28th International Symposium on Ballistics

SEPTEMBER 22-26, 2014 ➢ ATLANTA, GEORGIA, USA

NDIA

INTERNATIONAL BALLISTICS SOCIETY

PREVIOUS INTERNATIONAL SYMPOSIA ON BALLISTICS

- Orlando, Florida, USA 1974
- Daytona, Florida, USA 1976
- Karlsruhe, Germany 1977
- Monterey, California, USA 1978
- Toulouse, France 1980
- Orlando, Florida, USA 1981
- The Hague, The Netherlands 1983
- Orlando, Florida, USA 1984
- Shrivenham, UK 1986
- San Diego, California, USA 1987
- Brussels, Belgium 1989
- San Antonio, Texas, USA 1990
- Stockholm, Sweden 1992
- Quebec City, Canada 1993
- Jerusalem, Israel 1995
- San Francisco, California, USA 1996
- Midrand, South Africa 1998
- San Antonio, Texas, USA 1999
- Interlaken, Switzerland 2001
- Orlando, Florida, USA 2002
- Adelaide, South Australia 2004
- Vancouver, BC, Canada 2005
- Tarragona, Spain 2007
- New Orleans, Louisiana, USA 2008
- Beijing, China 2010
- Miami, Florida, USA 2011
- Freiburg, Germany 2013

FUTURE INTERNATIONAL SYMPOSIA ON BALLISTICS

- Edinburgh, Scotland 2016
- Long Beach, California, USA 2017

28th INTERNATIONAL SYMPOSIUM ON BALLISTICS

SEPTEMBER 22-26, 2014 ▸ HYATT REGENCY ATLANTA

The International Symposium on Ballistics is an opportunity for ballistics scientists, engineers, and others to report, share, and discuss current research and advances in ballistics and visions of the future. The International Symposium on Ballistics is jointly organized and supported by the International Ballistics Society (IBS), in conjunction with the National Defense Industrial Association (NDIA), Arlington, Virginia, USA.

WHY YOU SHOULD ATTEND:

- Exposure to the most current state-of-the-art technology in ballistics. Interact with some of the world's leading experts in the field of ballistics technology.
- Meet other professionals with similar interests and experiences. Opportunity to meet and discuss technology with other professionals in your field of expertise. Cultivate communication, business interests and cooperative development.
- Have an opportunity to present, exhibit, and share your scientific research and development with an international group of professionals. Receive individual feedback and interaction on your work.

ABOUT THE INTERNATIONAL BALLISTICS SOCIETY:

The IBS promotes the science of ballistics internationally. The IBS provides for technical interchange via the International Symposium on Ballistics and provides professional development for its members by providing opportunities for publication, short courses, student programs, and other activities to promote career development. Dr. Ian Cullis of Qinetiq serves as president of the Society.

ABOUT NDIA:

NDIA provides individuals from academia, government, the military services, small businesses, prime contractors, and the international community the opportunity to network effectively with the government-industry team, keeping abreast of the latest in technology developments, and addressing and influencing issues critical to the health of the defense industry and the preservation of U.S. national security.

Symposium Chairmen
Dr. Richard Ames
Raytheon Missile Systems
richard_ames@raytheon.com

Mr. Dan Boeka
General Dynamics OTS
Dan.Boeka@gd-ots.com

Symposium Planning Team
Ms. Britt Bommelje, CMP
Director, Operations, NDIA
bbommelje@ndia.org

LETTER FROM THE PRESIDENT:

It is a great honor and pleasure for me as President of the International Ballistics Society, to welcome you to the 28th International Symposium on Ballistics. I very much hope you enjoy your stay in Atlanta, which has a tremendous history to explore.

This is the third symposium to be organised by the Society, supported once again by the NDIA. I would like to acknowledge the hard work of Britt Bommelje, Kari King and their colleagues from the NDIA in organizing the symposium and its social program.

I know you will find the Atlanta symposium as a unique opportunity to network with your fellow delegates to expand your knowledge of your area of ballistics, make new contacts and understand the scientific challenges of the future.

The oral papers and posters will provide a fascinating insight into recent worldwide research in all areas of ballistics. I very much hope you will enter into a lively debate with the authors and delegates to stimulate new ideas for experiments and research topics to maintain the health of the symposia.

The technical standard of all the papers remains very high and continues to demonstrate the progress being made to develop the theory and experimental methods in all areas of ballistics. The Society continues to encourage a wide range of papers from work in progress through to journal quality papers. I would therefore urge established ballisticians to support our younger members and students and encourage them on their chosen research paths.

The Board is working hard to secure the future of the Society and in particular to establish educational and training opportunities to allow members to continue to develop their professional qualifications.

On behalf of the Board of Directors and the local organizing committee I wish you a very successful symposium in a dynamic part of the USA.

Yours sincerely,

Ian Cullis
President International Ballistics Society
September 2014

AUTHORS & PRESENTERS FROM 26 COUNTRIES

- Australia
- Belgium
- Canada
- China
- Czech Republic
- Finland
- France
- Germany
- India
- Israel
- Italy
- Japan
- The Netherlands
- Norway
- Poland
- Portugal
- Russia
- Singapore
- South Africa
- South Korea
- Spain
- Sweden
- Turkey
- Ukraine
- United Kingdom
- USA

PRESENTER INFORMATION:

All oral and poster presenters must register and pay registration fees.

Papers & Copyright Transfers are due 27 June.

Paper guidelines can be downloaded from www.ballistics.org.

The Society requires you to transfer the copyright of your paper to the Society, in order for it to be published in the proceedings and placed in our data base and on-line store for future access. The form can be downloaded from: http://www.ballistics.org/docs/Copyright_licence.docx.

Please complete and sign the form and scan it as a PDF. You will be requested to upload your completed form when you upload your paper. If you have any questions please contact the President at president@ballistics.org.

PowerPoints are due 1 September.

JOURNAL PAPERS:

If your paper has been selected for publishing in *Defence Technology*, sponsored by China Ordnance Society, your full manuscript will be published there, instead of the symposium proceedings. However, an extended version of your abstract will be included in the symposium proceedings if you submit the extended abstract (4 pages maximum) by June 27. The extended abstract should refer readers to *Defence Technology* to view your full manuscript.

REGISTRATION

SYMPOSIUM REGISTRATION FEES	EARLY (UNTIL 7/11)	REGULAR (7/12-9/12)	LATE/ONSITE (AFTER 9/12)
ACADEMIC PROGRAM	$1035	$1135	$1235
SOCIAL PROGRAM	$385	$385	$385
TUTORIAL SESSION AM SESSION ONLY	$225	$225	$300
TUTORIAL SESSION PM SESSION ONLY	$225	$225	$300
TUTORIAL SESSION BOTH AM & PM SESSIONS	$375	$375	$525
EXHIBITORS 10 X 10 BOOTH	$3000	$3000	$3000

REGISTRATION PROCESS:

Registration is open at www.ballistics.org/28th_isb.php

If you are a member of the International Ballistics Society, you will first be asked to log in, then directed to the registration process.

If you are an IBS non-member, referred to as a Guest, you will be asked to join the Society. You cannot register for the 28th ISB without becoming a member of the Society.

Membership Renewal: Unless you are a Lifetime Member, your dues for renewal should appear automatically. Please contact the Membership Secretary at membership@ballistics.org if you wish to convert to a Lifetime Member.

You may log-in to the Ballistics Society registration portal multiple times in order to modify or add packages to your registration (for example, if you would like to pay for the Academic Program with your company credit card, but add the Social Program with your personal credit card, you may do so).

