

**NDIA**

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# 2018 IM & EM TECHNOLOGY SYMPOSIUM

INNOVATIVE INSENSITIVE MUNITION SOLUTIONS FOR ENHANCED WARFIGHTER EFFECTIVENESS



April 23 – 26, 2018

Doubletree by Hilton Portland

Portland, OR

**[NDIA.org/IMEM2018](http://NDIA.org/IMEM2018)**

# AGENDA

## MONDAY, APRIL 23

4:00 pm **CONFERENCE REGISTRATION AND WELCOME RECEPTION**  
FIRST LEVEL FOYER AND BROADWAY | WEIDLER | HALSEY BALLROOM

5:30 pm **ADJOURNMENT**

## TUESDAY, APRIL 24

7:00 am **CONFERENCE REGISTRATION AND BREAKFAST**  
FIRST LEVEL FOYER AND Broadway | Weidler | Halsey Ballroom

### **SESSION 1 PLENARY**

**Melissa Hobbs-Hendrickson**  
Orbital ATK  
*Session Chair*

8:00 am **WELCOME**  
LLOYD CENTER BALLROOM  
**Melissa Hobbs-Hendrickson**  
Orbital ATK

8:10 am **KEYNOTE ADDRESS**  
**Dr. Christine Michienzi**  
OUSD(AT&L) Manufacturing and Industrial Base Policy

8:40 am **20188 IM PLANS AND JIMTP FUTURE IN THE UNITED STATES**  
**Anthony Di Stasico**  
OUSD (AT&L)/TWS/LWM

9:00 am **20156 NATO WORKING GROUP ON INSENSITIVE MUNITIONS AND HAZARD CLASSIFICATION REQUIREMENTS, ASSESSMENT AND HAZARD FREQUENCY**

**Philip Cheese**  
Defence Equipment and Support

9:20 am **20249 U.S. NAVY INSENSITIVE MUNITIONS HANDBOOK**

**Dr. Jerry Ward**  
Booz Allen Hamilton

9:40 am **20149 MSIAC – HIGHLIGHTS AND FUTURE PRIORITIES**

**Dr. Michael Sharp**  
NATO Munitions Safety Information Analysis Center

10:10 am **NETWORKING BREAK**

BROADWAY | WEIDLER | HALSEY BALLROOM

## CONCURRENT BREAKOUT SESSIONS

### **SESSION 2A IM REQUIREMENTS & ASSESSMENTS**

MULTNOMAH

**Wade Babcock**  
NATO Munitions Safety Information Analysis Center  
*Session Chair*

### **SESSION 2B ENERGETIC MATERIALS**

HOLLADAY

**Mike Ervin**  
BAE Systems  
*Session Chair*

10:55 am **20265 Historical Review of Fragment Impact Standardization**

**Kathryn Hunt**  
MARCORSYSCOM

**20119 GrIMEx (Green IM Explosive): Development of Novel IM Comp B Replacements Based on Green TNT and RDX Replacements**

**Dr. David Price, Jr**  
BAE Systems.

11:15 am **20112 Review and Update of STANAG 4496  
Fragment Impact, Munitions Test Procedure**

Christophe Jacq  
DGA Missiles Testing

**20059 A New IMI Systems Less Sensitive  
Brisant Explosive Composition**

Dr. Gila Strul-Yudkiewicz  
IMI Systems

11:35 a **20063 US Navy Insensitive Munitions  
(IM) Munitions Reaction Evaluation Board  
(MREB)**

Ken Tomasello  
Naval Ordnance Safety and Security Activity

**20184 LX-17 Process Development and  
Scale-Up**

Brian Alexander  
BAE Systems Inc, Ordnance Systems

11:55 am **20137 MSIAC Workshop 2018: Improved  
Explosives and Munitions Risk Management**

Martijn van der Voort  
MSIAC

**20164 New Polycarbonate-Based  
Thermoplastic Polyurethane Binder for HMX  
Based Explosives**

Emily Robertson  
Lawrence Livermore National Laboratory

12:15 pm **LUNCH**  
CASCADE BALLROOM

**SESSION 3A LARGE SCALE TESTING 1**  
MULTNOMAH  
Michael Sharp  
NATO Munitions Safety Information Analysis Center  
*Session Chair*

