AT THE HEART OF THE MISSION

NDIA

1919 2019

62ND ANNUAL FUZE CONFERENCE

Fuzing Innovations for Tomorrow's Weapons

May 13 – 15, 2019 | Buffalo, NY | NDIA.org/Fuze19

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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. NDIA is proud to celebrate 100 years in support of our warfighters and national security. The technology used by today's modern warfighter was unimaginable 100 years ago. In 1919, BG Benedict Crowell's vision of a collaborative team working at the intersection of science, industry, government and defense began what was to become the National Defense Industrial Association. For the past century, NDIA and its predecessor organizations have been at the heart of the mission by dedicating their time, expertise and energy to ensuring our warfighters have the best training, equipment and support. For more information visit **NDIA.org**

LEADERSHIP

Roy Streetz
Fuze Committee Chair

Thomas Harward
Fuze Committee Vice Chair

Nassir Alaboud
Fuze Committee Secretary

FUZE MUNITIONS

WHO WE ARE

The purpose of the Fuze Section shall be to promote an open exchange of technical information among government and industry technical personnel, and to identify and address changes in standards, guidance, policy, and organizational functions that impact the development, production, and performance of fuzes.

WELCOME TO THE 62ND ANNUAL FUZE CONFERENCE

On behalf of the NDIA Fuze Conference Steering Committee Members and the NDIA, I would like to welcome you to the 62nd Annual NDIA Fuze Conference. This international conference brings together the work of the top professionals in the fuzing industry from government, private industry, and academia; and provides an opportunity for the exchange of the latest research and development on fuzing, with the common goals of improving safety, capability, and reliability for our warfighters. While the history of fuzing dates back several hundred years, and the advances in technology have been significant over that time, new challenges continue to emerge. Through the ongoing passionate work of the authors, presenters, sponsors, and attendees at this conference and across our worldwide defense industry, these challenges will be overcome, resulting in safer, more reliable fuzes being fielded to our warfighters.

Roy Streetz
Chair
NDIA Fuze Committee

Vice President Advanced Electronic Systems
Excelitas Technologies Corporation

SCHEDULE AT A GLANCE

MONDAY, MAY 13

Registration & Opening Reception
5:00 – 6:00 pm

TUESDAY, MAY 14

Registration
7:00 am – 5:00 pm

Networking Continental Breakfast
7:00 – 8:00 am

Welcome & Keynote Speaker
8:00 – 8:45 am

General Session
8:45 – 11:45 am

Networking Break
10:00 – 10:30 am

Harry Diamond Fuzing Excellence Award Presentation
11:45 am – 12:00 pm

Networking Lunch
12:00 – 1:00 pm

Concurrent Breakout Sessions
1:00 – 3:00 pm

Networking Break
3:00 – 3:20 pm

Concurrent Breakout Sessions
3:20 – 5:00 pm

Grand Reception
Big Ditch Brewing Company
5:30 – 7:00 pm

WEDNESDAY, MAY 15

Registration
7:00 am – 5:00 pm

Networking Continental Breakfast
7:00 – 8:00 am

Concurrent Breakout Sessions
8:00 – 10:00 am

Networking Break
10:00 – 10:20 am

Concurrent Breakout Sessions
10:20 am – 12:00 pm

Networking Lunch
12:00 – 1:00 pm

Concurrent Breakout Sessions
1:00 – 3:00 pm

Networking Break
3:00 – 3:20 pm

Concurrent Breakout Sessions
3:20 – 4:20 pm

THURSDAY, MAY 16

Tour of PCB Piezotronics, Inc.
PCB Piezotronics Headquarters
8:30 – 10:30 am

EVENT INFORMATION

LOCATION

Hyatt Regency Buffalo Hotel
Two Fountain Plaza
Buffalo, NY 14202

Big Ditch Brewing Company
55 E Huron St
Buffalo, NY 14203

PCB Piezotronics, Inc.
3425 Walden Avenue
Depew, NY 14043

EVENT WEBSITE

NDIA.org/Fuze19

EVENT THEME

Fuzing Innovations for Tomorrow's Weapons

WIFI

Network: Hyatt Meeting
Password: NDIA

INTERACTIVE KIOSK

We invite attendees to learn about NDIA's 100 year history through an interactive touchscreen.

ATTIRE

Civilian: Business
Military: Uniform of the day

SURVEY AND PARTICIPANT LIST

You'll receive via email a survey and list of attendees (name and organization) after the conference. Please complete the survey, which helps make our event even more successful in the future.

EVENT CONTACT

General Event
Reneé Despot
Manager, Meetings
(703) 247-2599
rdespot@ndia.org

Agenda
Loey Bleich
Program Manager
(703) 247-2575
lbleich@ndia.org

PLANNING COMMITTEE

Roy Streetz
Committee Chair

Nassir Alaboud
Ray Ash
Ed Cooper
Chris DeWitt
Mark Etheridge
Frank Fairchild
Lawrence Fan
Doug Harms
Thomas Harward
Robert Hertlein
Ken Kelly
Bill Kurtz
Homesh Lalbahadur
David Lawson
Byron Lee
Jim Lemister
Telly Manolatos
Bob Metz
Barry Neyer
Eric Roach
Perry Salyers
James Sharp
Don Shutt
Martin Tanenhaus

SPEAKER GIFTS

In lieu of speaker gifts, a donation is being made to the Fisher House Foundation.

