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
WELCOME TO THE IM & EM TECHNOLOGY SYMPOSIUM

On behalf of the Insensitive Munitions and Energetic Materials Committee and our MSIAC partner, I would like to welcome you to the 2018 Insensitive Munitions and Energetic Materials Technology Symposium. This international gathering of the top chemists, system designers and engineers from government laboratories, private industry and academia will provide a venue for exchange and dissemination of the latest research in synthesis, formulation, system design, testing, characterization and safety – all aimed at advancing munitions effectiveness WHILE improving safety for the warfighter. In recent decades great advances have been made and our munitions are less vulnerable to attack than ever before; however, challenges remain. It is through the continuing work of the authors, presenters, sponsors and attendees at this conference and across our worldwide defense industry that these challenges will be overcome resulting in safer munitions being produced in our factories and fielded to our warfighters.

Melissa Hobbs-Hendrickson
Director Business Development
Orbital ATK

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<table>
<thead>
<tr>
<th>SCHEDULE AT A GLANCE</th>
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<tbody>
<tr>
<td><strong>MONDAY, APRIL 23</strong></td>
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</table>
| Registration and Welcome Reception  
First Level Foyer and Broadway | Weidler | Halsey Ballroom  
4:00 pm - 5:30 pm |
| General Session  
Lloyd Center Ballroom  
8:00 am |
| Concurrent Presentations  
Multnomah & Holladay Ballrooms  
10:55 am |
| Lunch  
Cascade Ballroom  
12:15 pm |
| **TUESDAY, APRIL 24** |
| Registration and Breakfast  
First Level Foyer and Broadway | Weidler | Halsey Ballroom  
7:00 am |
| Concurrent Presentations  
Multnomah and Holladay Ballrooms  
1:45 pm |
| Symposium Reception  
Cascades Ballroom  
5:30 pm - 7:00 pm |
| **WEDNESDAY, APRIL 25** |
| Registration and Breakfast  
First Level Foyer and Broadway | Weidler | Halsey Ballroom  
7:00 am |
| Concurrent Presentations  
Multnomah & Holladay Ballrooms  
8:00 am |
| Symposium Adjourns for the Day  
11:20 am |
| **THURSDAY, APRIL 26** |
| Registration and Breakfast  
First Level Foyer and Broadway | Weidler | Halsey Ballroom  
7:00 am |
| Concurrent Presentations  
Multnomah & Holladay Ballrooms  
8:00 am |
| Lunch  
Cascades Ballroom  
11:40 am |
| Concurrent Presentations  
Multnomah & Holladay Ballrooms  
1:00 pm |
| Spanish Wine Celebration and Awards  
Broadway | Weidler | Halsey Ballroom  
4:20 pm |
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

MUNITIONS TECHNOLOGY

MISSION

Works to maintain an open exchange of technical information among government and industry programs and technical managers, and to identify changes and trends in policy, guidance and organizational functions that affect the development, production, maintenance and demilitarization of munitions.
EVENT INFORMATION

**EVENT WEBSITE**
NDIA.org/IMEM2018

**EVENT CONTACT**
Carol Dwyer
Meeting Planner
(703) 247-2582
cdwyer@ndia.org

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

**PLANNING COMMITTEE**
Melissa Hobbs-Hendrickson
Event Chair

Paul Braithwaite

Mike Ervin

Ken Graham

Kathryn Hunt

David Hunter

Wade Babcock

Matthew Beyard

Wade Babcock

Matthew Beyard

Steve Nicolich

Michael Sharp

Stephen Struck

Tom Swierk

Andrew Wilson

**WI-FI**
Network: DOUBLETREE
Password: There is no password

**ATTENDEE ROSTER, PROCEEDINGS & SYMPOSIUM SURVEY**
NDIA will be emailing all participants the symposium attendee roster, the link for symposium proceedings (those which have been approved) and the symposium survey information within three week of the conclusion of the symposium.

