95TH SHOCK & VIBRATION SYMPOSIUM

SEPTEMBER 21-25, 2025

INSIDE COVER - PURPOSEFULLY LEFT BLANK

Welcome

WELCOME TO NEW ORLEANS AND THE 95TH SHOCK AND VIBRATION SYMPOSIUM!

Since the first meeting in 1947, the Shock and Vibration Symposium has become the oldest continual forum dealing with the response of structures and materials to vibration and shock. The symposium was created as a mechanism for the exchange of information among government agencies concerned with design, analysis, and testing. It now provides a valuable opportunity for the technical community in government, private industry, and academia to meet and discuss research, practices, developments, and other issues of mutual interest.

The symposium is presented by the **Shock and Vibration Exchange**.

Thank You

WE WOULD LIKE TO RECOGNIZE OUR TECHNICAL ADVISORY GROUP (TAG) MEMBERS WHO PARTICIPATED ON THE 95TH SHOCK AND VIBRATION SYMPOSIUM SUMMER PLANNING COMMITTEE AND/OR AWARD REVIEW COMMITTEE:

Justin Caruana, Cardinal Engineering*
Shawn Czerniak, Hutchinson*
Matt Forman, NSWC Dahlgren*
Rebecca Grisso, NSWC Carderock*
Adam Hapij, Thornton Tomasetti*
Kurt Hartsough, 901E&T*
Roger Ilamni, NSWC Indian Head*
Alan Klembczyk, Taylor Devices*
Brian Lang, NSWC Carderock*
Kenneth Lussky, BAE Systems*
Luke Martin, NSWC Dahlgren*
Bob Metz, PCB Piezotronics*
Calvin Milam, Element US Space & Defense*
Michael Olsen, HII Newport News Shipbldg*
Drew Perkins, SAVE/HI-TEST*
Ashley Shumaker, SAVE/HI-TEST*
Ernie Staubs, Air Force Research Lab*
Mackenzie Wilson, HII Newport News Shipbldg*
Lauren Yancey, HI-TEST Laboratories*
Bill Yancey, HI-TEST Laboratories**

**TAG members in attendance at summer meeting for 95TH S&V program review.*
***TAG members who peer-reviewed award nomination packages*

Thank You

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Schedule at a Glance

(WITH DAILY OUTLINE AND HOURS)

DAY/DATE	PROGRAM FEATURE TYPE	TIME	PAGE
SUNDAY (09/21)	REGISTRATION (SOUTHDOWN)	8:00AM - 5:00PM	
	TUTORIAL	8:00AM - 4:00PM	PG. 7
MONDAY (09/22)	REGISTRATION (SOUTHDOWN)	7:00AM - 6:00PM	
	TUTORIALS	8:00AM - 6:30PM	PG. 8-13
	EXHIBIT HALL SETUP (NAPOLEON BALLROOM)	NOON - 6:00PM	
	WELCOME RECEPTION (NAPOLEON BALLROOM)	6:30PM - 8:30PM	PG. 15
TUESDAY (09/23)	REGISTRATION (SOUTHDOWN)	7:00AM - 6:00PM	
	EXHIBIT HALL OPEN (NAPOLEON BALLROOM)	7:00AM - 5:00PM	
	TUTORIALS	8:00AM - 11:00AM	PG. 16-18
	GENERAL SESSION I & EXHIBITORS LUNCHEON	11:00AM - 1:00PM	PG. 20-21
	TECHNICAL PAPER SESSIONS & TRAINING	1:00PM - 5:45PM	PG. 22-26
	NEW ENGINEERS & ATTENDEES NETWORKING	5:45PM - 7:00PM	PG. 27
WEDNESDAY (09/24)	REGISTRATION (SOUTHDOWN)	7:00AM - 6:00PM	
	TECHNICAL PAPER SESSIONS & TRAININGS	8:00AM - NOON	PG. 28-31
	EXHIBIT HALL OPEN (NAPOLEON BALLROOM)	9:00AM - 4:00PM	
	GENERAL SESSION II & AWARDS LUNCHEON	NOON - 1:30PM	PG. 32-33
	TECHNICAL PAPER SESSIONS & TRAININGS	1:30PM - 3:30PM	PG. 34-35
	TUTORIALS	3:30PM - 6:30PM	PG. 36-37
	EXHIBIT HALL DISMANTLE	4:15PM - 6:00PM	
	COMMERCIALLY SPONSORED SOCIAL EVENT	7:00PM - 10:00PM	PG. 38-39
THURSDAY (09/25)	REGISTRATION (SOUTHDOWN)	7:00AM - NOON	
	TECHNICAL PAPER SESSIONS & TRAININGS	8:00AM - 12:05PM	PG. 40-43
	S&V TAG COMMITTEE MEETING (MTG ROOM)	1:00PM - 2:00PM	PG. 43
	EXHIBIT HALL LAYOUT & VENDOR DESCRIPTIONS		PG. 44-51
	HOTEL MEETING SPACE FLOOR PLANS		PG. 52-53