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

MONDAY, MAY 13

5:00 – 6:00 pm

REGISTRATION
GRAND BALLROOM FOYER

Sponsored by L3 Defense Electronic Systems

5:00 – 6:00 pm

NETWORKING OPENING RECEPTION
GRAND BALLROOM FOYER

Sponsored by L3 Defense Electronic Systems

TUESDAY, MAY 14

7:00 am – 5:00 pm

REGISTRATION
GRAND BALLROOM FOYER

Sponsored by L3 Defense Electronic Systems

7:00 – 8:00 am

NETWORKING CONTINENTAL BREAKFAST
GRAND BALLROOM FOYER

Sponsored by JUNGHANS Defence

SESSION 1 – WELCOME, ADMIN REMARKS & KEYNOTE ADDRESS

8:00 – 8:05 am

INTRODUCTION & ADMIN REMARKS
GRAND BALLROOM ABC

Roy Streetz
Chair, NDIA Fuze Committee; VP Advanced Electronic Systems, Excelitas Technologies Corporation

8:05 – 8:15 am

NDIA OPENING REMARKS
GRAND BALLROOM ABC

MG James Boozer, USA (Ret)
Executive Vice President, National Defense Industrial Association

8:15 – 8:45 am

KEYNOTE SPEAKER
GRAND BALLROOM ABC

Col Gary R. Charlton II, USAF
Commander 107th Attack Wing, New York Air National Guard

SESSION 2 – U.S. GOVERNMENT SCIENCE, TECHNOLOGY & ACQUISITION

Thomas Harward
Raytheon
Session Chair

Bob Metz
PCB Piezotronics, Inc.
Session Assistant

8:45 – 9:10 am

ARMY S&T STRATEGY

GRAND BALLROOM ABC

Gene Henderson
U.S. Army CCDC Aviation & Missile Center

9:10 – 9:35 am

ARMY S&T STRATEGY

GRAND BALLROOM ABC

Charles Robinson
U.S. Army CCDC Armaments Center

9:35 – 10:00 am

NAVY S&T STRATEGY

GRAND BALLROOM ABC

Jason Koonts
NSWC Dahlgren

10:00 – 10:30 am

NETWORKING BREAK

GRAND BALLROOM FOYER

Sponsored by PACSCI EMC

10:30 – 10:50 am

AIR FORCE S&T STRATEGY

GRAND BALLROOM ABC

George Jolly
Technical Advisor, Air Force Research Laboratory/RWMF

10:50 – 11:10 am

SANDIA NL CAPABILITIES & MISSION

GRAND BALLROOM ABC

Adam Church
Manager, 2627 Advanced Fuzing Technology, Sandia National Laboratories

11:10 – 11:30 am

OSD PERSPECTIVE/FUZE IPT

GRAND BALLROOM ABC

Lawrence Fan
JFTP Manager, Naval Surface Warfare Center - Indian Head Division

11:30 – 11:45 am

JOINT FUZE TECHNOLOGY PROGRAM (JFTP)

GRAND BALLROOM ABC

Tim Tobik
Air Force Research Laboratory

11:45 am – 12:00 pm

HARRY DIAMOND FUZING EXCELLENCE AWARD PRESENTATION

GRAND BALLROOM ABC

Roy Streetz
Chair, NDIA Fuze Committee; VP Advanced Electronic Systems, Excelitas Technologies Corporation

Presented to:
Philip T. Gorman, Jr.
Lead Associate, Booz Allen Hamilton

12:00 – 1:00 pm

NETWORKING LUNCH

GRAND BALLROOM FOYER

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CONCURRENT BREAKOUT SESSIONS

SESSION 3A – OPEN SESSIONS

GRAND BALLROOM EFG

Bob Metz
PCB Piezotronics, Inc.
Session Chair

Mark Etheridge
U.S. Army AMRDEC
Session Assistant

SESSION 3B – CLOSED SESSIONS

GRAND BALLROOM ABC

Homesh Lalbahadur
U.S. Army ARDEC
Session Chair

Nassir Alaboud
Lockheed Martin
Session Assistant

1:00 – 1:20 pm

Guidelines for Implementing a Low Voltage Command Arm Distributed Fuzing System

21801

Mark Etheridge
Electrical Engineer, U.S. Army CCDC Aviation & Missile Center

Preparing EOD for Fuzing Innovations

21766

Justin Welling
Lead Systems Engineer, USAF AFLCMC/EBDZ

1:20 – 1:40 pm

Advanced Modeling and Analysis in the Design of Next Generation Accelerometers for Fuzing Applications

21774

David Ort
R&D Engineer, PCB Piezotronics, Inc.

Evaluation of Embedded Fuze Components in Explosives

21848

Tiffany Hatcher
1st Lt, U.S. Air Force, AFRL/RWMF

1:40 – 2:00 pm

Effectiveness of 40mm High Velocity Air Burst Ammunition

21770

Cemil Yilmaz
Lead Engineer, ASELSAN, Inc.

Fuzing Components in High-G Shock Regime

21871

Joshua Dye
Electrical Engineer, Sandia National Laboratories

2:00 – 2:20 pm

Calibration and Acceptance Tests for Accelerometers Used in Severe Shock Applications

21783

Jeffrey Dosch
Technical Director, PCB Piezotronics, Inc.

M1156 Precision Guidance Kit (PGK) Multi-Option Fuze Transition to Production

21804

Nathan Noble
Senior Principal Manufacturing Engineer, Northrop Grumman Innovation Systems

2:20 – 2:40 pm

Microwave Interferometry to Investigate Transition Phenomena Inside Detonators
21895

Alexandre Lefrancois
Engineer, CEA Gramat

MEMSAD – Maturing the Technology
21805

Lynne Rider
U.S. Army CCDC Armaments Center

2:40 – 3:00 pm

Close-Air-Support with <190 Rounds… A Practical Approach
21776

Lauren Schumacher
Self-Graduate Fellow, The University of Kansas

Test Observed Considerations for Embedded Smart Fuzing of Penetrating Munitions
21874

Alma Oliphant
Principal Engineer, Applied Research Associates

3:00 – 3:20 pm

NETWORKING BREAK
GRAND BALLROOM FOYER

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CONCURRENT BREAKOUT SESSIONS

Continued

SESSION 3A – OPEN SESSIONS
GRAND BALLROOM EFG

SESSION 3B – CLOSED SESSIONS
GRAND BALLROOM ABC

3:20 – 3:40 pm

Novel Approach for Fuze Safety Design and Requirements in Drone Based Weapon Systems
21782

Tal Leibovich
Head of Technology - Development Section, IDF

Proximity Sensors For Hypersonic Applications
21853

Kristin DeWeese
Systems Engineering Manager, L3 Technology

3:40 – 4:00 pm

Unmanned Systems Safety Precepts
21838

Jeffrey Fornoff
Senior Engineer, U.S. Army CCDC Armaments Center

Tail Kit Impact Environment Analysis and Ground Test Design
21873

Alma Oliphant
Principal Engineer, Applied Research Associates

4:00 – 4:20 pm

Lithium Battery Innovations for Projectile Munitions
21767

Paul Schisselbauer
Director of Engineering, EnerSys Advanced Systems

Embedded Fuze Forward Assembly Cannon Test
21885

Mark Mlejnek
Electrical Engineer, L3 Fuzing & Ordnance Systems

4:20 – 4:40 pm

Exploring High-Strain-Rate Deformation of Microscale Planar Metallic Materials using Customized Taylor Anvil Impact Test
21840

