SMS-2	**Sea-Based Strategic Missiles II - Enabling Technology**			**Room 3/4**
Chaired by: S. VAN DYK, Navy Strategic Systems Programs and A. EDSALL, The Charles Stark Draper Laboratory, Inc. and C. CUPPLES, Lockheed Martin Space Systems				
1300 hrs AIAA-Defense2021-9050 **Rapid Feature Development and Deployment on High Consequence Systems** M. Burno, M. Gerlitz, General Dynamics Corporation, Pittsfield, MA	1330 hrs AIAA-Defense2021-9051 **Collaboration via OUSD(R&E) Programs to ensure Stable and Affordable Domestic Manufacturing Infrastructure and Skilled Worker Pipelines** M. Kay, B. Snow, K. Perry, Naval Surface Warfare Center Crane, Bloomington, IN	1400 hrs AIAA-Defense2021-9052 **Government Radiation Hardened System on a Chip (GRADSOC)** P. Melanson, Charles Stark Draper Laboratory, Inc., Cambridge, MA	1430 hrs AIAA-Defense2021-9053 **Strategic Missile Electronics Card & Box development in a Model Based Engineering Environment** D. Kenyon, A. Sireci, Lockheed Martin Corporation, Sunnyvale, CA	1500 hrs AIAA-Defense2021-9054 **Seamless management of electronics production data: Initial implementation of IPC-2581** A. Amar, D. Kenyon, Lockheed Martin Corporation, Sunnyvale, CA

Wednesday, 15 September 2021				
23-WSE-1	**Morphing Weapons Technology**			**Room 5/6**
Chaired by: A. CASH, Dynetics, Inc. and N. MORLEY, Air Force Reseach Laboratory				
1300 hrs AIAA-Defense2021-9055 **Active Missile Forebody Articulation for Improved Interceptor Performance** B. Dickinson, Air Force Research Laboratory, Eglin AFB, FL; J. Ratcliff, Leidos, Inc., Shalimar, FL; M. Rask, Cummings Aerospace, Niceville, FL; D. Bodkin, T. Mason, Leidos, Inc., Shalimar, FL	1330 hrs AIAA-Defense2021-9056 **Optimization and Validation of Load-Bearing Skins for Cylindrical Morphing Missile Bodies** G. Frank, University of Dayton Research Institute, Dayton, OH; W. Chapkin, D. Seifert, J. Baur, Air Force Research Laboratory, Wright-Patterson AFB, OH	1400 hrs AIAA-Defense2021-9057 **Design and Optimization of a Morphing Missile Head** R. Beblo, G. Reich, Air Force Research Laboratory, Wright-Patterson AFB, OH; T. Cruz-Gonzalez, M. Tidball, University of Dayton Research Institute, Dayton, OH	1430 hrs AIAA-Defense2021-9058 **Surface Morphing and Adaptive Structures for Hypersonics: Morphing Waveriders and Low-Entropy Control Surfaces** J. Maxwell, U.S. Naval Research Laboratory, Washington, D.C.	1500 hrs AIAA-Defense2021-9059 **Control Systems for High Speed Stratospheric Maneuverability** J. Schoneman, E. Blades, ATA Engineering, Huntsville, AL; K. Casper, Sandia National Laboratories, Albuquerque, NM; M. Landers, Dynetics, Huntsville, AL

Wednesday, 15 September 2021		
24-PLNRY-6 **1530 - 1600 hrs**	**Defense Industry Leadership Series: How Digital Technologies are Driving Change in Defense**	**Auditorium**

Speaker: **Bryan Rosselli**
Vice President, Business Transformation and Execution
Raytheon Missiles & Defense

In today's global threat environment, speed to the battlefield is just as important as speed on the battlefield. Digital technologies, and the data threads they create, are helping drive transformative change throughout the defense industry, from how we envision and field solutions to how we interact with customers and warfighters. In his talk, Bryan Rosselli will offer key insights into Raytheon Missiles and Defense's unique digital transformation journey and how it's accelerating the pace of innovation and performance, strengthening customer partnerships, and helping industry and government leaders reimagine the DoD's acquisition process.

Wednesday, 15 September 2021

25-PLNRY-7 1600 - 1730 hrs	Space Asset Protection	Auditorium

While the Interim National Security Strategic Guidance released in March calls for ensuring the "safety, stability and security of outer space activities" (p. 17), much work remains to be done to protect our space assets. "It's time to protect our nation's space-based systems by designating them as critical infrastructure. Without adequate security, cyberattackers can cause them to malfunction, send false information or collide, potentially creating a debris field that could linger for decades. Worse, cyberattackers could simulate an attack on military systems, sparking an international — possibly nuclear — confrontation." (Ed Swallow and Sam Visner, "It's time to declare space systems as critical infrastructure", POLITICO, April 2, 2021.) How do the various commands, agencies and organizations involved cooperate; how can the defense community support; and what new policies, products and solutions are needed to secure space assets?

