

NDIA

2018 HUMAN SYSTEMS CONFERENCE

HUMAN SYSTEMS IN EMERGING DOMAINS: AUTONOMY, HUMAN
AUGMENTATION, AND CYBER



March 13 – 14, 2018

Waterford at Springfield

Springfield, VA

NDIA.org/HumanSystems18

WELCOME TO THE 2018 HUMAN SYSTEMS CONFERENCE

Welcome. The 2018 Conference of the NDIA Human Systems Division (HSD) is designed to serve the Department of Defense and strengthen the defense industry. This is the mission of the NDIA and its members: 1,600 corporations and 85,000 individuals. The HSD conference supports the mission by bringing DoD S&T leadership, representatives of industry, and other guests into discussion over accomplishments of DoD human systems research and development, gaps in DoD human systems, and emerging research and technology that can bridge those gaps. This conference is a small and vital forum for all of us to learn, to envision new solutions, and to build the relationships and opportunities to collaborate.

The NDIA Human Systems Division is chartered to support the DoD Human Systems Community of Interest (HS COI). Our subcommittee structure (represented by the list of technical sessions in this program) is identical that of the HS COI, with the exception of one addition: this Division has established a subcommittee on Human Systems Metrics to help assess and promote the value of human systems research and development, techniques, and technologies. The leaders of our five subcommittees plan this conference, participate in

studies for DoD, and grow the Human Systems community. I urge you to join one of the Division's subcommittees. To pursue that opportunity, contact NDIA, or talk to any of the Human Systems Division subcommittee co-chairs at this conference.

Thanks to the team that organized our conference: the conference co-chairs, LCDR Jacob N. Norris, Ph.D., and Eric Jones; their team members on the HSD sub-committee co-chairs; and the professional staff of NDIA. Thanks also to the representatives of the DoD Human Systems Community of Interest, who have joined us at this event. A special note of appreciation to our sponsors: Ball Aerospace, Rockwell Collins, and DCS Corporation. Finally, welcome to all of you who have come here to understand, improve, and accelerate the research and development of better human systems for the Department of Defense.

Respectfully,



Jared Freeman, Ph.D.
Chair, NDIA Human Systems Division
Chief Scientist, Aptima, Inc.

SCHEDULE AT A GLANCE

TUESDAY, MARCH 13

General Session

Singleton/Miller Ballroom
8:00 am – 5:00 pm

Networking Poster and Demonstration Session

von Sternberg/Hazel Ballroom
1:15 – 3:15 pm

Networking Reception

Waterford Foyer
5:00 – 6:30 pm

WEDNESDAY, MARCH 14

General Session

Singleton/Miller Ballroom
8:00 am – 5:00 pm

Round Table Discussion

Singleton/Miller Ballroom
3:15 – 4:45 pm

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WHO WE ARE

The National Defense Industrial Association is the trusted leader in defense and national security associations. As a 501(c)(3) corporate and individual membership association, NDIA engages thoughtful and innovative leaders to exchange ideas, information, and capabilities that lead to the development of the best policies, practices, products, and technologies to ensure the safety and security of our nation. NDIA's membership embodies the full spectrum of corporate, government, academic, and individual stakeholders who form a vigorous, responsive, and collaborative community in support of defense and national security. For more information, visit NDIA.org



HUMAN SYSTEMS DIVISION

WHO WE ARE

NDIA's Human System Division promotes the exchange of technical information and discussions between government, industry and academia, and the expansion of research and development in areas related to the human as a system whose performance must be integrated into any military system of systems. To this end, the division will serve as an infrastructure by providing a variety of ways for government, industry and academia to collaborate to advance human performance in air, land, sea, space and cyberspace through research, education and consultation.

LEADERSHIP AND COMMITTEES

Dr. Jared Freeman

Human Systems Chair
Chief Scientist, Aptima, Inc.