Jeffrey Smyth
Mechanical Engineer, U.S. Army CCDC Armaments Center

Advanced Material Model Development and Setback Sensing
21883

Bill Bartinelli
Mechanical Engineer, L3 Fuzing & Ordnance Systems

4:40 – 5:00 pm

FMCW (Frequency Modulated CONTINUOUS WAVE) Proximity Technology with Advance EM Insensitive Features
21781

Luis Abad
Product Manager - Fuze Systems, Expal Systems

Characterizing Embedded Fuzing Environments with Non-Linear Viscoelastic Modeling
21852

Shane Curtis
Staff Member, Sandia National Laboratories

5:30 – 7:00 pm

NETWORKING GRAND RECEPTION
BIG DITCH BREWING COMPANY
55 E HURON ST, BUFFALO, NY 14203

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WEDNESDAY, MAY 15

7:00 am – 5:00 pm

REGISTRATION
GRAND BALLROOM FOYER

Sponsored by L3 Defense Electronic Systems

7:00 – 8:00 am

NETWORKING CONTINENTAL BREAKFAST
GRAND BALLROOM FOYER

CONCURRENT BREAKOUT SESSIONS

SESSION 4A – OPEN SESSIONS
GRAND BALLROOM EFG

Eric Roach
Lockheed Martin
Session Chair

Telly Manolatos
Electronics Development Corp.
Session Assistant

SESSION 4B – CLOSED SESSIONS
GRAND BALLROOM ABC

Byron Lee
Northrop Grumman Innovation Systems
Session Chair

Jim Sharp
Naval Surface Warfare Center Dahlgren
Session Assistant

8:00 – 8:20 am

DoD MEMS Fuze Explosive Train Evaluation and Enhancement
21865

David Muzzey
Chemical Engineer, NSWC IHEODTD

Advanced Fireset Electronics and Custom Packaging for Extremely High Shock Survivability
21753

Ron Knobler
Director of Engineering, McQ, Inc.

8:20 – 8:40 am

SPACIDO 1D Course-Correction Fuze
21831

Benjamin Campion
Programme Manager, JUNGHANS Defence

Electrical Transmission Line Replacement for Det-Cords in Flight Termination Systems
21761

Dustin Atwood
Mechanical Engineer, Naval Air Warfare Center Weapons Division

8:40 – 9:00 am

Guided Munitions for Aerial Gunnery; Increased Mission Effectiveness and Large Cost Savings
21775

Lauren Schumacher
Self-Graduate Fellow, The University of Kansas

Neyer Testing Results for MEMS S&A Bridgewires
21762

Charles Romaniello III
Mechanical Engineer, U.S. Army CCDC Armaments Center

9:00 – 9:20 am

Prototyping Fuze Electronics for High Reliability Manufacturing
21772

Stephen Redington
Sr. Engineer, U.S. Army CCDC Armaments Center

Matt Sargent
U.S. Army CCDC Armaments Center

M550 Safe & Arm Redesign
21842

Jason Sweterlitsch
Fuze Engineer, U.S. Army CCDC Armaments Center

9:20 – 9:40 am

Numerical Simulations at the Core of Acceleration Testing Expertise
21841

Paul Deconinck
R&D Manager, Thiot Ingenierie

Current Controlled Solidtron Characterization and Testing Results
21887

Jeff Gardner
Electrical Engineer, L3 Fuzing & Ordnance Systems

9:40 – 10:00 am

Providing Continued DSU-33D/B Viability
21855

Dave Liberatore
Sr. Program Manager, Northrop Grumman Innovation Systems

Advanced Nano-structuring and Enhanced Performance of Thermal Battery Cathode Materials
21780

Giuseppe Di Benedetto
U.S. Army CCDC Armaments Center

10:00 – 10:20 am

NETWORKING BREAK
GRAND BALLROOM FOYER

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CONCURRENT BREAKOUT SESSIONS

Continued

SESSION 4A – OPEN SESSIONS
GRAND BALLROOM EFG

SESSION 4B – CLOSED SESSIONS
GRAND BALLROOM ABC

10:20 – 10:40 am

FMU-139D/B Qualification and Production for Operation Use
21856

Scott Pfeiffer
Program Director, Fuzing & Electronic Integration, Northrop Grumman Innovation Systems

Fuze Enhanced Airburst Response for Medium Caliber Munition
21757

Alexander Neeb
Fuze Engineer, U.S. Army CCDC Armaments Center

10:40 – 11:00 am

Safety Logic Dilemmas for Loitering Unmanned Ground Vehicle (UGV) Munitions
21877

Shay Sas
Fuze Engineer, RAFAEL Advanced Defense Systems, Ltd.

EFI Fire Pulse Delay Circuit
21756

Michael Haddon
Engineer, NAWCWD

11:00 – 11:20 am

Drop Testing of LIGA MEMS Parallel Beam, Bi-Stable Latching Metallic Mechanisms
21839

Kevin O'Connor, Jr.
Mechanical Engineer, U.S. Army CCDC - Armaments Center Fuze Division

Kevin Aghaei
Mechanical Engineer, U.S. Army CCDC - Armaments Center Fuze Division

Target Scene Generator
21863

Dexter Cook
U.S. Army CCDC Armaments Center

11:20 – 11:40 am

Sensitivity Prediction of Exploding Foil Initiators
21768

Qingchou Chen
Engineer of Institute of Chemical Materials, China Academy of Engineering Physics

Optical Fuze Programmer Project Update
21844

Steve Guerrera
VP of Engineering, Creative Microsystems Corporation

11:40 am – 12:00 pm

Innovative Developments in Carbon Cathode Matrix Materials for Li/SOCl2 Reserve Batteries Used in Artillery Projectiles
21851

Brett Barclay
Design Engineer, EnerSys Advanced Systems

Material Properties Comparison between Additive Manufactured and Machined Parts
21886

Bryan Driskell
Mechanical Engineering Manager, L3 Fuzing & Ordnance Systems

12:00 – 1:00 pm

NETWORKING LUNCH
GRAND BALLROOM FOYER

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CONCURRENT BREAKOUT SESSIONS