CANCELLATION POLICY:

Cancellations received on or before August 31, 2014 will receive a refund minus $75 cancellation fee. No refunds will be given for cancellations after August 31, 2014. Refunds will only be made in U.S. dollars and by check.

Substitutions are welcome in lieu of cancellations. Cancellations and substitutions must be made in writing to kking@ndia.org.

SYMPOSIUM PROCEEDINGS:

All registered symposium attendees will receive a CD-ROM of the symposium proceedings. Should you wish to purchase the 2-volume textbook of proceedings for $250, please add the Symposium Proceedings category under Event Information to your registration.

ACADEMIC PROGRAM:

Registering for the Academic Program package grants you access to the Tuesday through Friday technical program agenda sessions, all scheduled breakfasts, breaks and lunches, and a CD of the symposium proceedings.

SOCIAL PROGRAM:

Adding the Social Program to your registration grants you access to the Monday evening reception in the Exhibit Hall, Wednesday group outing to Turner Field for dinner and a Major League Baseball game (Atlanta Braves vs Pittsburgh Pirates), and the Thursday evening Symposium Banquet.

TUTORIALS:

The following tutorials will be offered on Monday, September 22.

- AM Course: Warhead Mechanism, presented by Dr. Bill Walters, U.S. Army Research Laboratory
- PM Course: Overview on Armour, presented by Dr. Manfred Salk, Fraunhofer Institute for High Speed Dynamics

The tutorials are listed as "NDIA Courses" within the registration portal. The price includes presentation materials, lunch, and morning and/or afternoon breaks, dependant upon AM or PM session registration. For more information, please see the Monday, September 22 agenda page.

COMPANION PROGRAM:

Symposium attendees' companions or spouses are invited to participate in our Companion Program for the following additional fees:

- **All Scheduled Companion Program Events: $500**
  This price includes access to:
  - Monday Opening Reception in the Exhibit Hall
  - Tuesday "Atlanta History Tour": Learn about the role of Atlanta in the Civil War, its architecture and modern development. Lunch at the Swan Coach House is included.
  - Wednesday Group Outing to Turner Field for dinner and a Major League Baseball game: Atlanta Braves vs Pittsburgh Pirates
  - Thursday "Atlanta Heroes Tour": Visit the Margaret Mitchell House (author of *Gone With the Wind*), the Jimmy Carter Presidential Library and the Martin Luther King, Jr. Center for Social Change. Lunch at Mary Mac's is included.
  - Thursday Evening Symposium Banquet
- **Symposium Events Only: $385**
  This price includes access only to Social Program events:
  - Monday Opening Reception in the Exhibit Hall
  - Wednesday Group Outing to Turner Field for dinner and a Major League Baseball game: Atlanta Braves vs Pittsburgh Pirates
  - Thursday Evening Symposium Banquet

LOCATION & LODGING:

The Symposium will take place at the Hyatt Regency Atlanta.

Hyatt Regency Atlanta
265 Peachtree Street NE
Atlanta, Georgia, USA, 30303
(404) 577-1234

A block of rooms has been reserved at the Hyatt Regency Atlanta. In order to ensure the discounted NDIA rate, please make reservations early and ask for the NDIA room block. Please call the hotel directly at 888-421-1442 or (404) 577-1234 to make your reservation. For international assistance with reserving your room, please email kking@ndia.org. Rooms will not be held after August 30, 2014 and may sell out before then. Rates are also subject to increase after this date.

Industry Rate: $179 (single/double)
Government Rate: $133 (single/double)
Prevailing government per diem

**The rate for U.S. government attendees is the prevailing per diem rate at the time of the symposium. The per diem rate is only available to active duty or civilian U.S. government employees. ID will be required upon check-in. Retired military or government civilians do not qualify for the government rate.*

TRAVEL INFORMATION:

Arrive at Hartsfield-Jackson International Airport (Airport code ATL) which is 12 miles from the Hyatt Regency.

Transportation options:

Taxi Service
To/from airport fee: $30.00 plus $2.00 per each additional person.

Airport Shuttle Service (T.A.A.S.S.)
Shuttle runs 6 a.m. to midnight from the airport and leaves the Hyatt Regency every 10 and 40 minutes after the hour. $16.50 one way/$29 round trip per person.

AWARD INFORMATION

THE ROSALIND AND PEI CHI CHOU AWARD FOR YOUNG AUTHORS

This NDIA-sponsored award is given to a young author, 35 years of age or younger, at the time of the symposium. The paper may have multiple authors, however, the young author must have made a major contribution to the paper. The young author must be registered at the symposium and must give the oral presentation or the poster presentation to be eligible for the Award. All papers, both oral and poster, will be considered eligible, but must apply for the award.

To apply for this award, please download the application from www.ballistics.org/awards.php and submit to Kari King at kking@ndia.org.

THE LOUIS & EDITH ZERNOW AWARD

This NDIA-sponsored award is given by Louis and Edith Zernow to the author of the paper containing the best advancement made in the fundamental nature of ballistics.

All papers, both oral and poster, will be considered eligible and reviewed for this award. No application is required. The selection is based solely on technical content of the published paper.

THE NEILL GRIFFITHS MEMORIAL AWARD

The Griffiths Award, sponsored by Qinetiq, is presented to the author(s) of the paper judged to have made the most significant contribution to shaped charge technology at the International Symposium on Ballistics.

All papers, both oral and poster, will be considered eligible and reviewed for this award. No application is required. The selection is based solely on technical content of the published paper.

THE SOUTH AFRICAN BALLISTICS ORGANISATION (SABO) AWARD

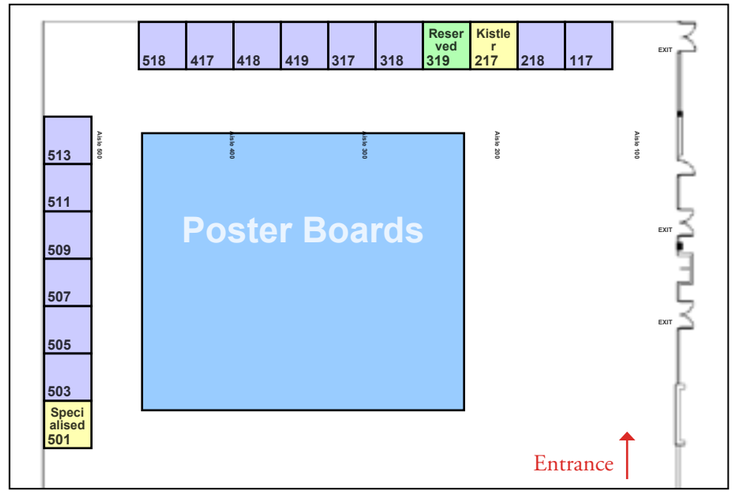
The SABO Award is presented to the author(s) of the best poster as displayed and presented to appointed adjudicators. The presence of the author at the poster during the session is of paramount importance.

The objective of this award is to inspire poster presenters to present their work in creative, legible and professional fashion thus enhancing the poster sessions as a quality medium for the exchange of information during the symposium.

A maximum of three posters from each poster session will be nominated for the award by the poster chairmen. All nominations will be evaluated on equal footing by the adjudication committee for visual quality, creative skill and layout, and a winner will be selected from the nominations.