**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, 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
CAPT Frank Michael, USN (Ret)
National Defense Industrial Association

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 Stasio
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
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
<th>Organization</th>
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<tbody>
<tr>
<td>9:20 am</td>
<td>20249 U.S. NAVY INSENSITIVE MUNITIONS HANDBOOK</td>
<td>Dr. Jerry Ward</td>
<td>Booz Allen Hamilton</td>
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<tr>
<td>9:40 am</td>
<td>20149 MSIAC – HIGHLIGHTS AND FUTURE PRIORITIES</td>
<td>Dr. Michael Sharp</td>
<td>NATO Munitions Safety Information Analysis Center</td>
</tr>
<tr>
<td>10:00 am</td>
<td>MUNITIONS SAFETY AWARDS</td>
<td>Dr. Michael Sharp</td>
<td>NATO Munitions Safety Information Analysis Center</td>
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<td>10:10 am</td>
<td>NETWORKING BREAK</td>
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<tr>
<td>10:55 am</td>
<td>20265 Historical Review of Fragment Impact Standardization</td>
<td>Kathryn Hunt</td>
<td>MARCORSYSCOM</td>
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<td>11:05 am</td>
<td>20119 GrIMEx (Green IM Explosive): Development of Novel IM Comp B Replacements Based on Green TNT and RDX Replacements</td>
<td>Dr. David Price, Jr</td>
<td>BAE Systems</td>
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<tr>
<td>11:15 am</td>
<td>20112 Review and Update of STANAG 4496 Fragment Impact, Munitions Test Procedure</td>
<td>Christophe Jacq</td>
<td>DGA Missiles Testing</td>
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<td>20059 A New IMI Systems Less Sensitive Brisant Explosive Composition</td>
<td>Dr. Gila Strul-Yudkiewicz</td>
<td>IMI Systems</td>
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<tr>
<td>Time</td>
<td>Session 3A: Large Scale Testing 1</td>
<td>Session 3B: Formulations</td>
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<td>1:45 pm</td>
<td>20082 Gun Launch and Setback Actuators</td>
<td>20077 Evaluation of Composition B Using Nano-Energetics</td>
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<td></td>
<td>Dr. Ernest Baker</td>
<td>Philip Samuels</td>
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<td>NATO MSIAC</td>
<td>ARDEC</td>
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<td>2:05 pm</td>
<td>20183 Fragment Impact Testing of the XM25</td>
<td>20261 The DOTC Enterprise – Helping You Accelerate Technologies to the Field</td>
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<td>Nausheen Al-Shehab</td>
<td>James Wilson</td>
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<td>US Army</td>
<td>DOTC Program Office - Picatinny NJ</td>
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<tr>
<td>2:25 pm</td>
<td>20057 Novel Slow Cook-off Test Method to Replicate Worst Case for Munitions Containing Internal Fuel</td>
<td>20111 Effect of Microstructure Control on the Reaction Characteristics In Al/Ni Reactive Powder</td>
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<td></td>
<td>Ben Blazek</td>
<td>Dr. Sang-Hyun Jung</td>
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<td>NAVAIR</td>
<td>Agency for Defense Development (South Korea)</td>
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<tr>
<td>Time</td>
<td>Session A</td>
<td>Session B</td>
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</table>
| 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 Comparative Fire Response of Simulated Rocket Motors in Steel and Carbon Fiber Composite Missile Launching Canisters  
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 |
| 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 |
Yves Guengant  
ARIANE GROUP 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**

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**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 Swashek
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 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

20290 Electronic Properties and Hirshfeld Surface Analysis of Inensitive High Energy Density Material Dihydroxylammonium 5,5'-bistetrazole-1,1'-diolate under Compression
Bokinala Abraham
Advances Centre of Research in High Energy Materials

9:20 am  20274 New Generation Influence Mine Classified as 1.6N
Björn Granqvist
OY FORCIT AB