**SESSION 3B FORMULATIONS**  
HOLLADAY  
Paul Braithwaite  
Orbital ATK  
*Session Chair*

1:45 pm **20082 Gun Launch and Setback Actuators**

Dr. Ernest Baker  
NATO MSIAC

**20077 Evaluation of Composition B Using  
Nano-Energetics**

Philip Samuels  
ARDEC

2:05 pm **20183 Fragment Impact Testing of the XM25**

Nausheen Al-Shehab  
US Army

**20120 Replacement of Oppanol B-150 in  
Composition C-4**

Matt Hathaway  
BAE Systems

2:25 pm **20057 Novel Slow Cook-off Test Method to Replicate Worst Case for Munitions Containing Internal Fuel**

Ben Blazek  
NAVAIR

**20111 Effect of Microstructure Control on the Reaction Characteristics In Al/Ni Reactive Powder**

Dr. Sang-Hyun Jung  
Agency for Defense Development (South Korea)

2:45 pm **20118 Advancing the Propane Fast Cookoff Burner and Testing**

Dr. Ephraim Washburn  
Naval Air Warfare Center Weapons Division

**20074 Characterization of MTNP (1-Methyl-3,4,5-Trinitro-1,2-Pyrazole)**

Philip Samuels  
ARDEC

3:05 pm **20260 Fast Cook of Simulated Rocket Motors with Intumescent Paint**

Dr. Jon Yagla  
Bowhead Technical Services

**20069 Influence of Concentration, Type and Particle Size of Fillers on the Dynamic Mechanical Behaviour of Elastomeric HTPB Binder**

Manfred Bohn  
Fraunhofer ICT

3:25 pm **NETWORKING BREAK**

BROADWAY | WEIDLER | HALSEY BALLROOM

**SESSION 4A THERMAL HAZARD TESTING**

MULTNOMAH

Tom Swierk  
Hart Technologies, Inc.  
*Session Chair*

**SESSION 4B EM PROCESSING I**

HOLLADAY

Ron Hollands  
BAE Systems  
*Session Chair*

3:45 pm **20080 Slow Heating Testing Survey and Historical Events Review**

Dr. Ernest Baker  
NATO MSIAC

**20145 Property-Processing Implications in Additive Manufactured Materials for Munitions**

Wade Babcock  
NATO Munitions Safety Information Analysis Center

4:05 pm **20126 An Investigation into a Proper Heating Rate for Slow Cook-Off Testing**

Dr. David Hubble  
NSWC Dahlgren Division

**20174 Robust Enhanced Blast Explosive Manufacturing at Holston Army Ammunition Plant**

Virgil Fung  
BAE Systems

4:25 pm **20267 Insensitive Munitions Industry Contribution for New Stanag - AOP Edition of the Slow Heating Test**

Yves Guengant  
ARIANEGROUP SAS

**20155 New NTO Workshop and Associated Product Characterizations**

Arthur Delage  
EURENCO

4:45 pm **20279 Scaling of Fast Cook Off Fires**

Dr. Jon Yagla  
Bowhead Technical Services

**20179 Characterization of LX-14 FEM / PBXN-9 FEM High Energy Explosives**

Brian Alexander  
BAE Systems Inc, Ordnance Systems

5:05 pm **20258 Cost of Propane Fast Cook-Off Testing**

Dr. Ephraim Washburn  
Naval Air Warfare Center Weapons Division

**20157 Development of a CONUS Manufacturing Capability for FOX-7**

Dr. Bradley Sleadd  
NSWC IHEODTD

5:30 pm **GRAND RECEPTION**  
CASCADE BALLROOM

7:00 pm **ADJOURNMENT**

## WEDNESDAY, APRIL 25

7:00 am **CONFERENCE REGISTRATION AND BREAKFAST**

FIRST LEVEL FOYER AND Broadway | Weidler | Halsey Ballroom

## CONCURRENT BREAKOUT SESSIONS

**SESSION 5A LARGE SCALE TESTING II**

MULTNOMAH  
Ken Graham  
Aerojet Rocketdyne  
Session Chair

**SESSION 5B ENERGETIC MATERIALS II**

HOLLADAY  
Steve Nicolich  
U.S. Army  
Session Chair

8:00 am **20275 Passing Sympathetic Reaction Responses in 500 and 1,000-lb General Purpose Bombs with AFX-770**

