



Baldini Resource Associates, Inc.

2009-2010 SCHEDULE OF TRAINING & DEVELOPMENT COURSES

VISIT OUR WEBSITE: [HTTP://WWW.BALDINI.COM](http://www.baldini.com)

For Information or Registration, Contact: LOU BALDINI • BALDINI RESOURCE ASSOCIATES, INC. 10 Barry Lane, Newton, NJ 07860 U.S.A.
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ALL COURSES ARE FOR NEW EMPLOYEES, INTERNS, TECHNICIANS, ENGINEERS, SCIENTISTS &/OR GENERAL PERSONNEL

THERE ARE NO PREREQUISITES FOR ANY COURSES EXCEPT DR. CHARLES H. MURPHY'S COURSES REQUIRE A WORKING KNOWLEDGE OF DIFFERENTIAL EQUATIONS.

<p>2009 SCHEDULE OF FIVE DAY TRAINING & DEVELOPMENT COURSES <small>NO PREREQUISITE FOR ANY COURSE EXCEPT DR. CHARLES H. MURPHY'S COURSES</small></p>	<p>HIGH VELOCITY, HIGH PRESSURE GUN SYSTEMS INTERIOR BALLISTICS AUGUST 31-SEPTEMBER 4, 2009 Virginia Beach, VA BRAI-1</p>	<p>BALLISTICS OVERVIEW FOR TECHNICIANS, ENGINEERS & SCIENTISTS AUGUST 31-SEPTEMBER 4, 2009 Virginia Beach, VA BRAI-2</p>	<p>TERMINAL BALLISTICS SEPTEMBER 14-18, 2009 Aberdeen Proving Ground, MD area BRAI-3</p>	<p>GUNS, PROJECTILES & SABOT DESIGN SEPTEMBER 14-18, 2009 Aberdeen Proving Ground, MD area BRAI-4</p>
<p>EXPLOSIVES: EXPLOSIVE TEST OPERATORS/EXPLOSIVE ORDNANCE OPERATORS NOVEMBER 9-13, 2009 Ft. Walton Beach, FL BRAI-5</p>	<p>TEST & EVALUATION: EXPERIMENTAL BALLISTICS NOVEMBER 9-13, 2009 Ft. Walton Beach, FL BRAI-6</p>	<p>HIGH SPEED PHOTOGRAPHY: INSTRUMENTATION TECHNIQUES & ANALYSIS DECEMBER 7-11, 2009 Las Vegas, NV BRAI-7</p>	<p>SAFETY: BALLISTIC RANGES DECEMBER 7-11, 2009 Las Vegas, NV BRAI-8</p>	<p>BALLISTICS DECEMBER 14-18, 2009 Las Vegas, NV BRAI-9</p>
<p>RANGE TESTING & OPERATION DECEMBER 14-18, 2009 Las Vegas, NV BRAI-10</p>	<p style="text-align: center;">Keep Your Sights On</p> <div style="text-align: center;">  <p>TRAINING AND DEVELOPMENT SHORT COURSES FOR NEW EMPLOYEES, TECHNICIANS, ENGINEERS, SCIENTISTS, AND/OR GENERAL PERSONNEL</p> </div>			<p>2010 SCHEDULE OF FIVE DAY TRAINING & DEVELOPMENT COURSES <small>NO PREREQUISITE FOR ANY COURSE EXCEPT DR. CHARLES H. MURPHY'S COURSES</small></p>
<p>BALLISTICS: INTERIOR, TRANSITIONAL, EXTERIOR, TERMINAL BALLISTICS & BEHIND ARMOR DAMAGE(BAD) JANUARY 25-29, 2010 Ft. Walton Beach, FL BRAI-11</p>	<p>ENVIRONMENTAL & CHEMICAL HAZARDS JANUARY 25-29, 2010 Ft. Walton Beach, FL BRAI-12</p>	<p>INTERIOR BALLISTICS EXPERIMENTAL DATA; COMPUTER CODES; DATA COLLECTION TECHNIQUES & APPROACHES: OVERVIEW FOR INTERNS, TECHNICIANS, ENGINEERS & SCIENTISTS MARCH 7-12, 2010 Ft. Walton Beach, FL BRAI-13</p>	<p>LASERS & BALLISTIC RANGES SAFETY MARCH 7-12, 2010 Ft. Walton Beach, FL (NEW FOR 2010) BRAI-14</p>	<p>TEST & EVALUATION: DESTRUCTIVE & NON-DESTRUCTIVE TESTING MARCH 7-12, 2010 Ft. Walton Beach, FL BRAI-15</p>
<p>SAFETY: BALLISTIC RANGES APRIL 12-16, 2010 Virginia Beach, VA BRAI-16</p>	<p>GUNS, PROJECTILES & SABOT DESIGN APRIL 12-16, 2010 Virginia Beach, VA BRAI-17</p>	<p>HIGH VELOCITY GUN SYSTEMS, RANGE SYSTEMS & RANGE OPERATIONS MAY 17-21, 2010 Virginia Beach, VA BRAI-18</p>	<p>HAZARDOUS MATERIALS: USE & CONTROL MAY 17-21, 2010 Virginia Beach, VA BRAI-19</p>	<p>TERMINAL BALLISTICS JUNE 21-25, 2010 Virginia Beach, VA BRAI-20</p>
<p>HIGH VELOCITY, HIGH PRESSURE GUN SYSTEMS, INTERIOR BALLISTICS JUNE 21-25, 2010 Virginia Beach, VA BRAI-21</p>	<p>VULNERABILITY/SURVIVABILITY: WEAPONS EFFECTS ON STRUCTURES JUNE 28-JULY 2, 2010 Virginia Beach, VA BRAI-22</p>	<p>HIGH SPEED PHOTOGRAPHY II JUNE 28-JULY 2, 2010 Virginia Beach, VA BRAI-23</p>	<p>GUNS, PROJECTILES & SABOT DESIGN JULY 19-23, 2010 Virginia Beach, VA BRAI-24</p>	<p>RANGE TESTING & OPERATION JULY 19-23, 2010 Virginia Beach, VA BRAI-25</p>
<p>GUN DESIGN: SMALL CALIBER, LARGE CALIBER & EXPERIMENTAL BALLISTICS AUGUST 16-20, 2010 VIRGINIA BEACH, VA BRAI-26</p>	<p>FUZES, WARHEAD DESIGN & EOD SEPTEMBER 27-OCTOBER 1, 2010 Ft. Walton Beach, FL (New for 2010) BRAI-27</p>	<p>ENVIRONMENTAL & CHEMICAL HAZARDS SEPTEMBER 27-OCTOBER 1, 2010 Ft. Walton Beach, FL BRAI-28</p>	<p>HIGH SPEED PHOTOGRAPHY: INSTRUMENTATION TECHNIQUES & ANALYSIS DECEMBER 6-10, 2010 Las Vegas, NV BRAI-29</p>	<p>EXPLOSIVES: EXPLOSIVE TEST OPERATORS/EXPLOSIVE ORDNANCE OPERATORS DECEMBER 6-10, 2010 Las Vegas, NV BRAI-30</p>
<p>BALLISTICS III DECEMBER 13-17, 2010 Las Vegas, NV BRAI-31</p>	<p>EXPERIMENTAL BALLISTICS DECEMBER 13-17, 2010 Las Vegas, NV BRAI-32</p>	<p>REGISTRATION: Advance registration with fee is required. Checks, purchase orders, U.S. Government standard DD 1556/SF182 forms or government purchase orders must be received by Baldini Resource Associates, Inc. before registration is complete. The fee includes course notes and material, coffee breaks, reception and other administrative expenses. No other expenses are included. A certificate will only be issued for successful course attendance and completion. NO REFUNDS for cancellations twelve weeks prior to course date. After you have been accepted and/or confirmed to attend a given course; \$100.00 service fee, other cancellations; substitutions are acceptable at any time. Mail the attached Acceptance Form with fee (payable to Baldini Resource Associates, Inc., 10 Barry Lane, Newton, NJ 07860 USA) or visit our website: http://www.baldini.com for a registration form. NOTE: FEES ARE BASED ON WHEN PAYMENT IS RECEIVED BY BALDINI RESOURCE ASSOCIATES, INC. NOT WHEN PAPERWORK IS INITIATED, WHETHER IT BE A PURCHASE ORDER OR 1556 FORM. We accept credit cards.</p>		

Keep Your
Sights On



TRAINING & DEVELOPMENT COURSES

COURSE DESCRIPTIONS, REGISTRATION FORM, FEES AND IMPORTANT SPECIAL ANNOUNCEMENTS CAN BE VIEWED AT OUR WEBSITE: <http://www.baldini.com>

COURSE NO. TITLE

- MWB/LB-1 High Velocity
- MWB/LB-2 Interior Ballistics
- MWB/LB-3 Terminal Ballistics
- MWB/LB-4 Ballistics Range Technology
- MWB/LB-5 Guns, Arms & Ammo
- MWB/LB-6 Lasers
- MWB/LB-7 Ballistics
- MWB/LB-8 Environmental & CHM HZD
- MWB/LB-9 Ballistics II
- MWB/LB-11 Vulnerability: Weapons Effects on Structures
- MWB/LB-13 Safety: Ballistic Ranges
- MWB/LB-14 High Speed Photography: Instrumentation, Techniques & Analysis
- MWB/LB-15 Ballistics III
- MWB/LB-16 Excellence: TQM/SPC/Tagucci
- MWB/LB-17 Vulnerability/Survivability: Land, Air, Sea & Space
- MWB/LB-18 Test & Evaluation/Experimental Ballistics
- MWB/LB-19 Ballistics: Interior, Transitional, Exterior, Terminal & Behind Armor Damage
- MWB/LB-20 Environmental & Chemical Hazards
- MWB/LB-21 Modeling & Simulation: Overview, Applications
- MWB/LB-22 Test & Evaluation: Live Fire Testing & Non Destructive Testing: Overview
- MWB/LB-23 Robotics & Artificial Intelligence
- MWB/LB-24 Modeling & Simulation: Acquisition
- MWB/LB-25 Firearms Litigation: Prevention & Defense
- MWB/LB-26 Guns, Projectile & Sabot Design
- MWB/LB-27 Gun & Ammunition Design: Small Caliber - Standard & Experimental Ballistics
- MWB/LB-28 Program Management, Project Engineering, Production Facilities, Proposal Writing & Technology Transfer
- MWB/LB-29 Gun & Ammunition Design: Large Caliber - Standard & Experimental Ballistics
- MWB/LB-30 Vulnerability/Survivability: Smart Munitions: Electro-Optic Surveillance & Seeker Systems
- MWB/LB-31 Explosives & Explosive Ordnance Operators/Explosive Test Operators
- MWB/LB-32 Soldier & Shoulder Launched Munitions
- MWB/LB-33 Commercial Arms
- MWB/LB-36 Instrumentation & Telemetry

COURSE NO. TITLE

- MWB/LB-37 Computer Literacy Interior, Exterior, Terminal Ballistics & Projectile Design
- MWB/LB-38 Fuzes
- MWB/LB-39 Malfunctions, Malfunction Investigation & Forensics
- MWB/LB-40 Guns & Ammunition Design: Military & Commercial
- MWB/LB-41 Modeling & Simulation: Overview, Applications, Analysis & Acquisitions
- MWB/LB-42 Gun Design: Small Caliber, Large Caliber & Experimental Ballistics
- MWB/LB-43 Bombs, Torpedoes, Warheads & Fuze Design
- MWB/LB-44 Experimental Ballistics
- MWB/LB-45 Lasers & Applications to Ballistics
- MWB/LB-46 Vulnerability/Survivability: Weapons Effects on Structures & Vehicles
- MWB/LB-47 Gun Design
- MWB/LB-48 Explosive Ordnance Disposal (EOD)
- MWB/LB-49 Vulnerability/Survivability
- MWB/LB-50 Range Testing & Operation
- MWB/LB-51 Safety
- MWB/LB-52 Test & Evaluation
- MWB/LB-53 Environmental
- MWB/LB-54 Small Arms: Interior & Exterior Ballistic
- MWB/LB-55 Range Testing Techniques
- MWB/LB-56 Guns & Ammunition Design
- MWB/LB-57 Fuzes & Warhead Design
- MWB/LB-58 Lasers & Range Safety
- MWB/LB-59 Ballistic Range Design & Operation: Overview for New Employees, Technicians, Engineers & Scientists
- MWB/LB-60 Acquisition & Program Planning
- MWB/LB-61 Explosives
- MWB/LB-62 High Speed Photography II
- MWB/LB-63 Hazardous Materials: Use & Control
- MWB/LB-64 PRODAS Projectile Design, Interior, Exterior & Space Ballistics
- MWB/LB-65 Explosives & Explosives Testing
- MWB/LB-66 Ballistics & Ballistics Testing
- MWB/LB-67 Test & Evaluation: Overview for New Employees, Technicians, Engineers & Scientists
- MWB/LB-68 High Velocity, High Pressure Gun Systems Interior Ballistics
- MWB/LB-69 Environmental & Chemical Hazards: Overview for Facilities Personnel, New Employees, Technicians, Engineers & Scientists
- MWB/LB-70 Test & Evaluation: Overview for Technicians & Engineers

COURSE NO. TITLE

- MWB/LB-71 Design of Experiments & Ballistic Testing: Overview for Technicians, Engineers & Scientists
- MWB/LB-72 Ballistics: Overview for New Employees, Technicians, Engineers & Scientists
- MWB/LB-73 Explosives & Ballistics: Test & Evaluation: Overview for New Employees, Technicians, Engineers & Scientists
- MWB/LB-74 Vulnerability/Survivability Overview
- MWB/LB-75 Ballistics: Interior, Exterior & Terminal (Developed for on-site course at Picatinny Arsenal)
- MWB/LB-76 Ballistics Range Design & Operation
- MWB/LB-77 Explosives & Explosive Testing
- LB-240 Anti-Terrorism Techniques & Considerations: Primarily Explosives & Fuzes
- LB-243 Hyper Velocity Granular Propellant Gun & Ammunition Systems*
- LB-244 Interior Ballistics: Experimental Data: Computer Codes: Data Collection Techniques & Approaches: Overview for Interns, Technicians, Engineers & Scientists*
- LB-246 Large Caliber & Small Caliber Interior, Exterior & Terminal Ballistics; An Introduction to Space Ballistics:*
- LB-252 Warheads, Explosives, Explosive Devices, Fuzes, Guns, Ammunition & Armor Ballistic Testing Techniques:**
- LB-264 Ballistic Range Design Instrumentation Techniques & Analysis: Guns & Explosives & Explosive Devices:**
- MWB/LB-78 Infantry Weapons
- MWB/LB-79 Combat Vehicles
- MWB/LB-80 Lasers
- MWB/LB-81 Free Flight Motion of Symmetric Missiles (6 Day Course by Dr. Charles H. Murphy)
- MWB/LB-82 Linear Motion of Symmetric Missiles* (3 Day Course by Dr. Charles H. Murphy)
- MWB/LB-83 Flight Misbehavior of Symmetric Missiles** (3 Day Course by Dr. Charles H. Murphy)

NEW COURSES IN 2010

- MWB/LB-84 Lasers & Ballistic Ranges Safety***
- MWB/LB-85 Fuzes, Warhead Designs & EOD (Explosive Ordnance Disposal)***

*New course in 2008 **New course in 2009 ***New course in 2010

NOTES: The course descriptions listed are for a five day course, unless otherwise noted. Any of the the course descriptions listed can be modified for more than five days or less than five days. Courses tailored to a particular need are also available. Quotes for "On-Site" or "Near-Site" courses are available by calling: Lou Baldini (973) 383-6375 or (973) 383-6090, by faxing (973) 579-9552, or by e-mail at bra@nac.net. Please do not consider your fax, phone call or e-mail message received until you have received a confirmation notice, or a return call.