Food & Beverage Events

(ALL SYMPOSIUM ATTENDEES ARE WELCOME TO ATTEND EVENTS LISTED BELOW)

MONDAY (09/22)	**WELCOME RECEPTION** (NAPOLEON BALLROOM / EXHIBIT HALL) *BEVERAGES & HEAVY HORS D'OEUVRES* **GUESTS OF SYMPOSIUM ATTENDEES ARE WELCOME.*	6:30PM - 8:30PM
TUESDAY (09/23)	**BREAKFAST & NETWORKING** (NAPOLEON BALLROOM / EXHIBIT HALL)	7:00AM - 8:00AM
	GENERAL SESSION 1: KEYNOTE ADDRESS & EXHIBITORS LUNCHEON (NAPOLEON BALLROOM / EXHIBIT HALL)	11:00AM - 1:00PM
	ICE CREAM SOCIAL (NAPOLEON BALLROOM / EXHIBIT HALL)	3:00PM - 3:40PM
WEDNESDAY (09/24)	**BREAKFAST & NETWORKING** (NAPOLEON BALLROOM / EXHIBIT HALL)	7:00AM - 8:00AM
	GENERAL SESSION 2: AWARDS PRESENTATION AND LUNCHEON (NAPOLEON BALLROOM / EXHIBIT HALL)	NOON - 1:30PM
	AFTERNOON DESSERT BREAK & PASSPORT PROGRAM DRAWING (NAPOLEON BALLROOM / EXHIBIT HALL)	3:30PM - 4:15PM
	SYMPOSIUM SOCIAL/DINNER AT OFF-SITE LOCATION (TBD) **COMMERCIALLY SPONSORED BY HI-TEST LABORATORIES** **GUESTS OF SYMPOSIUM ATTENDEES ARE WELCOME.*	7:30PM - 9:30PM
THURSDAY (09/25)	**BREAKFAST & NETWORKING** (NAPOLEON BALLROOM / EXHIBIT HALL)	7:00AM - 8:00AM

**PLEASE NOTE THAT ALL MEALS ARE COMMERCIALLY SPONSORED THROUGH EXHIBITOR AND CORPORATE SUPPORTER REVENUES. NO COSTS FOR MEALS ARE DIRECTLY INCLUDED IN INDIVIDUAL ATTENDANCE FEES.*

SAVE
SHOCK & VIBRATION EXCHANGE

SYMPOSIUM WI-FI SPONSOR

PASSWORD: TBD

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TUTORIAL SESSION I
8:00 - 11:00AM

MIL-DTL-901E SHOCK QUALIFICATION TESTING
Kurt Hartsough (901 E&T)

MEETING ROOM TBD

Instructor will be presenting the requirements for shock qualification testing as detailed in MIL-DTL-901E and interpreted by NAVSEA 05P1. Shock testing theory, MIL-DTL-901E shock test devices and facilities, detailed specification requirements, cost avoidance and clarification and MIL-DTL-901E IC#2 will be covered. Attendees should include anyone involved in the acquisition, specification, review and approval of Navy shipboard equipment including PARMs and LCMs and contracting officers, contractors having to deal with the Navy and wishing to supply shock qualified equipment to the Navy, Ship Program Managers and Ship Logistic Managers responsible for the acquisition & maintenance of shock hardened Navy ships and shock qualification test facilities.

TUTORIAL SESSION II
1:00 - 4:00PM

MIL-DTL-901E SHOCK QUALIFICATION TESTING EXTENSIONS
Kurt Hartsough (901 E&T)

MEETING ROOM TBD

Instructor will be presenting the requirements for shock qualification extensions as detailed in MIL-DTL-901E and interpreted by NAVSEA 05P1. Shock extension specification requirements, MIL-DTL-901E design guidelines and shock design lessons learned will be covered. Attendees should include anyone involved in the acquisition, specification, review and approval of Navy shipboard equipment including PARMs and LCMs and contracting officers, contractors having to deal with the Navy and wishing to supply shock qualified equipment to the Navy, Ship Program Managers and Ship Logistic Managers responsible for the acquisition & maintenance of shock hardened Navy ships and shock qualification test facilities.