9:40 am  NETWORKING BREAK

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 2017 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
Eurenco 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
Mr. Owain Sowden
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
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<th>Speaker</th>
<th>Affiliation</th>
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<tr>
<td>1:40 pm</td>
<td>20266 An Approach to Predict the Cook-off Response of Confined and Vented Full Scale Munitions Based on Small Scale Tests</td>
<td>An Approach to Predict the Cook-off Response of Confined and Vented Full Scale Munitions Based on Small Scale Tests</td>
<td>Dr. N. Albert Moussa</td>
<td>BlazeTech Corp</td>
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<td>20133 Small Scale Assessment of LOVA Thermoplastic Elastomer (TPE) Propellants for Large Calibre Gun Systems</td>
<td>Small Scale Assessment of LOVA Thermoplastic Elastomer (TPE) Propellants for Large Calibre Gun Systems</td>
<td>Mr. Owain Sowden</td>
<td>BAE SYSTEMS Land (UK)</td>
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<tr>
<td>2:00 pm</td>
<td>30000 International Sympathetic Reaction Testing Survey</td>
<td>International Sympathetic Reaction Testing Survey</td>
<td>Dr. Ernest Baker</td>
<td>NATO MSIAC</td>
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<td>20146 Age-Related Mechanical Damage and Ageing of Munition Materials</td>
<td>Age-Related Mechanical Damage and Ageing of Munition Materials</td>
<td>Wade Babcock</td>
<td>NATO Munitions Safety Information Analysis Center</td>
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<td>2:20 pm</td>
<td>20161 Filling the Gap between the Initiation Behavior of Shaped Charge Jets and Fragments</td>
<td>Filling the Gap between the Initiation Behavior of Shaped Charge Jets and Fragments</td>
<td>Werner Arnold</td>
<td>MBDA - TDW</td>
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<td>20136 Subscale Testing to Predict Full-Scale Response to Fragment Impact in Solid Propellants</td>
<td>Subscale Testing to Predict Full-Scale Response to Fragment Impact in Solid Propellants</td>
<td>Dr. Jamie Neidert</td>
<td>AMRDEC</td>
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<td>2:40 pm</td>
<td>NETWORKING BREAK</td>
<td>NETWORKING BREAK</td>
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<td>BROADWAY</td>
<td>WEIDLER</td>
<td>HALSEY BALLROOM</td>
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<tr>
<th>Session 10A Systems II</th>
<th>Session 10B EM Qualification &amp; Sustainability</th>
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<tr>
<td>MULTNOMAH</td>
<td>HOLLADAY</td>
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<tr>
<td>Jamie Neidert</td>
<td>Andrew Wilson</td>
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<td>AMRDEC</td>
<td>Exploinsights</td>
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<td>Session Chair</td>
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<tr>
<td>3:00 pm</td>
<td>20150 Heavyweight Torpedo Warhead – IM Assessment</td>
<td>Heavyweight Torpedo Warhead – IM Assessment</td>
<td>Luc Chaffois</td>
<td>EURENCO</td>
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<td>20138 Qualification and Energetic Materials Challenges</td>
<td>Qualification and Energetic Materials Challenges</td>
<td>Dr. Matthew Andrews</td>
<td>NATO MSIAC</td>
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<td>3:20 pm</td>
<td>20181 Improving Knowledge of Tactical Rocket Motor Response under Insensitive Munition Threats: BI, FI and FH Tests Results of the Research Program</td>
<td>Improving Knowledge of Tactical Rocket Motor Response under Insensitive Munition Threats: BI, FI and FH Tests Results of the Research Program</td>
<td>Laurent Bonhomme</td>
<td>ROXEL</td>
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<td>20163 Impacts of REACh, ITAR and Other Regulations on Energetic Materials Sustainability</td>
<td>Impacts of REACh, ITAR and Other Regulations on Energetic Materials Sustainability</td>
<td>Geneviève Eck</td>
<td>EURENCO</td>
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</table>
3:40 pm  20245 IM Characteristics of Large Diameter Extruded Double Base Rocket Motors with Composite Cases
Joseph Bellotte
BAE Systems Inc. OSI

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

20151 Influence of Ageing on the Properties of IHE
Hendrik Radies
Rheinmetall Weapon & Munition

4:20 pm  SPANISH WINE CELEBRATION AND AWARDS
BROADWAY | WEIDLER | HALSEY BALLROOM

4:45 pm  SYMPOSIUM CONCLUDES

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.

VOTE NOW
PEOPLE’S CHOICE AWARD
Vote for your favorite presentation by going to surveymonkey.com/r/9553S8P or by using the QR Code.

The People’s Choice Award will be presented at the Spanish Wine Celebration and Awards at the end of the Symposium on Thursday, April 26th!
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<th>ABSTRACT #</th>
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<th>AUTHOR</th>
<th>SESSION</th>
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<tr>
<td>20057</td>
<td>Novel Slow Cook-off Test Method to Replicate Worst Case for Munitions Containing Internal Fuel</td>
<td>Blazek</td>
<td>3A</td>
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<td>20059</td>
<td>A New IMI Systems Less Sensitive Brisant Explosive Composition</td>
<td>Strul-Yudkiewicz</td>
<td>2B</td>
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<tr>
<td>20063</td>
<td>US Navy Insensitive Munitions (IM) Munitions Reaction Evaluation Board (MREB)</td>
<td>Tomasello</td>
<td>2A</td>
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<tr>
<td>20069</td>
<td>Influence of concentration, type and particle size of fillers on the dynamic mechanical behaviour of elastomeric HTPB binder</td>
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### BIOGRAPHY

**DR. CHRISTINE MICHIENZI**  
Senior Industrial Analyst, Missiles and Munitions  
OUSD(AT&L), Manufacturing and Industrial Base Policy  

Dr. Michienzi began her career with the Department of Defense (DoD) at the Naval Surface Warfare Center, Indian Head Division, where she initially worked as a formulation chemist, developing new explosive and propellant formulations for DoD weapons systems, for which she holds five patents. She transitioned to program manager, establishing and leading the Navy’s gun propellant development program, and eventually became the acting Research, Development, Test and Evaluation Department Head. She has also served as the munitions technical expert for the Technical Director, Program Executive Office, Integrated Warfare Systems (PEO IWS) for Surface Ship Weapons.