LIST OF ON-SITE COURSES, FACILITIES AND LOCATIONS PREVIOUSLY PRESENTED BY BALDINI RESOURCE ASSOCIATES, INC.

COURSE TITLE	FACILITY	LOCATION	COURSE TITLE	FACILITY	LOCATION
Exterior Ballistics: Flight Misbehavior of Symmetric Missiles by Dr. Charles H. Murphy	ARDEC	Picatinny Arsenal, NJ 2009 (3 Day Course)	Ballistics: Interior, Exterior and Terminal (Special Design for Picatinny)	TACOM-ARDEC	Picatinny Arsenal, NJ
Exterior Ballistics: Linear Motion of Symmetric Missiles by Dr. Charles H. Murphy	ARDEC	Picatinny Arsenal, NJ 2008 (3 Day Course)	Terminal Ballistics	ARL	Aberdeen, MD
Safety: Ballistic Ranges	NSWLSU2 (Navy Special Ops)	Virginia Beach, VA	Terminal Ballistics	AMSAA (Twice)	Aberdeen, MD
Exterior Ballistics: Free Flight Motion of Symmetric Missiles by Dr. Charles H. Murphy	ARDEC	Picatinny Arsenal, NJ (6 Day Course)	Terminal Ballistics	NGIC (Twice)	Charlottesville, VA
High Velocity, High Pressure Gun Systems Interior Ballistics	Eglin AFB	University of Florida	High Speed Photography II	Sandia National Laboratory	Albuquerque, NM
Terminal Ballistics	Graduate Engineering Research Center Shalimar, FL		Guns, Projectile & Sabot Design	Primex Corporation	Seattle, WA
Terminal Ballistics	US Army Evaluation Center (AEC)	Englewood APG, MD	Safety: Ballistic Ranges	MICOM	Huntsville, AL
Terminal Ballistics	United Defense, LP	Santa Clara, CA	Explosives: Explosive Ordnance Operators/Explosive Test Operators	NSWC	White Oak, MD.
Terminal Ballistics	Applied Ordnance Technology (AOT)	Virginia Beach, VA	Experimental Ballistics by Mr. Luigi F. Baldini	Drexel University Center for Ballistics	Philadelphia, PA
Ballistics: Interior, Exterior & Terminal	TACOM-ARDEC	Picatinny Arsenal, NJ	High Speed Photography: Instrumentation Techniques & Analysis	NSWC	Pt. Mugu, CA
BALLISTICS:Interior, Transitional, Exterior, Terminal & Behind Armor Damage	NSWCDD	Dahlgren, Virginia	Lasers	White Sands Missile Range	White Sands, NM (Area)
Interior Ballistics	EXPROTEC/SNCTEC	Montreal, Canada	High Velocity: Gun Systems, Range Systems, and Range Operations	ARDEC	Picatinny Arsenal, NJ
Terminal Ballistics	TACOM	Warren, MI		(Many Times)	

NOTE: PLEASE REGISTER BY PHONE AND/OR FAX – DO NOT CONSIDER YOUR REGISTRATION RECEIVED UNTIL YOU RECEIVE A CONFIRMATION FROM BALDINI RESOURCE ASSOCIATES, INC.

ALL COURSES ARE FOR NEW EMPLOYEES, INTERNS, TECHNICIANS, ENGINEERS, SCIENTISTS AND/OR GENERAL PERSONNEL THERE ARE NO PREREQUISITES FOR ANY COURSES.

EXCEPT DR. CHARLES H. MURPHY'S COURSES WHICH REQUIRE A WORKING KNOWLEDGE OF DIFFERENTIAL EQUATIONS.

ANY COURSE CAN BE SCHEDULED FOR VIRGINIA BEACH, VA IF 6 OR MORE PEOPLE ARE GUARANTEED – TIME FRAME IS BETWEEN 2ND WEEK OF SEPTEMBER TO MIDDLE OF JUNE.

ANY COURSE CAN BE SCHEDULED FOR LAS VEGAS, NV IF 6 OR MORE PEOPLE ARE GUARANTEED (ALMOST ANY TIME).

ANY COURSE CAN BE SCHEDULED IN FT. WALTON BEACH, FL IF 6 OR MORE PEOPLE ARE GUARANTEED (ALMOST ANY TIME).

ANY COURSE CAN BE GIVEN ON OR NEAR YOUR SITE – CALL FOR DETAILS.

CUSTOM COURSES CAN BE SCHEDULED FOR YOUR NEEDS.

FOR INFORMATION, REGISTRATION, OR ON-SITE/NEAR SITE PRICE QUOTES

**CALL: LOU BALDINI
(973) 383-6375 / (973) 383-6090
or FAX: (973) 579-9552**

**BALDINI RESOURCE ASSOCIATES, INC.
10 BARRY LANE, NEWTON, NJ 07860 U.S.A.**

**E-MAIL ADDRESS: bra@nac.net
(NOTE: DO NOT USE E-MAIL FOR COURSE REGISTRATION WITHOUT EITHER CALLING OR FAXING ALSO)**

**VISIT OUR WEB SITE AT:
<http://www.baldini.com>**

INTRODUCTION

Please keep this brochure in a safe place, since it will be the only one sent out for this schedule of courses.

Instructors with hands-on testing experience are the majority of the instructors for all courses. Concepts and Ideas, without equations are the backbone of these courses. Equations are used only, when absolutely necessary, to explain a concept.

There are no prerequisites for any courses taught by Baldini Resource Associates, Inc. except Dr. Charles H. Murphy's Courses.

Baldini Resource Associates, Inc., has been developing and presenting short courses since 1982. Changes have been made during the years in order to continue to bring a Quality Educational and Meaningful Training Program to the Community, with Instructors who are primarily hardware oriented, i.e. those who have actually gotten their hands dirty, doing their own work. We appreciate your participation and support and always listen to your course evaluations. There will be more than one point of view per topic in many cases, since we can only present information and the facts as we know them.

Changes constantly occur in previously developed courses in order to keep contents current. Some instructors change in previously developed courses also.

PLEASE NOTE THAT THESE COURSES ARE NO LONGER SPONSORED BY THE ADPA: These courses were sponsored by the American Defense Preparedness Association (ADPA) National Organization from 1982 until September 1989 – THESE COURSES ARE NO LONGER SPONSORED BY THE ADPA, AND THERE IS NO ASSOCIATION WITH BALDINI RESOURCE ASSOCIATES, INC. The new name for the ADPA is the National Defense Industrial Association (NDIA).

It should also be noted that attendance at these courses DOES NOT qualify anyone to perform any testing of any kind, or handle any hazardous equipment or material—your facility must do that to qualify you—with adequate training and instruction, which, in many instances, consists of years of training.

PLEASE NOTE THAT IN ADDITION TO THE COURSES LISTED, OTHER COURSES NOT LISTED ARE ALSO AVAILABLE FOR “ON-SITE” OR “NEAR-SITE” COURSES — CALL FOR QUOTES AND INFORMATION AND VISIT OUR WEBSITE FOR DESCRIPTION OF AVAILABLE COURSES AT: <http://www.baldini.com>

Outlined in this brochure are the courses to be given in 2009-2010. This year, all courses scheduled are shown on the front of this brochure as well as on the registration form. Registration information is listed under “General Information” on the inside back pages of this brochure. A listing of courses that can be brought to your site is shown on the back cover and on our website at <http://www.baldini.com>. Call Lou Baldini for on-site quote and terms. Ph: (973) 383-6375 or (973) 383-6090; Fax: (973) 579-9552; E-mail: bra@nac.net. Please do not use e-mail only for registration—call or fax also. Do not consider your registration received until you receive confirmation from Baldini Resource Associates, Inc. *Thank you for your continued participation and support of us and our troops in harms way.*

2009

HIGH VELOCITY, HIGH PRESSURE GUN SYSTEMS INTERIOR BALLISTICS

August 31-September 4, 2009 BRAI-1 Virginia Beach, VA

- PROPELLANT GUNS
- LIGHT GAS LAUNCHERS
- ELECTROMAGNETIC LAUNCHERS
- INTERIOR BALLISTICS OF GUN SYSTEMS: THEORETICAL AND EXPERIMENTAL
- PROPELLANTS & PRIMERS: THEIR INTERACTION AND CONSEQUENCES
- EXPLOSIVES & TESTING EXPLOSIVE TARGETS
- FUZES & WARHEAD DESIGNS
- DETONATION & DEFLAGRATION
- HIGH ORDER VS LOW ORDER DETONATIONS
- IGNITION TRAINS: PROPELLANTS & EXPLOSIVES
- HIGH VELOCITY DEFINITIONS
- HIGH PRESSURE DEFINITIONS: SMALL CALIBER; LARGE CALIBER; LIGHT GAS LAUNCHER HIGH PRESSURE SECTIONS
- GUN, CHAMBER, JOINTS & TUBE DESIGN
- ASSOCIATED PROJECTILE & SABOT DESIGN
- RANGE DESIGN & OPERATION
- STANDARD OPERATING PROCEDURES
- MISFIRE/MALFUNCTION PROCEDURES
- RENDER SAFE PROCEDURES
- STANDARD OPERATING PROCEDURES
- SAFETY OFFICERS & RANGE OFFICERS: DUTIES & RESPONSIBILITIES
- SAFETY PRECAUTIONS & DESIGN CONSIDERATIONS
- TARGETS, TARGET HOLDERS & TARGET MATERIALS
- COLLECTING TERMINAL BALLISTICS DATA
- EVACUATED TANK TESTING TECHNIQUES & PRECAUTIONS
- LARGE CALIBER EVACUATED BORE AND TANK SYSTEMS PRECAUTIONS
- VARYING ATMOSPHERIC CONDITIONS IN EVACUATED TANK SYSTEMS
- INSTRUMENTATION TECHNIQUES
- HIGH SPEED PHOTOGRAPHIC EQUIPMENT & RECORDING TECHNIQUES
- HIGH SPEED X-RAY, EQUIPMENT, SCREENS, & FILM; MEASURING OF EVENTS TECHNIQUES
- ANALYSIS OF RESULTS & DESIGN OF EXPERIMENT OF BOTH DIGITAL & FILM SYSTEMS
- LESSONS LEARNED

OBJECTIVE & SCOPE

This course will describe several research, developmental and experimental techniques for obtaining

High Velocity and High Pressure Interior Ballistics operations. Included will be propellant, Light Gas, Electromagnetic (EM), and other types and hybrid launch systems. Also discussed will be range set-ups and instrumentation as well as gun, chamber, projectile and sabot designs. Range construction and precautions will also be covered to some extent.

BALLISTICS:

OVERVIEW FOR TECHNICIANS, ENGINEERS & SCIENTISTS

August 31-September 4, 2009 BRAI-2 Virginia Beach, VA

- **TERMINAL, INTERIOR AND EXTERIOR BALLISTICS**
- **TERMINAL BALLISTICS**
 - THEORETICAL AND EXPERIMENTAL CONSIDERATIONS
 - KINETIC ENERGY (KE) PENETRATORS
 - SHAPED CHARGE (SC) PENETRATORS
 - EXPLOSIVELY FORMED PENETRATORS
 - ARMORS AND ARMOR ARRAYS: ROLLED HOMOGENEOUS STEEL (RHS), HIGH HARDNESS STEEL
 - (HHS), ALUMINUM(AL), CERAMICS & CERAMIC COMPOSITES; OTHER TARGET ARRAYS
 - MATERIAL PROPERTIES: PENETRATORS & ARMORS
 - PROJECTILE & SABOT DESIGN; EFFECT OF NOSE SHAPE & CAPS
 - EFFECTS OF LOW, HIGH, AND HYPER VELOCITY ON PENETRATION
 - EFFECTS OF OBLIQUITY AND SPACINGS ON PENETRATION
- **INTERIOR BALLISTICS**
 - THEORETICAL AND EXPERIMENTAL CONSIDERATIONS
 - EFFECTS OF PRIMERS ON IGNITION & PROPELLANT BED BURNING
 - EFFECTS OF PROPELLANT TYPES AND RELATIVE QUICKNESS
 - AREA UNDER THE CURVE: PRESSURE VERSUS TIME CURVES
 - STICK, BALL, MULTIPERF AND OTHER PROPELLANT CONFIGURATIONS
 - METHODS OF OBTAINING HIGHER VELOCITY
 - GUN AND CHAMBER DESIGNS
 - LIGHT GAS, ELECTROMAGNETIC AND OTHER LAUNCHER TYPES
 - EXPANSION RATIO: EFFECTS OF INCREASED BARREL LENGTH AND CHAMBER VOLUME DIMENSIONS
- **EXTERIOR BALLISTICS**
 - DRAG COEFFICIENTS AND THEIR EFFECT ON TERMINAL VELOCITIES AT LOW, ORDNANCE, HIGH AND HYPER VELOCITY
 - HISTORY & CONSIDERATIONS FOR COMMERCIALY AVAILABLE BULLETS
 - SIERRA COMPUTER PROGRAM AS AN EXAMPLE REFERENCE TO BOB MCCOY'S BOOK ON EXTERIOR BALLISTICS
- LESSONS LEARNED

OBJECTIVE & SCOPE

NOTE: THERE ARE NO PREREQUISITES FOR ANY OF THESE TRAINING COURSES; CONCEPTS AND NOT EQUATIONS ARE STRESSED; EQUATIONS ARE ONLY USED TO EXPLAIN A CONCEPT; INSTRUCTORS ARE MOSTLY “HANDS ON PEOPLE” WHO HAVE DONE THEIR OWN WORK. This course is designed to give an overview of the areas of Terminal, Interior and a little on Exterior Ballistics. It is designed for the Technician, Engineer and Scientist, New Employees and/or General Personnel. This course is a portion of several other courses designed to touch on many topics. If more information is needed, there are other courses with more specific topics, which can be taken.