OPTIONAL THREE HOUR COURSES. ATTENDEES WILL RECEIVE A CERTIFICATE OF COMPLETION AND MAY RECEIVE CEUs/PDHs (VARIES BY STATE). ADDITIONAL FEES APPLY TO ATTEND.

MONDAY
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TUTORIAL SESSION III
8:00 - 11:00AM

OPTIONAL THREE HOUR COURSES. ATTENDEES WILL RECEIVE A CERTIFICATE OF COMPLETION AND MAY RECEIVE CEUs/PDHs (VARIES BY STATE). ADDITIONAL FEES APPLY TO ATTEND.

MIL-DTL-901E SUBSIDIARY COMPONENT SHOCK TESTING & ALTERNATIVE TEST VEHICLES
Kurt Hartsough (901 E&T)

MEETING ROOM TBD

The MIL-DTL-901E Subsidiary Component Shock Testing and Alternate Test Vehicles course will cover the following areas: NAVSEA 05P1's current policy for testing subsidiary components, description of test environment requirements, examples of recent successful test programs, alternate test vehicle descriptions, alternate test vehicle limitations, discussions on shock spectra, Multi-Variable Data Reduction (MDR) and various shock isolation systems. This course is intended to give the necessary information to equipment designers and program managers who intend to shock qualify COTS equipment that will require frequent upgrades due to obsolescence, equipment upgrades, change in mission, etc. Although not required, it is recommended that those attending this course also attend courses on Shock Policy, MIL-DTL-901E testing and particularly MIL-DTL-901E extensions offered by the same instructor (Hartsough).

FUNDAMENTALS OF SINE AND RANDOM SHAKER TESTING
Chris Sensor (Siemens)

MEETING ROOM TBD

This tutorial will cover the fundamental concepts of shaker Sine and Random vibration testing. Swept Sine, Sine Dwell, Random, Sine-on-Random, Random-on-Random and Time Waveform Replication test modes will be covered. Additional topics such as response limiting, control channel averaging, kurtosis, and practical shaker considerations will also be discussed. Subjects will be accompanied by live demos of shaker tests, with opportunities for hands on participation by attendees.

ANALYSIS FOR A MEDIUM WEIGHT SHOCK TEST
Josh Gorfain (Quartus Engineering)

MEETING ROOM TBD

While a shock test is essentially the bottom line for a shock qualification, a lot of analysis often goes into the mix before the test. The reasons for this are many: The equipment manufacturer wants his equipment to pass and will often commission some kind of pre-test prediction to maximize the likelihood of success or to high-light design problems. Since the weight and frequency of the tested equipment can affect the response of the test significantly, the system may need to be examined to assure that the tested environment is correct. This tutorial will first review the Medium Weight Shock Machine (MWSM) and its use in shock qualification testing, followed by presentation of the test environment. Next, the types of analysis that can be performed to estimate the test environment experienced by a given piece of equipment will be described. The intention of these analyses is to provide an assessment of equipment response subject to a MWSM test in an effort to assure a successful test. Additionally, the merits and limits of these methods are discussed so the most appropriate method may be rationally selected for a given application. Examples will be presented that illustrate the different types of analyses and how they may be applied.

PLANNING LIFE CYCLE DESIGN, ANALYSIS, AND SHOCK AND VIBE QUALIFICATION OF NAVY EQUIPMENT

MEETING ROOM TBD

Dr. Christopher Merrill (CM&A Engineering)