Moderator: Jamie Morin, Executive Director, Center for Space Policy and Strategy; Vice President, Defense Systems Operations, The Aerospace Corporation
Panelists:

Col Brian Bracy, USSF
Chief (Acting), Systems Engineering and Architecture
Office of the Portfolio Architect
Space Systems Command

Roberta Ewart
Chief Scientist
Space Systems Command

Ronald Keen
Senior Energy Advisor, National Risk Management Center
Cybersecurity and Infrastructure Security Agency
Department of Homeland Security

Samuel Visner
Director, National Cybersecurity Federally Funded Research and Development Center, MITRE
Board Member, Space Information Sharing and Analysis Center (ISAC)

Thursday

Thursday, 16 September 2021

26-PLNRY-8 0800 - 0930 hrs	Advanced Technology: Industry Prime Contractors Panel	Auditorium

"Maintaining the Department's technological advantage will require changes to industry culture, investment sources, and protection across the National Security Innovation Base." (National Defense Strategy [Unclassified], p. 3) The sense of urgency is driving a new environmental dynamic in industry, but how can we accelerate through the "valley of death"? Industry leaders respond to DoD modernization priorities and address requirements for fielding technologies at the speed of relevance.

Moderator: Todd Nygren, Senior Vice President, Engineering and Technology Group, The Aerospace Corporation
Panelists:

Tim Barton
Dynetics Group CTO
Leidos

Naveed Hussain
Boeing Chief Technology Officer and VP and General Manager
Boeing Research & Technology

Tom Pieronek
Vice President and Chief Technology Officer
Research, Technology and Engineering
Northrop Grumman Aeronautics Systems

Steve Walker
Chief Technology Officer
Lockheed Martin

John Zolper
Vice President, Research and Innovation
Raytheon Company

Thursday, 16 September 2021

27-HYTASP-4	Hypersonic Flight and Trajectories			Parsons Auditorium
Chaired by: J. RHOADS, Lockheed Martin Aeronautics				
1000 hrs AIAA-Defense2021-9060 **DARPA Glide Breaker Modeling and Simulation Overview and Parametric Analysis** M. Galfond, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1030 hrs AIAA-Defense2021-9061 **Training an Artificial Neural Network to Fly Hypersonic Glide Vehicles Using Reinforcement Learning** A. Lysak, J. Curro, C. Zagaris, J. Komives, Air Force Institute of Technology, Wright-Patterson AFB, OH	1100 hrs AIAA-Defense2021-9062 **Systems Study of Communication Networks with Hypersonic Vehicles** M. Martin, M. Miller, J. Rozier, W. Engler, Georgia Institute of Technology, Atlanta, GA	1130 hrs AIAA-Defense2021-9024 **Hypersonic Phenomenology Signature Study** D. Gao, G. Wrench, Lockheed Martin Corporation, Palo Alto, CA	

Thursday, 16 September 2021

28-SMS-4	Strategic Missiles - Launch Systems			Auditorium
Chaired by: A. EDSALL, The Charles Stark Draper Laboratory, Inc. and M. OLMOS, Northrop Grumman Corporation and C. CUPPLES, Lockheed Martin Space Systems				
1000 hrs AIAA-Defense2021-9063 **Investigation and Verification of External Acoustics Approach of a Silo Launched Flight Vehicle Using Computational Fluid Dynamics** M. Lively, F. Sanchez, S. Ramakrishnan, Northrop Grumman Corporation, San Bernardino, CA	1030 hrs AIAA-Defense2021-9064 **Prediction and verification of silo launch tube environments during the hot fly-out of ICBM launch vehicles using CFD** R. Hariharan, Northrop Grumman Corporation, San Bernardino, CA; S. Buchanan, Northrop Grumman Corporation, Ogden, UT	1100 hrs AIAA-Defense2021-9065 **Improved Routes to Launcher Development and Qualification** C. Kennedy, J. Carr, D. Gonzalez, Northrop Grumman Corporation, Sunnyvale, CA	1130 hrs AIAA-Defense2021-9066 **Virtual Reality for Computational Fluid Dynamics (CFD)** D. Garber, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1200 hrs AIAA-Defense2021-9067 **Minuteman III Integrated Test Bed Enhancements** M. Ramirez, S. Maccarthy, Lockheed Martin Corporation, Hill AFB, UT; D. Hammel, Lockheed Martin Corporation, Valley Forge, PA; M. Fredrickson, The Boeing Company, Layton, UT

