EMTWG'24

Energetic Materials Technology Working Group

13-16 MAY 2024- OSLO, NORWAY

DRAFT AGENDA 12 DECEMBER 2023

Monday, 13 May 2024

TBD **Welcome Reception and On-Site Registration**
Clarion Hotel the Hub

Tuesday, 14 May 2024

08:00 AM **Welcome Remarks/ IMEMG Highlights**
Loic Minguet

08:30 AM **Keynote and Welcome Address**
TBD

09:00 AM **Keynote Presentation**
TBA

09:30 AM **Keynote Presentation**
TBA

10:00 AM **Networking Break**

Concurrent Breakout Sessions

Insensitive Munitions Policy & Requirements	**Energetic Material Formulations & Synthesis**
Session Chair: Hervé Bénard	**Session Chair: Loïc Minguet**
Status on implementation of IM-policy in the Norwegian defence sector Øystein Hetland	*Continuous crystallization of energetic materials using continuous oscillatory baffled crystallizer* Ruaraidh Wells
NATO IM Portfolio Update w/ Focus on IM-HC Harmonization Daniel J. Pudlak	*Use of soluble desensitizer to pilot terminal performance and IM response for a TNT based melt-cast composition* Gilloux Teddy
Insensitive Munitions Industry Contribution: How to benefit from IM munitions during manufacturing and storage phases Carole Fournier *Cost and Benefit Analysis: a necessary approach to support massive ammunition resupply in current geopolitical context* Rémi BOULANGER	*A rocky road toward a suitable TNT replacement* Arthur DELAGE *New low-cost melt-cast composition for IM mortar ammunition - Theoritical approach to experimental aspect* Gilloux Teddy *CL-20 in the Beginning: Perspectives from Eyewitnesses to the Early Days* Bob Wardle

12:10 PM **Lunch**

Concurrent Breakout Sessions

IM Thermal Hazard Test Methodology **Location TBA**	**Energetic Materials Processing** **Location TBA**
Session Chair: Tom Swierk	**Session Chair: TBD**
FCO Esea Alessandro Liberatore	*Energetic Material Processing with RAM* Ruth Doherty
Heat flux measurements with CALIFLUX in Fast Heating tests Marie De Bats	*Advancements in ResonantAcousticÂ® Continuous Flow Technology for Surrogate Energetic Material Synthesis and Crystallization* Joseph Mayne
Guidance on Temperature and Heat Flux Measurement Techniques Used in IM and HC Testing Christelle Collet	*Insensitive Munitions (IM) Response of Resonant AcousticÂ® Mixing (RAM)-Loaded Mix-in-Case (MIC) Munition Items* Andrew Nelson
Slow heating: First lessons learned from heating rate standard testchange on composite RM response. Laurent BONHOMME	*Effect of modality on the rheology of uncured HMX-based PBXs* Cansu Tuygun
Slow Cook-Off Soak Temperature Effect on Munition Response Nausheen Al-Shehab	*Combustion and mechanical properties of co(glycidyl nitrate-glycidyl azide) polymer energetic binders* Charles Dubois

3:30 PM **Coffee Break- Networking Opportunity**

Concurrent Breakout Sessions

IM Test Methodology II **Location TBA**	**Propellants: Formulations & Performance** **Location TBA**
Chair: Ken Graham	**Chair: Paul Braithwaite**
A Review of the Likelihood of Bullets Impacts on Munitions During Domestic Transport Brian Fuchs	*Improved performance of LOVA-propellants with maintained production safety* Erik Tunestål
Novel Rocket Motor Impact Threat Protection Dan Turner	*Partial Burn Testing of New High Energy Extruded Double Base Rocket Propellants and Associated Self-Extinguishment Properties* Joseph Bellotte
A Method to Extend the Qualification of a PBXN-109 loaded Air-craft Bomb using an Inert Surrogate Material Carole Fournier	*Ageing Characteristics of Solid Composite Propellants* Eirik A. Løkke
	Solid Fuel Ramjet Technology at Nammo Raufoss AS Camilla Alm
	Composite Solid Propellant Formulation Evaluation Erin Wallace

5:40 PM **Adjourn**

Wednesday, 15 May

8:00 AM **Keynote Presentation**

8:30 AM **Keynote Presentation**

9:00 AM **Keynote Presentation**

9:30 AM **Munitions Safety Awards & Highlight and Future Priorities**
MSIAC

10:00 AM **Coffee Break- Networking Opportunity**

Concurrent Breakout Sessions

Energetic Material Properties & Characteristics II	**Energetic Material Properties & Characteristics I**
Session Chair: Steve Nicolich	**Session Chair: Phil Samuels**
Statistical assessment of the sensitivity of energetic materials Dennis Christensen	*Inherent Material Property Effects on Dimensional Stability of PBXN-9* Francis J. Milbower
How to assess thermo-chemical aging of high explosives in adequate way. Peculiarities in application of test protocols Manfred Bohn	*Self-Heating of High Explosives in Safe Scale Up for Manufacturing* Sean Swaszek
The Effects of Energetic Material Ageing on Munition IM Response - Focused on Propellants Gaynor Olliver	*Enhanced Blast Explosives with Improved Survivability* James White
Terminal Effects of Blast Wave Propagation from Metal Enhanced Home-Made Explosive Composition Pholisa Ngcebesha	*Identification and assessment of potential thermostable and powerful explosives* Eric Pasquinet
	Explosive acceleration of fluoropolymer-based reactive material fragments Hayleigh J. Lloyd