This tutorial provides general simple techniques for use in parallel with long term Classical and Numerical Dynamic Analysis of Systems subjected to US Navy shock and vibration requirements over Navy equipment life cycles to maximize accuracy and minimize errors in Dynamic Analysis and Qualification of electronic and mechanical systems. The interaction of the US Navy shock and vibration requirements is a major driver of the efficacy of long-term Dynamic Analysis from the start. Apart from major issues that occur on any major long-term developmental programs, simple, seemingly minor, errors present in the analysis from the beginning can lead to huge cost and schedule impacts generally at the worst time for the program (FAT). Fortunately, there are procedural long-term Dynamic Analysis Quality Control techniques that can be used from the beginning and in parallel during the long-term dynamic analysis to mitigate the risk of such errors. This tutorial will provide examples of types and genesis of such errors, as well as, a process to perform at the beginning and in parallel with the long-term dynamic analysis in order to perform quality control comparisons to mitigate these errors. Finally, the importance of comparison of FAT dynamic test results to dynamic analysis including failure and use of prototyping will be included. The tutorial will end with an exercise where the trainer will attempt to stump the trainee with balky computer model results. The trainee will leave the tutorial with a list of types and genesis of discrete and basic errors, a process chart and algorithm for applying these Quality Control Techniques at the start and in parallel with the long-term dynamic analysis, and insight on improving techniques for planning Life Cycle Design, Analysis, and Shock and Vibe Qualification of Navy Equipment.

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TUTORIAL SESSION IV
NOON - 3:00PM

OPTIONAL THREE HOUR COURSES. ATTENDEES WILL RECEIVE A CERTIFICATE OF COMPLETION AND MAY RECEIVE CEUs/PDHs (VARIES BY STATE). ADDITIONAL FEES APPLY TO ATTEND.

AN INTRODUCTION TO ALIASING, FFT, FILTERING, SRS & MORE FOR FEA USERS AND TEST ENGINEERS

MEETING ROOM TBD

Dr. Ted Diehl (Bodie Technology)

Working with either physical test data and/or numerical simulations related to severe mechanical shock, impact, failure, etc. is extremely challenging. Some of the biggest challenges in this type of work are 1) properly collecting the initial raw data while avoiding aliasing [especially from numerical simulations], 2) utilizing robust methods to identify and separate the "noise & distortions" from the "true" frequency-rich content in the data, and 3) determining what portion of the "true" frequency-rich content is meaningful and what does it tell you. For a given problem, the initial appearance of raw time-domain data in this class of work may be vastly different between physical testing and data derived from transient simulation codes (LS-Dyna, Abaqus/Explicit, RADIOSS…). While the data might look different, the rules of DSP (Digital Signal Processing) are the same. Most importantly, understand and utilizing DSP properly is a critical requirement to success in BOTH types of approaches, especially to obtain correlation between physical tests and simulation of the same specific problem.

The 3-hour seminar provides guidance to both simulation analysts and test engineers on how to properly collect and process such data; ultimately uncovering significantly improved results. The course covers highlights of DSP theory in the language of Mechanical Engineering pertinent to simulation analysts and test engineers. This seminar introduces key aspects of working with transient data – specifically, clearly explaining time-domain and frequency domain analysis (DFS, FFT, PSD); data collection (sampling, up-sampling, decimation, and aliasing); filtering (lowpass, highpass, IIR, and FIR), how to avoid aliasing, calculating Shock Response Spectrum (Accel SRS & PVSS) from transient data, and numerous unique aspects related to explicit dynamics FEA data (non-constant time increments, massively over-sampled data, short transient signals with non-zero end conditions, and more). Simplified demonstrations are presented to solidify key DSP aspects, along with many relevant real-world examples. Both FEA users and experimentalists will benefit from this training.

DATA INTEGRITY

MEETING ROOM TBD

John Hiatt (DEWESoft)

The data integrity training is designed as an overview of the data acquisition process and how each step in the measurement chain can affect your measured data. Primary focus of this session is on the data acquisition system (DAS). We will learn what happens in each step of the process and how to mitigate common measurement errors. The idea is to get the best possible data first time. Its hard to make good decisions with bad data. We also cover DAS specifications so users can be better prepared to compare system specifications.

FUNDAMENTALS OF CLASSIC SHOCK AND SRS SHAKER TESTING

MEETING ROOM TBD

Chris Sensor (Siemens)
Bob Metz (PCB Piezotronics)

This tutorial will cover the fundamental concepts of shaker shock testing, from field data acquisition to Classic Shock and Shock Response Spectrum (SRS) wavelet synthesis in a vibration controller. The tutorial will cover shock data acquisition and analysis, classic shock pulses, SRS concepts, SRS and Pseudo Velocity Shock Spectrum (PVSS) data analysis, a review of Classic Shock and SRS test methods in MIL-STD-810H (including the "new" method of Te and TE), shock test tailoring and SRS wavelet synthesis for shaker SRS testing. A segment covering specialty shock sensors and instrumentation will also be presented. Subjects will be accompanied by live demos of data acquisition and shaker tests, with opportunities for hands on participation by attendees.