BG Peter Palmer, USA (Ret)

Human Systems Vice Chair
President, P2 Consulting Services

Scott Kozak

Human Systems Deputy Chair
Managing Director, CogniSens
Applied Research Center

EVENT INFORMATION

EVENT WEBSITE

NDIA.org/HumanSystems18

EVENT CONTACT

Andrea Lane
Meeting Planner
(703) 247-2554
alane@ndia.org

EVENT THEME

Human Systems in Emerging Domains: Autonomy, Human Augmentation and Cyber

CONFERENCE LEADERSHIP

Eric Jones
Industry Chair

LCDR Jake Norris, USN
Government Chair

SESSION CHAIRS

Brad Chedister
Industry Co-Chair, PS&WP

Dr. James McCarthy
Industry Co-Chair, PAE&T

George Salazar
Government Lead, HSM

Glenn Gunzelmann
Government Co-Chair, PAE&T

Dr. Todd Nelson
Government Co-Chair, SI&CP

Peter Squire
Government Co-Chair, PS&WP

Dr. Kelly Hale
Industry Lead, HSM

CDR Henry Phillips, USN
Government Co-Chair,
HI3Lead

SURVEY AND PARTICIPANT LIST

A survey and list of attendees (name and organization only) will be emailed to you after the conference. NDIA would appreciate your time in completing the survey to help make our event even more successful in the future.

HARASSMENT STATEMENT

NDIA is committed to providing a professional environment free from physical, psychological and verbal harassment. NDIA will not tolerate harassment of any kind, including but not limited to harassment based on ethnicity, religion, disability, physical appearance, gender, or sexual orientation. This policy applies to all participants and attendees at NDIA conferences, meetings and events. Harassment includes offensive gestures and verbal comments, deliberate intimidation, stalking, following, inappropriate photography and recording, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome attention. Participants requested to cease harassing behavior are expected to comply immediately, and failure will serve as grounds for revoking access to the NDIA event.

AGENDA

TUESDAY, MARCH 13

7:00 am – 6:00 pm

REGISTRATION

VON STERNBERG/HAZEL FOYER

7:00 – 8:00 am

NETWORKING BREAKFAST

MILLER/VON STERNBERG FOYER

8:00 – 8:15 am

WELCOME AND INTRODUCTORY REMARKS

SINGLETON/MILLER BALLROOM

Dr. Jared Freeman

Human Systems Division Chair
Chief Scientist, Aptima, Inc.

8:15 – 9:00 am

KEYNOTE ADDRESS

SINGLETON/MILLER BALLROOM

Dr. Brian Pierce

Office Director, Information Innovative Office (I2O)
Defense Advanced Research Projects Agency (DARPA)

9:00 – 10:30 am

PANEL: HUMAN SYSTEMS INTERFACE RESEARCH AND DEVELOPMENT CHALLENGES – GOVERNMENT PERSPECTIVE

SINGLETON/MILLER BALLROOM

LCDR Peter Walker, USN

Military Deputy, Human and Bioengineered Systems, Code 341, Office of Naval Research
Moderator

Laurie Fenstermacher

Principal Research Lead Open Source Analysis, 711 HPW/RHXM

Glenn Gunzelmann

Senior Research Psychologist, Air Force Research Laboratory

Dr. Todd Nelson

Division Chief, 711 HPW/AFRL

Peter Squire

Program Officer, Office of Naval Research

10:30 – 11:00 am

NETWORKING BREAK

MILLER/VON STERNBERG FOYER

11:00 – 11:05 am

INTRODUCTION TO TECHNICAL SESSION

SINGLETON/MILLER BALLROOM

Eric Jones

Conference Industry Chair, NDIA Human Systems Division

Human Systems Architect, The Charles Stark Draper Laboratory, Inc.

11:05 am - 12:15 pm

SESSION 1: PROTECTION, SUSTAINMENT AND WARFIGHTER PERFORMANCE (PS&WP)

SINGLETON/MILLER BALLROOM

Collaboration for Breakthrough Innovation in Human Performance Monitoring for the Warfighter

Dr. Melissa Grupen-Shemansky

SEMI-Flex, Tech

FitForce Planner: Optimizing USMC Physical Fitness

Timothy Clark

Aptima, Inc.

Transitioning Laboratory Neuroscience to the Real-World through Deep Learning: Using Evoked Potentials to Assess State

Dr. Stephen Gordon

DCS Corporation

Optimizing Future Soldier Systems through the Incorporation of Human Aspects into the Soldier as a System Domain using the Systems Modeling Language

Sean Pham

U.S. Army ARDEC

12:15 – 1:15 pm

NETWORKING LUNCH

VON STERNBERG/HAZEL BALLROOM

1:15 – 3:15 pm

NETWORKING POSTER AND DEMONSTRATION SESSION

VON STERNBERG/HAZEL BALLROOM

3:15 – 3:30 pm

REFRESHMENT BREAK

MILLER/VON STERNBERG FOYER

3:30 – 4:40 pm

SESSION 2: HUMAN SYSTEMS METRICS (HSM)

SINGLETON/MILLER BALLROOM

Human Systems Metrics Applied to Optimize Warfighter Capability

Sarah Orr

711 HPW/HP

Realizing Our Collective Vision by 2025: Leveraging Advances in Artificial Intelligence and Autonomy with Human Systems Advances in Human–Machine Symbiosis to Realize Our Roadmap to the Future

Dr. Denise Nicholson

Soar Technology, Inc.