EXHIBIT INFORMATION

A limited amount of exhibit space is available for organizations to display equipment and information related to the field of ballistics. Displays or marketing of weaponry, however, will not be permitted. View the floor plan online at www.ndia.org/exhibits/4210. Purchase your exhibit online at www.ballistics.org/28th_isb.php



POSTER PRESENTER INFORMATION

Poster size should not exceed 1 meter wide by 2 meters tall. Your poster may be set up any time between 10 am and 4 pm on Monday, September 22, 2014, and must remain in place until 4:00 pm on Thursday, September 26, 2014. Posters will be organized numerically by abstract ID number, and topically by category. Presenters are responsible for both posting and removing their own posters. Pushpins will be provided to hang your poster, however, you may use Velcro strips if you provide them yourself.

Posters will be located in the exhibit hall where refreshment breaks and the opening reception will be held. Please check the agenda for the timeframe of your particular poster session, during which we expect you to be available to discuss your poster with symposium attendees.

The only materials that should be used are laminations, pictures, paper, or poster paper. If a pushpin or Velcro strip cannot attach an item to the board, then it is not permitted to be used. Nothing should stand alone, on the floor, or hang off of the board. No extra props are allowed (tables, equipment, etc.). There is no floor space permitted for a poster session.

SPONSORSHIP OPPORTUNITIES

Increase your company or organization's exposure at this international premier event by becoming a sponsor. A sponsorship ($5000) will add your company name to the back cover of the onsite brochure, as well as main podium recognition, signage at all events, and a 350-word organization description in the symposium agenda. For more information, contact Britt Bommelje at bbommelje@ndia.org.

COST TO EXHIBIT:

Sign up for a 10'x10' booth in the hall where all poster sessions, morning and afternoon breaks and the opening reception will be held! A 10'x10' booth can be purchased for $3,000 and includes 2 Symposium registrations. (Add $50 for Society membership if not already a member).

For more information and to view the floor plan, please visit www.ndia.org/exhibits/4210.

The cost of the exhibit includes all scheduled breakfasts, lunches and breaks, plus the opening reception. The cost also includes two complimentary full registrations for exhibit personnel, company profile online, 24-hour security, fabric back and side walls plus a 7"x44" ID sign.

Booths are sold in 10'x10' square foot increments. NDIA does not charge extra for corner or island placement. No "end cap" booths are permitted. An "end cap" is defined as a booth exposed to aisles on three sides and consisting of two booths. Booth furnishings are not included and floor covering is required. Internet, electric and water are available at an additional charge by the facility.

EXHIBITOR REGISTRATION:

For each 10'x10' exhibit space your company occupies, your organization will be entitled to 2 symposium Academic Program registrations, plus access to the Monday evening opening reception.

We highly encourage exhibitors to add the Social Program package to their purchase in order to attend the Wednesday Group Outing and Thursday evening Symposium Banquet.

MONDAY, SEPTEMBER 22, 2014

8:00 AM - 7:00 PM Registration Open

9:00 AM - 4:30 PM Tutorial Sessions

**Additional Registration Fees Apply: Tutorial Sessions*

AM Tutorial Session
WARHEAD MECHANISM presented by Dr. Bill Walters

9:00 AM:
- 1.1 Introduction/Overview
- 1.2 Shaped Charge Concepts

10:45 AM: Coffee Break in Foyer

11:00 AM:
- 1.3 EFPs
- 1.4 Penetrator Analysis and Penetration Mechanics

12:15 PM Luncheon - AM & PM Tutorial Attendees Only

PM Tutorial Session
OVERVIEW ON ARMOUR presented by Dr. Manfred Salk

1:30 PM:
- 2.1 RHA
- 2.2 Ceramics
- 2.3 Glass

3:00 PM: Coffee Break in Foyer

3:15 PM:
- 2.4 Composites
- 2.5 ERA
- 2.6 NERA or Bulging
- 2.7 Active Defence Concepts

10:00 AM - 4:00 PM Exhibitor Move-In & Poster Set-Up

5:00 PM Exhibit Hall Open

5:00 PM - 7:00 PM Opening Reception in Exhibit Hall

**Additional Registration Fees Apply: Social Program*

TUESDAY, SEPTEMBER 23, 2014

7:30 AM - 5:50 PM Registration Open

7:30 AM - 8:30 AM Continental Breakfast

8:30 AM - 8:45 AM Welcome & Administrative Remarks
Dr. Richard Ames, Chairman, 28th International Symposium on Ballistics

8:45 AM - 9:00 AM Pei Chi Chou Remembrance
Dr. William Fliss, DET Technologies

9:00 AM - 10:00 AM Keynote Address
Mr. Philip M. Cunniff, Research Mechanical Engineer, U.S. Army NSRDEC

10:00 AM - 5:50 PM Exhibit Hall Open

10:00 AM - 10:40 AM Break in Exhibit Hall

10:40 AM - 12:40 PM General Oral Session
Chaired by Dennis Baum and Klaus Thoma

10:40 AM — 229 - Perforation of Thin Plate Targets by Laser Impact
Matthias Wickert, Germany; Jens Osterholz

11:00 AM — 211 - Shaped Charge Jets Driven by Electromagnetic Energy
Fred Grace, USA; James Degnan, Chris Roth, Don Gale, Sean Coffey, Mark Lehr

11:20 AM — 300 - Investigations on the Charge Confinement at Sub-Detonative Outputs
Markus Graswald, Germany

11:40 AM — 173 - Test Configuration Development for Small Shaped Charge Threat Insensitive Munitions Testing
Ernest Baker, USA

12:00 PM — 297 - Shaped Charge Design Issues For Exploiting Supra-Pressure Detonation
Ronald E. Brown, USA; Stanley E. DeFisher, Christopher A. Tilley, Dimitrios Fanaras

12:20 PM — 130 - Progress in the Ability of Numerical Simulation to Predict Natural Fragmentation
Ian Cullis, UK; A. Harrison, I. Lewtas, R. Townsley, P. Dunsmore

12:40 PM - 2:10 PM Lunch

2:10 PM - 3:50 PM Terminal Ballistics Poster Session (P1)
Chaired by

2:10 PM - 3:50 PM Explosion Mechanics Oral Session
Chaired by Paul Locking and Ernie Baker

2:10 PM — 54 - Design Techniques for Linear Fragment Distribution in Dynamic Explosion
Zhengfeng Liang, China; Baohui Yuan, Shujie Cheng

2:30 PM — 114 - Very Long Standoff Penetration of Shaped-Charge Jets
Meir Mayseless, Israel; Eitan Hirsch, Lev Misiuk

2:50 PM — 161 - A Novel Method for Measuring the Fracture Toughness Under Impulsive Loadings
Maria Jesus Perez-Martin, Spain; Borja Erice, David Cendon, Francisco Galvez

3:10 PM — 283 - Axially Switchable Modes Warheads
Werner Arnold, Germany; Ernst Rottenkolber

3:30 PM — 237 - New Analytical Formulations for Land Mine Total and Specific Impulse Predictions Based Upon Similitude Approaches
Scott Mullin, USA; Alexander Carpenter, Jack Riegel, P.A.Cox, John McFarland, Carl Weiss

3:50 PM - 4:10 PM — Break in Exhibit Hall

4:10 PM - 5:50 PM — Explosion Mechanics Poster Session (P2)
Chaired by

4:10 PM - 5:50 PM — Terminal Ballistics Oral Session
Chaired by Harm Van der Werff and Charlie Anderson

4:10 PM — 184 - Damage Visualization and Deformation Measurement in Glass Laminates During Projectile Penetration
Elmar Strassburger, Germany; Steffen Bauer, Gregor Popko

4:30 PM — 213 - A Method to Describe the Statistical Aspects of Armor Penetration, Human Vulnerability, and Lethality Due to Fragmenting
Philip Cunniff, USA

4:50 PM — 250 - Assessment of a Layered Ceramic Armor Structure in Laboratory Tests Against Compact Copper Projectiles
Thilo Behner, Germany; Andreas Heine, Matthias Wickert