TUTORIAL SESSION IV
NOON - 3:00PM
(CONTINUED)

EFFECTIVE SOLUTIONS FOR SHOCK AND VIBRATION CONTROL

MEETING ROOM TBD

Alan Klembczyk (Taylor Devices)
Ken Lussky (BAE Systems)

Part 1 of this Tutorial provides an outline of various applications and methods for implementing isolation control of dynamic loads and damping within a wide array of dynamic systems and structures. Photos, videos, and graphical results are presented of solutions that have been proven effective and reliable in the past. Design examples are given and typical applications are reviewed. Additionally, key definitions and useful formulae are presented that will provide the analyst or systems engineer with the methods for solving isolation problems within the commercial, military, and aerospace sectors. A wide range of isolation mounts and systems are covered including liquid dampers, elastomer and wire rope isolators, tuned mass dampers, and engineered enclosures. Engineering guidelines are presented for the selection and evaluation of isolation control products.

Part 2 of this Tutorial addresses characterization of shock and vibration environments and finite element analysis (FEA) of shock and vibration isolation performance. Methods used to characterize shock and vibration responses and their application are defined. For shock these include spectral definitions (SRS shock response spectrum and PVSS pseudo velocity shock spectrum) and time-history definitions (peak velocity, peak acceleration, average acceleration and displacement). These are discussed with respect to their application to shock input severity, and equipment fragility and damage potential. Shock test qualification methods, their input definitions, and how they are represented in FEA are discussed. Also addressed are the value of damping in shock isolation and how shock and vibration isolation systems are represented in FEA. For vibration the spectral definition of Acceleration Spectral Density (ASD) is discussed. Other topics addressed are the application of UERD Tools for shock characterization, and when to engage with the appropriate shock and vibration Technical Warrant Holders (TWH).

A PRIMER ON VIBRATION TESTING AND DATA ANALYSIS

MEETING ROOM TBD

Dr. Luke Martin (NSWC Dahlgren)

This tutorial will give an introduction to vibration testing and will be concept focused. The tutorial will begin with an understanding of a typical laboratory vibration test setup, followed by a deeper dive of the fundamental components. Specifically, a typical single degree of freedom vibration test will be decomposed into its pieces: amplifier, shaker, slip table, test item, vibration controller, and reference profiles. Once the components of the control loop are understood, the tutorial will focus on data analysis required by both the vibration controller to conduct a test and by a user who wishes to use measured field data to develop a tailored vibration test profile.

Along the way concepts that will be covered are: electrodynamic shakers, servo-hydraulic shakers, single degree of freedom testing, multiple degree of freedom testing, control vs measurement transducers, Miner's Rule, sinusoidal testing, random testing, mixed mode testing, MIL-STD-167, MIL-STD-810, need for tailored vibration data, and digital signal processing used for data analysis.

MONDAY
SEPTEMBER 22

TUTORIAL SESSION V
3:30 - 6:30PM

OPTIONAL THREE HOUR COURSES. ATTENDEES WILL RECEIVE A CERTIFICATE OF COMPLETION AND MAY RECEIVE CEUs/PDHs (VARIES BY STATE). ADDITIONAL FEES APPLY TO ATTEND.

DDAM 101
George D. (Jerry) Hill (SERCO)

MEETING ROOM TBD

The U.S. Navy Dynamic Design Analysis Method (DDAM) has been in general use since the early 1960s. It is a method of estimating peak shock response of equipment and outfitting on naval combatants using normal mode theory, originally extended from earthquake analysis methods. The DDAM requires linearelastic model behavior and employs a statistical method of modal superposition yet has persisted to today as the U.S. Navy required method for shock qualification by analysis. This, in spite of the rapid advancement of dynamic transient simulation technology and techniques for representing nonlinearities including material plasticity and contact behavior. The tutorial will address: how the method works, how the shock spectral input values are presented in DDS-072-1, what is the role of modal weights and participation factors, why has the method persisted including what are its strengths and also what are its weaknesses. The tutorial will provide a basic understanding of the method, requirements, and procedures to those who expect to be involved in shock analysis and will demystify the procedure for many who are current users.