Thursday, 16 September 2021				
29-WSE-5	**Weapon Systems Effectiveness: Laser Lethality I**			**Room 5/6**
Chaired by: G. WOOD, Johns Hopkins University Applied Physics Laboratory and D. LOOMIS, DNL Consulting				
1000 hrs AIAA-Defense2021-9068 **Group 1 UAS Tailboom Lethality Assessment** D. Duffin, Radiance Technologies, Las Cruces, NM; C. LaMar, U.S. Army Space and Missile Defense Command, Huntsville, AL	1030 hrs AIAA-Defense2021-9069 **Analysis of Directed Energy Engagements of UAV Targets using Modeling & Simulation Tools** G. Romanczuk, U.S. Army Space and Missile Defense Command, Huntsville, AL	1100 hrs AIAA-Defense2021-9070 **Laser Vulnerability Assessments for Air Base Defense** M. Sheyka, E. Ahn, C. Wilcox, Air Force Research Laboratory, Albuquerque, NM; R. Lee, Leidos, Inc., Albuquerque, NM	1130 hrs AIAA-Defense2021-9071 **Unmanned Aircraft System (UAS) Categorization and Character-Driven Grouping** J. Gundlach, Gundlach Aerospace LLC, Fairfax Station, VA; S. Baird, C. LaMar, U.S. Army SMDC, Huntsville, AL; A. Westenhofer, Radiance Technologies, Huntsville, AL	1200 hrs AIAA-Defense2021-9072 **Analysis of an Aircraft Optical Window** J. Tam, S. Lau, Naval Surface Warfare Center Dahlgren, Dahlgren, VA

Thursday, 16 September 2021				
30-HYTASP-3	**Hypersonic Phenomenology**			**Parsons Auditorium**
Chaired by: J. DAYWITT, Lockheed Martin Corporation and J. MCINTIRE, MIT Lincoln Laboratory				
1300 hrs AIAA-Defense2021-9073 **Enhancement and Application of Advanced Software Tools for Hypersonic Flowfields and Signatures** T. Deschenes, B. Smith, Spectral Sciences, Inc., Burlington, MA; V. Gidzak, M. Bartkowicz, GoHypersonic Inc., Minneapolis, MN	1330 hrs AIAA-Defense2021-9074 **Infra-red(IR) analysis of Hypersonic Glide Vehicle Wakes with Scene Generation** J. Papp, M. DeMagistris, N. Sinha, CRAFT Tech, Pipersville, PA	1400 hrs AIAA-Defense2021-9075 **Hypersonic Vehicles** C. Epstein, M. McLaughlin, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA	1430 hrs AIAA-Defense2021-9076 **Update to EPSS Workshop on Plume/Wake/ Hypersonic Signature Prediction Capabilities As National Assets** M. Vaughn, CCDC AvMC, Redstone Arsenal, AL	1500 hrs AIAA-Defense2021-9077 **Progress Toward Incorporating Particulate Radiation in Ablation Signatures** J. Cline, J. Quenneville, T. Deschenes, B. Smith, Spectral Sciences, Inc., Burlington, MA

Thursday, 16 September 2021				
31-MD-1	**Missile Defense**			**Room 3/4**
Chaired by: R. GAMBLE, QuantiTech Corporation and D. FOX, Lockheed Martin Missiles and Fire Control				
1300 hrs AIAA-Defense2021-9078 **Recent Threat Observations** B. Sheeks, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA	1330 hrs AIAA-Defense2021-9079 **Detection and Tracking of HGV Targets Using Space-Based IR Sensors** S. Hsu, H. Burke, M. McLaughlin, D. Youmans, J. Otazo, S. Prutzer, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA	1400 hrs AIAA-Defense2021-9080 **Hybrid Scene Projection Methodologies for Imaging Sensor Testing** H. Lowry, S. Steely, R. Nicholson, K. Mead, National Aerospace Solutions, Arnold AFB, TN	1430 hrs AIAA-Defense2021-9081 **Angle of Attack Based Queueing** B. Miller, Lockheed Martin Corporation, Palo Alto, CA	