TERMINAL BALLISTICS

September 14-18, 2009 BRAI-3 Aberdeen Proving Ground, MD area

- KINETIC ENERGY (KE) PROJECTILES
- SHAPED CHARGE (SC) PROJECTILES & WARHEAD DESIGN
- EXPLOSIVELY FORMED PENETRATORS (EFP) PROJECTILES
- ARMOR & BEHIND ARMOR DAMAGE (BAD) AND EFFECTS
- KINETIC ENERGY (KE) & SHAPED CHARGE (SC) MATERIAL PROPERTIES
- DEFINITIONS OF PERFORATION & PENETRATION
- DEFINITIONS OF BALLISTIC LIMITS; OBLIQUITIES
- REACTIVE ARMOR; PASSIVE ARMORS
- BEHIND ARMOR DAMAGE
- METALLURGY OF PENETRATORS (KE & SC) AND ARMORS
- ANALYTICAL MODELING OF SC & KE PENETRATORS
- LONG ROD PENETRATORS: UP TO LENGTH/DIAMETER OF 36
- COMPARISON OF MODELS: WITH EXPERIMENTAL DATA
- SABOT LAUNCHED ARMOR PIERCING (SLAP) PROJECTILES
- ARMOR PIERCING PROJECTILES: FULL BORE AND SABOTED
- LARGE CAL AND SMALL CAL PENETRATOR: DESIGNS & PERFORMANCE
- TUNGSTEN AND URANIUM ALLOYS COMPARISON: KE & SC PENETRATORS
- ALUMINUM, NATO, SPACED TARGETS & TARGET ARRAYS
- ROLLED HOMOGENOUS & CERAMIC COMPOSITE ARMORS
- ORDNANCE VELOCITIES: 1 KM/S TO 2 KM/S
- HIGH AND HYPERVELOCITIES: ABOVE 2 KM/S TO 12 KM/S
- COMPUTER PROGRAMS AND PREDICTION TECHNIQUES TO DETERMINE ARMOR PENETRATING PERFORMANCE CAPABILITIES: FOR KE & SC PENETRATORS
- COMPARISON OF COMPUTER MODELS WITH EXPERIMENTAL DATA
- VULNERABILITY METHODOLOGY & ANALYSIS: APPLICATIONS

OBJECTIVE AND SCOPE

This course will cover the Terminal Ballistics of Kinetic Energy (KE) and Shaped Charge (SC) Penetrators and their interaction before, at, and beyond a given target array. KE penetrators for both Small and Large caliber systems will be discussed at all velocity levels for rolled homogeneous steel, aluminum and ceramic composites at various target obliquities. The material properties of KE, SC penetrators, and armors will be emphasized; explosively formed penetrators will also be covered. Analytical modeling of KE and SC projectiles, will be shown, along with projectile-plate interaction for long rods, and comparison and correlation of models with experimental data. Emphasis will be placed on the practical, experimental, and theoretical, in that order. Equations will only be used to explain a concept. This seminar is UNCLASSIFIED; classified information WILL NOT be discussed, at any time; the author's topics and course notes will not include sensitive material.

GUNS, PROJECTILE & SABOT DESIGN

September 14-18, 2009 BRAI-4 Aberdeen Proving Ground, MD area

- GUN DESIGN-MILITARY, COMMERCIAL AND EXPERIMENTAL: SMALL, CANNON & LARGE CALIBER
- PROJECTILE DESIGN-STANDARD AND EXPERIMENTAL TYPES
- SABOT DESIGN-STANDARD AND EXPERIMENTAL-STANDARD, HIGH AND HYPER VELOCITIES; FABRICATION TECHNIQUES
- LAUNCH CONSIDERATIONS FOR SABOTED AMMUNITION
- COMPUTER AIDED DESIGN-PROTOTYPE FABRICATION
- COMPUTER AIDED-INTERIOR & EXTERIOR BALLISTICS CONSIDERATIONS
- MECHANISMS IN STANDARD GUN DESIGN
- DIFFERENCES IN MILITARY & COMMERCIAL GUN DESIGNS: AMMUNITION DESIGNS
- CHAMBER & CARTRIDGE OR SHELL DESIGN
- AMMUNITION WITH EXPLOSIVES, TRACERS, INCENDIARIES, FUMERS, ETC.
- FABRICATION TECHNIQUES FOR GUN, PROJECTILE & SABOTS: STANDARD: MILITARY & COMMERCIAL; EXPERIMENTAL; STANDARD AND ORDNANCE VELOCITIES; HIGH AND HYPER VELOCITIES
- AUTOFRETTAGING: GUN AND CHAMBER DESIGN APPROACHES
- WEAR AND EROSION CONSIDERATIONS
- RELATED INTERIOR AND EXTERIOR BALLISTIC CONSIDERATIONS
- RIFLING TYPES AND TWIST CONSIDERATIONS: ALL CALIBERS
- DESIGN CRITERIA RELATED TO MATERIALS CONSIDERATION FOR: GUN, PROJECTILE & SABOT DESIGN
- QUALITY CONTROL, HUMAN ENGINEERING, PRODUCTION AND OTHER CONSIDERATIONS
- SIMULATED TRAINING CONCEPTS
- MANUALS, TRAINING, AND SAFETY CONSIDERATIONS

EXPLOSIVES & EXPLOSIVE ORDNANCE OPERATORS/EXPLOSIVE TEST OPERATORS

November 9-13, 2009 BRAI-5 Ft. Walton Beach, FL

- QUALIFICATIONS FOR EXPLOSIVE TEST OPERATORS/ EXPLOSIVE ORDNANCE OPERATORS
- ORDNANCE TESTING AND EVALUATION: PROCESS; FACILITIES; EQUIPMENT; PEOPLE; HOW IS IT DONE?
- STANDARD OPERATIONAL PROCEDURES: NORMAL OPERATION; MALFUNCTION; HAND LOADING-SMALL & LARGE CALIBER; FIRE; INDOOR TESTING; OUTDOOR TESTING; RECORDING AND REPORTING; SET-UP PROCEDURES; INSTRUMENTATION; PROTECTIVE GEAR; SAFETY PRECAUTIONS, ETC.
- SECURITY; SAFETY; ENVIRONMENT; NEIGHBORS; AIR SPACE
- TEST PLANS: ASSOCIATED DOCUMENTATION; HARDWARE AND REQUIRED ASSETS TO ACCOMPLISH TEST PLAN; LOGISTICS
- ENVIRONMENTAL CONCERNS: STORAGE, TRANSPORTATION, DISPOSAL, MARKINGS
- HEALTH HAZARDS & REGULATIONS
- SAFETY, TRAINING & PROCEDURES
- ROCKET AND MISSILE PROPULSION TESTING & EVALUATION
- EXPLOSIVES: CLASSIFICATIONS: USES: CHARACTERISTICS
- CHARACTERISTICS OF A DETONATION
- NEAR-FIELD PRESSURE-TIME; FAR-FIELD PRESSURE-TIME
- DETONATIONS: UNDERGROUND; UNDERWATER; SPACE
- EXPLOSIVES:DESIGN; MANUFACTURE; ENVIRONMENTAL CONCERNS
- EXPLOSIVES: SAFETY; SHIPPING; HANDLING; STORAGE
- COMMERCIAL APPLICATIONS OF EXPLOSIVES

OBJECTIVE AND SCOPE

This course is directed to those Explosive Test Operators/Explosive Ordnance Operators who test with both guns and explosive and launch devices, as well as Engineers and Safety Officers and Range Officers who may direct Range Testing or Range Operations. This course is an overview of explosives, propellants primers and energetic materials and Propulsion Systems and their safe handling. Covered will be a basic understanding of explosives and energetic materials and the reasons for special handling in manufacture, loading, testing and use of these materials.

TESTING & EVALUATION: EXPERIMENTAL BALLISTICS

November 9-13, 2009 BRAI-6 Ft. Walton Beach, FL

- TEST FACILITIES REQUIREMENTS
- SAFETY NEEDS, CONSIDERATIONS AND REQUIREMENTS
- TEST & EVALUATION PROCEDURES : BALLISTIC RANGE PROCEDURES
- SPECIAL TEST CONDITIONS : LAND; UNDERSEA/WATER; SPACE; OTHER MEDIA
- ARENA TESTING OF WARHEADS; THEATER TESTING OF HIGH EXPLOSIVES
- TEST & EVALUATION: GUNS, AMMUNITION, ARMOR SYSTEMS & MATERIALS
- MILITARY SPECIFICATIONS (MIL SPEC) & TESTING PROCEDURES
- LETHALITY & SURVIVABILITY EFFECTIVENESS TESTING
- TEST PROCEDURES FOR REACTIVE ARMOR TESTING
- RANGE, EQUIPMENT, INSTRUMENTATION & PERSONNEL REQUIREMENTS
- LIFE CYCLE REQUIREMENTS (R&D TO DEMILITARIZATION)
- HUMAN ENGINEERING TESTING REQUIREMENTS
- COMMUNITY INTERACTION REQUIREMENTS WITH LARGE SCALE TESTING
- QUALITY CONTROL OF TEST INSTRUMENTATION; CALIBRATION
- INTERIOR, TRANSITIONAL, EXTERIOR & TERMINAL BALLISTIC CONSIDERATIONS: STANDARD & EXPERIMENTAL
- RANGE DESIGN; GUN DESIGN & SABOT DESIGN CONSIDERATIONS
- INSTRUMENTATION; SHIELDING; TRIGGERING TECHNIQUES

- SCALING IN TEST & EVALUATION
- X-RAYS AND NON-DESTRUCTIVE TESTING
- ENVIRONMENTAL AND SHOCK AND VIBRATION TESTING
- LOADING & GUN/LAUNCHER HANDLING PROCEDURES
- LOADING PROCEDURES & LOADING EQUIPMENT: REFERENCES
- LAUNCH BALLISTICS; LAUNCHER CHARACTERISTICS
- PRE-QUALIFICATION, QUALIFICATION, AND PRODUCTION CONTROL TESTS
- SMALL ARMS GUN & AMMUNITION ACCEPTANCE AND SURVEILLANCE
- ANALYSIS OF DATA AND DESIGN OF EXPERIMENTS
- MANUALS; HAZARD CLASSIFICATIONS; PACKAGING; TRANSPORTATION; STORAGE; FUNCTION & CASUALTY TESTING; FUZE, LINK, & VEHICLE TESTING
- SAFETY & LESSONS LEARNED

HIGH SPEED PHOTOGRAPHY: INSTRUMENTATION TECHNIQUES & ANALYSIS

December 7-11, 2009 BRAI-7 Las Vegas, NV

- HIGH SPEED PHOTOGRAPHIC CAMERAS
- HIGH INTENSITY LIGHT SOURCES
- TECHNIQUES FOR RECORDING/WRITING HIGH SPEED EVENTS
- VELOCITY MEASURING TECHNIQUES-HIGH SPEED EVENTS
- MODEL INTEGRITY AND ORIENTATION/MOTION ANALYSIS TECHNIQUES
- HIGH SPEED X-RAY EQUIPMENT SYSTEMS AND OPERATION
- X-RAY INTENSIFYING SCREENS, FILMS, DEVELOPMENT AND ANALYSIS
- HARD & SOFT X-RAYS
- METHODS OF ANALYSIS FOR HIGH SPEED PHOTOGRAPHY AND X-RAYS
- HALL STREAK CAMERA SYSTEMS
- TRIGGERING TECHNIQUES FOR PHOTOGRAPHIC EVENTS
- LASER USE AND OTHER TYPES OF ILLUMINATION
- LIGHT SOURCES AND THEIR LIMITATIONS AND APPLICATIONS
- DETECTION TECHNIQUES AND LIMITATIONS OF EACH TYPE
- SPARK PHOTOGRAPHY
- BECKMAN-WHITLEY/CORDIN TYPE CAMERA WRITING OPERATION AND USES
- CAMERAS, ROTATING PRISM AND OTHER TYPES AND LIMITATIONS
- SCHLIEREN PHOTOGRAPHIC APPROACHES; SHADOWGRAPH INTERFEROMETRY
- METHODS FOR FILM PROCESSING
- APPLICATIONS OF HIGH SPEED PHOTOGRAPHY TO BALLISTICS
- IN-BORE AND OUT OF BORE INSTRUMENTATION
- TEST AND EVALUATION APPLICATIONS OF HIGH SPEED PHOTOGRAPHY
- HARDENING OF EXPENSIVE PHOTOGRAPHIC AND OTHER EQUIPMENT
- LABORATORY AND RANGE SAFETY INSTRUCTIONS FOR DELICATE EQUIPMENT
- PRECISION IN MEASUREMENT APPROACHES; ALIGNMENT PROCEDURES
- SAFETY IN USE OF HIGH ENERGY AND RADAR EQUIPMENT
- PROPER SAFETY INSTRUCTION; INTERLOCKS; SAFETY EQUIPMENT
- STANDARD OPERATING PROCEDURES
- PRECAUTIONS WHEN WORKING WITH EXPLOSIVES & BALLISTIC MALFUNCTIONS
- RELATED OPTICS; VIDEO AND ANALYSIS
- DIGITAL IMAGING TECHNIQUES
- COMPUTER DATA ANALYSIS AND DATA REDUCTION APPROACHES
- FILM ENHANCEMENT TECHNIQUES AND PROCESSING

NOTE: More than one point of view may cover a given topic. There will be some hands on experience, but that will not be the primary emphasis of this course.

OBJECTIVE & SCOPE

The emphasis for this High Speed Photographic Seminar will be to provide a sound basis of capability, operation and use of equipment to obtain visual stop action for high speed motion events. Other Instrumentation Techniques covered would include Ballistic and Explosive events, Missiles, as well as Laboratory polarized stress-strain analysis and other experiments. Triggering and Instrumentation Techniques will be discussed for obtaining Test and Evaluation information and data in the Ballistic Range Facilities as well in the Laboratory.

MATERIAL COVERED

High Speed Photographic and Visual Motion Capturing Data Collecting Equipment, including triggering, lighting, developing, set-up, measurement, digital imaging media and analysis and enhancing techniques, will be covered. Instrumentation and other areas related to data collection for Test and Evaluation will also be emphasized.