5:10 PM — 242 - Investigation of Impact Performance of Transparent Armor
Charles Anderson, USA; Carl E. Weiss, Rory P. Bigger

5:30 PM — 169 - Investigation of Failure Mechanisms in Glass Under Dynamic Loading Using High Speed X-Ray Phase Contrast Imaging
Weinong Chen, USA; Niranjan D. Parab, Benjamin Claus, Matthew Hudspeth, John Black, Kamel Fezzaa

5:50 PM — Adjourn

WEDNESDAY, SEPTEMBER 24, 2014

7:00 AM - 3:20 PM — Registration Open

7:00 AM - 8:00 AM — Continental Breakfast

8:00 AM - 3:20 PM — Exhibit Hall Open

8:00 AM - 8:10 AM — Administrative Remarks
Dr. Richard Ames, Chairman, 28th International Symposium on Ballistics

8:10 AM - 10:10 AM — Vulnerability & Survivability Poster Session (P3)
Chaired by

8:10 AM - 10:10 AM — Exterior Ballistics Oral Session
Chaired by Francisco Galvez (INVITED) and Paul Weinacht

8:10 AM — 95 - On the Control of a 155mm Spin-Stabilized Projectile Using the Coanda Effect
Mickael Zeidler, France; Eric Garnier, Roxan Cayzac, Alain Merlen

8:30 AM — 151 - Aerodynamic Coefficients Identification Procedure of a Finned Projectile Using Magnetometers and Videos Free Flight Data
Marie Albisser, France; Claude Berner, Simona Dobre

8:50 AM — 149 - Problem of the Reference Height of the Projectile Trajectory as a Reduced Meteo-ballistic Weighting Factor
Vladimir Cech, Czech Republic; Ludek Jedlicka, Jiri Jevicky

9:10 AM — 295 - GPS Denied State Estimation for Spin-Stabilized Smart Artillery
Gordon Brown, USA; James Maley , Frank E. Fresconi, Luisa D. Fairfax

9:30 AM — 132 - Supersonic Projectile Behaviour Under Electric Discharges Generating a Plasma
Patrick Gnemmi, France; Christian Rey, Pierre Wey

9:50 AM — 32 - Modelling and Simulation of Ballistic Characteristics for Dual-Spin Stabilized Projectiles Equipped with Canards
Sijiang Chang, China; Zhongyuan Wang

10:10 AM - 10:30 AM — Break in Exhibit Hall

10:30 AM - 11:30 AM — Exterior Ballistics Poster Session (P4)
Chaired by

10:30 AM - 11:30 AM — Terminal Ballistics Oral Session
Chaired by Meir Mayseless and Gordon Johnson

10:30 AM — 241 - Modeling Dyneema and Spectra with Finite Elements by Bundling Fibers into Strips
Sidney Chocron, USA; Alon Brill, Alon Malka, Tal Namir, Doron Havazelet, Harm van der Werff, Arthur Nicholls, Ulrich Heisserer, James Walker

10:50 AM — 27 - New Protection Levels of UHMWPE Armor: From a Hydrocode Model of HB26 to New Dyneema® Generation for Armor Application
Ulrich Heisserer, The Netherlands; Harm van der Werff, Torsten Laessig, Werner Riedel

11:10 AM — 87 - Cavitation Theory Applied to Polycarbonate Ballistic Response
Alon Weiss, Israel; David Durban

11:30 AM - 1:00 PM	Lunch
1:00 PM - 1:40 PM	Exterior Ballistics Poster Session (P4) Continued *Chaired by*
1:00 PM - 1:40 PM	Terminal Ballistics Oral Session Continued *Chaired by Meir Mayseless and Gordon Johnson*
1:00 PM	265 - A New Combined Particle-Element Method for Ballistics Computations *Gordon Johnson, USA; Stephen Beissel*
1:20 PM	180 - Pre-Fragmented Rod Interaction with Plate Target *Andreas Heine, Germany; Matthias Wickert*
1:40 PM - 3:20 PM	Terminal Ballistics Poster Session (P5) *Chaired by*
1:40 PM - 3:20 PM	Vulnerability & Survivability Oral Session *Chaired by Bo Janzon and Doug Templeton (INVITED)*
1:40 PM	275 - Developing 95% Bounding Models for Impact and Blast Events *James Walker, USA; David S. Riha, Sidney Chocron, John McFarland, Gregory C. Willden*
2:00 PM	214 - Influence of Composite Architecture on Stress Transmittance in Ultra-High Molecular Weight Polyethylene Composite Armor *Lionel Vargas-Gonzalez, USA; James C. Gurganus*
2:20 PM	136 - The Influence of Soil Conditions on the Blast Intensity for Sand, Clayey Sand and Gravel with Silt *Zvi Asaf, Israel; Oded Drori, Eylam Ran, Guy Golan, Itzhak Kuchuk Katalan*
2:40 PM	107 - On Ballistic Parameters of Less-Lethal Projectiles Influencing the Severity of Thoracic Blunt Impacts *Nicolas Eches, France; Julien Pavier, André Langlet*
3:00 PM	223 - Reduction of Global Effects on Vehicles After IED Detonations *Vincent Denefeld, Germany; Norbert Heider, Andreas Holzwarth, Axel Sättler, Manfred Salk*
3:20 PM	Adjourn
5:30 PM - 10:00 PM	Major League Baseball Game: Atlanta Braves vs Pittsburgh Pirates **Additional Registration Fees Apply: Social Program* *Buses will depart the Hyatt Regency for Turner Field at 5:30 PM and return at the conclusion of the game*

THURSDAY, SEPTEMBER 25, 2014

7:00 AM - 3:40 PM	Registration Open
7:00 AM - 8:00 AM	Continental Breakfast
8:00 AM - 2:20 PM	Exhibit Hall Open
8:00 AM - 8:10 AM	Administrative Remarks *Dr. Richard Ames, Chairman, 28th International Symposium on Ballistics*
8:10 AM - 9:30 AM	Launch Dynamics & Interior Ballistics Poster Session (P6) *Chaired by*
8:10 AM - 9:30 AM	Terminal Ballistics Oral Session *Chaired by Sidney Chocron and Jack Riegel*
8:10 AM	157 - Numerical Exploration of the Terminal Effects Of Multiple Penetrators Perforating Concrete *Christopher Meyer, USA*
8:30 AM	208 - Effective Target Flow Stress Calibrated Using the Walker-Anderson Penetration Model *Jack P. Riegel III, USA*
8:50 AM	131 - Effects of Cladding Ceramics and its Influence on Ballistic Performance *Ian Crouch, Australia; Rajneesh Jaitlee, David Elder*
9:10 AM	34 - Numerical Study of Damage Propagation and Dynamic Fracture in Sapphire *Costas Fountzoulas, USA; Elmar Strassburger*
9:30 AM - 9:50 AM	Break in Exhibit Hall
9:50 AM - 11:10 AM	General Poster Session (P7) *Chaired by*
9:50 AM - 11:10 AM	Launch Dynamics & Interior Ballistics Oral Session *Chaired by Clive Woodley and Michael Courtney*
9:50 AM	238 - 45mm ETI Gun Firings with a CAB-LOVA Gun Propellant *Axel Sättler, Germany; Denny Aberg, Dominik Rakus, Rudi Heiser*
10:10 AM	38 - Assessment of Self Ignition Temperature (Cook-Off) in Gun Barrels *Amer Hameed, UK; Phil Pitcher, Lt Cdr Matthew Azavedo*
10:30 AM	63 - Linking Two- and One-dimensional Internal Ballistics Analyses *Simon Georgi, UK; Martin Pocock, Clive Woodley*
10:50 AM	201 - Formulation Development and Characterization of Cellulose Acetate Nitrate Based Propellants For Improved Insensitive Munitions *Thelma Manning, USA; Jeffrey Wyckoff, Carlton Adam, Eugene Rozumov, Michael Fair, John Bolognini*
11:10 AM - 12:40 PM	Lunch