Thursday, 16 September 2021				
32-SDA-2	**System and Decision Analysis for National Security**			**Room 7/8**
Chaired by: K. LABBE, Systems Planning and Analysis and J. LAFLEUR, Sandia National Laboratories				
1300 hrs AIAA-Defense2021-9082 **Portion-Marking Documents through the Use of Artificial Intelligence** K. Townsend, A. Firpi, Johns Hopkins University Applied Physics Laboratory, Laurel, MD	1330 hrs AIAA-Defense2021-9083 **Working Toward Mitigating Cognitive Biases in Analogous-Based Cost Estimating Models** J. Wright, A. Dorado, J. Samberson, Sandia National Laboratories, Albuquerque, NM	1400 hrs AIAA-Defense2021-9084 **Multi-criteria Analysis for the Integration of Operational, Technical and Program Decisions** M. Vasek, Systems Planning and Analysis, Inc., Alexandria, VA	1430 hrs AIAA-Defense2021-9085 **Ethics and the Emerging Military Technology of Hypersonics** R. Tuggle, U.S. Naval War College, Newport, RI	1500 hrs AIAA-Defense2021-9086 **Connecting Two Sides of the Same Nuclear Coin: Assessing the Impacts of Nuclear Weapon Technologies and Systems on Arms Control and Stability** J. Lafleur, S. Gilbert, Sandia National Laboratories, Livermore, CA; G. Forden, J. Gaudioso, Sandia National Laboratories, Albuquerque, NM

Thursday, 16 September 2021				
33-SUR-1	**Survivability**			**Auditorium**
Chaired by: W. SCHONBERG, Missouri University of Science and Technology and C. MCALLISTER, Joint Aircraft Survivability Program Office				
1300 hrs AIAA-Defense2021-9087 **Physics Based Survivability Metrics** R. Ewart, USSF/SSC, El Segundo, CA	1330 hrs AIAA-Defense2021-9088 **Rapid Structural Vulnerability Toolkit** S. Rosencrantz, N. Berg, Skyward Ltd., Dayton, OH	1400 hrs AIAA-Defense2021-9089 **The Fast Laser ATGM Soft-Kill (FLASK) Countermeasure and the Integration of its Optical Threat Warner with the Modular Active Protection System Framework (MAF)** C. Wolfe, L. Vanderhoef, Army Research Laboratory, Aberdeen Proving Ground, MD; G. Thomson, Oak Ridge Associated Universities, Belcamp, MD; A. Valenzuela, A. Schweinsberg, Army Research Laboratory, Aberdeen Proving Ground, MD; W. Beyer, CCDC Ground Vehicle Systems Center, Warren, MI; et al.	1430 hrs AIAA-Defense2021-9090 **Overview of LLNL's Hypersonic Flight Modeling Suite (Sora)** D. Driver, Lawrence Livermore National Laboratory, Livermore, CA	

Thursday, 16 September 2021				
34-WSE-6	**Weapon Systems Effectiveness: Laser Lethality II**			**Room 5/6**
Chaired by: G. WOOD, Johns Hopkins University Applied Physics Laboratory and D. LOOMIS, DNL Consulting				
1300 hrs AIAA-Defense2021-9091 **Missile Component Testing under High Speed Airflow at AEDC** C. von Hohenleiten, Naval Surface Warfare Center Dahlgren, Dahlgren, VA	1330 hrs AIAA-Defense2021-9092 **Thermal Blooming Analysis/Engagement Study** L. Schanwald, Naval Surface Warfare Center Dahlgren, King George, VA	1400 hrs AIAA-Defense2021-9093 **Laser Lethality Field Test Review, JTCG/ME** C. Carney, Naval Surface Warfare Center Dahlgren, Dahlgren, VA	1430 hrs AIAA-Defense2021-9094 **Laser Penetration Testing & Analysis of Metals in High Subsonic and Supersonic Flow** E. Nugent, B. Myruski, Naval Surface Warfare Center Dahlgren, Dahlgren, VA	1500 hrs AIAA-Defense2021-9095 **Target Vulnerability Process for Laser Weapon C-ASCM Applications** S. Potter, Booz Allen Hamilton, King George, VA

Thursday, 16 September 2021		
35-PLNRY-9 **1530 - 1830 hrs**	**Air Force Futures Agile Gaming Demo: Hypersonics 2030**	**Auditorium**
The Air Force Futures Agile Wargaming Team will be providing 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, as agile games typically average 6-9 players for 3-hour sessions. This game and the surrounding conversation is meant to highlight the quick-turn development and execution key for successful agile games through the lens of conceptual hypersonics. Players do not need to have any prior experience in wargaming or hypersonics.		

2022 AIAA DEFENSE FORUM CALL FOR PRESENTATIONS

Diciplines and direct contacts.

ADVANCED PROTOTYPES

Ryan Fontaine
MIT Lincoln Laboratory
ryan.fontaine@ll.mit.edu

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.