SESSION 5A – OPEN SESSIONS
GRAND BALLROOM EFG

Perry Salyers
L3 Defense Electronic Systems
Session Chair

Jim Lemister
Pacific Scientific Energetic Materials
Session Assistant

SESSION 5B – CLOSED SESSIONS
GRAND BALLROOM ABC

Doug Harms
NNSA's National Security Campus
Session Chair

Bob Metz
PCB Piezotronics, Inc.
Session Assistant

1:00 – 1:20 pm

Hardened, Compact and Fast: Adaptive Flight Control Actuators for Guided Hard-Launched Munitions
21779

Dr. Ron Barrett-Gonzalez
Professor of Aerospace Engineering, Director of the Adaptive Aerostructures and Aircraft Design Laboratories, The University of Kansas

Wireless Power Transmission for Distributed Multi-Point Fuzing Applications
21870

Joshua Dye
Electrical Engineer, Sandia National Laboratories

1:20 – 1:40 pm

A Historical Review of US Aerial Engagements: 1946-Present
21777

Lauren Schumacher
Self-Graduate Fellow, The University of Kansas

ARDEC Fuze S&T
21854

Evan Young
U.S. Army CCDC Armaments Center

1:40 – 2:00 pm

A Structured Approach to Fuze Technology Refresh
21902

Vince Matrisciano
R&D Program Coordinator, Joint PEO Armaments & Ammunition

High Voltage Switch Development
21861

Paul Heffernan
DOE KC-NSC (Honeywell FM&T)

2:00 – 2:20 pm

High Quality, High Throughput Neutron Radiography using Accelerator Based Neutron Generators
21857

Brad Bloomquist
Director of Business Development, Phoenix, LLC

Small-Scale Testing of Electronic Components in Shock Loading
21904

Vasant Joshi
Scientist, NSWC

2:20 – 2:40 pm

Survivability and Reliability of Silicon MEMS Components
21868

Caitlyn May
Mechanical Engineer, NSWC IHEODTD

Ground Testing Suite to Reduce Risk for Fuzes in Hard Target Penetrators
21872

Ericka Amborn
Senior Engineer, Applied Research Associates

2:40 – 3:00 pm

Equipment for Characterization of an EFI according to STANAG 4560 – A Generic STANAG Comes Alive…
21812

Christian Euba
Systems Engineer, TDW (MBDA)

Missile ESAD Enhancements
21859

Eric McDonough
Northrop Grumman Innovation Systems

3:00 – 3:20 pm

NETWORKING BREAK
GRAND BALLROOM FOYER

Sponsored by PCB PIEZOTRONICS MTS SYSTEMS CORPORATION

CONCURRENT BREAKOUT SESSIONS

Continued

SESSION 5A – OPEN SESSIONS
GRAND BALLROOM EFG

SESSION 5B – CLOSED SESSIONS
GRAND BALLROOM ABC

3:20 – 3:40 pm

Development and Testing of Setback Locks for High Reliability in DPICM-XL
21765

Laura Ostar-Exel
Mechanical Engineer, U.S. Army CCDC Armaments Center

Tailored EFIs for Enhanced Safety & Performance
21769

Nate Sanchez
R&D Engineer, Los Alamos National Laboratory

3:40 – 4:00 pm

Li-Ion Battery for FTS and Telemetry Application
21771

Dmitry Molchanov
Electrical Engineering Manager, EnerSys

Antifuse Obsolescence Mitigation in ESAD Applications: Analysis of High Shock, Acceleration and Vibration Effects on Safety Critical Logic Devices
21884

Nicholas Adams
Engineering Supervisor, L3 Fuzing & Ordnance Systems

4:00 – 4:20 pm

Development of Electronics for DPICM-XL CMRT
21837

Andrew Warne
Chemical Engineer, U.S. Army CCDC Armaments Center

Smart Distributed Embedded Fuzing: Current and Future Research Directions
21875

Curtis McKinion
Mechanical Engineer, Air Force Research Laboratory

4:20 pm

ADJOURN

THURSDAY, MAY 16

8:30 – 10:30 am

FACILITY TOUR OF PCB PIEZOTRONICS, INC.
PCB PIEZOTRONICS, INC.
3425 WALDEN AVENUE, DEPEW, NY 14043

*Separate registration required to attend.

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.

KEYNOTE BIOGRAPHY

COL GARY R. CHARLTON II, USAF

Commander
107th Attack Wing, New York Air National Guard

Col. Gary R. Charlton II is the commander, 107th Attack Wing, New York Air National Guard, Niagara Falls Air Reserve Station, Niagara Falls, NY. He commands the 107th Attack Wing, encompassing operations, medical, and mission support group functions as well as, two geographically separated units. He is responsible for the deployment and employment of assigned personnel and equipment to ensure these assets are available to support all state and national requirements.

Charlton enlisted in the New York Air National Guard in May 1990 and served as a fuels systems technician. He graduated from Columbia College in 1995 earning a Bachelor of Arts degree in psychology. He then commissioned in 2000 and attended undergraduate pilot training in 2001. Charlton completed initial F-16 qualification training in 2002 and served as an F-16C pilot flying with the 138th Fighter Squadron, Hancock Field, NY. He has held the positions of flight, detachment and squadron commander of the 138th Fighter Squadron; as well as 107th Operations Group commander. Prior to his current assignment, he was the vice commander of the 107th Attack Wing, Niagara Falls, NY.

A combat veteran, Charlton served seven combat deployments, three while enlisted, Operations Desert Shield and Storm, and Northern Watch, and four additional deployments flying F-16C combat missions in Operations Iraqi and Enduring Freedom. He is a command pilot with over 3,200 flying hours in the T-37, T-38A, T-38C, F-16C/D, MQ-1, and MQ-9

AWARDEE BIOGRAPHY

PHILIP T. GORMAN, JR.