DIGITAL SIGNAL PROCESSING - FILTERING AND THE FOURIER TRANSFORM (GOING FROM TIME TO FREQUENCY DOMAIN)
John Hiatt (DEWESoft)

MEETING ROOM TBD

Two of the most common Digital Signal Processing (DSP) techniques are filtering and transforming data from the time domain to the frequency domain with the Fourier transform (FFT). Both mathematical processes can create unwanted effects on the data. This session will examine these effects on your data and how they can be mitigated. For the Fourier transform, we will also discuss the assumptions, inputs to the FFT and possible reasons FFT's calculated with two different software packages do not match. This training is designed to help new users understand how these processes and how they work to help prevent data processing mistakes.

INTRODUCTION TO MIL-STD-461 ELECTROMAGNETIC INTERFERENCE TESTING
Jeff Viel (Element US Space & Defense)

MEETING ROOM TBD

This 3 hour tutorial provides a detailed technical overview of MIL-STD-461G addressing the electromagnetic interference (EMI) emission and susceptibility test methods and control requirements for subsystems and equipment and subsystems designed or procured for the Department of Defense (DoD). This tutorial starts from the very beginning discussing the basis for EMI control testing, including a historical case study, to the progressive development of test methods and requirements adapted to modern day technologies and electromagnetic environments. While the standard is broadly designed to address all DOD platforms, this tutorial is focused to specifically address shipboard and submarine application requirements.

TUTORIAL SESSION V
3:30 - 6:30PM
(CONTINUED)

AIR BLAST AND CRATERING: AN INTRODUCTION TO THE ABC'S OF EXPLOSION EFFECTS IN AIR AND ON LAND

MEETING ROOM TBD

Denis Rickman (USACE ERDC)

This three-hour course introduces the effects of explosions in air and on land. Topics covered include airblast, soil/rock/pavement cratering, and ground shock phenomena produced by explosive detonations. There is a little math, but for the most part, the focus is on aspects and principles that are of practical use to those conducting (and utilizing) blast-related research. Most researchers in the blast arena have some grasp of explosion effects fundamentals, but very few have a good, broad-based understanding of how it all works. The goal is to provide the participants with enough of an understanding that they can appreciate the various explosion phenomena and those parameters that affect blast propagation and blast loading of objects in a terrestrial setting.

CENTRAL LIMIT THEOREM AND THE PROBABILITY DISTRIBUTION OF STRUCTURAL RESPONSE

MEETING ROOM TBD

Dr. Thomas Paez (Thomas Paez Consulting)

It is frequently stated that random structural responses (and even excitations) are governed by a Gaussian distribution because of the effects of the Central Limit Theorem (CLT). It is, however, seldom proven. The usual claim underlying the assertion is that when a random phenomenon is the result of the superposition of a large number of independent, identically distributed random components, the CLT applies. Whether or not a structural response is governed by a Gaussian distribution is not just a matter of curiosity; some random vibration analyses are accurate only when the response is Gaussian. There are several versions of the CLT, each a bit more general and realistically applicable than the previous one. This presentation, first, develops some background materials in probability and structural dynamics; the objective is to permit development of the ideas of the CLT. The presentation then proves a simple version of the CLT. The proof relies on several definitions from probability theory and the use of the Fourier transform. It then proceeds to demonstrate more complex versions of the CLT. It so happens that the CLT is applicable even when the underlying random components are not all independent and not all identically distributed. In fact, even when a sum consists of a relatively small number of elements, the CLT may still hold approximately. The implications that all this holds for random vibration shaker testing in the laboratory are discussed. Numerous examples are included. Each participant will be given a link that may be used to download a color copy of the presentation slides, and MATLAB code to run the examples.

MONDAY
SEPTEMBER 22

Welcome Reception

HI-TEST Laboratories, Inc.

element U.S. Space & Defense

ALL SYMPOSIUM ATTENDEES AND GUESTS ARE INVITED TO ATTEND.

6:30 - 8:30PM
HEAVY HORS D'OEUVRES & DRINKS
NAPOLEON BALLROOM (EXHIBIT HALL)

TUESDAY
SEPTEMBER 23

BREAKFAST + NETWORKING

7:00 - 8:00AM | EXHIBIT HALL

AFTER BREAKFAST, ENJOY THE OPPORTUNITY TO NETWORK WITH OTHER ATTENDEES AND INTERACT WITH EXHIBITORS.

TUTORIAL SESSION VI
8:00 - 11:00AM

OPTIONAL THREE HOUR COURSES. ATTENDEES WILL RECEIVE A CERTIFICATE OF COMPLETION AND MAY RECEIVE CEUs/PDHs (VARIES BY STATE). ADDITIONAL FEES APPLY TO ATTEND.