12:40 PM - 2:00 PM	Terminal Ballistics Oral Session *Chaired by Baoming Li and Andreas Heine (INVITED)*
12:40 PM	115 - Jet Interaction with High Explosive Flow *Meir Mayseless, Israel; Zvika Asaf, Vadim Favorski*
1:00 PM	220- EFP Warheads Against Explosive Reactive Armour *Ewa Lidén, Sweden; Jonas Lundgren*
1:20 PM	183 - Penetration of Sand by Pointy-Nosed Projectiles *William Flis, USA*
1:40 PM	219 - Fragment and particle size distribution of impacted ceramic tiles *E.P. Carton, The Netherlands; J. Weerheijm, C. Ditzhuijzen, I. Tuinman*
2:00 PM - 2:20 PM	Break in Exhibit Hall
2:20 PM - 6:30 PM	Exhibit Hall Closed; Exhibitor Move-Out & Poster Dismantle
2:20 PM - 3:40 PM	Explosion Mechanics Oral Session *Chaired by Dave Lambert and Richie Fong*
2:20 PM	280 - Modifications of the Gurney Equation to Account for Gas Leakage *Ho Soo Kim; Thomas Hartmann, Ernst Rottenkolber, Werner Arnold*
2:40 PM	218 - Spall Initiation of Confined Explosives *Andreas Helte, Sweden; Jonas Lundgren*
3:00 PM	296 - Effects of Meso-Scale Perturbations in Detonation Reaction Zone on Shaped Charge Liner Response *Igor Plaksin, Portugal; Raafat Guirguis, Luis Rodrigues, Ricardo Mendes, Eduardo Fernandes, Svyatoslav Plaksin*
3:20 PM	80 - Measurement of Dynamic Deformation of Clamped Circular Plates in Small Scale Blast Loading Experiments *Izak Snyman, South Africa; FJ Mostert, M. Olivier*
3:40 PM	Adjourn
6:30 PM - 10:00 PM	Symposium Banquet **Additional Registration Fees Apply: Social Program* *Dinner and dancing; Business/cocktail attire suggested*

FRIDAY, SEPTEMBER 26, 2014

7:30 AM - 1:45 PM	Registration Open
7:30 AM - 8:30 AM	Continental Breakfast
8:30 AM - 8:40 AM	Administrative Remarks *Dr. Richard Ames, Chairman, 28th International Symposium on Ballistics*
8:40 AM - 10:20 AM	Launch Dynamics & Interior Ballistics Oral Session *Chaired by Xiaobing Zhang and Axel Saettler (INVITED)*
8:40 AM	310 - Experimental Investigation of Different Ignition Methods for Lova Gun Propellant *Amar Bouchama, France; Barbara Baschung, Marc Comet, Christophe Boulnois*
9:00 AM	198 - Subscale Simulation of Sabot Separation *Ilmars Celmins, USA*
9:20 AM	191 - Thermo-mechanical Analysis of a Gun Tube During Firing *Oger Antoine, France; Safont Ophélie, Guilmard Yann, Crepin Jérôme*
9:40 AM	21 - Burning Characteristics of Microcellular Combustible Objects *Weitao Yang, China; Sanjiu Ying*
10:00 AM	158 - Quantitative Measure of Dynamic Bullet Engraving Forces in a 7.62-mm Gun *Richard Beyer, USA; John J. Ritter*
10:20 AM - 10:40 AM	Break
10:40 AM - 12:00 PM	General Oral Session *Chaired by Ron Brown and Matthias Wickert (INVITED)*
10:40 AM	153 - Shock Tube Design for High Intensity Blast Waves for Laboratory Testing of Armor and Combat Materiel *Amy Courtney, USA; EDS Courtney, MW Courtney*
11:00 AM	235 - Dynamic Characterization of Ceramics Using a High Pulsed Power Generator *Benjamin Erzar, France; Jean-Luc Zinszner*
11:20 AM	279 - Assessing New Operational Opportunities by Scalable Effects with UniVeMo *Markus Graswald, Germany; Daniel Rossberg, Heinrich Dorsch*
11:40 AM	TBD
12:00 PM - 12:30 PM	Presentation of Awards
12:30 PM - 12:45 PM	Invitation to the 29th International Symposium on Ballistics *Edinburgh, Scotland, UK*
12:45 PM - 1:45 PM	Society Business Meeting
1:45 PM	Symposium Adjourned

POSTER SESSIONS

TERMINAL BALLISTICS POSTER SESSION (P1)

TUESDAY 2:10 PM - 3:50 PM

17 - Effect of Fragment Geometry on Ballistic Protection

Debra Carr, UK; R. Gibbon, C. Crawford, C. Lankester, N. Gridley

18 - Effect of FSP Material on the Penetration of a Typical Body Armour Fabric

Debra Carr, UK; V. Steier, C. Crawford, C. Lankester, S. Holden, M. Helliker

22 - Statistical Method for Determining Governing Properties of High-Velocity Polymer Penetrations

Carey Price, USA

29 - Analysis of the Dynamic Visco-plastic Properties of the Tungsten Alloy Used for Penetrators

Mariusz Magier, Poland; Mariusz Zielenkiewicz, Leopold Kruszka

60 - Influence of the Fiber Alignment in the Ballistic Performance of Dyneema Non-Woven Fabrics

Francisca Martínez-Hergueta, Spain; Kaitlyn Broz, Álvaro Ridruejo, Francisco Gálvez, Carlos González, Javier Llorca

64 - The Effect of Target Thickness on the Ballistic Performance of UHMW Polyethylene Composite

Long Nguyen, Australia; Shannon Ryan, Stephen Cimpoeru, Adrian Mouritz, Adrian Orifici

70 - The Damage Mechanism and Effects of Reactive Fragments

Chen Jin, China

71 - Thermal Effect on Mass Loss of Projectile During Penetration into Concrete: Experimental and Numerical Study

Lei Guo, China; Yong He, Xianfeng Zhang, Yuan He, Liang Qiao

72 - High-Speed Penetration of Metal Blade Proejctiles

Viktor Kozlov, Russia; V. Veldanov, A. Yu. Daurskikh, S.V. Fedorov, M. A. Maximov, M. Yu. Sotskiy

75 - Research on the Theoretical Model of Penetration Over a Wide Velocity Range

Jian Feng Lou, China

83 - The Effective Analysis of Backup Plates of Explosive Reactive Armor

Heonjoo Lee, Korea; Joonhong Choi, Changhyun Lee, Dongkyu Kim

85 - Evaluation of Ballistic Performance of Bi-layered Ceramic Armor Using Numerical Simulations

Vitaly Paris, Israel; Yoav Hirschberg, Zvi Assaf, Moshe Ravid, Nimi Shapira

91 - FEM Analysis on the "Self-Sharpening" Behaviour of Tungsten-Fiber/Metallic Glass Matrix Composite Long Rod

Jicheng Li, China; X.W. Chen

97 - Oblique Penetration Into Steel-Confined Ceramic

Jianming Yuan, Singapore; G.E.B. Tan

100 - Research on Penetration Capability of Shaped Charge Loaded with Different HE Explosives