Lead Associate
Booz Allen Hamilton

March 2019 – Present: Booz Allen Hamilton Senior Lead Technologist, Ordnance. Fuzing Systems: 36 years' experience in fuzing from science and technology through production and sustainment. 16 years as the Fuze Division Chief, Army Armaments Research Development and Engineering Center (ARDEC) responsible for research, development, production, test, and evaluation of fuzes, fuze setters, and munitions power sources. Served 17 years as the Army Lead on the DoD Fuze IPT addressing technology and industrial base issues. Served 9 years as the Army member on the Joint Fuze Technology Panel overseeing a joint S&T program sponsored by OSD, addressing department technology gaps in fuzing and fuzing systems. Led development program on the M734A1 Multi-option Fuze for Mortars, led production program for PATRIOT M143 S&A Device. M.S. Mechanical Engineering, DAWIA Level III SPRDE Certified, Secret Clearance.

SPONSOR DESCRIPTIONS

Defense Electronic Systems

REGISTRATION & OPENING RECEPTION SPONSOR

L3 Defense Electronic Systems (L3 DES), a division of L3 Technologies, Inc., provides precision electronic components, subsystems, and systems for the Department of Defense and international allies. L3 DES specializes in the design and manufacture of build to print and modernized fuze solutions, ignition safety devices, proximity sensors, inertial measurement and GPS navigation systems, assured position, navigation, and timing (A-PNT) capabilities, aerospace status indicators, and intelligence management systems. As a trusted partner, you can count on L3 DES to deliver quality products and develop superior solutions that enhance capabilities and provide overmatch superiority to the warfighter.

Headquartered near Cincinnati, Ohio, L3 DES' primary manufacturing facility was specifically designed and constructed for the manufacture of fuzing and ordnance systems and precision electronic components. With additional locations in Anaheim, CA, Budd Lake, NJ, and San Diego, CA, L3 DES has strategically located its resources, including program management, engineering, and quality assurance, at each site to ensure complete adherence to programmatic and technical requirements, enabling process efficiencies.

Dedicated to continuous improvement, L3 DES operates a quality management system certified to AS9100D and ISO 9001:2015 standards. With highly flexible manufacturing operations, L3 DES can accommodate a variety of products, with run rates that can exceed 40,000 units per month down to individual production units for development efforts. L3 DES also has on-site inspection and test capabilities to perform all required environmental test procedures.

At L3 DES, customer focus is a key element of who we are and how we operate. Our customers are the foundation of our success and we are committed to establishing long-term relationships and ensuring collaboration throughout the product lifecycle.

L3 DES is committed to supporting the warfighter. We will continue to innovate and develop unique solutions by leveraging our valued workforce. To learn more, please visit www.L3T.com or call 513-943-2000.

NORTHROP GRUMMAN

GRAND RECEPTION SPONSOR

At Northrop Grumman, we are focused on providing our warfighters with high-quality products that provide overmatch in a number of land, sea, and air engagement scenarios. Key to the effectiveness of many U.S. and ally weapon systems are our advanced bomb fuzes and proximity sensors. Our fuze portfolio includes electronic and electro-mechanical bomb fuzes that are capable of penetrating deeply buried targets, engaging high speed maneuverable surface threats and delaying detonation for mission success, while our sensors detect the height of a weapon above a target and operate in an electronic countermeasure environment. For more information, speak with one of us during the conference or visit us at northropgrumman.com.

KAMAN

Fuzing & Precision Products

WEDNESDAY LUNCH & WRISTBAND SPONSOR

Kaman Precision Products is the integration of two respected ordnance manufacturers in the United States: Raymond Engineering of Middletown, Connecticut, and Dayron, Inc. of Orlando, Florida. Two great defense manufacturers, one specializing in missile fuzing and one specializing in bomb fuzing, came together to create a company that serves many of the U.S. and international militaries' missile and bomb systems. Kaman Precision Products provides design, development, test and manufacture of fuzing, safe and arm, and flight termination products and systems. In addition, we design and build inductive (eddy current) sensors for operation in severe conditions, and advanced data storage and retrieval systems for military applications. Our products are found on many new and legacy missile systems such as Maverick, Harpoon, Tomahawk, ATACMS, STANDARD, Hawk and AMRAAM. Our fuzing products segment is also involved with high-g, 3 axis data recorders and flight termination Safe & Arm systems.

EXCELITAS TECHNOLOGIES®

TUESDAY LUNCH SPONSOR

Excelitas Technologies is a leader in the design, test, and manufacturing of Electronic Safe, Arm and Fire (ESAF); Electronic Safe and Arm Devices (ESAD); and Firing Modules (FM) for safe fuzing requirements of both legacy and next-generation missiles and munitions. Our dedicated staff of research and design experts use the latest advances in technology to design smaller, lighter, and more cost effective ESAFs and FMs to meet evolving requirements of newer more sophisticated weapon systems. Capabilities include a line of components and subsystems that have been qualified for hard target penetration environments as well as for the next generation of smaller class munitions.

We also produce a large array of custom energetic devices to meet specific customer requirements for many Department of Defense and National Nuclear Safety Administration systems. Excelitas ensures the reliability and consistent performance of each energetic device through control of in-house recrystallization, processing, and pressing of our own explosive powders.

DISPLAY HOURS

MONDAY, MAY 13
5:00 – 6:00 pm

TUESDAY, MAY 14
7:00 am – 5:00 pm

WEDNESDAY, MAY 15
7:00 am – 3:20 pm

TABLE TOP DISPLAYS

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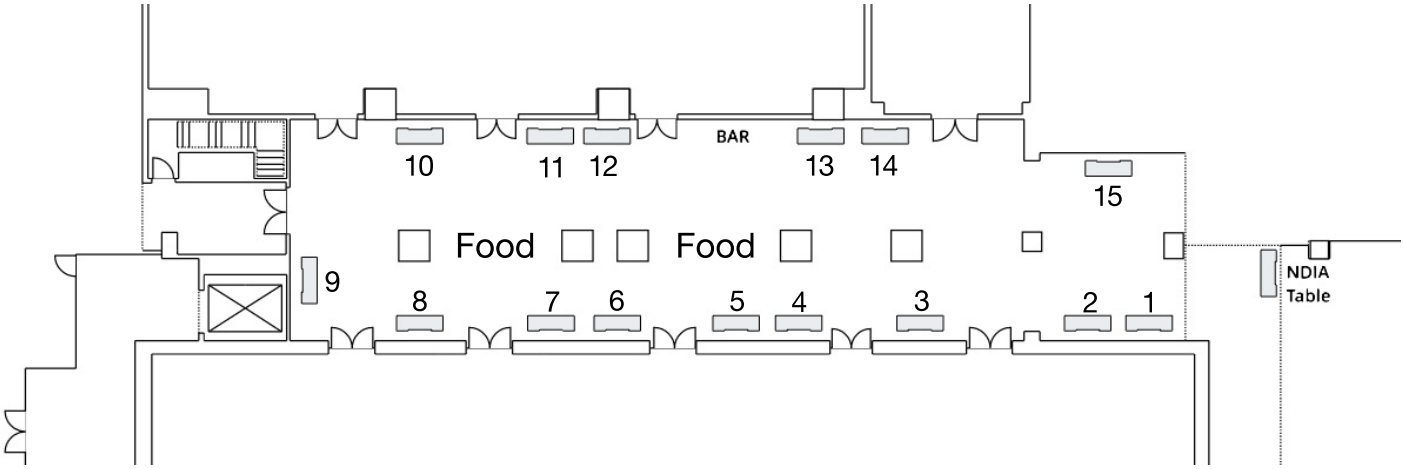
DISPLAY MAP