SAFETY: BALLISTIC RANGES

December 7-11, 2009 BRAI-8 Las Vegas, NV

- TESTING & EVALUATION SAFETY: MOST ORDNANCE TYPES
- BALLISTIC RANGES: MINIMUM RANGE SAFETY FANS: RICOCHET PROBLEM; IMPROPER LAUNCH
- RANGE SAFETY OFFICER: DUTIES AND RESPONSIBILITY
- SAFETY REQUIREMENTS: DURING DEVELOPMENT THROUGH TO LIMITED AND FINAL PRODUCTION
- LASER AND HIGH VOLTAGE HAZARDS (ELECTROMAGNETIC GUNS)
- TOXIC GAS AND CHEMICAL HAZARDS AND PROTECTIVE EQUIPMENT
- STATISTICAL CATASTROPHIC SAFETY REQUIREMENTS: FOR FIELDING SYSTEMS
- RANGE INTRUSION SECURITY AND CONTROL: METHODS AND PROCEDURES
- LOADING: EXPLOSIVES IN MANUFACTURE; PROPELLANTS IN LOAD PLANTS; EXPERIMENTAL TESTING
- LIVE FIRE MALFUNCTION UNLOADING/DISPOSAL PROCEDURES
- DEMILITARIZATION SAFETY PROBLEMS; DISPOSAL PROBLEMS

- ORDNANCE DISPOSAL PROCEDURES: EXPLOSIVE ORDNANCE DISPOSAL (EOD)
- SURVEILLANCE TESTING: SAFETY CONSIDERATIONS
- IMPROPER TESTING, STORAGE, HANDLING, AND OPERATING PROCEDURES TO AVOID
- PROPER PROCEDURES TO KEEP LIFE AND LIMBS
- MALFUNCTION INVESTIGATIONS: RED TEAM & BLUE TEAM; ANALYSIS AND TESTING APPROACHES; PRIVACY CONSIDERATIONS
- ACCIDENTS: LETHAL: MILITARY AND CIVILIAN INVESTIGATIVE UNITS
- MILITARY STANDARDS AND REQUIREMENTS: DIRECTIVE DOD 6055.9; DOD 6055.9
- ARMY, NAVY & AIR FORCE: REGULATIONS, PAMPHLETS AND BULLETINS
- FEDERAL REQUIREMENTS: OCCUPATIONAL SAFETY AND HEALTH (OSHA); ENVIRONMENTAL PROTECTION (EPA); DEPARTMENT OF TRANSPORTATION (DOT); BUREAU OF ALCOHOL, TOBACCO AND FIREARMS (BATF)
- STATE REQUIREMENTS AND LOCAL REQUIREMENTS: STATE: OSHA, FIRE, ELECTRIC AND OTHERS
- PROPELLANTS, PRIMERS, IGNITERS AND EXPLOSIVES CLASSIFICATIONS: METHODS OF CLASSIFICATION; SAFE HANDLING, STORAGE & TRANSPORTATION
- HAZARD IDENTIFICATION: MATERIAL SAFETY DATA SHEET (MSDS); INDIVIDUAL REPORTS; INSPECTIONS; SAFETY AUDITS
- DOCUMENTATION REQUIREMENTS: INCIDENT REPORTS
- TRAINING REQUIREMENTS: ON-GOING EFFORTS
- STANDARD OPERATING PROCEDURES: DEVELOPMENT; IMPLEMENTATION; AND EVALUATION; PERIODIC UP-DATES OF OPERATING PROCEDURES
- ACCURATE AND COMPLETE RECORD KEEPING: FOR ALL TESTING PROCEDURES OF ANY KIND; ALSO NECESSARY FOR CONTROLLING NUMBER AND TYPE OF PEOPLE IN TEST AREAS, AT ALL TIMES; AIDES ANY ACCIDENT INVESTIGATION

OBJECTIVE AND SCOPE

This Course Can Apply To Anyone Who Works Or Has Anything To Do With Range Facilities

BALLISTICS

December 14-18, 2009 BRAI-9 Las Vegas, NY

- TERMINAL BALLISTICS OF SHAPED CHARGED PROJECTILES
- BEHIND ARMOR DAMAGE EFFECTS FOR KINETIC ENERGY AND SHAPED CHARGE PROJECTILES
- TESTING OF SHAPED CHARGES AND KINETIC PROJECTILES
- PROTECTION EFFECTS OF STEEL, ALUMINUM, CERAMICS, CERAMIC COMPOSITES, SPACINGS, KEVLAR, REACTIVE AND PASSIVE ARMORS
- EXPLOSIVE FORMED PENETRATORS (EFP) PROJECTILES
- TERMINAL BALLISTICS ON LAND, SEA, AIR, UNDER THE SEA, AND SPACE
- THE DESIGN AND CAPABILITIES OF CLOSED BREECH LAUNCHER SYSTEMS
- INTERIOR BALLISTICS OF LARGE CALIBER NAVY GUNS, AS WELL AS SMALL AND LARGE CALIBER SYSTEMS
- OSANITY CHECKINGÓ AND ENGINEERING REASONING
- GRANULAR, SOLID, LIQUID AND COMPOSITE PROPELLANTS
- ELECTRICAL-THERMAL LAUNCHERS; LIGHT - GAS GUNS
- APPROACHES TO OBTAIN HIGHER VELOCITIES FOR HEAVIER LAUNCH PAYLOADS
- TOTAL QUALITY MANAGEMENT (TQM); QUALITY ENGINEERING CONCEPTS
- STEPS OF PRODUCT DESIGN (SYSTEM, PARAMETER & TOLERANCE)
- TYPES OF QUALITY CHARACTERISTICS
- EXTERIOR BALLISTICS DRAG COEFFICIENTS
- METHODS OF EXPERIMENTALLY OBTAINING DRAG COEFFICIENTS
- AEROBALLISTIC FACILITIES IMPORTANT DESIGN CONSIDERATIONS
- PROJECTILE YAW; OPTICAL AND X-RAY VELOCITY AND YAW MEASURING SYSTEMS; BALLISTIC LIMIT TESTING TECHNIQUES
- HIGH VELOCITY (13,000 FEET/SECOND) CONVENTIONAL PROPELLANT GUN
- HIGH PRESSURE GUN AND CHAMBER DESIGNS (UP TO 210 KPSI)
- DESIGN AND AUTOFRETTAGE TECHNIQUES FOR HIGH PERFORMANCE GUNS
- KINETIC ENERGY PROJECTILE AND SABOT DESIGNS FOR LAUNCHING AT HIGH PRESSURES (50 KPSI TO 210 KPSI)
- STRAIN GAGE METHODS OF MEASURING INTERNAL CHAMBER PRESSURE
- SAFETY IN OPERATION AND RANGE DESIGN CONSIDERATIONS
- STANDARD SMALL ARMS AND AMMUNITION TESTING; US AND NATO TESTING

OBJECTIVE AND SCOPE

The objective of this course is to give one day of material from each of five courses given in the area of BALLISTICS, by Baldini Resource Associates, Inc. Another objective is to have instructors different from those currently teaching those courses in order to give another point of view. One of the five days would be from each of the following five day courses: 1. HIGH VELOCITY; 2. BALLISTIC RANGE TECHNOLOGY; 3. INTERIOR BALLISTICS; 4. GUNS ARMS & AMMO; and 5. TERMINAL BALLISTICS.

The scope will in general consist of material in Interior Ballistics, Exterior Ballistics, Terminal and launching techniques; Also, safe gun and range design and operation from low to high velocity; Some standard weapon and ammunition testing will be covered; Quality and Total Quality Management (TQM) techniques to assure a product which can be put into production and meet or exceed requirements, will also be part of this course.

RANGE TESTING & OPERATION

December 14-18, 2009 BRAI-10 Las Vegas, NY

- RANGE TESTING TECHNIQUES: GUNS, MISSILES, EXPERIMENTAL PROPULSION SYSTEMS AND LAUNCHERS
- EXPLOSIVES TESTING: WARHEADS (SHAPED CHARGES); WEAPONS; GUNS
- MEASURING APPROACHES FOR SPECIFIC TESTING; TEST PLAN; TESTING TEAM
- RANGE OR FACILITY REQUIREMENTS AND CONSIDERATIONS: SAFETY OF PERSONNEL; SHIELDING OF EQUIPMENT; ENVIRONMENTAL HAZARDS
- DETECTING EQUIPMENT: LASERS; X-RAYS; ETC.
- INSTRUMENTATION METHODS FOR MEASURING VELOCITY PRESSURE, ACCURACY, ACTION TIME, ETC.
- LOADING TECHNIQUES AND REQUIREMENTS; LOAD AREA CONSIDERATIONS & PROCEDURES
- ARMOR TESTING PROCEDURES; KINETIC ENERGY OR CHEMICAL ENERGY
- ACCEPTING & SURVEILLANCE TESTING OF AMMUNITION; ARMOR ACCEPTANCE TESTING
- OPERATING PROCEDURES FOR VARIOUS TYPES OF RANGE FACILITIES; STANDARD OPERATING PROCEDURES
- PERFORMANCE SPECIFICATIONS: PROS AND CONS
- COOK-OFF PROBLEMS
- HEAT CHECKING PROBLEMS
- MALFUNCTIONS AND CLEARING PROCEDURES
- SECURITY, HANDLING, STORAGE & TRANSPORTATION
- TRAINING PROCEDURES FOR EXPLOSIVE ORDNANCE OR EXPLOSIVE TEST OPERATORS
- SAFETY, ENVIRONMENTAL & EQUIPMENT REQUIREMENTS
- LESSONS LEARNED

2010

BALLISTICS

INTERIOR, TRANSITIONAL, EXTERIOR, & BEHIND ARMOR DAMAGE

January 25-29, 2010 BRAI-11 Ft. Walton Beach, FL

- INTERIOR BALLISTICS: CURRENT THEORIES AND OPERATION; ALL CALIBERS; ALL TYPES; ALL VELOCITY REGIMES
- * LOW VULNERABILITY PROPELLANTS; GUN SYSTEMS; PREDICTIVE PERFORMANCE; AVAILABLE COMPUTER PROGRAMS AND CAPABILITIES;
- * IGNITION TECHNIQUES: ARTILLERY; NAVY GUNS; MORTAR; SMALL, CANNON AND TANK CALIBER
- * STICK, BALL, FLAKE AND OTHER CONFIGURATION PROPELLANTS
- * LIQUID; ELECTRO THERMAL, CHEMICAL AND MAGNETIC SYSTEMS
- * TRANSITIONAL BALLISTICS: GUN BORE TO MEDIA TRANSITION
- * METHODS OF REDUCING: BLAST EFFECTS ON LAUNCH PACKAGES;
- * TYPES OF FLASH SUPPRESSION; SMOKE; SMOKE SUPPRESSION;
- * ACCURACY INCREASE; BARREL JUMP; PROJECTILE JUMP; OTHER PHENOMENA
- * TEMPERATURE EFFECTS: BARREL BENDING; RATE OF FIRE; COOK-OFF;
- * IN-BORE DETONATIONS: HIGH ENERGY/EXPLOSIVE PROJECTILE
- * IN-BORE DETONATIONS: PRIMER-PROPELLANT-SHOCK WAVE PHENOMENA
- * EFFECTS ON SABOTED PROJECTILES; IN GUN TRANSITION ZONE; IN FLIGHT
- * EXTERIOR BALLISTICS: VELOCITY DECAY; CENTER OF PRESSURE, GRAVITY
- * STABILITY FACTORS; TWISTS; DRAG COEFFICIENTS; AVAILABLE COMPUTER PROGRAMS
- * TERMINAL BALLISTICS: PENETRATION; SHAPE CHARGE; KINETIC ENERGY EXPLOSIVELY FORMED PENETRATORS; LASERS; WATER JETS
- * PREDICTIONS AND SIMULATIONS
- * BODY AND OTHER PROTECTIVE ARMOR COMBINATIONS
- * PROJECTILE-TARGET INTERACTION; SHOCK PHENOMENA
- * BEHIND ARMOR DAMAGE: RISK ASSESSMENT; SURVIVABILITY
- * FRAGMENTATION MUNITIONS; EXPLOSIVE ORDNANCE; COMBINATIONS
- * BALLISTIC SYSTEMS PERFORMANCE ENHANCEMENT TECHNIQUES; CHARACTERISTICS
- COMPUTER: PROJECTILE DESIGN; GUN DESIGN; PERFORMANCE CHARACTERISTICS PARAMETERS;
- REDUCED VULNERABILITY BEHIND ARMOR DAMAGE DESIGNS

ENVIRONMENTAL & CHM HZD

January 25-29, 2010 BRAI-12 Ft. Walton Beach, FL

- LIFE CYCLE SYSTEMS PLANS: INCEPTION TO DISPOSAL OR DEMILITARIZATION I.E. CRADLE TO GRAVE
- METHODS, PROCEDURES AND VENDORS WHO HELP TO INSURE THAT YOU AND YOUR FACILITY ARE IN COMPLIANCE WITH THE LAW
- EFFECT OF YOUR SIGNATURE: WHEN TOXIC SUBSTANCES OR HAZARDOUS WASTES ARE INVOLVED OR FOUND;
- LEGAL LIABILITY IF CONTAMINATION IS FOUND: AS A CIVILIAN OR US GOVERNMENT EMPLOYEE
- CURRENT ENVIRONMENTAL REGULATIONS & THEIR IMPACT: AS PRESENTED BY AN ATTORNEY: EXISTING ENVIRONMENTAL, HAZARDOUS WASTE, AND TOXIC SUBSTANCES REGULATIONS
- LAW AND INTERPRETATION OF THE LAW IN AREAS OF ENVIRONMENTAL AND CHEMICAL HAZARDS
- PROPOSED FUTURE ENVIRONMENTAL REGULATIONS & AND THEIR IMPACT: AS PRESENTED BY AN ATTORNEY
- THE CLEAN AIR ACT; THE CLEAN WATER ACT
- STANDARDS: FOR HAZARDS AND TOXIC WASTE CLASSIFICATIONS

- USE OF HANDBOOK TO DETERMINE THE CLASSIFICATION OF HAZARDS
- REQUIRED PROCEDURES WHENEVER ENVIRONMENTAL PROBLEMS ARISE
- PRECAUTIONS WHEN TESTING MACHINING OR FORMING: URANIUM; LEAD, TUNGSTEN OR THEIR ALLOYS
- SPECIAL PRECAUTIONS FOR MACHINING AND TESTING OF URANIUM: REQUIRED AIR FILTRATION; PROPER AND LEGAL DISPOSAL OF WASTE INCLUDING ARMOR IMPACTED BY URANIUM PROJECTILES
- BY-PRODUCTS OF THE INTERIOR BALLISTICS COMBUSTION CYCLE: IMPACT ON THE ENVIRONMENT; NEEDED ENVIRONMENTAL IMPACT STATEMENT
- SPECIAL PRECAUTIONS WHEN USING LIQUID PROPELLANT GUN SYSTEM
- SAFETY AND HEALTH CONSIDERATIONS AROUND RANGE INSTRUMENTATION: RADAR; LASERS; LASER RANGE FINDER SIGHTS; X-RAYS; EML AND OTHER DANGEROUS POWER SUPPLIES
- SAFETY AND PROTECTIVE EQUIPMENT REQUIREMENTS: TYPES AND LIMITATIONS
- FIRE HAZARDS: TESTING WITH EXPLOSIVES, TRACERS, OR INCENDIARIES
- NOISE HAZARDS: METHODS AND TYPES OF PROTECTION
- EXPLOSIVE ORDNANCE DISPOSAL: BOMBS; MINES; EXPLOSIVE SHELLS; DUDS; TORPEDOES; AND MUNITIONS
- SAFE USE AND PROPER DISPOSAL OF CHEMICAL HAZARDS
- BASE CLOSURES; BASE CLEAN-UPS; PROCEDURES; FEDERAL AND STATE REGULATIONS

OBJECTIVE AND SCOPE

The objective of this course is to present the current regulations covering Environmental Hazardous Waste, Toxic Substances and Chemical Hazards, as they apply to anyone in general and specifically to those people working in Ballistics. The information contained in this course, will assist each attendee to be in compliance with the law. People have gone to jail and companies have gone out of business or suffered large fines for non-compliance of environmental laws. Being a government employee does not exempt the individual; ignorance of these laws can be very costly. The scope of the material covered in this course will be the current regulations and proposed future regulation.

