

NDIA

Warheads and Ballistics Classified Symposium



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July 31 - August 3, 2017 | Naval Postgraduate School | Monterey, CA

Monday, July 31, 2017

5:00–6:30 PM **Early Bird Registration, Reception**
Hilton Garden Inn Monterey

Tuesday, August 1, 2017

8:00 AM **Registration and Security Check-in**
Naval Postgraduate School, Glasgow Hall Courtyard

9:00 AM **Introductory Remarks:**
Symposium Chair: Robert Ciccarelli, DE Technologies, Inc., King of Prussia, PA

Session I: Warhead Technology - Air Blast

Session Chair: Chi Mai, US Air Force Research Laboratory, Eglin AFB, FL

9:00 AM Session Introduction

9:15 AM **Introduction to Air Blast from Multiple Charges**

- Angela Diggs (US Air Force Research Laboratory, Eglin AFB, FL)
- Suhithi Peiris

9:35 AM **Air Blast from Multiple Charges: Simulations Using LESLIE3D and CTH**

- Brian Taylor (US Air Force Research Laboratory, Eglin AFB, FL)
- George Butler
- Brandon Paikoff

9:55 AM **Experiments in Collaborative Air Blast from Multiple Charges of Uncased, Spherical PBXN-110**

- Chi Mai (US Air Force Research Laboratory, Eglin AFB, FL)
- Stephen Thornton
- Kyle Winter
- Michael Hargather
- Angela Diggs
- Suhithi Peiris

10:15 AM **High-Speed Refractive Imaging of Air Blast from Multiple Charges**

- Michael Hargather (US Air Force Research Laboratory, Eglin AFB, FL)
- Kyle Winter
- Chi Mai
- Angela Diggs
- Suhithi Peiris

10:35 AM **Coffee Break**
Glasgow Hall Courtyard

11:00 AM **An Experimental Investigation of a Distributed Airblast Concept for Building Targets**

- Roosevelt Davis (US Air Force Research Laboratory, Eglin AFB, FL)
- Alan Ohrt
- Brian Lagrange

Session II: Warhead Technology - Blast and Fragmentation

Session Chairs: Nausheen Al-Shehab, US Army RDECO-ARDEC, Picatinny, NJ

Gabriel Bonnstetter, Orbital ATK, Plymouth, MN

11:20AM Session Introduction

11:25 AM **Frag Panel for High Speed Air-to-Ground Missiles**

- Michael Denigan (US Air Force Research Laboratory, Eglin AFB, FL)
- Michael Murphy
- John Granier
- Donald Bland
- Michael Hopson

11:45 AM **Selectable Lethality Warhead**

- John Granier (Energetic Materials & Products, Inc., Round Rock, TX)
- Dennis Wilson
- Donald Littrell
- Chi Mai
- Mike Gunger
- Paul Braithwaite

12:05 PM **Lunch**

Hermann Hall Ballroom

1:20 PM **120mm Advanced Multi-Purpose (AMP) XM1147 Warhead**

- Eric VanderMolen (Orbital ATK, Plymouth, MN)

1:40 PM **Fragment Impact Modeling and Experimental Results for a 120mm Warhead**

- Nausheen Al-Shehab (US Army RDECOM-ARDEC, Picatinny, NJ)
- Kevin Miers
- Daniel Prillaman
- David Hunter
- Art Daniels

2:00 PM **Advanced Lethality and Accuracy System for Medium Caliber (ALAS-MC) Study of Novel Fragmentation Materials**

- James Grzybek (U.S. Army Research Laboratory APG, MD)
- Jack Pincay

2:20 PM **Development and Integration of an Air-bursting M72 Shoulder Launched Munition System**

- D. Jezierski (Nammo Talley, Mesa, AZ)
- D.A. Kneble
- M. O'Neal
- C.M. Savarese
- P. Stevenson

2:40 PM **Advanced Breaching and Demolition Technology**

- Adam Enea (US Army RDECOM-ARDEC, Picatinny, NJ)
- David Kalfrouni
- Denis Rickman
- Stephen Roberts
- Gregory Stunzenas

3:00 PM **Coffee Break**

Glasgow Hall Courtyard

3:25 PM **Fragmentation Assessment Tool Development**

- Henry Hsieh (US Army RDECOM-ARDEC, Picatinny, NJ)

3:45 PM **Mk-152 Fragment Population Optimization Lethality Study**

- Thomas Hatch-Aguilar (Naval Air Warfare Center, China Lake, CA)

Agenda

- 4:05 PM **Sheetmetal Flechette Warhead Tests & Results**
- David Bittle (US Army Aviation & Missile Research, Development & Engineering Center, Redstone Arsenal, AL)
- 4:25 PM **Adjourn**
- 5:00–6:30 PM **Symposium Reception**
Hilton Garden Inn Monterey