Nan Yu-Xiang, China; Jiang Jian-Wei, Wang Shu-You, Men Jian-Bing

101 - Dynamic Deformation Response of Thin Plates between Explosive Loading and Impact Loading

Yongxiang Dong, China

110 - Dynamic Fracture Behaviors of the Transparent Materials Under the Detonation Loading

Joon Hong Choi, Korea; Heon Joo Lee, Chang Hyun Lee

125 - Examination of DOP Test of Confined SIC Tiles

Jianming Yuan, Singapore; R. Liu, G.E.B. Tan

134 - Effect of Warhead Shell Thickness on Fragment's Forming and Penetration Ability

Chen Chun, China; Li Wei-bing, Li Wen-bin, Wang Xiao-ming, Lu Hai-tao

154 - Ballistic Glasses - A Numerical Approach of Optimization

Arash Ramezani, Germany; Daniel Huber, Hendrik Rothe

165 - A Computational and Experimental Study of Fracture Conoid Development During Normal and Oblique Impacts on Brittle Mater

Brady Aydelotte, USA; Brian Schuster

166 - Experimental Study of Energy Release Effect of PTFE Based Reactive Material Rod Striking at Spaced Plates

Zhonghua Lu, China

170 - Experimental Research on the Penetration of 80% W-Fiber/Zr-Based BMG Long Rods into Steel Target

Xiaowei Chen, China

174 - Shaped Charge Jet Interaction with Spaced Masonry Targets

Bernhard Reck, France; Hoellinger R., Bayer P.

175 - Calibration of Parameters for Concrete and Ground Targets Materials

Nicolas Eches, France

EXPLOSION MECHANICS POSTER SESSION (P2)

TUESDAY 4:10 PM - 5:50 PM

16 - Test Methodology to Quantify Fragment Dispersion in Fragment Generator Warheads

Kusumkant Dhote, India; KPS Murthy

48 - Constitutive Behavior of Tantalum-Tungsten Alloys and the Application to Liner for Explosively Formed Projectile

Fei Gao, China

51 - Study on Plane Wave Generator (PWG) Using Simple Air-metal Barrier

Wei Xiong, China

53 - Quantification of Projection Angle in Fragment Generator Warhead

Kusumkant Dhote, India; KPS Murthy, KM Rajan, MM Sucheendran

55 - The Effect of the Detonation Mode to the Multi-Layered Linear Explosively-Formed Projectile

Xing-yun Sun, China; Gang Li, Baohui Yuan, Yuwu Cao

58 - New Method for Axial Equal Explosive Field Intensity Control

Shujie Cheng, China; Zhengfeng Liang

67 - Explosive Materials Characterisation by TNT Equivalence

Paul Locking, UK

77 - On the Relation Between the Ignition And Growth Model and Shock Initiation Criteria

Roy Ceder, Israel

82 - Study on Design and Performance of Linear EFP Warhead

Yuwu Cao, China

102 - Simulation of Shaped Charge Jet Formation Using ALE Element Formulation

Manouchehr Nejad Ensan, Canada

109 - Experimental and Numerical Study of Fragmentation of Expanding Warheads by Using Different Physical Models and Software

John Fredrik Moxnes, Norway; Anne K. Prytz, Jan A. Teland, Cato Dørum, Stian Skriudalen, Øyvind Frøyland

111 - Strain Rate Dependency and Fragmentation Pattern of Expanding Warheads

John Fredrik Moxnes, Norway; Anne K. Prytz, Jan A. Teland, Øyvind Frøyland, Gard Ødegårdstuen

144 - Study on the Facture Behavior of PBX Under Static Tension

Hu Guo, China; Jingrun Luo, Pingan Shi, Jianguo Xu

167 - Shaped-Charge Jet Interaction with Nitrocellulose Propellant

Gina Schafer, USA

173 - Test Configuration Development for Small Shaped Charge Threat Insensitive Munitions Testing

Ernest Baker, USA; Nausheen Al-Shehab, Arthur Daniels, Koon-Wing Ng, Timothy Madsen, Brian E. Fuchs

187 - Numerical Simulation for the Thermal Response of the Cookoff Bomb on Fire

Xiaoli Zhang, China

200 - Jet Velocity Profile of Linear Shaped Charges

Seokbin (Bin) Lim, USA

237 - New Analytical Formulations for Land Mine Total and Specific Impulse Predictions Based Upon Similitude Approaches

Scott Mullin, USA; Alexander Carpenter, Jack Riegel, P.A.Cox, John McFarland, Carl Weiss

244 - The Effect of Wave Shaper on Velocity and Length-Diameter Ratio of EFP

Chuansheng Zhu, China; Z.X. Huang, X.D. Zu, Q.Q. Xiao, X. Jia

247 - Underwater Explosion Bubble Dynamics of a Round Column PETN

Huang Chao, China

289 - Shock Tube Evaluation of Gauges for Blast Measurement

David Davison, USA; Nick Glumac, Dan Pratt

305 - Asymetric Shaped Charges as Rear-bar-cutting Anti-Structure Warhead

Robin Werthebach, Germany; Hendrik Lips

VULNERABILITY & SURVIVABILITY POSTER SESSION (P3)

WEDNESDAY 8:10 AM - 10:10 AM

19 - Development of a Head Model for Ballistic Testing

Debra Carr, UK; A. Lindstrom, A. Jareborg, N. Waddell, S. Champion, J. Kieser

33 - Modeling of Behind Wall Debris Effects

Heinrich Dorsch, Germany; Andreas Doerr, Dr. Rainer Hoellinger, Dr. Albrecht Bongartz

35 - An AVAL Safety Distance Assessment of Jettisoned Missile Warheads: A Helicopter Platform Case Study

Cornelis Terblanche, South Africa; GJF Smit

36 - Calculating Lethal Areas for Complex Targets using AVAL

Cornelis Terblanche, South Africa; GJF Smit

37 - Assessment of Skin Penetration of Kinetic Non-Lethal Projectiles Using the Surrogate Method

L. Koene, The Netherlands; M.L. van Essen, A. Oukara, A. Papy

39 - Mitigation of Blast Parameters with a Lightweight Panel Assembly

Guy Gettle, USA; Andreas Holzwarth, Gregory Brower

46 - Bony Debris Ingress into Lungs Due to Gunshot

Alexander Mabbott, UK; Eoghan Caldwell, Debra Carr, David Miller, Michael Teagle

50 - Development of Crash and Blast Analysis Post-Processor to Evaluate Simulations and Live Blast Tests Results

Nimi Shapira, Israel; Moshe Ravid, Hadar Raz, Dmitry Naroditsky

62 - Survivability for Occupants of Different Weight and Size

Ming Cheng, Canada; Jean-Philippe Dionne, Doug Bueley, Lock-Sui Chin, Neil Wright, Aris Makris

68 - Testing and Analyses of Copolymer Fibers Based on 5-amino-2-(p-aminophenyl)-benzimidazole)

Walter McDonough, USA; Joy Dunkers, Amanda Forster, Alan Heckert, Jae Hyun Kim, Scott Wight

81 - A Study of High Velocity Impact on a Layered Target of Different Angles by an Explosively Formed Projectile (EFP)

Sreenivas Rao Yellamanchali, India; Padmaja A.