MATERIAL COVERED

Conditions and Precautions which allow for compliance with the clean air and clean water acts. Knowledge of: proper classification of Environmental & Chemical Hazards, and Toxic Wastes; safe handling, storage, transportation, use, and proper, legal disposal. Material is covered by an attorney; former congressional staff member; compliance officer; safety officer and researcher; university professor and a former Explosive Ordnance Disposal (EOD) expert.

INTERIOR BALLISTICS:

EXPERIMENTAL DATA; COMPUTER CODES; DATA COLLECTION TECHNIQUES & APPROACHES: OVERVIEW FOR INTERNS, TECHNICIANS, ENGINEERS & SCIENTISTS

March 7-12, 2010 BRAI-13 Ft Walton Beach, FL

- EXPERIMENTAL TESTING TECHNIQUES TO OBTAIN A GIVEN VELOCITY FOR A GIVEN MASS LAUNCHED
- RELATIVE QUICKNESS OF PROPELLANTS - GENERAL RULES
- PRIMER - PROPELLANT INTERACTION - BASIC GENERAL RULES: SMALL CALIBER AND LARGE CALIBER GUN SYSTEMS
- PROPELLANT LAYERING; PROPELLANT MIXING; PROPELLANT BURNING CHARACTERISTICS
- GUN RANGE GUN SYSTEMS: STANDARD SYSTEMS; EXPERIMENTAL SYSTEMS; COMBINATION OF STANDARD AND EXPERIMENTAL SYSTEMS
- RANGE DESIGN CONSIDERATIONS FOR SAFE OPERATION, STORABLE, TRANSPORTATION AND HANDLING OF PROPELLANTS/EXPLOSIVES.
- COMPUTER CODES - HOW THEY ARE DEVELOPED - THEORETICAL AND EXPERIMENTAL DATA
- DATA COLLECTION: CHAMBER PRESSURES, VELOCITY MEASUREMENTS, X-RAY AND HIGH SPEED PHOTOGRAPHIC METHODS; REDUNDANT VELOCITY MEASURING SYSTEMS
- EXPERIMENTAL FRANKFORD ARSENAL/DR. MANNING CURVES
- EXTENDED FRANKFORD ARSENAL/DR. MANNING CURVES - OBSERVATIONS
- THEORETICAL VELOCITY LIMITS FOR GRANULAR PROPELLANT SYSTEMS
- THEORETICAL VELOCITY LIMITS FOR LIGHT GAS GUN SYSTEMS COMPARED TO GRANULAR PROPELLANT GUN SYSTEMS AT SAME PRESSURE LEVELS
- RANGE DESIGN CONSIDERATIONS FOR VERSATILE GUNS AND CHAMBERS USAGE
- GUN DESIGNS FOR TESTING: MULTIPLE CALIBERS, LENGTHS
- CHAMBER DESIGNS FOR TESTING
- PROPELLANT GUN SYSTEMS DESIGNS FOR TESTING
- VARIABLE CHAMBER VOLUME CONSIDERATIONS
- PROPELLANTS AVAILABILITY AND USE FOR OBTAINING VARIABLE VELOCITIES FOR A GIVEN LAUNCH WEIGHT AND CONFIGURATION
- CARTRIDGE CASES WHEN APPROPRIATE
- ENVIRONMENTAL AND CHEMICAL HAZARDS, HANDLING, STORAGE, TRANSPORTATION AND OTHER SAFETY CONSIDERATIONS
- LESSONS LEARNED

LASERS & BALLISTIC RANGES SAFETY

March 7-12, 2010 BRAI-14 Ft Walton Beach, FL
(New for 2010)

THIS IS A COMBINATION OF PREVIOUSLY DEVELOPED COURSES. THE COURSE DESCRIPTION FOR THIS COURSE CONSISTS OF PORTIONS OF THE FOLLOWING COURSES: LASERS & APPLICATIONS TO BALLISTICS, AND SAFETY: BALLISTIC RANGES

TEST AND EVALUATION

DESTRUCTIVE AND NON-DESTRUCTIVE TESTING

March 7-12, 2010 BRAI-15 Ft Walton Beach, FL

- BASIS FOR INDEPENDENT TEST AND EVALUATION
- LIVE FIRE TESTING AND EVALUATION
- NON-DESTRUCTIVE TESTING
- HOT, COLD AND AMBIENT TEMPERATURE TESTING
- SAFETY IN TESTING ENVIRONMENT
- SAFE HANDLING, STORAGE, TRANSPORTATION OF EXPLOSIVES & EXPLOSIVE MATERIALS
- PROPER ENVIRONMENTAL CONSIDERATIONS FOR ALL TYPES OF TESTING
- ENVIRONMENTAL TESTING TECHNIQUES
- SHOCK & VIBRATION TESTING
- METHODS OF TESTING AND EVALUATING
- TESTING TECHNIQUES & INSTRUMENTATION TECHNIQUES
- MATRIX PLANNING & TESTING APPROACHES
- ANALYSIS METHODS & TECHNIQUES
- STAGES OF RESEARCH & DEVELOPMENT & TESTING
- SAFETY CERTIFICATION OF WEAPONS & WEAPON SYSTEMS
- METHODS AND CALCULATIONS RELATED TO QUALITY CONTROL
- MISFIRES & MALFUNCTION INVESTIGATIONS
- STANDARD OPERATING PROCEDURES
- EMERGENCY PRECAUTIONS
- LESSONS LEARNED

OBJECTIVE & SCOPE

This course will be a general overview of Test & Evaluation for all type of personnel working in a Test and or Evaluation environment, or working with personnel directly working in the areas of testing and/or Evaluation. Instructors are people with hands on experience who are or have done their own set-up and testing. Instructors have been told not to use an equation unless it is absolutely necessary to explain a concept. This is true for all courses.

SAFETY: BALLISTIC RANGES

April 12-16, 2010 BRAI-16 Virginia Beach, VA

GUNS, PROJECTILE & SABOT DESIGN

April 12-16, 2010 BRAI-17 Virginia Beach, VA

HIGH VELOCITY:

GUN SYSTEMS, RANGE SYSTEMS & RANGE OPERATIONS

May 17-21, 2010 BRAI-18 Virginia Beach, VA

- 13000 FEET/SECOND: HIGH VELOCITY CONVENTIONAL PROPELLANT GUN (30 GM LAUNCH MASS/200 KPSI PRESSURE/40MM BORE DIAMETER)
- HIGH PRESSURE GUN & CHAMBER DESIGNS: UP TO AND ABOVE 200 KPSI
- HIGH PRESSURE MEASURING TECHNIQUES
- LIQUID PROPELLANT GUN SYSTEMS: TYPES, DESIGNS, & OPERATIONS
- ELECTROMAGNETIC (EM), ELECTROTHERMAL, ELECTROCHEMICAL & OTHER VARIATIONS: DESIGNS, OPERATION AND MATERIAL CONSIDERATIONS
- 38,000 FEET/SECOND LIGHT GAS GUNS AND LAUNCHERS, SYSTEM DESIGNS, MATERIALS, OPERATION AND CONSIDERATIONS
- RAM ACCELERATOR: FUNDAMENTAL PRINCIPLES; OPERATIONAL CHARACTERISTICS; LATEST EXPERIMENTAL RESULTS; SCALING & APPLICATIONS
- SABOT DESIGNS: FRAGMENTS & HIGH PRESSURE LAUNCH PACKAGES
- LONG ROD PENETRATOR & SABOT DESIGN, AND LAUNCH: LENGTH TO DIAMETER (L/D) RATIO UP TO 36; UP TO 210 KPSI
- EXTERIOR BALLISTICS: METHODS FOR CALCULATING DRAG COEFFICIENTS AND ACCURACY
- ARMOR PENETRATION: DESIGN, EVALUATION AND ANALYSIS
- PHASES OF IMPACT: ORDNANCE TO HYPER-VELOCITY; LONG ROD IMPACT PHENOMENA; COMPARISONS AND ANALYSIS
- SCALING: GUN CALIBERS; CHAMBERS AND BORE SYSTEM DIMENSIONS; PENETRATORS; SABOTS; TARGETS AND TARGET ARRAYS
- EXPERIMENTAL BALLISTIC RANGE: DESIGNS, INSTRUMENTATION, AND SAFE OPERATION
- INTERIOR BALLISTICS OF HIGH VELOCITY CONVENTIONAL PROPELLANT GUN (13,000 F/S): CHAMBER AND ACTION DESIGN; IGNITION SEQUENCE
- PROPELLANT AND PRIMER INTERACTIONS: UNIQUE METHODS OF IGNITION
- CHARGE PREDICTION AND PERFORMANCE: FOR VARIOUS LAUNCH MASS AND VELOCITY REQUIREMENTS
- TECHNIQUES FOR IGNITION AND CONTROLLED SEQUENTIAL PROPELLANT BURNING
- CASELESS; FOLDED AND OTHER EXOTIC GUN SYSTEMS: ADVANTAGES AND DISADVANTAGES
- RANGE INSTRUMENTATION: DESIGN AND APPLICATIONS FOR BALLISTIC EVENT MEASUREMENT
- FLASH X-RAY SYSTEMS: OPERATION, CAPABILITIES AND LIMITATIONS; DESIGN, UNIQUE USES; SCREEN MATERIALS AND COMBINATIONS FOR BEST RESULTS
- SAFETY: AVOID CATASTROPHIC FAILURES: DESIGN TO KNOWN FAILURE MODES; EXPECT THE UNEXPECTED

HAZARDOUS MATERIALS: USE & CONTROL

May 17-21, 2010 BRAI-19 Virginia Beach, VA

- OVERVIEW APPROACH TO HAZARDOUS MATERIALS MANAGEMENT
- POLLUTION PREVENTION CONCEPTS FOR GUNS AND EXPLOSIVES RANGES
- GUN AND EXPLOSIVES RANGE OPERATIONS WITH AND AROUND HAZARDOUS MATERIALS; STANDARD OPERATING PROCEDURES AND COMMUNICATIONS
- PRE-TESTING REQUIREMENTS FOR USING HAZARDOUS MATERIALS
- EMERGENCY PLANNING REQUIREMENTS FOR OPERATIONS INVOLVING GUN AND EXPLOSIVE RANGES
- FIRE AND OTHER ASSOCIATED CONCERNS FOR HAZARDOUS MATERIALS
- PROTECTIVE EQUIPMENT AND PROCEDURES IN DEALING WITH HAZARDOUS MATERIALS
- LIFE CYCLE SYSTEM PLANNING
- REGULATORY DIFFERENCES BETWEEN: HAZARDOUS MATERIALS, CHEMICALS SUBSTANCES AND HAZARDOUS WASTE
- IDENTIFICATION, LABELING AND MARKING REQUIREMENTS
- DETERMINING THE CLASSIFICATION OF HAZARDS (USING A HANDBOOK)
- CLEAN AIR ACT REQUIREMENTS, INCLUDING TITLE V PERMITTING
- CLEAN WATER ACT REQUIREMENTS, INCLUDING NPDES PERMITTING
- DISPOSAL METHODS FOR HAZARDOUS MATERIALS, CHEMICALS AND HAZARDOUS WASTE
- MILITARY MUNITIONS AS HAZARDOUS WASTE
- PROTECTIVE SAFETY MEASURES AND EQUIPMENT WHEN DEALING WITH HAZARDOUS CONDITIONS
- NOISE HAZARDS AND PROTECTION
- COMPATIBLE STORAGE FOR HAZARDOUS MATERIALS (USING A HANDBOOK)
- SPECIAL PROCEDURES FOR THE HANDLING AND USE OF: DEPLETED URANIUM, TUNGSTEN, LEAD (AND THEIR ALLOYS) AND LIQUID GUN PROPELLANTS
- ADMINISTRATIVE AND REGULATORY RECORD KEEPING REQUIREMENTS FOR HAZARDOUS MATERIALS
- PROPOSED FUTURE ENVIRONMENTAL REGULATIONS AND THEIR IMPACT
- LESSONS LEARNED TO AVOID UNSAFE WORKING CONDITIONS AND ENVIRONMENT

OBJECTIVE & SCOPE

The objective of this course is to present the current regulations covering hazardous materials, chemicals, substances, and hazardous waste, as they apply to range management, explosive technicians responsible for testing, project managers, test directors, and administrative officers. There will be several hands on exercises. The necessary reference books/material needed to do the exercises are included in the student's material in addition to the substantial student notebook.