She is currently in the Office of the Under Secretary of Defense for Acquisition Technology and Logistics (OUSD(AT&L)), where she has held several positions. She served as a munitions expert and the Insensitive Munitions (IM) lead for the DoD for the Deputy Assistant Secretary of Defense, Tactical Warfare Systems (DASD TWS) and is currently the Senior Industrial Analyst for Missiles and Munitions for DASD Manufacturing and Industrial Base Policy (MiBP). Dr. Michienzi is responsible for assessing the health of the industrial base for all components of all DoD munitions, identifying issues and potential mitigation plans for senior OSD leadership. She also reviews acquisition strategies for new munitions and yearly DoD budget submissions to identify and work to solve any industrial base issues.

Dr. Michienzi received her Bachelor of Science degree in Chemistry from the University of Maryland, College Park (UMCP) and her Doctorate in Analytical Chemistry, also from UMCP.
DEFENSE OPTIMIZATION INC.

Defense Optimization Inc. is a National Defense corporation - a Think Tank and a next-generation weapon-system group. Our mission is to serve as a catalyst for victory and world-wide peace, by fielding the best weapon systems known to man. We assess the performance of various classes of weapon systems and sub-systems, providing assistance to the Department of Defense and to weapon-system contractors.

Defense Optimization Inc’s capabilities eliminate major root causes that prevent thoughtful weapon system conception, development, production, fielding and application. We mentor top weapon-system professionals and DoD agency leaders.

All current weapon systems are susceptible to a host of system instabilities (noises) which wreak havoc with weapon system performance in the field - whether that field includes underwater, on the ground, in space, or across global and spatial electromagnetic spectrums.

Our team members have over 50 years combined experience in weapon-system conception and performance optimization.

The results of our efforts lead to:

- Lower system costs,
- Higher performance,
- Higher System reliability,
- Extended weapon-system lifetimes, and
- Capable systems for all environments.

Our Secret Sauce includes leading-edge conceptional, optimization and data tools, which we pass along to our partners.

DSIAC

The Defense Systems Information Analysis Center (DSIAC) is a component of the U.S. Department of Defense’s Information Analysis Center (IAC) enterprise. Our organization's purpose is to provide information research and analysis for DoD and Federal government users to stimulate innovation, foster collaboration, and eliminate redundancy. DSIAC’s mission is to generate, collect, analyze, synthesize, and disseminate Scientific and Technical Information (STI) to DoD and Federal government users and industry contractors. The scope of DSIAC includes nine subject areas, six of which were part of the legacy DoD IAC operations: Advanced Materials; Energetics; Military Sensing; Reliability, Maintainability, Quality, Supportability, Interoperability (RMQSI); Survivability and Vulnerability; and Weapon Systems; plus three more focus areas of Autonomous Systems; Directed Energy; and Non-lethal Weapons.

DSIAC is chartered to become the premier information research partner and curator of technology advancements and trends for the defense systems community. Our website is www.DSIAC.org where you can find the DSIAC Digest, published twice-monthly, for the latest news and technical articles, and the quarterly DSIAC Journal of technical publications. Requests for STI and literatures searches can be submitted through our website.
For more than a half-century, NTS has been a trusted partner to the Department of Defense, U.S. military, defense industry, aerospace, and other industries; providing comprehensive services and testing. Our network of national and international labs offer:

- Engineering services
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- Single location insensitive munitions & hazard classification testing
- Transportation & packaging safety testing
- Mechanical stress, strain & function testing
- Performance, safety & functional testing
- Static & dynamic firings of weapons & ordnance
- Body armor & firearm safety
- Function & reliability testing

- Integrated program management, planning & procedures

Within our facilities or on a customer’s site, we integrate into each client’s internal team. From technical expertise and exclusive accreditations, to an extensive physical infrastructure and engineering excellence, NTS is adept at maximizing quality and efficiency across our extensive customer base.