Dr. Christopher Crouse  
Air Force Research Laboratory

**20172 MDNT: IM Melt-Phase Energetic Binder**

Omar Abbassi  
US ARMY ARDEC

8:20 am **20268 An Explosive Fragment Projector for IM Testing**

Tal Eliash  
Rafael

**20171 Melt-Pour Explosive Formulation Development Featuring TNBA**

Virgil Fung  
BAE Systems

8:40 am **20122 Outgassing Pad for Cook-Off Mitigation in Warheads**

Josiah Garfield  
NAWCWD-China Lake

**20166 Particle Size and Surface Area Effects on the Initiation of Diaminoazoxyfurazan (DAAF)**

Elizabeth Francois  
Los Alamos National Laboratory

9:00 am **20083 Insensitive Munitions Explosive Ordnance Disposal Challenges**

Dr. Ernest Baker  
NATO MSIAC

**20289 Manufacturing of PAX-3 High Explosive**

Sean Swaszek  
ARDEC

9:20 am **20273 Explosive Ordnance Disposal (EOD) of Insensitive Munitions: Challenges and Solutions**

Patrick Brousseau  
DRDC - Valcartier RC

**20153 Qualification Of Malleable Plastic Explosive Hexomax and its Application in a Flexible Linear Shaped Charge System**

Christelle Songy  
EURENCO

9:40 am **NETWORKING BREAK**

BROADWAY | WEIDLER | HALSEY BALLROOM

### **SESSION 6A MITIGATION & TESTING**

MULTNOMAH

Patrick Brousseau  
DRDC - Valcartier RC  
*Session Chair*

### **SESSION 6B SYNTHESIS**

HOLLADAY

Matthew Andrews  
NATO Munitions Safety Information Analysis Center  
*Session Chair*

10:00 am **20141 Mitigation Technologies for Propulsion Applications**

Christelle Collet  
MSIAC

**20123 Modernization and Capabilities of the Lawrence Livermore National Laboratory Pilot Facility for Remotely Controlled Energetic Materials Synthesis**

Dr. Nathaniel Zuckerman  
Lawrence Livermore National Laboratory

10:20 am **20154 Sheet-metal Ammunition Packing Tray for Mitigation of Secondary Cook-off of Medium-caliber Ammunition**

Greg Little  
Naval Surface Warfare Center, Dahlgren Division

**20180 Synthesis, Formulation, and Testing of 3,4-DNP**

Dr. Jacob Morris  
BAE Systems

10:40 am **20159 Development and Successful Demonstration of a Lightweight, Particle Impact Mitigation Sleeve (PIMS) With Specified Hardness and Perforation Features**

Daniel Pudlak  
ARDEC

**20271 Microfluidic Synthesis of Energetic Materials**

Dr. Joe Scavuzzo  
Orbital ATK

11:00 am **20147 Stopping KM/S Blunt Fragments and Limiting Shock Lensing with a New Advanced Energy Absorbing Composite**