Usability Scorecard

Deidrick Capers

Millennium Corporation

Julia Ruck

PM DCGS-A

HSI T&E Methods and Metrics to Assess User–Automation Interaction

Dr. Janae Lockett-Reynolds

DHS

4:40 – 5:00 pm

DAY 1 WRAP UP

SINGLETON/MILLER BALLROOM

Dr. Jared Freeman

Human Systems Division Chair

Chief Scientist, Aptima, Inc.

5:00 – 6:30 pm

NETWORKING RECEPTION (CASH BAR)

WATERFORD FOYER

WEDNESDAY, MARCH 14

7:00 am – 3:00 pm

REGISTRATION

VON STERNBERG/HAZEL FOYER

7:00 – 8:00 am

NETWORKING BREAKFAST

MILLER/VON STERNBERG FOYER

8:00 – 8:05 am

WELCOME REMARKS

SINGLETON/MILLER BALLROOM

Dr. Jared Freeman

Human Systems Division Chair
Chief Scientist, Aptima, Inc.

8:05 – 9:00 am

PLENARY ADDRESS

SINGLETON/MILLER BALLROOM

Dr. Paul Zablocky

Division Director, Complex Hybrid Warfare Sciences Division, Expeditionary Maneuver Warfare and Combating
Terrorism Science and Technology Department, Office of Naval Research

9:00 – 10:10 am

PANEL: HUMAN SYSTEMS INTEGRATION METRICS

SINGLETON/MILLER BALLROOM

Dr. John Tangney

Director, Human & Bio-Engineered Systems, Office of Naval Research
Moderator

Rick Craft

Systems Analyst & Principal Member of the Technical Staff, Sandia National Laboratory

Dr. Kelly Hale

Senior Vice President, Technical Operations, Design Interactive, Inc.

BG Peter Palmer, USA (Ret)