EXHIBITOR DESCRIPTIONS

DIEHL & EAGLE-PICHER GMBH #11

Diehl & Eagle-Picher GmbH (D&EP), is one of Europe's leading manufacturers of individualized pow-er supplies for the military and civil market.

Diehl & Eagle-Picher a German-American joint venture, develop and produce activatable thermal bat-teries for defence applications and customized battery packs for both the defence and civil market. In addition, more than 15 years ago D&EP furthermore began to design and manufacture lithium reserve batteries for applications in proximity, time and multifunction fuzes used for mortar, artillery and naval gun ammunition.

In 2013 Diehl & Eagle-Picher started a new development in the field of defence in order to minimize the size of lithium thionylchloride (Li/SOCl2) reserve batteries in response to the trend towards more efficient and less energy requiring fuzes in the medium caliber sector. The system lithium thionylchlo-ride (Li/SOCl2) for Reserve batteries stands out due to extremely high energy density. Therefore, es-pecially these minimized batteries are perfectly suitable to deliver energy for fuzes used in medi-um/large caliber ammunition for rocket and grenade weapons.

Diehl & Eagle-Picher are a most flexible partner corresponding to various customer demands due to different modular design possibilities of our batteries.

ENERSYS #8

EnerSys, the global leader in stored energy solutions for industrial applications, has an Advanced Systems division solely focused on powering submarines to satellites. Our mission is to design and manufacture custom, state-of-the-art batteries for military, space and aviation applications. By leveraging 50 years of experience in powering Fuzing applications, we remain at the forefront of powering advanced weapons across the Department of Defense. Our proprietary Cobalt Disulfide chemistry also raises the bar for what is possible with Thermal batteries for Munition applications. EnerSys Advanced Systems' wide breadth of technologies and capabilities allows us to provide our customers with the best performing products and highest quality services at the best possible value.

EXCELITAS #12

See company description on page 15.

EXPAL SYSTEMS, S.A. #14

EXPAL Systems is a global defense and security company. We offer high-end technology products, services and solutions to meet the current and future needs of Air, Land and Sea Armed Forces.

We are a trusted ally in over 60 countries adding safety, precision and advanced systems to any mission. EXPAL manages the entire life-cycle of ammunition, from R&D and manufacturing to maintenance and integration services, up to our leading demilitarization solutions.

From its Fuzes Excellence Center, a cutting-edge facility located in Europe, the company designs, manufactures and integrates a wide portfolio of fuzes. Among its latest developments, the company produces electronic FMCW proximity fuzes: a sophisticated solution that integrates time, proximity and impact functioning modes. This safety and reliability system have been proved, even when subjected to the most severe and adverse on-board electromagnetic environments.

EXPAL's fuzes, designed following the latest NATO standards, are compatible with the most demanding ammunition systems and are currently in use in over 35 armed forces all over the world.

EXPAL supports the U.S. Armed Forces through its subsidiary company EXPAL USA. Headquartered in Dallas since 2011, EXPAL USA has state-of-the-art facilities in Texarkana and a R&D center in Camp Minden to develop demilitarization services for the U.S. Army and energetic materials for the US DoD, holding the potential to extend its capabilities to the rest of EXPAL offering.

GOWANDA COMPONENTS GROUP #3

GCG designs and manufactures reliable, robust, high-performance magnetics and filters for use in demanding applications in military, aerospace, medical and communication systems around the world. GCG has a unique combination of product breadth, custom-design capabilities, proprietary equipment, in-house environmental testing and multiple facilities, all located in the USA. With more than 150,000 sq. ft. of manufacturing/engineering space spread out over six locations, GCG is disaster-plan qualified. Nearly 10,000 sq. ft. of machining space, including in-house transfer molding capability, provides quick turnaround of prototypes. All of this combined with other in-house vertical integration, helps GCG to streamline its operations and manage process flow, thereby reducing time-to-market for customers. GCG affiliates include Gowanda Electronics, DYCO Electronics, HiSonic, Butler Winding, Communication Coil, Gowanda REM-tronics, TTE Filters, Microwave Circuits, and Instec Filters.

Magnetics Products include RF & power inductors: broadband, QPL, high-reliability for space; RoHS & Pb; chips, chokes, coils, common-mode, conicals, toroids, transformers; surface-mount, thru-hole; AS9100, ISO9001. Filters Products include RF & microwave filters: bandpass, band-rejection, highpass, lowpass; Bessel, Butterworth, Chebyshev, Elliptical-Function, Gaussian; multiplexers; bias tees; and EMI/RFI filters: feed-thru's & bolt-styles.

GCG products are utilized in numerous space projects: NASA Europa, Delta IV heavy, James Webb Space Telescope, MAVEN, LADEE, and GOES-R.

HT MICROANALYTICAL, INC. #1

HT Micro's mission is to replace conventionally manufactured switches and connectors with the smallest, most robust metal microfabricated products. For military applications such as safe and arm, target detection, and guidance systems, the Company produces the smallest and most reliable, passive, surface mount inertial switches in the world. The product line can survive 100,000+ Gs while still responding to nominal thresholds ranging from 2 to 10,000 Gs. The company's entire product line and data sheets can be found at www.htmicro.com.