OVERVIEW OF UNDERWATER EXPLOSION PHENOMENOLOGY & BULK CHARGE WEAPON EFFECTS

MEETING ROOM TBD

LIMITED DISTRIBUTION D (SECURITY PAPERWORK REQUIRED)

Greg Harris (Consultant)

This tutorial will provide an overview of underwater explosion (UNDEX) phenomenology relevant to bulk charge underwater warheads. The phenomenology discussion includes UNDEX shock wave propagation, bulk cavitation effects, and UNDEX bubble dynamics. UNDEX testing and analysis procedures for characterizing the shock wave and bubble performance of explosive compositions will be described. Finally, a brief discussion of the damage mechanisms used by bulk charge underwater weapons such as mines and torpedoes will be given using illustrative examples from UNDEX testing programs and recent naval encounters.

BLAST PRESSURE MEASUREMENT

MEETING ROOM TBD

Troy Skinner (N2L, Inc.)
Bob Metz (PCB Piezotronics)
Denis Rickman (USACE ERDC)

When researchers collect poor blast pressure data, they often conclude “it must be the gauge!” Truth be known, sensors rarely insert themselves into a blast test. Instead, they bravely go into whatever location the test engineer commands, often producing poor data or worse, experiencing an untimely death. These brave, and costly, soldiers deserve better!

To make matters more complicated, there are two sensing technologies to choose from. Quartz piezoelectric and silicon MEMS piezoresistive transducers are both successfully used for air-blast pressure measurements. This tutorial will objectively compare strengths and weaknesses of MEMS piezoresistive and ICP piezoelectric pressure transducers focused only on their applicability to the air-blast environment. The analysis considers measurement errors found in air blast, which include thermal transients, acceleration/strain, and cable length effects. Transducer performance parameters of dynamic range, ruggedness/survivability, and frequency response will be compared.

INTRODUCTION TO DESIGNING SHOCK MOUNTED SYSTEMS USING SHOCK ISOLATION MOUNT PREDICTION & LOADING ESTIMATES (SIMPLE) SOFTWARE

MEETING ROOM TBD

Dave Callahan (HII Newport News Shipbuilding)

This course will introduce a process for designing and assessing shock isolation systems with emphasis on applications related to the design of shipboard equipment for shock loads produced by underwater explosions utilizing the analytical software tool “Shock Isolation Mount Prediction & Loading Estimates” (SIMPLE). This process is split into two parts: 1) initial analysis using classic Shock Response Spectrum (SRS) and 2) assessment, confirmation, iteration or comparison of isolation system designs using SIMPLE simulation methods. Attendees will learn how to build six Degree of Freedom (DOF) SIMPLE models of isolated systems, select shock mounts and modify mount properties, select shock inputs, evaluate the isolation system performance and iterate designs rapidly. This course is intended for anyone that desires validation and assurance that shock and vibration mounts are properly selected for equipment and structures using SIMPLE software. Examples of SIMPLE users are: engineers, program managers, integrators, analysts, mount vendors, and shock qualification reviewers/approvers.

TUTORIAL SESSION VI
8:00 - 11:00AM
(CONTINUED)

REMOVING THE BOUNDARY CONDITION HOBGOBLINS IN VIBRATION QUALIFICATION TESTING WITH MODAL TECHNIQUES

MEETING ROOM TBD

Troy Skousen (Sandia National Laboratories)
Randy Mayes (Consultant)

How a modal technique provides a simple modification to the base input mitigating the field-to-laboratory impedance mismatch for high confidence component qualification

Random vibration laboratory testing is used to qualify components to survive in-service responses to system environments. Using realistic research hardware and an analytical rocket system, we show that traditional single degree of freedom (SDOF) shaker test specifications guarantees large response uncertainties when compared with the field environment responses due to the difference in laboratory boundary conditions. A brief review is provided showing how fixed-base mode shapes are derived from test data. A model utilizing fixed-base and rigid body modes of the component on its vibration test fixture is used to decompose the component field motion into a few intuitive responses. This model demonstrates why 6DOF laboratory control can eliminate large uncertainties in traditional SDOF testing with a corresponding boost in qualification confidence. In fact, the model leads to modified base inputs for a greatly improved SDOF or 3DOF test.