NTS also provides many related services, supporting all phases of customer-defined engineering projects that require a range of specialized services.

Orbital ATK is a global leader in aerospace and defense technologies. The company designs, builds and delivers space, defense and aviation systems for customers around the world, both as a prime contractor and merchant supplier. Its main products include launch vehicles and related propulsion systems; missile products, subsystems and defense electronics; precision weapons, armament systems and ammunition; satellites and associated space components and services; and advanced aerospace structures. For more information, visit www.orbitalatk.com.
BAE SYSTEMS OSI

Headquartered in Radford, Virginia, BAE Systems Ordnance Systems Inc. (OSI) operates the Holston and Radford Army ammunition plants in support of U.S. Department of Defense (DoD) and commercial requirements. In addition to production, OSI provides a host of ammunition related services including modernization program management, inventory management, and energetics research and development.

Holston Army Ammunition Plant is the single source for U.S. DoD high explosives. Portfolio product mix includes RDXs, HMXs, IMXs, and PBXs. Radford Army Ammunition Plant is the single source for high-volume U.S. DoD Nitrocellulose / Propellants. Portfolio product mix includes Nitrocellulose, single-base propellants, multi-base propellants and rocket propellants.

OSI is an innovation leader in next generation explosives and propellants development thru its robust IR&D program. OSI is an active supporter of U.S. DoD and commercial product development through a wide variety of CRAD programs. In addition, OSI has provided total Program Management for all modernization projects conducted at its two ammunition plants. This extensive program includes modernization planning, project management, design, construction, and prove-out of a wide variety of projects.

ORBITAL ATK

As battlefield threats evolve, our warfighters need the best tools and technologies to successfully execute their missions safely. The U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC) has leaned forward in maturing insensitive munitions (IM) technology and delivering it to the front line where the threats are high. With the recent introduction of IM technology to Orbital ATK’s rocket motors for the Guided Multiple Launch Rocket System (GMLRS) and HELLFIRE® missiles – among the first rocket motors ever to fully integrate IM technology – our nation is taking a major step in meeting new standards of weapon safety.

A common misconception is that new technology requires a complete overhaul. To the contrary, Orbital ATK’s IM rocket motor technology can be tailored to fit both new and existing tactical systems affordably. In fact, Orbital ATK has successfully introduced all the safety benefits of IM technology to the rocket motors without significantly changing the current design of legacy systems without sacrificing effectiveness or performance.

Orbital ATK is proud to serve the warfighter. That responsibility drives our team to invest, improve and innovate. This summer, the company will expand its capabilities at the Allegany Ballistics Laboratory (ABL) in Rocket Center, West Virginia when it opens its new Large Tactical Motor Manufacturing Facility specializing in high efficiency manufacturing of IM-compliant motors. Looking ahead, Orbital ATK will continue to develop and qualify similar rocket motor technology for other military applications, fielded systems and next generation upgrades to improve the strength of our armed forces.

Learn more about our IM technology at www.OrbitalATK.com
Making munitions that are safer for our warfighters to handle is a shared goal of the military and industry. Aerojet Rocketdyne has an extensive history in developing insensitive munition solutions for both warheads and rocket motors. Our insensitive munitions and energetic materials solutions provide an increased margin of safety for our men and women who are deployed across the globe to protect the interests of America and its allies.

- Capabilities include:
  - Tailored insensitive energetic formulations for warheads and rocket motors
  - Innovative solutions to make systems meet IM criteria
  - Composite case manufacturing
  -Insensitive munitions mitigation methods
  -Modeling and simulation
  -Small-scale development testing
  -Insensitive munitions tests per NATO STANAGS
  -Production of components and systems for government and industry customers worldwide

Aerojet Rocketdyne is an innovative company delivering solutions that create value for its customers in the aerospace and defense markets. The company is a world-recognized aerospace and defense leader that provides propulsion and energetics to the space, missile defense and strategic systems, tactical systems and armaments areas, in support of domestic and international markets. Additional information about Aerojet Rocketdyne can be obtained by visiting our websites at www.Rocket.com and www.AerojetRocketdyne.com.

**Corporate Contact:**
Jared Holt, Director, Contract Administration
E-mail: Jared.Holt@Rocket.com
Telephone: (256) 922-2575

**Technical Contact:**
Kenneth J. Graham, Engineering Fellow
Insensitive Munitions and Explosives
E-Mail: Ken.Graham@Rocket.com
Telephone: (540) 854-2182
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