Dr. Gareth Tear  
Synbiosys Ltd

**20228 Synthesis Development of Novel Energetic Ingredients**

Dr. Sarah Headrick  
BAE Systems

11:20 am **OPEN**

**OPEN**

11:40 am **ADJOURNMENT**

**THURSDAY, APRIL 26**



7:00 am **CONFERENCE REGISTRATION AND BREAKFAST**

FIRST LEVEL FOYER AND Broadway | Weidler | Halsey Ballroom

**CONCURRENT BREAKOUT SESSIONS**

**SESSION 7A SYSTEMS I**

MULTNOMAH

**Steve Struck**

Energetic Materials Branch, Munitions Directorate  
*Session Chair*

**SESSION 7B HE CHARACTERISTICS**

HOLLADAY

**Melissa Mileham**

Orbital ATK  
*Session Chair*

8:00 am **20182 Additive Manufacturing for Net Shape Munitions**

**Dr. Bhanu Chelluri**

BAE Systems- Dayton

**20081 Gap Test Calculations and Correlations**

**Dr. Ernest Baker**

NATO MSIAC

8:20 am **20140 Reaction Mechanisms for Rocket Motors**

**Christelle Collet**

MSIAC

**20276 PBXN-5 Mechanical Characterization and Proposed Constitutive Model**

**Dr. Daniel Peairs**

L-3 Fuzing and Ordnance Systems

**Dr. Ericka Amborn**

ARA

8:40 am **20132 Loading Density and Vent Area Ratio Effects on the Structural Response of Reinforced Concrete Structures Storing HD 1.3 Gun Propellant**

**Cynthia Romo**

Naval Air Warfare Center Weapons Division

**20113 Investigation of the Hugh James Criteria using Estimated Parameters**

**Dr. Justin Sweitzer**

Practical Energetics Research, Inc

9:00 am **20114 Life Cycle Demilitarization Considerations for IM Development**

**Gary Mescavage**

PD Demil

**20281 Additive Manufacturing of Composite Energetic Materials**

**JULIEN MORICEAU**

ARIANE GROUP

9:20 am **20274 New Generation Influence Mine Classified as 1.6N**

Björn Granqvist  
OY FORCIT AB

**20290 Electronic Properties and Hirshfeld Surface Analysis of Insensitive High Energy Density Material Dihydroxylammonium 5,5'-bistetrazole-1,1'-diolate under Compression**

Bokinala Abraham  
Advances Centre of Research in High Energy Materials

9:40 am **NETWORKING BREAK**

BROADWAY | WEIDLER | HALSEY BALLROOM

**SESSION 8A SUB-SCALE TESTING I**

MULTNOMAH

Brian Fuchs  
Company  
Session Chair

**SESSION 8B PROPELLANTS**

HOLLADAY

Jessica Vaughn  
Company  
Session Chair

10:00 am **20139 Correlation of Response for Munitions Containing RDX/TNT: Bullet Impact and EMTAP Tube Testing Results**

Phil Cheese  
UK Ministry of Defence

**20135 The Unknown Detonation Transition (XDT) Mechanisms Associated with Damaged Rocket Propellant Impacting a Surface: Understanding and Applications to IM**

Dr. Mark Pfeil  
US Army AMRDEC

10:20 am **20262 Radiant Chamber for Fast Cook of Testing and Simulation**

Dr. Jon Yagla  
Bowhead Technical Services

**20115 Innovative Nitrogen-doped Boron Propellants**

Dr. Thelma Manning  
US ARMY RDECOM ARDEC

10:40 am **20117 Analysis of Temperature Profiles of Chemical Reaction upon Impact of Reactive Materials**

Ki-bong Lee  
Agency for Defense Development(South Korea)

**20264 Insensitive Minimum Smoke Propellants**

Dr. Thomas Deschner  
Nammo Raufoss AS

11:00 am **20121 Validating Experiments for Vulnerability Calculations of Munitions and Lessons Learned**

Gert Scholtes  
TNO Defence, Safety & Security

**20152 Increased Impulse of Solventless Extruded Double Base Rocket Propellant by Addition of High Explosives RDX And FOX-7.**

Erik Tunestål  
Eurengo Bofors

11:20 am **20241 Effect of Insensitive HE on Shaped Charge Jets**

Werner Arnold  
MBDA - TDW

**20134 Initial Steps Towards Large Scale Production of UK Lova Thermoplastic Elastomer (TPE) Propellants**

Dr. Mark Penny  
BAE SYSTEMS Land (UK)