KNOWLES-NOVACAP #6

Novacap, a Knowles Precision Devices Brand, features high temperature, high energy capacitors designed for reliable operation under single or multiple pulse firing applications. Energy density exceeds that of conventional Class 1 materials, providing excellent short duration pulse delivery at temperatures to 200°C. Integral bleed resistors are offered in a range of values.

Capacitors are 100% tested to application tailored, Novacap high reliability screening and evaluated at operational extremes consistent with munitions and oil field exploration/seismic detonation conditions. Other applications include power supply filtering, energy storage and coupling/decoupling. Custom size, voltages and capacitance ratings are available in single, series and series/parallel arrangements.

A division of Knowles Corporation, Knowles Precision Devices is a leading global innovator and manufacturer of high performance solutions. We focus on production of a wide variety of highly engineered Capacitors, EMI and Microwave to Millimeter Wave components for use in critical military, medical, industrial, electric vehicle, and 5G market segments. From 8,000 feet below the earth's surface to orbiting 254 miles above on the ISS, we take on the complex challenges that come with High Reliability, High Temperature, High Performance, High Energy and High Frequency solutions. Our Heritage Brands include Compex, DITF, DLI, Johanson, Novacap, Syfer and Voltronics.

MEGGITT ENDEVCO #4

Meggitt is a leading supplier of high-performance sensing and monitoring systems for physical parameter measurements in extreme environments. Meggitt's Endevco® range of piezoelectric, piezoresistive, Isotron® and variable capacitance accelerometers, piezoresistive pressure transducers, acoustic sensors, electronic instruments and calibration systems ensure critical accuracy and reliability within aerospace, automotive testing and medical applications.

NASCENTECHNOLOGY MANUFACTURING, INC. #15

INASCENTechnology Manufacturing manufactures High-Reliability, High Temp transformers and inductors for commercial and military grade markets. We operate with a class 10,000 clean room and our Quality system is compliant with ISO9000:2015, AS9100D, and PQR1060 issue U. We maintain permanent, full traceability for all of our manufactured parts to materials and testing data.

Our Low-Temperature Co-Fired Ceramic transformers and inductors are flat, thin, and a fraction of the size of wire-wound transformers. The LTCC transformer imbeds the coil windings within one solid unit making it a miniature monolith. As a result, they are far more reliable, and able to withstand extreme shock and vibration.

NASCENTechnology will also manufacture custom wire wound products with a focus on producing parts that are highly reliable in adverse conditions.

Our staff continues to research ways to process, apply, and combine magnetic materials that enhance the performance of our existing designs as well as meet the needs of future applications. For example, ceramic flyback transformers operational beyond 200-degree C are now available. Stop by and visit with us today.

PCB PIEZOTRONICS, INC. #13

PCB Piezotronics, Inc. is a designer and manufacturer of microphones, vibration, pressure, force, torque, load, and strain sensors, as well as the pioneer of ICP® technology used by design engineers and predictive maintenance professionals worldwide for test, measurement, monitoring, and control requirements in automotive, aerospace, industrial, R&D, military, educational, commercial, OEM applications, and more. With a worldwide customer support team, 24-hour SensorLineSM, and a global distribution network, PCB® is committed to Total Customer Satisfaction. Visit www.pcb.com for more information. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corporation. Additional information on MTS can be found at www.mts.com.

PRESIDIO COMPONENTS, INC. #9

Founded in 1980, Presidio Components is a US manufacturer of high reliability ceramic capacitors. One of our product line focused on pulse energy capacitors for Exploding Foil Initiator (EFI) used in fuse systems for missiles and ordnances. As an added safety feature, our pulse energy capacitors can be ordered with bleed resistors. Lead frames are also available for board flex compliance. Energy output is designed to match customer requirements.

Overall Presidio supplies ceramic capacitors used in other high reliability industrial, military or space applications. Presidio's power products include low inductance chips SMD, high reliability SMPS stacks, and high voltage radial leads.

Presidio's RF Power and RF /Microwave product group features Ultra-Porcelain™ capacitors with ultra-low ESR and ultra-high Q, broadband DC blocking capacitors, as well as the smallest wire-bondable single layer and broadband bypass capacitors available.

Presidio is qualified to most MIL specs including the highest established reliability rating of 'S' Level for MIL-PRF-55681. All QPL testing per MIL-STD-202 is done on site in Presidio's DSCC approved test lab.

SILICON POWER CORPORATION #2

Silicon Power Corporation is a developer and solutions provider dedicated to the design, development, testing and manufacturing of high-voltage semiconductor switches, high-voltage pulsed-power switches, and high-power utility-applicable systems.

Through its SolidTRON product group, Silicon Power assembles, tests, and delivers to the defense industry proprietary semiconductor discharge switches, which are designed into the critical fuze initiation of numerous active smart weapons programs.

Silicon Power's Pulsed Power product group offers the world leading technology in solid state high-speed, high voltage, and high-energy transfer switches. Beginning with the design of the constituent semiconductors, SolidTRON, our focus is enabling system-level designs with unprecedented performance compared to other solid state thyratron, ignitron and spark gap.

SPACE ELECTRONICS, LLC #10

ISpace Electronics is the world's leading manufacturer of totally safe igniter / squib circuit testers. Our SQB Series consists of automated multi-node systems, rackmount testers and portable single channel units. These systems are ideal for safely measuring the resistance and stray voltage in a weapon's multiple electrical circuit paths.

Customers such as the US Navy, Raytheon, Boeing, L3 Technologies and Lockheed Martin rely on Space Electronics systems to safely test rocket igniters, fuses, explosive bolts, squibs, detonators and electro-component lines (relays, actuators, diodes and semiconductor devices). Our designs incorporate multiple layers of safety and internal microprocessors. These features produce highly accurate, rapid and stable readings, while drastically reducing the risk of accidental detonations.

We designed and built our first squib meters in 1977 (many of our original units remain in use and we continue to support them). Space Electronics customers benefit from our detailed version control and world class customer service.

THIOT INGENIERIE #7

THIOT INGENIERIE, shock physics specialist since 1988, is working in two main activities around its expertise in shock physics.