Wednesday, August 2, 2017

- 7:00 AM **Registration and Security Check-in**
Naval Postgraduate School, Glasgow Hall Courtyard

Session III: Hard Target Defeat

Session Chair: Keri Bailey, US Air Force Research Laboratory, Eglin AFB, FL

- 8:00 AM **Session Introduction**
- 8:05 AM **Design, Testing, and Evaluation of Additively-Manufactured Warheads**
- Philip Flater (US Air Force Research Laboratory, Eglin AFB, FL)
 - William Graves
 - Zachary Provchy
 - David Liu
 - Anthony Palazotto
 - Donald Littrell
 - Sean Treadway
- 8:35 AM **A New Steel for Hard and Deeply Buried Targets: AF96**
- Rachel Abrahams (US Air Force Research Laboratory, Eglin AFB, FL)
 - Sean Gibbons
- 8:55 AM **The High Explosive Survivability Kit**
- Ethan Dobrot (US Air Force Research Laboratory, Eglin AFB, FL)
 - John Henry Williams
- 9:15 AM **AFRL's Warhead Simulation of Kinematic Events (WhSKE)**
- Keri Bailey (US Air Force Research Laboratory, Eglin AFB, FL)
 - Mark Green
 - Brian Plunkett
 - J. Donald Cargile

Session IV: Protection Systems

Session Chairs: Richard Mudd, US Army Research Laboratory, Aberdeen Proving Ground, MD
Richard Summers, US Army Research Laboratory, Aberdeen Proving Ground, MD

- 9:35 AM **Session Introduction**
- 9:40 AM **Performance of a Tandem Warhead versus Turret Front Armor with Applique**
- Edward Kennedy (US Army Research Laboratory APG, MD)
 - Jason Angel
 - Robin Strickland

10:00 AM **Movable, Rotatable, Edge-on Panel Armor System: An Adaptive Armor Developed in DARPA's GXV-T Program**

- James Walker (Southwest Research Institute, San Antonio, Texas)
- Daniel Pomerening
- Kristopher Kozak
- Nicholas Mueschke
- Gregory Wattis
- Oliver Harrison
- J. Allen Beavers
- Neal Seegmiller
- Stephan Lemmer
- Katie McCloud
- Sidney Chocron
- Carl Weiss

10:20 AM **Coffee Break**
Glasgow Hall Courtyard

10:35 AM **A Study of the Penetration and Impulse from Two Buried Penetrating Mines**

- Richard Mudd (US Army Research Laboratory APG, MD)
- Scott Kukuck
- Jason Angel

10:55 AM **Investigation of Behind Armor Debris when Overmatched by Underbody Penetrator Devices**

- Sarah Hug (US Army Research Laboratory APG, MD)
- Valerie Wagoner
- Edward Fioravante
- John Abell

11:15 AM **Armor Protection against Underbody Penetrating Threats**

- Valerie Wagoner (US Army Research Laboratory APG, MD)
- Sarah Hug
- Edward Fioravante

11:40 AM **Small-Caliber Deflection during Ballistic Impact of Nylon and Aluminum Targets**

- Adam Sokolow (US Army Research Laboratory APG, MD)

12:05 PM **Lunch**
Hermann Hall Ballroom

1:20 PM **Impact Modeling and Experimental Testing of XM25 High Explosive Air Burst Cartridges**

- Nausheen Al-Shehab (US Army RDECOM-ARDEC, Picatinny, NJ)
- Art Daniels
- Kevin Miers
- Benjamin Wong
- Jacek Foltynski

Session V: Warhead Technology - Shaped Charge and EFP

Session Chairs: Stanley DeFisher, US Army RDECOM-ARDEC, Picatinny, NJ
Jeffrey Kraft, US Army RDECOM-ARDEC, Picatinny, NJ

1:40 PM **Session Introduction**

1:45 PM **Shaped-Charge Development for Both Masonry Pre-Damage and Armor Defeat**

- David Pfau (US Army RDECOM-ARDEC, Picatinny, NJ)
- Daniel Suarez
- George Stunzenas