11:40 am **LUNCH**  
CASCADE BALLROOM

### **SESSION 9A MODELING & ANALYSIS**

MULTNOMAH

Gert Scholtes  
TNO Defence, Safety & Security  
*Session Chair*

### **SESSION 9B SUB-SCALE TESTING II**

HOLLADAY

Genevieve Eck  
EURENCO  
*Session Chair*

1:00 pm **20259 Fast Cook-Off Modeling and Simulation**

Dr. Jon Yagla  
Bowhead Technical Services

**20282 Insensitive Munitions (IM) Gun Propellant Optimization Efforts for Medium Caliber Application**

Dr. Melissa Liberatore-Moretti  
Picatinny Arsenal

1:20 pm **20269 Thermal Modeling of Fast Cook-Offs**

Dr. Markus Graswald  
TDW GmbH

**20131 Critical Diameter and Gap Tests for Hazard Classification of Solid Propellants and Motors**

Cynthia Romo  
Naval Air Warfare Center Weapons Division

1:40 pm **20266 An Approach to Predict the Cook-off Response of Confined and Vented Full Scale Munitions Based on Small Scale Tests**

Dr. N. Albert Moussa  
BlazeTech Corp

**20133 Small Scale Assessment of LOVA Thermoplastic Elastomer (TPE) Propellants for Large Calibre Gun Systems**

Dr. Mark Penny  
BAE SYSTEMS Land (UK)

2:00 pm **International Sympathetic Reaction Testing Survey**

Dr. Ernest Baker  
NATO MSIAC

**20234 Sub-Scale Cookoff Response of Hydrogenated HTPB Propellants**

Dr. Lauren Merriman  
NAWCWD

2:20 pm **20161 Filling the Gap between the Initiation Behavior of Shaped Charge Jets and Fragments**

Werner Arnold  
MBDA - TDW

**20136 Subscale Testing to Predict Full-Scale Response to Fragment Impact in Solid Propellants**

Dr. Jamie Neidert  
AMRDEC

2:40 pm **NETWORKING BREAK**

BROADWAY | WEIDLER | HALSEY BALLROOM

**SESSION 10A SYSTEMS II**

MULTNOMAH

Jamie Neidert  
AMRDEC  
*Session Chair*

**SESSION 10B EM QUALIFICATION & SUSTAINABILITY**

HOLLADAY

Name  
Company  
*Session Chair*

3:00 pm **20150 Heavyweight Torpedo Warhead – IM Assessment**

Luc Chaffois  
EURENCO

**20138 Qualification and Energetic Materials Challenges**

Dr. Matthew Andrews  
NATO MSIAC

- 3:20 pm **20181 Improving Knowledge of Tactical Rocket Motor Response under Insensitive Munition Threats: BI, FI and FH Tests Results of the Research Program**  
Laurent Bonhomme  
ROXEL
- 3:20 pm **20163 Impacts of REACh, ITAR and Other Regulations on Energetic Materials Sustainability**  
Geneviève Eck  
EURENCO
- 3:40 pm **20245 IM Characteristics of Large Diameter Extruded Double Base Rocket Motors with Composite Cases**  
Joseph Bellotte  
BAE Systems Inc. OSI
- 3:40 pm **20233 Qualification of Explosives Formulations Manufacturers and Ingredient Manufacturers for US Navy Use**  
Michael Kenyon  
NSWC IHEODTD
- 4:00 pm **20263 IM Technology for Stryker Tank Munitions**  
Adriana Eng  
US Army ARDEC
- 4:00 pm **20146 Age-Related Mechanical Damage and Ageing of Munition Materials**  
Wade Babcock  
NATO Munitions Safety Information Analysis Center
- 4:20 pm **20160 Transition of an Optimized Particle Impact Mitigation Sleeve (PIMS)**  
Daniel Pudlak  
US REDECOM ARDEC
- 4:20 pm **20151 Influence of Ageing on the Properties of IHE**  
Hendrik Radies  
Rheinmetall Weapon & Munition
- 4:40 pm **SPANISH WINE CELEBRATION AND AWARDS**  
BROADWAY | WEIDLER | HALSEY BALLROOM
- 5:10 pm **PROGRAM CONCLUDES**

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