TERMINAL BALLISTICS

June 21-25, 2010 BRAI-20 Virginia Beach, VA

HIGH VELOCITY, HIGH PRESSURE GUN SYSTEMS INTERIOR BALLISTICS

June 21-25, 2010 BRAI-21 Virginia Beach, VA

VULNERABILITY/SURVIVABILITY WEAPONS EFFECTS ON STRUCTURES & VEHICLES

June 28-July 2, 2010 BRAI-22 Virginia Beach, VA

- CHARACTERIZATION OF BLAST EFFECTS: FROM HIGH EXPLOSIVES; NUCLEAR WEAPONS; GAS EXPLOSIONS; FUEL/AIR EXPLOSIVES
- RESPONSE OF STRUCTURES TO BLAST LOADING
- DESIGN CONSIDERATIONS: TO REDUCE BLAST, VULNERABILITY & INCREASE SURVIVABILITY
- STEEL & CONCRETE DESIGNS: TO WITHSTAND BLAST
- USE OF DESIGN CODES: TM5-855, TM5-1300
- PENETRATION: OF STEEL, BUNKERS, CONCRETE & SOIL
- RESPONSE OF MATERIALS & STRUCTURES TO BALLISTIC LOADING
- STRESS WAVE EFFECTS: ON MATERIALS, STRUCTURES & VEHICLES
- GROUND SHOCK & BURIED STRUCTURES: EFFECTS FROM EXPLOSIVE WEAPONS
- EXAMINING THE EFFECT ON STRUCTURES: ARISING FROM ACCIDENTAL EXPLOSIONS, TERRORIST ATTACKS & ACTS OF WAR
- OVERVIEW: SUBJECT AREA OF STRUCTURE DESIGN AND RESPONSE
- METHODS OF QUANTIFYING LOADING FROM EXPLOSIVES: IN AIR & UNDERGROUND
- METHODS OF ASSESSING DAMAGE OR RESPONSE FROM EXPLOSIONS IN AIR OR UNDERGROUND: TO STRUCTURES (PRIMARILY); TO VEHICLES
- SURVIVABILITY TECHNIQUES: PROTECTIVE DESIGNS; METHODS OF REDUCING DAMAGE & VULNERABILITY
- ANALYTICAL TANK/VEHICLE MODEL
- SHAPE CHARGE EFFECTS ON TANKS/VEHICLES

OBJECTIVE AND SCOPE

- This course will cover the effect of explosives in various forms and media primarily on structures, and also on vehicles.
- Reduction of the Vulnerability of structures and vehicles to explosives, by improved designs, is a primary objective of this course.
- Knowledge of the blast effect of explosives and response of materials to severe shock loading is another objective of this course.
- The explosive delivery systems, the weapons, and media are varied; Their effects will be quantified, in order to increase Survivability and reduce Vulnerability.

MATERIAL COVERED

- The Vulnerability of structures (primarily) and vehicles (including combat vehicles), to various weapons damage will be covered.
- Methods of reducing damage and increasing Survivability will be discussed; Structural design will be discussed.
- The munitions looked at will be grenades, mortars, shaped charge and explosive projectiles, as well as bombs.
- Methods of surviving attacks by explosives and ways to reduce the Vulnerability of structures and vehicles will be covered.
- Behind Armor or Structural Damage, Vulnerability and Survivability as well as methods of designing better suppressive structures and protective structures will be discussed.
- This course will cover the history, definition and sensitivities, of various explosives as well as their vulnerability and their effects on structures.
- Shock and Blast effects of explosives and weapons will be covered; Response to loading and stress will be discussed.

HIGH SPEED & STANDARD PHOTOGRAPHY II

June 28-July 2, 2010 BRAI-23 Virginia Beach, VA

- HIGH SPEED PHOTOGRAPHY-OVERVIEW AND TYPES OF AVAILABLE EQUIPMENT
- STANDARD PHOTOGRAPHY- OVERVIEW AIMED AT KNOWLEDGE REQUIRED FOR EXCELLENT BALLISTICS RANGE TESTING OR HIGH SPEED DYNAMIC DATA COLLECTION
- DIGITAL TYPE OF EQUIPMENT AND INFORMATION PROCESSING
- LIGHT SOURCES-INCLUDING LASER/COHERENT LIGHT
- FILM, SCREENS AND DIGITAL EQUIPMENT
- OPTICS, DIFFERENT TYPES AND SET-UPS
- TRIGGERING APPROACHES AND TECHNIQUES
- FLASH UNITS, BULBS, SPARKS AND OTHER DEVICES AND THEIR USE IN HIGH SPEED AND STANDARD PHOTOGRAPHY
- FLASH X-RAYS; HALL STREAK CAMERA EFFECTS
- VIDEO AND OTHER TYPES OF DATA COLLECTION DEVICES
- OVERVIEW AND HISTORY OF OPTICS, LENSES AND F-STOPS
- RELATED CAMERA AND PHOTOGRAPHY EQUIPMENT AND INSTRUMENTATION
- PROCESSING OF FILM; FILM TYPES AND SPEED
- READING AND ANALYSIS OF FILMS AND DIGITAL RESULTS
- INTEGRATION OF DIGITAL CAMERA/VIDEO FOR POWER POINT TYPE PRESENTATIONS
- FILM MEASURING TECHNIQUES
- ENHANCED IMAGING TECHNIQUES
- TYPICAL TSST SET-UPS AND CAUTIONS
- DATA COLLECTION CONSIDERATIONS
- STANDARD OPERATING PROCEDURES
- ENVIRONMENTAL CONSIDERATIONS
- ARCHIVAL CONSIDERATION - STORAGE, TEMPERATURE AND HUMIDITY
- SAFETY CONSIDERATIONS IN OPERATING STANDARD AND HIGH SPEED DIGITAL, FILM, DRUM AND ROTATING PRISM CAMERAS, ETC.
- LESSONS LEARNED

OBJECTIVE & SCOPE

There are no prerequisites for this or any other course offered by Baldini Resource Associates, Inc. This course is designed to cover all aspects of high speed and slow to still photography in order to obtain the desired results in either the static or dynamic (High Speed) mode. Lighting and Optics, F-stops, Lens and related Instrumentation will be covered for either film or digital cameras/systems.

WHO SHOULD ATTEND:

Technicians who perform Range Testing or Experimental work as well as the Engineers and Scientists who direct the work, should attend. Course Listings and Descriptions

GUNS, PROJECTILE & SABOT DESIGN

July 19-23, 2010 BRAI-24 Virginia Beach, VA

RANGE TESTING & OPERATION

July 19-23, 2010 BRAI-25 Virginia Beach, VA

GUN DESIGN: SMALL CALIBER, LARGE CALIBER & EXPERIMENTAL BALLISTICS

August 16-20, 2010 BRAI-26 Virginia Beach, VA

- GUN AND LAUNCH DYNAMICS
- STANDARD VERSUS EXPERIMENTAL GUN DESIGN CONSIDERATIONS
- SMALL VERSUS LARGE CALIBER GUN DESIGN CONSIDERATIONS
- DYNAMIC VERSUS STATIC GUN DESIGN: THICK & THIN TUBE WALL THEORY
- MATERIAL PROPERTIES DESIRED IN GUN DESIGN
- CASED VERSUS NON-CASED GUN SYSTEMS
- HEAT CHECKING - ALL GUN DESIGNS
- RECOIL AND MOUNT SYSTEMS
- EFFECT OF BLAST FLASH & SMOKE SUPPRESSORS; SILENCERS
- LIQUID, LIGHT GAS & ELECTRO-MAGNETIC ELECTRO-THERMAL AND OTHER EXPERIMENTAL GUN DESIGNS
- EFFECTS OF WEAR & EROSION ON USEFUL GUN LIFE
- SAFETY REQUIREMENTS FOR FIELDING SYSTEMS
- ALLOWABLE RISKS FOR MAN/PERSON FIRING SYSTEMS
- AVOIDING "CATASTROPHIC" FAILURE IN GUN DESIGN
- DESIGNING FOR A "CONTROLLED" FAILURE
- LESSONS LEARNED

FUZES, WARHEAD DESIGNS & EOD

(EXPLOSIVE ORDNANCE DISPOSAL)

September 27-October 1, 2010 BRAI-27 Ft. Walton Beach, FL
(New for 2010)

THIS COURSE CONSISTS OF A COMBINATION OF PREVIOUSLY DEVELOPED COURSES ON FUZES, WARHEAD DESIGNS AND EOD (EXPLOSIVE ORDNANCE DISPOSAL)

COURSE DESCRIPTIONS WILL BE A PORTION OF EACH OF THREE COURSES: FUZES & WARHEAD DESIGNS AND EOD (EXPLOSIVE ORDNANCE DISPOSAL) INCLUDING RSP (RENDER SAFE PROCEDURES)

LESSONS LEARNED WILL BE EMPHASIZES BY INSTRUCTORS WHO HAVE HANDS-ON EXPERIENCE AND ARE STILL AROUND TO TELL ABOUT IT WITH MOST, IF NOT ALL OF THEIR LIMBS AND SENSES.

ENVIRONMENTAL & CHM HZD

September 27-October 1, 2010 BRAI-28 Ft. Walton Beach, FL

HIGH SPEED PHOTOGRAPHY: INSTRUMENTATION TECHNIQUES & ANALYSIS

December 6-10, 2010 BRAI-29 Las Vegas, NV

- HIGH SPEED PHOTOGRAPHIC CAMERAS
- HIGH INTENSITY LIGHT SOURCES
- TECHNIQUES FOR RECORDING/WRITING HIGH SPEED EVENTS
- VELOCITY MEASURING TECHNIQUES-HIGH SPEED EVENTS
- MODEL INTEGRITY AND ORIENTATION/MOTION ANALYSIS TECHNIQUES
- HIGH SPEED X-RAY EQUIPMENT SYSTEMS AND OPERATION
- X-RAY INTENSIFYING SCREENS, FILMS, DEVELOPMENT AND ANALYSIS
- HARD & SOFT X-RAYS
- METHODS OF ANALYSIS FOR HIGH SPEED PHOTOGRAPHY AND X-RAYS
- HALL STREAK CAMERA SYSTEMS
- TRIGGERING TECHNIQUES FOR PHOTOGRAPHIC EVENTS
- LASER USE AND OTHER TYPES OF ILLUMINATION
- LIGHT SOURCES AND THEIR LIMITATIONS AND APPLICATIONS
- DETECTION TECHNIQUES AND LIMITATIONS OF EACH TYPE
- SPARK PHOTOGRAPHY
- BECKMAN-WHITLEY/CORDIN TYPE CAMERA WRITING OPERATION AND USES
- CAMERAS, ROTATING PRISM AND OTHER TYPES AND LIMITATIONS
- SCHLIEREN PHOTOGRAPHIC APPROACHES; SHADOWGRAPH INTERFEROMETRY
- METHODS FOR FILM PROCESSING
- APPLICATIONS OF HIGH SPEED PHOTOGRAPHY TO BALLISTICS
- IN-BORE AND OUT OF BORE INSTRUMENTATION
- TEST AND EVALUATION APPLICATIONS OF HIGH SPEED PHOTOGRAPHY
- HARDENING OF EXPENSIVE PHOTOGRAPHIC AND OTHER EQUIPMENT
- LABORATORY AND RANGE SAFETY INSTRUCTIONS FOR DELICATE EQUIPMENT
- PRECISION IN MEASUREMENT APPROACHES; ALIGNMENT PROCEDURES
- SAFETY IN USE OF HIGH ENERGY AND RADAR EQUIPMENT
- PROPER SAFETY INSTRUCTION; INTERLOCKS; SAFETY EQUIPMENT
- STANDARD OPERATING PROCEDURES
- PRECAUTIONS WHEN WORKING WITH EXPLOSIVES & BALLISTIC MALFUNCTIONS
- RELATED OPTICS; VIDEO AND ANALYSIS
- DIGITAL IMAGING TECHNIQUES
- COMPUTER DATA ANALYSIS AND DATA REDUCTION APPROACHES
- FILM ENHANCEMENT TECHNIQUES AND PROCESSING

NOTE: More than one point of view may cover a given topic. There will be some hands on experience, but that will not be the primary emphasis of this course.

OBJECTIVE & SCOPE

The emphasis for this High Speed Photographic Seminar will be to provide a sound basis of capability, operation and use of equipment to obtain visual stop action for high speed motion events. Other Instrumentation Techniques covered would include Ballistic and Explosive events, Missiles, as well as Laboratory polarized stress-strain analysis and other experiments. Triggering and Instrumentation Techniques will be discussed for obtaining Test and Evaluation information and data in the Ballistic Range Facilities as well in the Laboratory.

MATERIAL COVERED

High Speed Photographic and Visual Motion Capturing Data Collecting Equipment, including triggering, lighting, developing, set-up, measurement, digital imaging media and analysis and enhancing techniques, will be covered. Instrumentation and other areas related to data collection for Test and Evaluation will also be emphasized.

EXPLOSIVES & EXPLOSIVE ORDNANCE OPERATORS/EXPLOSIVE TEST OPERATORS

December 6-10, 2010 BRAI-30 Las Vegas, NV

BALLISTICS III

December 13-17, 2010 BRAI-31 Las Vegas, NV

- VULNERABILITY: WEAPONS EFFECTS ON STRUCTURES
- VULNERABILITY/SURVIVABILITY OF STRUCTURES
- DESIGN OF STRUCTURES TO WITHSTAND SEVERE SHOCK AND EXPLOSIONS
- PROTECTION TECHNIQUES FOR INCREASING SURVIVABILITY

- GUN DESIGNERS SEMINAR: TYPES OF GUN DESIGNS;
- DIMENSIONAL TOLERANCES; CAUSES OF MALFUNCTION
- SAFETY: BALLISTIC RANGES; LIABILITY LAWS
- STANDARD OPERATIONAL PROCEDURES
- LOCAL, STATE, FEDERAL AND DEPARTMENT OF TRANSPORTATION SAFETY REGULATIONS & REQUIREMENTS
- HIGH SPEED PHOTOGRAPHY: INSTRUMENTATION TECHNIQUES & ANALYSIS
- LIGHT SOURCES & TRIGGERING APPROACHES FOR STOP ACTION OF HIGH SPEED EVENTS
- ROTATING PRISM AND OTHER CAMERAS: OPTICS AND VIDEO APPROACHES
- TEST & EVALUATION/EXPERIMENTAL BALLISTICS
- DESIGN AND CORRECT USE OF STANDARD TESTING PROCEDURES
- HUMAN ENGINEERING AND REAL RANGE FIELD CONDITION TESTING
- LIFE CYCLE CONSIDERATIONS; DEVELOPMENTAL THROUGH TO AND INCLUDING DEMILITARIZATION

EXPERIMENTAL BALLISTICS

December 13-17, 2010 BRAI-32 Las Vegas, NV

- RESEARCH AND DEVELOPMENT REQUIREMENTS: MILITARY OR COMMERCIAL
- ANALYSIS OF PROBLEM WITH TENTATIVE APPROACHES TO A SOLUTION
- COMPUTER SIMULATION WHEN AND WHERE POSSIBLE
- DESCRIPTION OF POSSIBLE VERIFICATION TEST & OTHER TEST REQUIREMENTS
- TESTING PROGRAM: AVAILABLE VERSUS REQUIRED ASSETS
- VELOCITY AND MASS LAUNCHED REQUIREMENTS
- GUN/LAUNCHER SELECTION ? THROUGH ANALYSIS
- FOR GUN TESTING: USING STANDARD AVAILABLE PROPELLANTS AND PRIMERS; AVAILABLE SURPLUS GUN AND CHAMBER SYSTEMS; AVAILABLE FIRING DATA FOR ALL STANDARD WEAPON SYSTEMS AND HANDBOOKS
- DESIGNING TEST FACILITY OR USING AVAILABLE FACILITIES
- DESIGNING TEST GUN/LAUNCHERS AND CHAMBERS
- SABOT DESIGNS FOR EXPERIMENTAL TESTING
- X-RAY SYSTEMS FOR MEASURING VELOCITY AND ANGLE OF YAW TO LINE OF FIRE
- HIGH SPEED PHOTOGRAPHY, RADAR AND OTHER INSTRUMENTATION REQUIREMENTS
- CHAMBER DESIGNS; PROS & CONS; MATERIALS, HARDNESS, STRENGTH REQUIREMENTS
- CARTRIDGE CASE DESIGNS, MATERIAL, SEALING, EXTRACTION, COMBUSTIBLE
- CHARGE DEVELOPMENT
- INTERIOR AND EXTERIOR COMPUTER PROGRAMS ? APPLICABLE TO MILITARY AND COMMERCIAL SYSTEMS
- EXTERIOR AND TERMINAL BALLISTIC CONSIDERATIONS

GENERAL INFORMATION

REGISTRATION: Advance registration with fee is required. Checks, purchase orders, U.S. Government standard DD 1556/SF182 forms or government purchase orders must be received by Baldini Resource Associates, Inc. before registration is complete. The fee includes course notes and material, coffee breaks, reception and other administrative expenses. No other expenses will be covered. A certificate will only be issued for successful course attendance and completion. **NO REFUNDS FOR CANCELLATIONS TWELVE WEEKS PRIOR TO COURSE START DATE, AFTER YOU HAVE BEEN ACCEPTED AND/OR CONFIRMED TO ATTEND A GIVEN COURSE;** \$100.00 service fee, other cancellations; substitutions are acceptable at any time. Mail the attached Acceptance Form with fee (payable to Baldini Resource Associates, Inc., 10 Barry Lane, Newton, NJ 07860 USA).