President, P2 Consulting Services

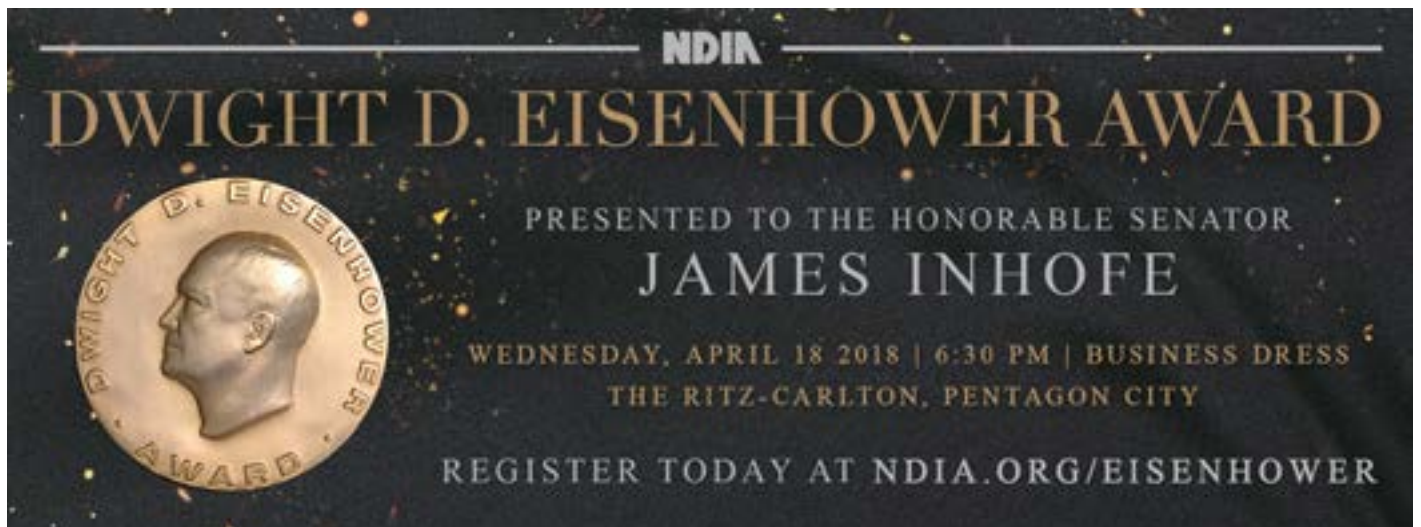
John Plaga

Aerospace Engineer, 711 HPW/HPIF

10:10 – 10:40 am

NETWORKING BREAK

MILLER/VON STERNBERG FOYER



10:40 – 11:50 am

SESSION 3: PERSONALIZED ASSESSMENT, EDUCATION & TRAINING (PAE&T)

SINGLETON/MILLER BALLROOM

Virtual and Augmented Reality for Training and Cognitive Aides

Peggy Wu

United Technologies Research Center

Developing a Predictive Model of Army Marksmanship Performance

Dr. Gregory Goodwin

U.S. Army Research Laboratory

Man vs. Machine: Comparing Traditional versus Big Data and Machine Learning to Predict Expertise

Dr. Krista Ratwani

Aptima, Inc.

Perceptual–Cognitive and Physiological Assessment of Training Effectiveness

Amy Diderksen

Rockwell Collins Simulation & Training Solutions

11:50 am – 12:45 pm

NETWORKING LUNCH

VON STERNBERG/HAZEL BALLROOM

12:45 – 1:55 pm

SESSION 4: SYSTEMS INTERFACE AND COGNITIVE PROCESSING (SI&CP)

SINGLETON/MILLER BALLROOM

Towards Natural Dialogue with Robotics: ARL Bot Language

Dr. Matthew Marge

U.S. Army Research Laboratory

VR Technologies for Next–Generation Battle Management Command and Control

Dr. Erin Cherry

Northrop Grumman Mission Systems

Developing an Autonomous Task Manager for Intelligence, Surveillance, and Reconnaissance Human–Machine Teams

Jennifer Lopez

711 HPW/RHXM

Seeing into the Black Box: Using Eye Tracking in User–Driven Workflows to Better Understand Decision–making Processes

Dr. Kristin Divis

Sandia National Laboratories

1:55 – 3:00 pm

SESSION 5: HUMAN INFORMATION, INTERPRETATION AND INFLUENCE (HI3)

SINGLETON/MILLER BALLROOM

Panel: Operations in the Information Environment

Laurie Fenstermacher

Principal Research Lead Open Source Analysis, 711 HPW/RHXM
Moderator

Dr. Rebecca Goolsby

Program Officer, Office of Naval Research

Eric Wallace

Chief, Concepts & Requirements, Joint Information Operations Warfare Center/Enterprise Operations Division

3:00 – 3:15 pm

REFRESHMENT BREAK

MILLER/VON STERNBERG FOYER

3:15 – 4:45 pm

ROUNDTABLE DISCUSSIONS

SINGLETON/MILLER BALLROOM

Protection, Sustainment and Warfighter Performance (PS&WP)

Human Systems Metrics (HSM)

Personalized Assessment, Education & Training (PAE&T)

Systems Interface and Cognitive Processing (SI&CP)

Human Information, Interpretation and Influence (HI3)

4:45 – 5:00 pm

CLOSING REMARKS

SINGLETON/MILLER BALLROOM

Dr. Jared Freeman

Human Systems Division Chair
Chief Scientist, Aptima, Inc.

5:00 pm

CONFERENCE ADJOURNS

The NDIA has a policy of strict compliance with federal and state antitrust laws. The antitrust laws prohibit competitors from engaging in actions that could result in an unreasonable restraint of trade. Consequently, NDIA members must avoid discussing certain topics when they are together at formal association membership, board, committee, and other meetings and in informal contacts with other industry members: prices, fees, rates, profit margins, or other terms or conditions of sale (including allowances, credit terms, and warranties); allocation of markets or customers or division of territories; or refusals to deal with or boycotts of suppliers, customers or other third parties, or topics that may lead participants not to deal with a particular supplier, customer or third party.

BIOGRAPHIES



DR. BRIAN PIERCE

Office Director, Information Innovation Office
 Defense Advanced Research Projects Agency (DARPA)

Dr. Brian Pierce joined DARPA in 2014 and serves as the director of the DARPA Information Innovation Office (I2O).