88 - Calculation on the Terminal Damage Effect of Aircraft from a Focusing Warhead

Chenzhong Zhao, China

89 - DRI Direct Measurement Device

Avi Neuberger, Israel; Ilan Meirson, Ronny Aizenstein

103 - TNT Hazard Response & Applicability to Counter-Rockets, Artillery and Mortar

Richard Townsley, UK; Andrew Wood

117 - Optimization of the Material Systems with Magneto-Rheological Fluids

Adam Wisniewski, Poland; Dawid Pacek

119 - Optimization of the Material Systems with Shear Thickening Fluids

Adam Wisniewski, Poland; Dawid Pacek

138 - The Current GSRC Vulnerability Analysis Simulator Capability and New Component Failure Modeling Efforts

Hirotaka Tsukada, Japan; Masayuki Sakamoto, Toyoki Matsuzawa

141 - Acceleration Sensing Technologies for Severe Mechanical Shock

Bob Metz, USA; Pat Walter, Jeff Dosch, Robert Sill, Anthony Agnello

185 - Dynamic Characterization of Kinetic Energy Non-lethal Deformable Projectiles Using Experimental Stress-Strain Curves

Nestor N. Nsiampa, Belgium; Cyril Robbe, Amar Oukara, Alexandre Papy

209 - Development of a Survivability, Vulnerability and Lethality Analysis Tool: ADD-SAT

Kyeong Soo Lee, Korea; Ho Soo Kim, Ernst Rottenkolber

232 - On The Relevance Of Blast Effect When Testing A Protective Solution Against An EFP Threat

Fabien Rondot, France; Y. Quirion, B. Bettencourt, E. Petitpas, K. Thoral-Pierre

234 - Insights into Evaluation Tools for Assessing Thoracic Behind-Armor Blunt Trauma Test Devices

Karin Rafaels, USA; Patrick Gillich, Nitin Moholkar

248 - Methods of Artillery Projectiles Protection from Access to Explosive - Possible Solutions

Bogden Krysinski, Poland; Jacek Borkowski, R. Bazela

251 - Numerical FE Modelling of Occupant Injury in Soil-Vehicle Blast Interaction

Michael Saleh, Australia

262 - Numerical Investigation of the Effect of Length of the Channel Leak Method on Blast Overpressure Attenuation for Cannons

Robert Carson, USA; Onkar Sahni

268 - Design Upgrade to the Plywood Penetration Mannequin

Autumn Kulaga, USA; Tlm Myers

278 - Numerical Design and Experimental Testing of a Novel Tri-V-Hull Design

Alexandra Sydney, USA; Don Halliday, Michael Fisher

282 - Improved Damage Tolerance In Composite Armour Through 3D Tufting

Mark French, UK

292 - Quantifying the Protective Capability of Body Armor Using M&S

Rebecca VanAmburg, USA; Natalie Eberius

311 - Evaluation of the Blast Mitigating Effects of Fluid Containers

Huon Bornstein, Australia; Christopher Anderson, Paul Phillips

318 - Ballistic Simulation of Loading and Injury Patterns Produced by a Blast Test and Evaluation of Contamination

Ryan Pinto, UK; Ian Horsfall

EXTERIOR BALLISTICS POSTER SESSION (P4)

WEDNESDAY 10:30 AM - 1:40 PM

24 - Algorithms for Determination of Exterior Ballistics Parameters at Aeroballistic Experiment

Sergey Gerasimov, Russia; Aleksandr V. Bugaev, Vasiliy I. Kostin

25 - Schemes of Shadowgraphing in Practice of Aeroballistic Experiment

Vladimir Erofeyev, Russia; Sergey I. Gerasimov, Aleksandr V. Bugaev

43 - Method of Trajectory Prediction and Analysis of Correction Quantity for One-Dimensional Trajectory Correction Projectile

Zhongyuan Wang, China; Sijiang Chang

45 - Comparison Between Classical and Modern Control Theory in Roll Control Application on a Guided Ammunition

Paolo Fersino, Italy; Ish-mael Stroobant

78 - Trajectory Optimization Design Under Uncertainty for a Gliding Projectile

Qi Chen, China; Zhongyuan Wang, Sijiang Chang

79 - Aerodynamic Parameter Estimation Using Maximum Likelihood Method Based on Artificial Fish School Algorithm

Jing Yang, China; Zhongyuan Wang, Sijiang Chang

92 - Explosively Formed Penetrators with Fins Formation and Flight Characteristics

Liu Jianqing, China; Gu Wenbin, Lu Ming, Xu Haoming

94 - The Probability Analysis Method of the Target Being within Seeker's FOV in the LOAL (Lock On After Launch) System

Jaehoon Ha, Korea

96 - Aerodynamics of Yawing-Spinning Finned Artillery Projectile

Roxan Cayzac, France

106 - Experimental and Numerical Study of Penetration Into Multi-Layer Water Targets

Mei Li, China; Wang Shushan, Ma Feng, Hui Zhi, Du Yong

108 - An Accurate Trajectory Prediction Method Based on Error Compensation of Angle of Attack

Dongguang Li, China; Xudong Liu, Guangyu Zeng

123 - Selected Ballistic Aspects of Fire Control System Designed to Anti-Aircraft Gun

Zbigniew Leciejewski, Poland; Tomasz Zawada, Pawel Kasprzak, Przemyslaw Kowalczuk, Jacek Szymonik

145 - 2D Course Correction System for Spin-Stabilized Projectiles Using a Spoiler Control Surface

Pierre Wey, France; Roxan Cayzac, Eric Carette, Pascal Denis, Christophe Grignon

148 - Flight Performance of a Man Portable Guided Projectile Concept

Frank Fresconi, USA; James DeSpirito, Ilmars Celmings

159 - Experimental Tests of the Proportionality of Aerodynamic Drag to Air Density for Supersonic Projectiles

Michael Courtney, USA; Elya Courtney, Amy Courtney

186 - Small Arms Surface Danger Zones – Ricochet Analysis for a Probability Based Computational Methodology

David Touati, Israel

197 - Coupled Roll Rate-Bending Vibration Behavior of Long-Rod Penetrators

Michael Minnicino, USA

199 - Actuator Characterization of Man Portable Precision Maneuver Concepts

Ilmars Celmins, USA; Frank E. Fresconi, Bryant P. Nelson

212 - A Passive Method to Stabilize an Airborne Vehicle

Timo Sailaranta, Finland; Ari Siltavuori

256 - Aerodynamic Drag Assessment on Projectiles with Base Bleed Unit Using CFD Numerical Simulation, Experimental Validation

Ramon Oton, Spain; Velasco F.J.S., García-Cascales J.R., Vera-García F., Moratilla-Fernández D., Ramírez-Fernández F.J.

267 - Gun Blast Calculation for 30mm Gun with Extension to the Far Field

Jon Yagla, USA; Samuel Koski

269 - Development and Demonstration of a New Capability for Aerodynamic Characterization of Medium Caliber Projectiles

T. Gordon Brown, USA; Thomas Harkins, Michael Don, Rex Hall, James Garner, Bradford Davis

299 - Simulation and Experimental Research on Line Throwing Rocket with Flight

Ming Lu, China; Wenbin Gu, Jianqing Liu, Qinxing Dong, Zhenxiong Wang, Jianghai Chen

308 - Trajectory Correction Capability Modeling of Projectiles with Lateral Propellant Impulse Thrusters

Min Gao, China; Yongwei Zhang, Chaowang Li

TERMINAL BALLISTICS POSTER SESSION (P5)

WEDNESDAY 1:40 PM - 3:20 PM

176 - On the Influence of Heat and Temperature on the Depth of Penetration of Kinetic Energy Penetrators

Nicolas Eches, France

178 - An Improved Polyurea Model for Ballistic Impact Simulation

Christopher Key, USA; Joshua Gorfain

190 - The Effect of Coupon Dimensions on the Ballistic Resistance of Transparent Armor

Eldad Shemer, Israel; Adili Armon, Itay Dyamant

195 - Measuring the Terminal Effects Performance of EOD Disruptors

Douglas Kirkpatrick, UK; Kevin Bradley, David Newell, Richard Potter, Martin Slater

207 - Estimate of Penetration/ Perforation Performance Based on Semi-Infinite Penetration Data

Charles Anderson, USA; Jack Riegel III

222 - Engineering Model for Impact of Blunt Projectiles on Metallic Sheets

Geert Roebroeks, The Netherlands; Carton, E.P.