- Engineering Trades Required to Produce a Fieldable System
- Hardware Design, Build, and Test Challenges and Successes
- Implementation of Novel Technology and Hardware to Enable New DoD Capabilities
- Innovative Manufacturing and Design Processes
- Low-Size, Weight, and Power (SWaP) Multifunctional Components
- Other Topics in Advanced Prototypes

AIR AND MISSILE DEFENSE

Rick Gamble
Arnold Engineering Development Complex/QuantiTech
ricky.gamble.ctr@us.af.mil

David Fox
Lockheed Martin Missiles and Fire Control
david.fox@lmco.com

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.

- Ballistic Defense Concepts and Systems
- Counter-UAS Concepts and Systems
- Hypersonic Defense Concepts and Systems
- Missile Defense in Other Battlefield Domains
- Space Development Agency Collaboration
- Threat Characterization
- Other Topics in Missile Defense

AUTONOMY, COLLABORATIVE ENGAGEMENT, AND MACHINE INTELLIGENCE

Bob Grabowski
Raytheon
robert.j.grabowski@raytheon.com

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.

- Architectures
- Autonomous Systems and the T&E and Safety Communities – Processes and Procedures for Certification
- Verification and Validation of Autonomous Systems and Effects on DoDI 3000.09
- Autonomous Systems on the Multi-Domain Battlefield

- Autonomy/Machine Intelligence Solutions to Intractable Hypersonics Challenges
- Counter-Autonomy
- Edge Perception
- "Explainable" AI – Toward Understanding the "Black Box" Nature of Deep Neural Networks
- Fragility in Today's ML Techniques
- Future of "Algorithmic Warfare"
- Human–Machine Teaming
- Large-Scale Data and SW Dev Frameworks for ML
- Applications of Commercial Best Practices to DoD
- Sparse Data Machine Learning
- DoD Challenge Problems that Silicon Valley Isn't Addressing
- Other Topics in Autonomy, Collaborative Engagement, and Machine Intelligence

CYBER AND COMPUTING SYSTEMS

Wale Akinpelu
Johns Hopkins University Applied Physics Laboratory
wale.akinpelu@jhuapl.edu

Rick Tuggle
PeopleTec
rick.tuggle@peopletec.com

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.

- Architecture, Operation, Network Management
- Current State of Aerospace and Defense Computing System Programs and Projects
- Cyber Resiliency
- Cybersecurity and DoD Risk Management Framework (RMF)
- High Performance and Embedded Computing for Artificial Intelligence and Machine Learning
- Parallel, GPU, Multicore, and High-Performance Computing
- Quantum Computing
- Open System Architectures
- Reconfigurable Computing
- Survivable Computing in Extreme Environments (such as Space and High Velocity/Acceleration)
- Other Topics in Cyber and Computing Systems

DIRECTED ENERGY WEAPONS

Mark Neice
Directed Energy Professional Society
mark@deps.org

Gary Wood
Johns Hopkins University Applied Physics Laboratory
gary.wood@jhuapl.edu

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.

- Coordination of Conventional Weapons with DEWs
- Counter to Swarming Attacks
- Counter-RAM
- Counter-Sensors/ISR
- Counter-UAVs
- Means to Extend the Range of DEWs
- Minimizing the Environmental Impacts on DEW Effectiveness
- Other Topics in Directed Energy Weapons

GUIDANCE, NAVIGATION, CONTROL, AND ESTIMATION

Mike McFarland
Raytheon
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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.

- Alternative Position, Navigation, and Timing (PNT)
- Optimal Guidance
- Sensor Fusion
- Feedback Control
- Adaptive Autopilots
- Autonomous Navigation
- Other Guidance, Navigation, Control, and Estimation Topics

HIGH-MANEUVERABILITY AND HYPERSONIC SYSTEMS AND TECHNOLOGIES

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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.

- Advanced Flight Control and Trajectory Optimization
- Aerothermal Modeling and Phenomenology of Hypersonic Flowfields
- Ground Testing and Flight Testing of Hypersonic Systems
- High Temperature Materials and Affordable Manufacturing
- Hypersonic Flight Vehicle Design and System Concept Studies
- Hypersonic Propulsion
- Innovative Techniques for Defending Against Adversary Hypersonic System Capabilities
- Seeker and Targeting Technologies for High-Speed Strike Weapons
- Subsystem Development for Hypersonic Vehicles
- Other Topics in High-Maneuverability and Hypersonic Systems and Technologies

ROBOTIC AND UNMANNED SYSTEMS

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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.