First in design and manufacturing test equipment for fast dynamics studies:

Gas guns | Acceleration generator | Split Hopkinson bars | Detonation chamber

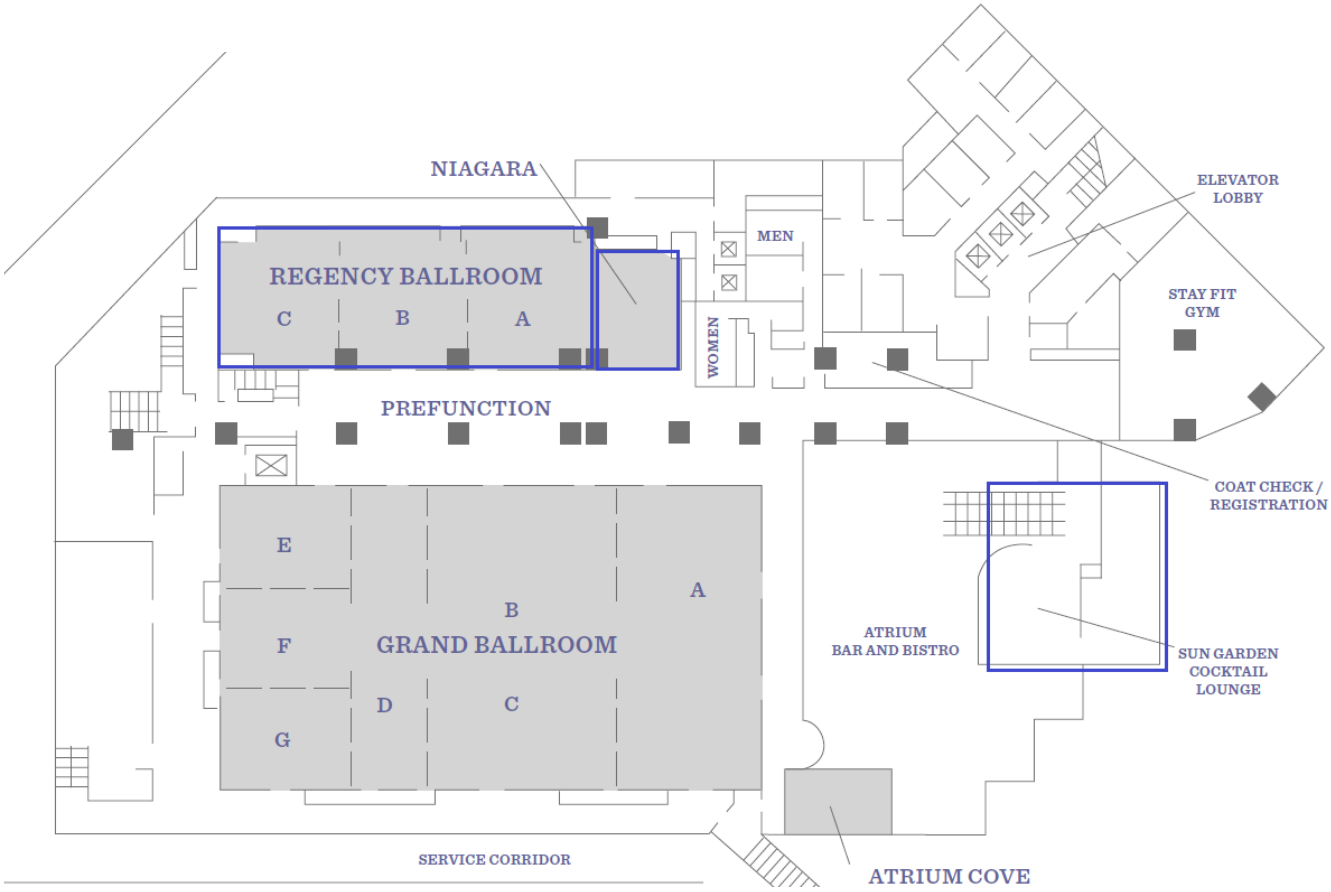
The second parts of its activity is a high level of expertise in shock physics with a terminal ballistics laboratory and a R&D department specialized in dynamic behavior of materials.

Our philosophy: To combine experimental tests results to numerical simulation to have the best knowledge of the material behavior.

Our equipment:

- 4 gas guns for impact tests: we can fire any type of projectile onto any kind of target from 50m/s up to 8500m/s (i.e. we can reproduce fuze behavior during impact).
- Numerical simulation: with our expertise in numerical simulation, we are able to simulate the behavior of your structures in all types of shock situation: ballistic impacts on armor, explosions inside a building or acceleration and/or deceleration phenomena.
- Mechanical characterization (Hopkinson bars tests, dynamic press).
- Acceleration testing (up to 100 000G): to observe and study the behavior of embedded systems under high levels of stress (MEMS, IMU, SAU).

VENUE MAP



NDIA CELEBRATES 100 YEARS!

The technology used by today's modern warfighter was unimaginable 100 years ago. In 1919, BG Benedict Crowell's vision of a collaborative team working at the intersection of science, industry, government and defense began what was to become the National Defense Industrial Association. For the past century, NDIA and its predecessor organizations have been at the heart of the mission by dedicating their time, expertise and energy to ensuring our warfighters have the best training, equipment and support.

Reflecting on NDIA's history, we embrace the opportunity to emphasize the need for legal and ethical collaboration among military, government, industry and academia to ensure the defense industrial base is prepared for future challenges and conflicts. Just as the early 20th century was characterized by massive transformation in military capabilities, emerging trends in technology and increasing geopolitical challenges demand new strategies and policies in today's national security landscape.

THANK YOU TO OUR SPONSORS

L3 Defense Electronic Systems

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PCB PIEZOTRONICS INC
MTS SYSTEMS CORPORATION

NOTES

2019 ARMAMENT SYSTEMS FORUM

Small Arms • Guns, Ammunition, Rockets & Missiles (GARM) • Unconventional and Emerging Armament (UEA)

The 2019 NDIA Armament Systems Forum will focus on **leveraging armament technology integration to achieve modernization, overmatch, and operational readiness**.

The can't miss, high-density agenda features parallel sessions for small arms, GARM, and UEA addressing synergy, communication, and networking opportunities across the entire armament community. This forum will also allow for an expanded number of technical/oral presentations and poster presentations addressing subjects relevant to legacy and evolving future armaments as well an incredible opportunity to interact with the latest technologies available on the exhibit floor.

June 3 – 6, 2019 | Fredericksburg, VA | NDIA.org/Armaments19