Dr. Pierce has 30 years of experience developing advanced technologies in the aerospace/defense industry. Prior to joining DARPA, he was a technical

director in Space and Airborne Systems at the Raytheon Company. During his first tour at DARPA, he served as the deputy office director of the Strategic Technology Office from 2005 to 2010. From 2002 to 2005, he was executive director of the Electronics Division at Rockwell Scientific Company in Thousand Oaks, California. From 1983 to 2002, he held various engineering positions at Hughes Aircraft

Company and Raytheon in southern California.

Dr. Pierce earned a Doctor of Philosophy degree in chemistry, a Master of Science degree in chemistry and a Bachelor of Science degree in chemistry and mathematics from the University of California at Riverside. He has more than 20 U.S. patents.



DR. PAUL ZABLOCKY

Division Director, Complex Hybrid Warfare Sciences Division, Expeditionary Maneuver Warfare and Combating Terrorism Science and Technology Department
 Office of Naval Research

Dr. Paul G. Zablocky currently serves at the office of Naval Research (ONR) as the Division Director of the Complex Hybrid Warfare Sciences Division (Code 301) within the Expeditionary Maneuver Warfare and Combating Terrorism Science and Technology Department. He is responsible for leading and directing an integrated portfolio of basic research, applied research, and advance technology development science and technology (S&T) efforts in support of the United States Marine Corps (USMC) and Naval Special Warfare.

Dr. Zablocky served as the Director of the US Army Communications Electronics Research Development and Engineering Center (CERDEC) Intelligence and Information Warfare Directorate (I2WD) from April 2015 to April 2016 and as

the Director of Space and Terrestrial Communications Directorate (S&TCD) from June 2013 to April 2015. In both organizations he provided leadership and guidance to approximately 800 government civilians and contractors who executed S&T programs, developed prototypes, and provided systems engineering support for Army programs in the areas of communications, Electronic Warfare (EW), and intelligence. Prior to that Dr. Zablocky served as the Senior Research Scientist for EW Technology (ST) at CERDEC I2WD where he was responsible for developing, planning, coordinating, and executing the Army's EW S&T portfolio. Paul started his government career in 2005 designing and developing prototype EW systems that transitioned to Army Programs of Record. He has over 30 years of research and development experience in Electrical Engineering working in both defense and

commercial industries. He served in the Navy from 1985 to 1989 achieving the rank of Lieutenant.

Dr. Zablocky received a Professional Master of Business Administration from the University of Massachusetts, a Doctor of Philosophy Electrical Engineering from the University of Pennsylvania, a Master of Science Electrical Engineering from the University of Central Florida and Bachelors of Science in Electrical Engineering and Physics from Fairleigh Dickinson University.

He is married to Barbara. Their daughter, Amanda, graduated from the Naval Academy and is now a pilot in Helicopter Sea Combat Squadron Eight assigned to the USS Nimitz. Their son, Daniel, is a recent graduate of The United States Military Academy and is in the Army Basic Officer Leader Course at Fort Benning, GA.

POSTER & DEMONSTRATION SESSION

Mixed Reality Environment for the Study of Human-UAV Interaction

Dr. Zhuming Ai
Naval Research Lab

Dynamic Robot Operator Interface (DROID) Assessment, Guidance, and Engineering Tool (AGENT)

Lisa Baraniceki
AnthroTronix, Inc.

Preliminary Job Task Analysis of a Cyber Kill Chain and its Application to Cyber Defense

Doron Becker
Department of Homeland Security

Marianne Paulsen
Department of Homeland Security

The Effect of a Powered Lower-Body Exoskeleton on Physical and Cognitive Warfighter Performance

Blake Bequette
Massachusetts Institute of Technology

Facial Emotional Expression Recognition Study (FEERS)

Gregory Black
Electric Boat Corporation

Human Machine Interaction Interface Display Design: A Perceptual Approach in Hilbert Space

Dr. Mustafa Canan
U.S. Army Research Laboratory

Impact of Torso-borne Load Redistribution on Soldier Biomechanics, Metabolics, and Comfort

Marina Carboni
Natick Soldier Research Development & Engineering Center

Initial Evaluation of Adaptive Language Learning Technology

Dr. Alan Carlin
Aptima, Inc.

Adaptive Automation in Sensemaking

Dr. Daniel Cassenti
U.S. Army Research Laboratory

Interactive Next-generation Testbed Environment for Retention and Assessment of Computer-based Training (INTERACT)

Ian Coffman
AnthroTronix, Inc.