Poster Session TBA

1:30 PM **Sessions Adjourn**

1:30 PM **Sit-down Lunch**

2:30 PM **Free Time**

7:00 PM **Gala Dinner**

8:00 AM **Keynote Presentation**

Concurrent Breakout Sessions

Insensitive Munitions Modeling	**Energetic Materials Qualification & Technology**
Chair: Melissa Hobbs-Hendrickson	**Chair: Jamie Neidert**
Simulating the Nammo 155 mm Artillery Projectile Sympathetic Reaction with IMPETUS Solver Lars Olovsson	*Representation of RDX Thermal Response for Use in Digital IM Engineering Tools* Keith Clutter
A MODEL TO DETERMINE THE RESPONSE OF MUNITIONS FOR LOWER ORDER REACTIONS GERT SCHOLTES	*Status of NATO Energetic Material Qualification Requirements* Philip Samuels
MODELING AND SIMULATION OF COOK-OFF SCENARIOS OF DEM-BASED THREE-DIMENSIONAL PROPELLANT BEDS IN CASED MUNITIONS Daniel Tomaschewski	*A Method to Extend the Qualification of a PBXN-109 loaded Air-craft Bomb using an Inert Surrogate Material* Carole Fournier
Demonstrating munitions insensitivity through simulation: the IMEMG compendium dedicated to cook-off scenarios D Picart	

9:40 AM **Coffee Break- Networking Opportunity**

Concurrent Breakout Sessions

IM Mitigation & Testing	**Energetic Material Formulations & Synthesis II**
Session Chair: TBD	**Session Chair: Dave Paritosh**
Best Practice for the Development and Manufacture of Energetic Materials Lawrence C. Farrar	*Optimized Lab and Pilot Scale Synthesis of 2,4-Dinitroanisole (DNAN) from Anisole* Tomasz Modzelewski
IM Tests on Vulcano Guided ammunitions Gianluca Bersano	*Pilot Scale Evaluation of Modified 3,4-Dinitropyrazole (DNP) Synthesis Process* Tomasz Modzelewski
The development and qualification of the 155 mm NM269, Insensitive Munition High Explosive Extended Range, IM HE-ER. Christer Sundell	*SHS SYNTHESIS OF MICROMETER-SIZED BORON PARTICLES WITH INCREASED SURFACE AREA AND HIGHER REACTIVITY FOR ENERGETIC APPLICATIONS* Sebastian Knapp
Energetic Defect Characterization (EDC) - A Multi-Disciplined, Multi-Faceted, US Joint-Service Approach for Identifying & Determining Defect Criticality for specific Munitions and their Respective Energetics Daniel J. Pudlak	*Properties of pressed explosive charges using the example of cocrystals* Peter Gerber
Higher Lethality Medium Caliber Munition Nausheen Al-Shehab	

11:50 AM **Lunch**

Concurrent Breakout Sessions

IM System Technology	Energetic Materials Lab-Scale Testing
Chair: Joseph LiVolsi	**Chair: Melissa Mileham**
AFRL Advanced Muntions Technology Complex Jacob Morris	*Energetic Defect Characterization - The US DoD's Approach* Daniel J. Pudlak
A magnetohydrodynamic model of a slapper detonator initiation train for performance and safety assessment: covering firing circuit simulation and detonation transfer to explosive train components Gareth Flegg	*X-RAY COMPUTED TOMOGRAPHY FOR INSPECTION OF INSENSITIVE ENGERTIC MATERIALS FOR LABORATORY SCALE TESTING* Brian McNanna
Modular Electronic Initiation System for multiple application Vegard Bakken	*Feature Extraction using Machine Learning for Defect Characterization* Victoria Gerardi
SHOCK INITIATION OF EXPLOSIVES USING A PLANE WAVE BOOSTER DRIVEN FLYER PLATE Anne Haslam	*Utilization of the Focus Beam Reflectance Measurement (FBRM) Probe in Explosive Processing* Kyle Ramos
	Characterization of the Impact-Induced Reaction of Multiple Explosives Using the AFRL High Explosive Survivability Test (HEST) Jesus Mares Jr.

3:00 PM **Coffee Break- Networking Opportunity**

Concurrent Breakout Sessions

IM Modeling & Materials	Energetic Materials Subscale Testing
Chair: TBD	**Chair: TBD**
AN INNOVATIVE METHODOLOGY TO PREDICT REACTION OF COMPLEX WARHEAD TO FRAGMENT IMPACTS Karol Woirin	*SUBSCALE TESTING OF NANOCOMPOSITE-MODIFIED SOLID FUELS & PROPELLANTS* Michael Fisher
Predicting Setback Failure of High Explosive Projectiles During Gun Launch Nicholas Tashjian	*Sensitivity Testing of Propellants in a Small-scale Experiment* Claudius Zimmermann
Understanding the variation coefficient with an experimental / numerical study for a shock to detonation transition reliability analysis Nicky Chaigneau	*Small Scale Impact Sensitivity Testing of Energetic Materials under Temperature and Relative Humidity* Christelle Collet
VOID COLLAPSE-INITIATED DEFLAGRATION: PROGRESS TOWARDS PREDICTIVE MODELING FOR RISK EVALUATION PT. 2 Brandon L. Johnson	*Thermal Radiation in Interior Ballistics and Closed Bomb Testing* Jon Yagla
A Lighter and Stronger Graphene Polymer Cartridge Case Vincent Battaglia	

Adjourn