PLEASE NOTE: CANCELLATIONS WILL ONLY BE ACCEPTED IN WRITING, as described above.

Please note that Baldini Resource Associates, Inc. reserves the right to substitute lectures, modify the program, change locations and dates or cancel any seminar.

**CLASSIFICATION: THESE COURSES ARE UNCLASSIFIED;
NO CLASSIFIED MATERIAL WILL BE DISCUSSED AT ANY TIME.**

ADDITIONAL INFORMATION: Contact: Lou Baldini, (973) 383-6375 or (973) 383-6090 or FAX: (973) 579-9552; 10 Barry Lane, Newton, NJ 07860 (USA)

TAX STATUS: Treasury Regulation 1.162-5 permits an income tax deduction for educational expenses (registration fees and cost of travel, meals and lodging) undertaken to: 1) maintain or improve skills required in one's employment or other trade or business, or 2) meet express requirements of an employer or a law imposed as a condition to retention of employment, job status or rate of compensation.

1-973-579-3997

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10 BARRY LANE
NEWTON, NJ 07860 USA

US GOVERNMENT AND MILITARY PERSONNEL: Government Quarters are not available at the Seminar site. Request for government orders should state temporary duty to: Ft. Walton Beach, FL or Virginia Beach, VA or Las Vegas, NV

TRANSPORTATION: Arrival by the evening prior to the seminar is recommended in view of the early starting time. Lodging, meals and transportation will be the responsibility of each attendee, and is not included in course fee.

FEES *Note: Fees are based on when payment is received by Baldini Resource Associates, Inc. not when paperwork is initiated, whether it be a purchase order or 1556/SF182 form. We accept credit cards.*

5 DAY	2795.00	each attendee per course, fees received by Baldini Resource Associates, Inc., up to before 2 weeks of course start date.
	2895.00	each attendee per course, fees received by Baldini Resource Associates, Inc., from 2 weeks before course start date to course start date.
	2995.00	plus 1.5% per month on the unpaid balance each attendee per course, fees received by Baldini Resource Associates, Inc., at the course start date or thereafter.
3 DAY	2595.00	each attendee per course, fees received by Baldini Resource Associates, Inc., up to before 2 weeks of course start date.
	2695.00	each attendee per course, fees received by Baldini Resource Associates, Inc., from 2 weeks before course start date to course start date.
	2795.00	plus 1.5% per month on the unpaid balance each attendee per course, fees received by Baldini Resource Associates, Inc., at the course start date or thereafter.
2 DAY	2495.00	each attendee per course, fees received by Baldini Resource Associates, Inc., up to before 2 weeks of course start date.
	2595.00	each attendee per course, fees received by Baldini Resource Associates, Inc., from 2 weeks before course start date to course start date.
	2695.00	plus 1.5% per month on the unpaid balance each attendee per course, fees received by Baldini Resource Associates, Inc., at the course start date or thereafter.

NOTE: FEES ONLY INCLUDE COURSE INSTRUCTION, HANDOUTS, COFFEE BREAKS AND RECEPTION. NOT INCLUDED IN THIS FEE ARE TRAVEL, FOOD, LODGING AND OTHER MISCELLANEOUS EXPENSES.

PAYMENT: Checks, Purchase Orders, DD Form 1556/SF182 or Credit Cards in US Dollars.

CONFIRMATION NOTICES: Confirmation Notices received from Baldini Resource Associates Inc. by an attendee will guarantee a place for that attendee at a given course, and constitute a firm commitment, by the attendee to attend.

CAUTIONS: If a sufficient number of attendees are not received for a given course, that course may be cancelled.

AGENDA FOR ALL COURSES: Coffee & Danish, 0700-0800, during course days; course starts at 0800 each day with a coffee break for both morning and afternoon; course completed by 1700 each day. Registration is from 0700 - 0800 the first day of each course.

LODGING: Hotel Location and Room rates information will be sent with your confirmation letter/fax, acknowledging the receipt of your registration and acceptance form or acceptance.

Any questions about these courses can be directed to: **Lou Baldini, Baldini Resource Associates, Inc.,** 10 Barry Lane Newton, NJ 07860 US, Phone: (973) 383-6375 • Phone (973) 383-6090 • Fax: (973) 579-9552 • email: bra@nac.net

NOTES:

- 1. Blocks of rooms have been reserved, but will only be held until four weeks before the start date of each course. These rooms are at a reduced rate for these courses.**
- 2. Please make your room reservations directly with the hotel as early as possible. To get these reduced rates, advise the hotel that you are attending a seminar presented by Baldini Resource Associates, Inc., i.e. a "Baldini Seminar."**
- 3. Lodging, Meals, Transportation and other expenses will be the responsibility of each attendee, and is not included in the course fee.**

ALL COURSES ARE FOR NEW EMPLOYEES, INTERNS, TECHNICIANS, ENGINEERS, SCIENTISTS AND/OR GENERAL PERSONNEL.
There are NO prerequisites for any courses, except Dr. Charles H. Murphy's courses which require a working knowledge of differential equations.

ALL COURSES ARE UNCLASSIFIED. NOTICE: THERE WILL BE NO DISCUSSION OF ANY CLASSIFIED MATERIAL AT ANY TIME. ONLY MATERIAL CLEARED FOR PUBLIC RELEASE OR AVAILABLE IN THE PUBLIC DOMAIN WILL BE DISCUSSED AT ANY TIME AT THE SEMINAR SITE.

I will be attending the following course(s): Please check the appropriate box(es)

2009 SCHEDULE OF FIVE DAY TRAINING & DEVELOPMENT COURSES	
<input type="checkbox"/> High Velocity, High Pressure Gun Systems Interior Ballistics BRAI-1 August 31-September 4, Virginia Beach, VA	<input type="checkbox"/> Test & Evaluation: Experimental Ballistics BRAI-6 November 9-13, Ft. Walton Beach, FL
<input type="checkbox"/> Ballistics: Overview BRAI-2 August 31-September 4, Virginia Beach, VA	<input type="checkbox"/> High Speed Photography: Instrumentation Techniques & Analysis BRAI-7 December 7-11 Las Vegas, NV
<input type="checkbox"/> BRAI-3 Terminal Ballistics September 14-18, Aberdeen Proving Ground, MD area	<input type="checkbox"/> Safety: Ballistic Ranges BRAI-8 December 7-11 Las Vegas, NV
<input type="checkbox"/> Guns, Projectiles & Sabot Design BRAI-4 September 14-18, Aberdeen Proving Ground, MD area	<input type="checkbox"/> Ballistics BRAI-9 December 14-18, Las Vegas, NV
<input type="checkbox"/> Explosives: Explosive Test Operators/Explosive Ordnance Operators BRAI-5 November 9-13, Ft. Walton Beach, FL	<input type="checkbox"/> Range Testing & Operation BRAI-10 December 14-18, Las Vegas, NV

2010 SCHEDULE OF FIVE DAY TRAINING & DEVELOPMENT COURSES	
<input type="checkbox"/> Ballistics: Interior, Transitional, Exterior, Terminal Ballistics & Behind Armor Damage (BAD) BRAI-11 January 25-29 Ft. Walton Beach, FL	<input type="checkbox"/> High Speed Photography II BRAI-23 June 28-July 2 Virginia Beach, VA
<input type="checkbox"/> Environmental & Chemical Hazards BRAI-12 January 25-29 Ft. Walton Beach, FL	<input type="checkbox"/> Guns, Projectiles & Sabot Design BRAI-24 July 19-23 Virginia Beach, VA
<input type="checkbox"/> Interior Ballistics BRAI-13 March 7-12 Ft. Walton Beach, FL	<input type="checkbox"/> Range Testing & Operation BRAI-25 July 19-23 Virginia Beach, VA
<input type="checkbox"/> Lasers & Ballistic Ranges Safety BRAI-14 March 7-12 Ft. Walton Beach, FL (<i>New for 2010</i>)	<input type="checkbox"/> Gun Design: Small Caliber, Large Caliber & Experimental Ballistics BRAI-26 August 16-20 Virginia Beach, VA
<input type="checkbox"/> Test & Evaluation: Destructive & Non-Destructive Testing BRAI-15 March 7-12 Ft. Walton Beach, FL	<input type="checkbox"/> Fuzes, Warhead Design & EOD BRAI-27 September 27-October 1 Ft. Walton Beach, FL (<i>New for 2010</i>)
<input type="checkbox"/> SAFETY: Ballistic Ranges BRAI-16 April 12-16 Virginia Beach, VA	<input type="checkbox"/> Environmental & Chemical Hazards BRAI-28 September 27-October 1 Ft. Walton Beach, FL
<input type="checkbox"/> Guns, Projectiles & Sabot Design BRAI-17 April 12-16 Virginia Beach, VA	<input type="checkbox"/> High Speed Photography: Instrumentation Techniques & Analysis BRAI-29 December 6-10 Las Vegas, NV
<input type="checkbox"/> High Velocity Gun Systems, Range Systems & Range Operations BRAI-18 May 17-21 Virginia Beach, VA	<input type="checkbox"/> Explosives: Explosive Test Operators/Explosive Ordnance Operators BRAI-30 December 6-10 Las Vegas, NV
<input type="checkbox"/> Hazardous Materials: Use & Control BRAI-19 May 17-21 Virginia Beach, VA	<input type="checkbox"/> Ballistics III BRAI-31 December 13-17 Las Vegas, NV
<input type="checkbox"/> Terminal Ballistics BRAI-20 June 21-25 Virginia Beach, VA	<input type="checkbox"/> Experimental Ballistics BRAI-32 December 13-17 Las Vegas, NV
<input type="checkbox"/> High Velocity, High Pressure Gun Systems, Interior Ballistics BRAI-21 June 21-25 Virginia Beach, VA	
<input type="checkbox"/> Vulnerability/Survivability: Weapons Effects on Structures BRAI-22 June 28-July 2 Virginia Beach, VA	