- Autonomy
- Defense Against Robotic/Unmanned Systems
- Miniaturization
- Payloads
- Remotely Piloted Vehicles, UAVs
- Tactical UAVs and Spacecraft
- Urban Warfare
- Other Topics in Robotic and Unmanned Systems

SECURE COMMUNICATIONS NETWORKING

conferences@aiaa.org

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, including:

- 5th Generation (5G) Communications Technologies
- Fully Networked Command, Control and Communications (FNC3)
- Mosaic Warfare
- Advanced Battle Management System
- Project Convergence
- Project Overmatch
- Other Topics On Secure Communications Networking

SPACE ACCESS

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Access to, and freedom of operations in, space is critical to national security. The committee is seeking briefings on the following topics:

- Delivery Systems
- Offensive Capabilities and Boosters
- Space Launch (Short and Long Range)
- Space Traffic Management: Proliferation, Risk, Mitigation, and Policy
- Other Topics in Space Access

SPACE SYSTEMS

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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.

- Launch Vehicles
- Spacecraft
- Payloads
- Ground Support Equipment
- Launch Operations
- Ranges
- Test Hardware
- Other Space Systems Topics

STRATEGIC MISSILE SYSTEMS

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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.

- Advanced Concepts, Including Penetration Aids, Underwater Launch, and Radiation Hardening
- Advanced Technology for Thermal Protection, Propulsion, Avionics, Sensors and Materials/Structures
- Aging Effects, Surveillance, and Age Management
- Air-Launched Ballistic Missiles
- Concepts to Leverage Technologies, Design Approaches, and Infrastructure Across Weapon Systems
- Design and Operational Concepts for Future Strategic Weapon Systems
- Ground-Based Strategic Deterrent (GBSD)
- Ground Test, Flight Test, and Alternative Test Methods
- Modeling and Simulation Techniques for Strategic Missiles and Subsystems
- Other Component Technologies for Meeting Unique Strategic Requirements
- Sea-Based Nuclear Deterrent
- System Enablers for Affordability for Strategic Missiles
- Test and Evaluation for Strategic Missiles, Booster, Reentry and Subsystems
- Underwater Launch
- Weather Effects on Reentry Vehicle Performance
- Other Strategic Missile Systems Topics

SURVIVABILITY

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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, in addition to the topics listed below, is particularly interested in advanced materials and structures for survivability.

- Additive Manufacturing and Survivability (e.g., Improved/Faster Battle-Damage Repairs)
- Aerospace Survivability and the Cyberspace/Information Domain
- Armor/Anti-Armor
- Autonomy and Survivability (e.g., Survivability of Autonomous Agents, Adaptive Survivability)
- General Survivability
- Space and Space Launch Systems
- Space Junk: Proliferation, Risk, Mitigation and Policy
- Survivability Against Directed Energy Weapons
- Survivability Game Changers: Emerging Technological Solutions that Will Revolutionize Survivability
- System Safety, Protection, and Health Monitoring
- Other Survivability Topics

SYSTEM AND DECISION ANALYSIS FOR NATIONAL SECURITY

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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. Possible topics include but are not limited to:

- Conceptual Design and Evaluation
- Data Visualization and Communication
- Economic and Resource Analysis
- Methods and Tools for Decision Analysis
- Performance and Capability Analysis
- Policy Trade Studies
- Risk Analysis
- Other Topics in System and Decision Analysis for National Security

SYSTEM PERFORMANCE MODELING AND SIMULATION

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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.

- Computational M&S Test Predictions
- Debris and Post-Intercept Sensor Scene Modeling and Simulation Predictions and Reconstruction
- Digital/Model-Based Engineering
  - Network Communication Standards
  - Stability and Control Prediction/Guidance and Navigation Control
  - Transition Modeling Prediction
- Distributed Architectures and Modeling Joint Operations
- M&S Assessments on the Cost of Weapon System Test and Evaluation and Ops
- M&S Criteria Development and Predictions
- New and Innovative Modeling Techniques for First Principle Codes (FPCs)
- New M&S Codes, Models and Techniques
- New M&S Employed in the Assessment of Weapon Systems
- Novel Applications
- Payload Integration
- Propulsion Design
- Risk Reduction Through Weapon System M&S
- Secondary Damage Modeling, Effects and Consequences, Including Casualty Modeling
- Warheads/Warhead Effects
- Weapon System Effectiveness M&S of Lethality for Kinetic Energy Weapons
- Other System Performance, Modeling And Simulation Topics

TACTICAL MISSILES

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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.