227 - The Influence of Projectile Material on Mass Abrasion of High Velocity Penetrator

Fenglei Huang, China; Yu Shan, Haijun Wu

231 - Experimental Study on Ballistic Characteristics of Fiber Reinforced Aerogel Composite Structures

Haijun Wu, China; Dalong Li, Fenglei Huang, Chao Guo

245 - Study on Cell Structure Liquid Composite Armour Subjected to Shaped Charge Jet Impact

X.D. Zu, China; Z.X. Huang, X. Jia, Q.Q. Xiao

246 - Accuracy of the Simulation Based Identified Material Parameters Set

Minhyung Lee, Korea; Yo-Han Yoo

253 - Static, Dynamic and Ballistic Properties of Bainitic-Austenitic Steel For Armour

Jaroslaw Marcisz, Poland; Wojciech Burian, Jerzy Stepien, Lech Starczewski, Jacek Janiszewski

259 - Numerical Modelling and Parametric Study of the Impact of a HEP/HESH Projectile on a Steel Armour Plate

Elie Truyen, Belgium; Frederik Coghe, Laurent Desmaret

263 - Experimental Study on Impact-induced Reaction of Typical Metal/ Polymer Reactive Fragments

Guangyan Huang, China; Chenglong Wang, Shunshan Feng

266 - An Experimental and Computational Study Investigating the Ballistic Response of Seams and Joints

Timothy Holmquist, USA; Rick Rickert

271 - Ballistic Performances of Al-Based Nanocomposites Developed by the Powder Metallurgy Route against Rods & Fragments

Christophe Kerisit, France; Sébastien Lemonnier, Elodie Barraud, Emmanuel Sorrel, Christina Terner, François Quesnay

281 - Support Plate Development for Multi-hit Armor

Jay Sayre, USA; Michael Fisher, Clarence Pollock, Kary Valentine

301 - Aiming at Quantifying the Deceleration of Shaped Charge Jet Particles in Air at Large Stand-Offs

Patrick Früh, Germany; Andreas Heine

302 - Kevlar® Fabric Structures for Use in Seamless Ballistic Helmets

Jeffrey Hanks, USA

307 - Modified Subsonic-Penetrator Design For Shoulder-Launched-Weapons Defeating MOUT Targets

Christian Schragen, Germany; Hendrik Lips, Stefan Greulich

309 - Ballistic Effect of Ball Ammunition On AA5059-H131 Aluminum Armor Plate

Evren Tan, Turkey; Hüseyin Öztürk, Cemily Ilmaz

312 - Signals Recorded with Nickel-Chromium Wires Embedded in Kevlar® Composite under Ballistic Impact

Sidney Chocron, USA; Alexander Carpenter, Lev Levin, Zvika Asaf, James Walker

313 - Impact Simulations of Kevlar® Composite at the Yarn Level

Sidney Chocron, USA; Alexander Carpenter, Lev Levin, Zvika Asaf

LAUNCH DYNAMICS & INTERIOR BALLISTICS POSTER SESSION (P6)

THURSDAY 8:10 AM - 9:30 AM

13 - The Measurement Method of Vibration Response Time of Gun Structure Under Firing Condition

Baoyuan Wang, China; Xiao-jun Shao, Bao-hui Li, Peng-ke Liu, Hong-xiao Chao

15 - Foamed NC-based Propellants

Li Yuxiang, China; Ying Sanjiu

23 - Investigation of Two-Stage Powder Ballistic Installation

Alexander Bugaev, Russia; Sergey V. Kolchev, Yelena A. Mikhailova

31 - Technique of Dual Environmental Force Simulation on Launching Trajectory for Fuze Testing in Laboratory

Yanning Gui, China; Huang Zheng, Wang Yingche, Dong Weibin, Rong Gang

42 - Engraving, Friction and Wear in Small Caliber Guns

Ove Dullum, Norway; Haakon Fykse, John F. Moxnes

59 - Modeling of Intermediate Ballistics of Modernized 35mm Caliber Naval Gun

Marta Czyzewska, Poland; Radoslaw Trebinski

66 - Simulation of Propellant Combustion Using the ICT Cellular Combustion Algorithm (ICCA)

Sebastian Wurster, Germany; Thomas S. Fischer

93 - Investigation of Application of Multiple-Pulse Energy Control Technology to Tactical Missiles

Liu Tingguo, China

104 - Study of Nano-nitramine Explosives: Preparation, Sensitivity and Application

Jie Liu, China; Wei Jiang, Fengsheng Li, Qing Yang

121 - A Novel 105mm Four Zone Solution Propellant for Propelling Heavy Projectiles

Eugene Rozumov, USA; Thelma Manning, Jeff Wyckoff, David Thompson

122 - Deterring of Double Based Ball Powder® with Inorganic and Organic Salts to Replace Dibutyl-Phthalate and Prevent Deterre

Eugene Rozumov, USA; Thelma Manning, Jeff Wyckoff, Elbert Caravaca

124 - Numerical Simulation of Sabot Discarding Process of APFSDS

Xiangyang Quan, USA

147 - Projectile Design and Barrel Leade Effects on 5.56mm Interior Ballistics

John Ritter, USA

160 - Performance Testing of Lead Free Primers: Blast Waves, Velocity Variations, and Environmental Testing

Michael Courtney, USA; Elya Courtney, Amy Courtney, Peter David Summer

168 - Deconsolidation and Combustion Performance of Thermally Consolidated Propellants Deterred by Coating Multi-layers

Zhenggang Xiao, China

171 - Numerical Simulation of 2D Heat Transfer of Gun Barrel

Xiaobing Zhang, China; Yujia Sun

172 - Dynamic Analysis of a Guided Projectile during Engraving Process

Xiaobing Zhang, China; Tao Xue

188 - Analysis of Inter-Chamber Energy and Mass Transport in High-Low Pressure Gun Systems

Ryan Hill, USA; Logan McLeod

198 - Subscale Simulation of Sabot Separation

Ilmars Celmins, USA

221 - Investigation on In-Bore Pressure Behavior of Underwater Gun System

Kei Asano, Japan; Akiko Matsuo, Kohei Okuno, Hiroaki Miura

270 - Pressure Vessel Discharge Non-dimensional Equations

Jon Yagla, USA

276 - Cold Gas Apparatus for Muzzle Brake Development

Jon Yagla, USA; Sloan Burns

277 - Internal Ballistics Simulation Incorporating Shotshell Dynamics

Kevin Jaansalu, Canada; J.F. Parent

286 - Coupling of a Lumped Mass Interior Ballistic Code with the Structural Finite Element Code Abaqus

Raymond Chaplin, USA; Adrian Blot, Alexander Colletti

GENERAL POSTER SESSION (P7)
THURSDAY 9:50 AM - 11:10 AM

224 - The Effect of Grain Size on Dynamic Tensile Extrusion Behavior

Leeju Park, Korea; Hakjun Kim, Seokbong Kim

249 - Influence of Laser Ignition Method of Pyrotechnic Delay Device for Their Performance Parameters

R. Warchol, Poland; Jacek Borkowski, R. Bazela, Marcin Nita