LECTURE TEAM

- The following are the Lecture Team for Training Seminars/Courses presented by Baldini Resource Associates, Inc.; Other Instructors will be added as required.
- DR. CHARLES E. ANDERSON, JR:** BS Physics, MS Physics, PhD Physics; Manager, Ballistics Science Section, Dept of Materials & Mechanics, Southwest Research Institute, San Antonio, TX
 - MR. LUIGI F. BALDINI:** BS Physics; President and Founder, Baldini Resource Associates, Inc., Newton, NJ
 - MR. JOSEPH J. BALDINI:** Master Photographer, Newton, NJ
 - MR. JOHN J. BALDINI, ESQ:** 2nd Amendment General Law, Defense Attorney, Drexel Hill, PA
 - MR. LOUIS A.C. BARBAK:** BS Aeronautical Engr, MBA; President, HNL Enterprises, Park Forest, IL
 - MR. JIM BOZWELL:** "Boz's" Institute of Technology, Niceville, FL
 - PROF. N. SINGH BRAR:** Consultant, University of Dayton Research Institute, Dayton, OH
 - DR. LINDA J. BONANNI:** Consultant, Trenton, NJ
 - PROF. ADAM P. BRUCHNER:** Professor, Department of Aeronautics & Astronautics, Univ. of Washington, Seattle, WA
 - MR. TIM BUMANN, ESQ:** Legal Defense, Cozen & O'Connor, Atlanta, GA
 - MR. LAWRENCE BURTON:** US ARL, APG, MD
 - MR. RAY CARR:** US Army, ARDEC, Picatinny Arsenal, NJ
 - MR. PHIL CHASE:** Advertising, Sprawl & Associates, Fairfield, CT
 - MR. ROBERT V. CHIARELLO:** Insurance, Joseph Chiarello & Co., Elizabeth, NJ
 - DR. WILLIAM C. CLIFF:** Manager, Battelle Pacific N.W., Richland, WA
 - MR. ANDREW CUNNINGHAM:** Adaptive Optics Associates, Inc., Madison, CT
 - MR. FRANCIS DAHDOUH:** Consultant, US ARDEC, Picatinny Arsenal, NJ
 - MR. RON DEEMER:** Consultant, Huntsville, AL
 - DR. ANDREW M. DIETRICH:** PhD Mech Dept, Sch of Eng; Former Chief, Warhead Mechanics Br., Terminal Ballistics Div., Army Research Lab (ARL), APG, MD (Retired)
 - MR. EDWARD B. FISHER:** ME Co-Founder and Technical Vice President, Verity Technology, Inc., East Amherst, NY
 - MR. ABRAHAM FLATAU:** BS, MAE Aeronautical Engr, ME Engr; Consultant, Baltimore, MD (Deceased)
 - MR. PETER W.W. FULLER:** MSc, MIEE, SMIEEE, GRAD ENG Royal Armament Research & Development Establishment; Consultant, Bromley, Kent, England
 - MR. WILLIAM D. (DON) GRAY:** Senior Fellow & Director, Water Program, Environmental and Energy Study Institute, Washington, DC
 - MR. ROBERT B. FREY:** Consultant, Belair, MD
 - DR. PAUL HAZEL:** Royal Military College of Science, Cranfield University, England, UK
 - MS. CONNIE JANZEN:** Photonic Systems, Inc., Stuart, FL
 - MR. P. A. COX:** Southwest Research Institute, San Antonio, TX
 - MR. WILLIAM HAIND:** Adaptive Optics Associates, Inc., Madison, CT
 - PROFESSOR JOHN G. HETHERINGTON BA,** MA Engineering Science, Cranfield University; Head, Design Group, Royal Military College of Science (RMCS), Cranfield University, England
 - MR. DAVID W. HOLMES:** Holmes Enterprize International, Virginia Beach, VA
 - DR. GARY R. HUGHES:** Professor, Consultant, The University of Alabama in Huntsville, Huntsville, AL
 - MR. FRED HUETTIG:** Adaptive Optics Associates, Inc., Madison, CT
 - MR. J.D. JONES:** Consultant, PRESENT SSK INDUSTRIES, Wintersville, OH
 - MR. WILLIAM L. KINCHLOPE:** P.E. Jayanbee Engineering, Consultant, Magalia, CA
 - MR. DONALD KENNEDY:** President, D.R. Kennedy & Associates, Mountain View, CA (Deceased)
 - MR. TERRY G. KLEYPAS:** Consultant, Axtell, TX
 - MR. FRANK KOSEL:** DRS Hadland Inc. DRS Technologies, Cupertino, CA
 - MR. CARL KRUPACK:** Consultant, Lafayette, NJ
 - MR. DONALD J. LACEY:** Field Artillery Infantry & Special Weapons Div., Directorate for Test, US Army Test & Evaluation Command, APG, MD
 - MR. ALVIN R. LANE:** Consultant, Fredricksburg, VA
 - MR. PETER LAWRENCE:** Titan Corporation, Dayton, OH
 - MR. EVERETT A. LONG JR.:** Consultant, Former Range Foreman Safety Officer, China Lake, CA, Ridgecrest, CA
 - DR. IAN LUCKRAFF:** Royal Military College of Science (RMCS), Cranfield University, England
 - PROFESSOR GEOFF MAY:** BSc Engr Sc, PhD; Head, Civil Engineering Group, Royal Military College of Science (RMCS), Cranfield University, England
 - MR. DAVE MEIER:** Photonics, Inc., Stuart, FL
 - MR. HARVEY B. MEIERFRANK:** Harvey B. Meier Associates, Pittsburgh, PA
 - DR. WILLIAM T. McDONALD:** ScD Instrumentation; Consultant: Sierra & Lyman Corp., Birmingham, AL
 - DR. NEALE A. MESSINA:** PhD Mech & Aerospace Engr; Consultant, Princeton, NJ
 - MR. MILT MONTEAU:** Consultant, Portsmouth, VA
 - DR. CHARLES H. MURPHY:** Consultant, Upper Falls, MD
 - DR. STEPHEN MURRAY:** Cranfield University, Royal Military College of Science, Sharnham, Wilts, England
 - MR. DENNIS L. ORPHAL:** Consultant, International Research Associates, Pleasanton, CA
 - MR. JAMES C. PEARSON:** BS, Mechanical Engineering; Former Chief, Warheads Group, US Army ARDEC, Picatinny Arsenal, Picatinny, NJ
 - MR. JAMES F. O'BRYON:** Former Director, Operational Test & Evaluation/Live Fire Testing, Office of the Secretary of Defense, The Pentagon, Washington, DC (Retired)
 - MR. CHARLES G. PRITCHARD:** MA Russian Area Studies; EOD Expert; Consultant and analyst; Institute for Defense Analysis, Silver Spring, MD (Deceased)
 - DR. MARK RICHARDSON:** DSc; First Class Honours, Physics, Imperial College; MSc Applied Optics, DICP, MInstP; Lecturer, Royal Military College of Science (RMCS), Cranfield University, England
 - MR. JOHN P. RIEGEL, III:** BS & Grad Studies; Manager, Southwest Research Institute, San Antonio, TX
 - MR. FREDERICK W. ROBBINS:** Consultant, Havre de Grace, MD
 - MR. JAMES L. ROBERTS:** Consultant/Firearms Examiner, Los Angeles Sheriffs Office, Los Angeles, CA
 - MR. WILLIAM J. ROBERTS, ESQ:** Legislative Director, Environmental Defense Fund, Washington, D.C.
 - MR. TODD G. RUMBALD:** DRS Hadland Inc. DRS Technologies, Cupertino, CA
 - MR. RICHARD E. "DICK" SCHWANKE:** BA, MS Sys Mgmt, MBA; Daedalian Systems, Safety & Health Physics Lab, US Army Research Lab, APG, MD
 - MR. JAMES B. SEBOLKA:** Consultant, Falls Creek, VA
 - MR. GRAHAM F. SILSBY:** BS, ME & CE; Terminal Ballistics Div ARL, APG, MD
 - MR. PETER SMITH:** MA Engr, MSc, University of Oxford; Senior Lecturer, Civil Engineering, Royal Military College of Science (RMCS), Cranfield University, England
 - MR. PAT SQUIRE:** Manufacturing & Importing, Simsbury, CT
 - DR. DAVE STRANGE:** President, Physics Applications Inc., Dayton, OH
 - DR. PETER F. STROM:** Professor, Department of Environmental Sciences, Rutgers Univ, New Brunswick, NJ
 - MR. HALLOCK F. SWIFT:** MS Physics; Chief Scientist, PAI, Dayton, OH
 - MR. GORDON TILLER:** Consultant Washington, DC
 - MR. PHILIP E. TOWNSEND:** Modeling and Simulation, Andover, NJ
 - DR. JAMES D. TROLINGER:** Metro Laser, Director of Research, Irving, CA
 - MR. RENE VAN GANEGHAM:** Consultant, MD
 - MR. CHARLES (PETE) VAN ROYEN:** BS Mech Engr; Project Engineer for 20MM Vulcan and Other Gatling Gun Systems, Consultant, VT
 - MR. DOUGLAS A. YOUNG:** Dual Corp., VA
 - MR. JAMES H. WALBERT:** Vulnerability Div., US Army Research Laboratory, APG, MD
 - MR. EDWIN A. WEBSTER, JR:** Consultant, Hewlett-Packard Corp, Chalfont, PA
 - MR. ROBERT H. WHYTE:** Tech Director, Arrow Tech, South Burlington, VT
 - MR. J.B. WOOD:** Custom Gunsmith, Fire Arms Designer, Evaluator, Appraiser and Forensic Consultant, Corydon, KY

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NOTE: All Course Descriptions, Outlines and Special Announcements can be viewed at our website: <http://www.baldini.com>

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Courses

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TRAINING & DEVELOPMENT COURSES

LISTING OF COURSE TITLES AVAILABLE FOR ON-SITE/NEAR SITE

COURSE NO.	TITLE	COURSE NO.	TITLE	COURSE NO.	TITLE	COURSE NO.	TITLE
MWB/LB-1	High Velocity	MWB/LB-30	Vulnerability/Survivability: Smart Munitions: Electro-Optic Surveillance & Seeker Systems		Overview for New Employees, Technicians, Engineers & Scientists		Data Collection Techniques & Approaches: Overview for Interns, Technicians, Engineers & Scientists*
MWB/LB-2	Interior Ballistics	MWB/LB-31	Explosives & Explosive Ordnance Operators/Explosive Test Operators	MWB/LB-60	Acquisition & Program Planning	LB-246	Large Caliber & Small Caliber Interior, Exterior & Terminal Ballistics; An Introduction to Space Ballistics:**
MWB/LB-3	Terminal Ballistics	MWB/LB-32	Soldier & Shoulder Launched Munitions	MWB/LB-61	Explosives		Warheads, Explosives, Explosive Devices, Fuzes, Guns, Ammunition & Armor Ballistic Testing Techniques:**
MWB/LB-4	Ballistics Range Technology	MWB/LB-33	Commercial Arms	MWB/LB-62	High Speed Photography II	LB-252	Ballistic Range Design Instrumentation Techniques & Analysis: Guns & Explosives & Explosive Devices:**
MWB/LB-5	Guns, Arms & Ammo	MWB/LB-36	Instrumentation & Telemetry	MWB/LB-63	Hazardous Materials: Use & Control		
MWB/LB-6	Lasers	MWB/LB-37	Computer Literacy Interior, Exterior, Terminal Ballistics & Projectile Design	MWB/LB-64	PRODAS Projectile Design, Interior, Exterior & Space Ballistics	LB-264	
MWB/LB-7	Ballistics	MWB/LB-38	Fuzes	MWB/LB-65	Explosives & Explosives Testing		
MWB/LB-8	Environmental & CHM HZD	MWB/LB-39	Malfuctions, Malfunction Investigation & Forensics	MWB/LB-66	Ballistics & Ballistics Testing		
MWB/LB-9	Ballistics II	MWB/LB-40	Guns & Ammunition Design: Military & Commercial	MWB/LB-67	Test & Evaluation: Overview for New Employees, Technicians, Engineers & Scientists		
MWB/LB-11	Vulnerability: Weapons Effects on Structures	MWB/LB-41	Modeling & Simulation: Overview, Applications, Analysis & Acquisitions	MWB/LB-68	High Velocity, High Pressure Gun Systems Interior Ballistics	MWB/LB-78	Infantry Weapons
MWB/LB-13	Safety: Ballistic Ranges	MWB/LB-42	Gun Design: Small Caliber, Large Caliber & Experimental Ballistics	MWB/LB-69	Environmental & Chemical Hazards: Overview for Facilities Personnel, New Employees, Technicians, Engineers & Scientists	MWB/LB-79	Combat Vehicles
MWB/LB-14	High Speed Photography: Instrumentation, Techniques & Analysis	MWB/LB-43	Bombs, Torpedoes, Warheads & Fuze Design	MWB/LB-70	Test & Evaluation: Overview for Technicians & Engineers	MWB/LB-80	Lasers New for 2004
MWB/LB-15	Ballistics III	MWB/LB-44	Experimental Ballistics	MWB/LB-71	Design of Experiments & Ballistic Testing: Overview for Technicians, Engineers & Scientists	MWB/LB-81	Free Flight Motion of Symmetric Missiles (6 Day Course by Dr. Charles H. Murphy)
MWB/LB-16	Excellence: TQM/SPC/Tagucci	MWB/LB-45	Lasers & Applications to Ballistics	MWB/LB-72	Ballistics: Overview for New Employees, Technicians, Engineers & Scientists	MWB/LB-82	Linear Motion of Symmetric Missiles* (3 Day Course by Dr. Charles H. Murphy)
MWB/LB-17	Vulnerability/Survivability: Land, Air, Sea & Space	MWB/LB-46	Vulnerability/Survivability: Weapons Effects on Structures & Vehicles	MWB/LB-73	Explosives & Ballistics: Test & Evaluation: Overview for New Employees, Technicians, Engineers & Scientists	MWB/LB-83	Flight Misbehavior of Symmetric Missiles** (3 Day Course by Dr. Charles H. Murphy)
MWB/LB-18	Test & Evaluation/Experimental Ballistics	MWB/LB-47	Gun Design	MWB/LB-74	Vulnerability/Survivability Overview		
MWB/LB-19	Ballistics: Interior, Transitional, Exterior, Terminal & Behind Armor Damage	MWB/LB-48	Explosive Ordnance Disposal (EOD)	MWB/LB-75	Ballistics: Interior, Exterior & Terminal (Developed for on-site course at Picatinny Arsenal)		
MWB/LB-20	Environmental & Chemical Hazards	MWB/LB-49	Vulnerability/Survivability	MWB/LB-76	Ballistics Range Design & Operation		
MWB/LB-21	Modeling & Simulation: Overview, Applications	MWB/LB-50	Range Testing & Operation	MWB/LB-77	Explosives & Explosive Testing		
MWB/LB-22	Test & Evaluation: Live Fire Testing & Non Destructive Testing: Overview	MWB/LB-51	Safety	LB-240	Anti-Terrorism Techniques & Considerations: Primarily Explosives & Fuzes		
MWB/LB-23	Robotics & Artificial Intelligence	MWB/LB-52	Test & Evaluation	LB-243	Hyper Velocity Granular Propellant Gun & Ammunition Systems*		
MWB/LB-24	Modeling & Simulation: Acquisition	MWB/LB-53	Environmental	LB-244	Interior Ballistics: Experimental Data; Computer Codes;		
MWB/LB-25	Firearms Litigation: Prevention & Defense	MWB/LB-54	Small Arms: Interior & Exterior Ballistic				
MWB/LB-26	Guns, Projectile & Sabot Design	MWB/LB-55	Range Testing Techniques				
MWB/LB-27	Gun & Ammunition Design: Small Caliber - Standard & Experimental Ballistics	MWB/LB-56	Guns & Ammunition Design				
MWB/LB-28	Program Management, Project Engineering, Production Facilities, Proposal Writing & Technology Transfer	MWB/LB-57	Fuzes & Warhead Design				
MWB/LB-29	Gun & Ammunition Design: Large Caliber - Standard & Experimental Ballistics	MWB/LB-58	Lasers & Range Safety				
		MWB/LB-59	Ballistic Range Design & Operation:				

NEW COURSES IN 2010

MWB/LB-84 Lasers & Ballistic Ranges Safety***
MWB/LB-85 Fuzes, Warhead Designs & EOD (Explosive Ordnance Disposal)***

*New in 2008 **New in 2009 ***New in 2010
NOTES: The course descriptions listed are for a five day course, unless otherwise noted. Any of the the course descriptions listed can be modified for more than five days or less than five days. Courses tailored to a particular need are also available. Quotes for "On-Site" or "Near-Site" courses are available by calling: Lou Baldini (973) 383-6375 or (973) 383-6090, by faxing (973) 579-9552, or by e-mail at bra@nac.net. Please do not consider your fax, phone call or e-mail message received until you have received a confirmation notice, or a return call.

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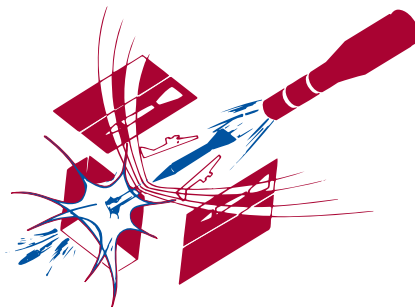
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