- Advanced Materials and Manufacturing: Sensors, Embedded Diagnostics, Additive Manufacturing
- Insensitive Munitions for Propulsion and Warheads: Design Approaches, Modeling, and Test Results
- Modeling, and Simulation: Integration, Targeting, Weapon Effectiveness, and Lessons Learned
- Propulsion and GNC: Thrust Vectoring, Pulse Motors, Controllable Solids, Sensors, Algorithms
- Test: Missile Integration, Targeting Capabilities, Weapon Effectiveness, and Lessons Learned
- Other Topics Relating to Tactical Missiles

TEST AND EVALUATION

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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.

- Assessments on the Cost of Weapon System Test and Evaluation
- Comparison of Flight, Ground, and Computational Results
- Debris and Post-Intercept Sensor Scene Results and Comparisons
- Demonstrated Weapon System Effectiveness and Lethality for Kinetic Energy Weapons
- Evaluation of Results, Criteria Development, and Assessment
- Flight, Ground, and Computational Test Execution and Results
- New Diagnostics Employed in the Assessment of Weapon Systems
- New Venues and Testing Techniques
- Risk Reduction Through Weapon System Test and Evaluation
- Wind Tunnel, Anechoic Chamber, Directed Energy Ranges, and Other Test Types
- Other Test and Evaluation Topics

WEAPON SYSTEM OPERATIONAL PERFORMANCE

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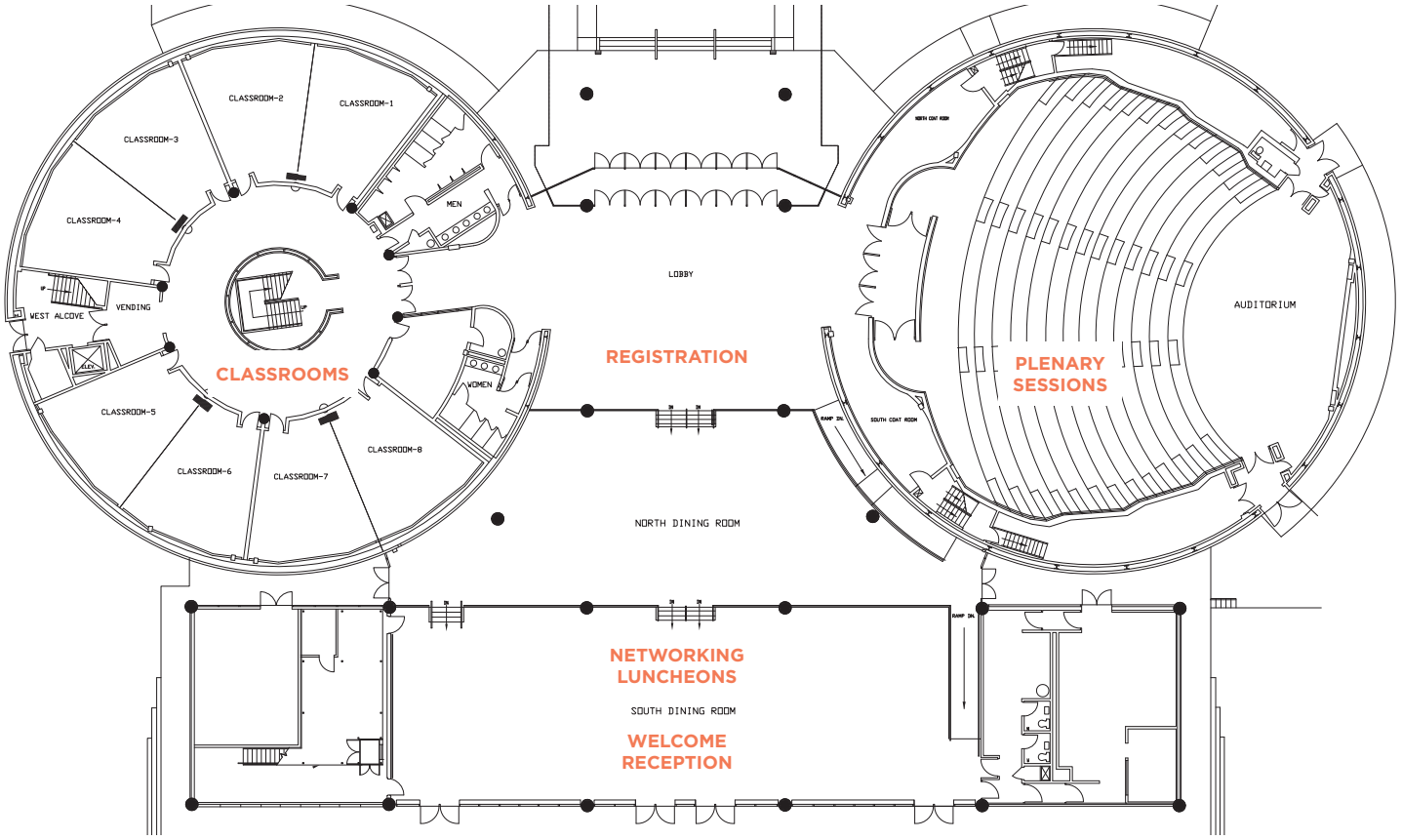
Assessing operational performance of weapon systems ensures mission success for the warfighter and cost effectiveness for the DoD. This topic area focuses on force level, mission level, and weapon system performance assessment.