Agenda

- 2:05 PM **Penetration of a Shaped Charge Jet Through Water**
- Stanley DeFisher (US Army RDECOM-ARDEC, Picatinny, NJ)
 - Gregory Stunzenas
 - Erik Wrobel
 - Jacek Foltynski
 - James Pham
 - Art Daniels
- 2:25 PM **Small Missile Warhead Evaluation and Optimization for Counter Unmanned Aerial System (CUAS) Applications**
- Daniel Suarez (US Army RDECOM-ARDEC, Picatinny, NJ)
 - Jack Pincay
- 2:45 PM **Coffee Break**
Glasgow Hall Courtyard
- 3:05 PM **Design of a Novel Unitary Warhead for Armor Defeat**
- Matthew Comstock (US Army RDECOM-ARDEC, Picatinny, NJ)
 - Roy Seppelt
 - Liam Buckley
 - Jeffrey Woodhouse
- 3:25 PM **Demonstration of Additively Manufactured (AM) Fragmentation & Explosive Technologies**
- David Kafrouni (US Army RDECOM-ARDEC, Picatinny, NJ)
 - L. Zunino
 - A. Wilson
 - E. Beckel
 - E. Jelis
 - T. Thompson
 - D. Sabanosh
 - T. Dolch
 - J. Kraft
- Session VI: Ballistics**
- Session Chairs:** Greg Johnson, US Army AMRDEC, Redstone Arsenal, NJ
Nicholas Peterson, US Army AMRDEC, Redstone Arsenal, AL
- 3:45 PM **Session Introduction**
- 3:50 PM **Exploration of Simplified Guns**
- Zachary Wingard (US Army Research Laboratory APG, MD)
 - Andrew Brant
 - Alex Michlin
 - Todd Dutton
 - Andrew McBain
- 4:10 PM **Development of a Low Velocity 40mm Stand-Off Breaching Round**
- Chad Greenlee (Nammo Talley, Mesa, AZ)
 - Andy Davis
- 4:30 PM **Predictive Spall Modeling Research**
- Richard Olson (US Army Aviation and Missile Research, Development and Engineering Center, Huntsville, AL)
 - Daniel Hyams
 - Graham Killough
- 4:50 PM **Preliminary Study of Cables Striking Armor at up to 3 km/s**
- James Walker (Southwest Research Institute, San Antonio, Texas)
 - Donald Grosch
 - Sidney Chocron
- 5:10 PM **Adjourn**

Thursday, August 3, 2017

7:00 AM **Registration and Security Check-in**
Naval Postgraduate School, Glasgow Hall Courtyard

Session VII: Warhead Technology - Energetics

Session Chairs: Anne Marie Petrock, US Army RDECOM-ARDEC, Picatinny, NJ
Nydeia Bolden-Frazier, US Air Force Research Laboratory, Eglin AFB, FL

8:00 AM **Session Introduction**

8:05 AM **Characterization of Printed EFI Bridges**

- Steven Doremus (US Army RDECOM-ARDEC, Picatinny, NJ)
- Brian Peltzer
- Daniel Schmidt
- Rodger Cornell
- Brian Fuchs

8:25 AM **Shaped Charge Initiation of Non-Ideal Explosives**

- Jeremy Kleiser (US Air Force Research Laboratory, Eglin AFB, FL)
- Stan DeFisher

8:45 AM **Fragment Initiation of Covered PBX-9502**

- Mark Marr Lyon (Los Alamos National Laboratory, Los Alamos, NM)
- Steven Barks
- Daniel Cox
- Ingrid Goglio
- Kevin Rainey
- Samuel Vincent

9:05 AM **Evaluation Methodology of the Hazard Severity of Fragments Projected from a Deflagrating Warheads**

- Daniel Pudlak (US Army RDECOM-ARDEC, Picatinny, NJ)
- Kevin Miers
- Brian Fuchs

9:25 AM **Reactive Fragment Arena Test**

- Nydeia Bolden-Frazier (US Air Force Research Laboratory, Eglin AFB, FL)
- Greg McCann
- Erin Ruiz
- Suhithi Peiris

9:45 AM **Evaluating Reactive Material Warhead Liners to Improve Breaching Effects**

- Robert Koch (US Army RDECOM-ARDEC, Picatinny, NJ)
- LaMar Thompson
- Paul Redner
- Richard Fong

10:05 AM **Adjourn**

Alternate Presentations

Session I:

NONE

Session II: Warhead Technology - Blast and Fragmentation

Optimization of Pre-formed Fragmenting Warheads for Area Denial

- Robert Koch (US Army RDECOM-ARDEC, Picatinny, NJ)
- Roy Seppelt
- Donna Snyder
- Andrew Maxwell

Session II: Hard Target Defeat

Deceleration Data Based High-Strength Concrete Forcing Function

- J. Donald Cargile (J Donald Cargile Consultancy, Inc., Vicksburg, MS)
- Keri Bailey
- Brian Plunkett
- Mark Green

Edge and Surface Effects on High-Strength Concrete Penetration

- Brian Plunkett (US Air Force Research Laboratory, Eglin AFB, FL)
- Keri Bailey
- J. Donald Cargile
- Mark Green

Distributed Embedded Fuze Systems (DEFS) Developments

- Hayley Chow (US Air Force Research Laboratory, Eglin AFB, FL)
- Janet Wolfson
- Jacob Dodson
- Alain Beliveau
- George Jolly

Session IV: Protection Systems

NONE

Session V: Warhead Technology - Shaped Charge and EFP

Session VI: Ballistics

NONE

Session VII: Energetics

NONE

Opening Reception Sponsor



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