Perceptual-Cognitive & Physiological Assessment of Training Effectiveness

Amy Dideriksen
Rockwell Collins Simulation & Training Solutions

Cognitive Operations Gear Pack (COG Pack™): A Capability for Realizing Real-Time Cognitive Performance Assessment in Air Force Operations

Allen Dukes
711 HPW/RHCPA

Confined Spaces Monitoring System

Kevin Durkee
Aptima, Inc.

Wearable Tactile Display for Hands-Free Covert Communications with Semi-Autonomous Systems

Dr. Linda Elliott
U.S. Army Research Laboratory

Topside - Unmanned System Command and Control for Mission Planning, Piloting, and Analysis

Thomas Fulton

Naval Undersea Warfare Center Division Newport

Robust Personalization of Training and Assessment through the Generalized Intelligent Framework for Tutoring (GIFT)

Dr. Benjamin Goldberg

U.S. Army Research Laboratory, HRED

Characterizing Tactical Decisions through Exploratory Multivariate Analysis

Dr. Chris Hale

Georgia Tech Research Institute

Analyzing Expert Marksmanship from the Human Centered Perspective

Dr. Leif Hasselquist

Natick Soldier Research Development & Engineering Center

Using Artificially Intelligent Computer Based Training for more Sophisticated Learning Needs

Cenetra Johnson

The George Washington University

Laser Eye Protection: Balancing Protection and Performance

Dr. Julie Lovell

711th HPW / Bioeffects Division, Optical Radiation Branch

Ambient Activity Monitors (AAMs) to Display Hidden Computer System Information

Dr. Jamie Lukos

SPAWAR Systems Center Pacific

Training a Traditional High Risk Organization in Resilience Engineering

Dr. Christopher Nemeth

Applied Research Associates, Inc.

Personnel Optimization for Human-Machine Teaming in the Maritime Domain

LCDR Jacob Norris, USN

SPAWAR Systems Center Pacific

Intelligent Humans Systems Integration – Could we have helped prevent the McCain and Fitzgerald Collisions at sea?

Dr. Nandakumar Ramanujam

ASSETT, Inc.

Enhancing Mission Performance: Design Heuristics for Augmented Reality

Kimberly Ryan

The Charles Stark Draper Laboratory, Inc.

Using Work Models to Derive Assessment Measures for Cyber Protection Teams

Dr. Stoney Trent

U.S. Army War College

Measuring Coordination in Multi-Agent Reinforcement Learning

Michael Walton

SPAWAR Systems Center Pacific

THANK YOU TO OUR SPONSORS



BALL AEROSPACE

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Ball Aerospace pioneers discoveries that enable our customers to perform beyond expectation and protect what matters most. We create innovative space solutions, enable more accurate weather forecasts, drive insightful observations of our planet, deliver actionable data and intelligence, and ensure those who defend our freedom go forward bravely and return home safely.

Ball Aerospace located near Wright-Patterson Air Force Base, supports the missions of the Air Force Research Laboratory (AFRL), the National Space Intelligence Center (NASIC), and several Air Force Life Cycle Management Center (AFLCMC) Program Executive Officer's programs. Ball is a prime contractor providing research and development in partnership with the Airman Systems Directorate (RH) and AFRL to discover, develop, and integrate affordable technologies to improve Warfighter performance, exploit autonomous systems and enhance Airman-machine teaming in Air, Space and Cyberspace. In collaboration with RH, Ball provides the Special Forces and Intelligence Communities with innovative,

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- Operator and maintenance training solutions
- Virtualized avionics and procedural training
- Developmental simulation framework Helmet Mounted Displays (HMDs) and soldier display systems
- Visual system solutions including: image generation, displays, projection systems and correlated sensors
- Tactical Air Combat Maneuver Instrumentation systems
- Live and virtual, augmented and mixed reality training applications



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ARMY SCIENCE & TECHNOLOGY SYMPOSIUM AND SHOWCASE

Emerging technologies for the future force

August 21–23, 2018

Washington Convention Center, Washington DC

NDIA.org/Army-Science



MARK YOUR CALENDAR!

2018 GROUND ROBOTICS CAPABILITIES CONFERENCE & EXHIBITION

April 10 – 11, 2018

Waterford at Springfield, Springfield, VA

NDIA.org/Robotics