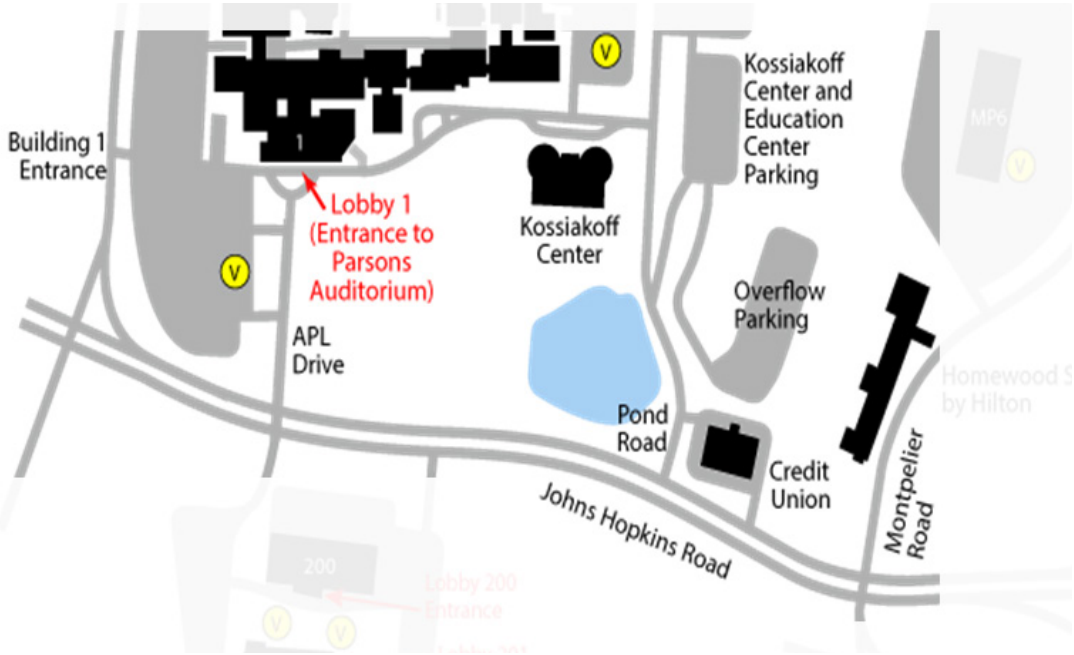
- Combat Modeling, Force Level, and Mission Level Assessment
- Cost and Effectiveness Assessment
- Cost of Weapon System Employment and Ops
- Data Acquisition and Assessment
- Direct and Indirect Fire Weapon System Performance
- Measured Post-Intercept and/or Impact Debris
- New Employment or Assessment of Weapon Systems
- Probability of Hit and Kill
- Other Topics in Weapon System Operational Performance

VENUE MAP

KOSSIAKOFF CENTER
JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY



ENTRANCE TO PARSONS AUDITORIUM



CALL FOR TECHNICAL BRIEFINGS

DEFENSE FORUM

19–21 APRIL 2022 | LAUREL, MD

TOPICS

- Advanced Prototypes
- Air and Missile Defense
- Autonomy, Collaborative Engagement and Machine Intelligence
- Cyber and Computing Systems
- Directed Energy Weapons
- Guidance, Navigation, Control, and Estimation
- High-Manueverability and Hypersonic Systems and Technologies
- Robotic and Unmanned Systems
- Secure Communications Networking
- Space Access
- Space Systems
- Strategic Missile Systems
- Survivability
- System and Decision Analysis for National Security
- System Performance Modeling and Simulation
- Tactical Missiles
- Test and Evaluation
- Weapon System Operational Performance

ABSTRACT SUBMISSION BEGINS
17 September 2021

ABSTRACT DEADLINE
19 October 2021, 2000 hrs ET, USA

SUBMIT YOUR ABSTRACT
aiaa.org/defense