UNDERWATER EXPLOSION SHOCK PHYSICS AND ENGINEERING MECHANICS APPLICATIONS

MEETING ROOM TBD

Frederick A. Costanzo (FAC Engineering Consultant, LLC)

This tutorial begins by presenting a primer on underwater explosion (UNDEX) fundamentals and shock physics. This provides a basic introduction to those who are new to this field, and serves as a brief review for those with experience in this area. Included in this discussion are the features of explosive charge detonation, the formation and characterization of the associated shock wave, bulk cavitation effects, gas bubble formation and dynamics, surface effects and shock wave refraction characteristics. In addition, analyses of associated measured loading and dynamic response data, as well as descriptions of supporting numerical simulations of these events, are presented. Next, applications of UNDEX-induced shock wave loadings to simple floating structures are discussed, and response solutions are generated using engineering mechanics strategies. Included are Taylor Plate analogies applied to both air-backed and water-backed structures, along with the application of the conservation of momentum principle for estimating the vertical kickoff velocity of floating structures (Spar Buoy approach). Derivations of the governing equations associated with each of these solution strategies are briefly presented, along with a description of the solutions and appropriate ranges of applicability. To round out the tutorial, some special studies are presented that illustrate the power of applied numerical methods in the form of finite differences to obtain approximate solutions to some classical mechanics problems. These studies include the formulation of solutions associated with the computation of linear and nonlinear SDOF systems under dynamic loadings, shock response spectra (SRS), and introduction to the concepts of residual spectra and reactive spectra.

SAVE Awards & Nomination Instructions

Henry C. Pusey Best Paper Award

KEEP A LOOKOUT IN THE PROGRAM FOR THIS QR CODE! SCAN TO NOMINATE ANY PRESENTATION DESERVING OF OUR ANNUAL ***HENRY C. PUSEY BEST PAPER AWARD.*** FULL AWARD CRITERIA AND NOMINATION FORM AVAILABLE BY SCANNING THE QR CODE.

Award for Excellence in Instruction

NOMINATE ANY THREE-HOUR TUTORIAL DESERVING OF OUR NEW ***AWARD FOR TUTORIAL EXCELLENCE.***

FULL AWARD CRITERIA AND NOMINATION FORM AVAILABLE BY SCANNING THE QR CODE.

Lifetime Achievement Award

THE LIFETIME ACHIEVEMENT AWARD IS BESTOWED TO A MEMBER OF THE SHOCK AND VIBRATION COMMUNITY WHO HAS MADE SIGNIFICANT TECHNICAL CONTRIBUTIONS TO THE FIELD WITH A LIFETIME OF CAREER DEDICATION.

REACH OUT TO DREW PERKINS OR ASHLEY SHUMAKER FOR ADDITIONAL AWARD CRITERIA AND/OR A NOMINATION PACKAGE FOR THIS PRESTIGIOUS AWARD.

Exhibitor Passport Program

HOW IT WORKS:

- Each Symposium attendee is given a "Passport" with a listing of participating exhibitors.
- Participating exhibitors are provided a custom stamp/sticker.
- As the attendees visit the participating exhibitors, exhibitors "stamp" the passport of the attendee.
- Attendees who collect the stamp of at least 20 participating vendors are entered into the drawing.
- Prizes range from gift cards to gadgets to new exhibitor products!
- *Drawing to be held during the Wednesday afternoon break (3:30 - 4:15pm).*

Thank You to the exhibitors participating in the Passport Program:

ALTAIR

BODIE TECHNOLOGY, INC. The Noisy Data Experts™

CRYSTAL INSTRUMENTS

dp Data Physics Team

DAYTON T. BROWN INC.

DEWESoft™ measurement innovation

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Dytran by HBK HOTTINGER BRÜEL & KJÆR

HI-TEST Laboratories, Inc.

mp INTERNATIONAL

PCB PIEZOTRONICS AN AMPHENOL COMPANY

ENDEVCO AN AMPHENOL COMPANY

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PRECISION FILTERS

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SPEKTRA

taylor devices inc.

VR VIBRATION RESEARCH

Engineering 901 E&T and Training

TUESDAY
SEPTEMBER 23

EXHIBITORS LUNCHEON
(GENERAL SESSION I)
WITH KEYNOTE ADDRESS
11:00AM - 1:00PM

SALON BALLROOM

11:00AM—11:10AM	**CALL TO ORDER** Mr. Drew Perkins, SAVE / HI-TEST Laboratories
11:10AM—11:15AM	**KEYNOTE INTRODUCTION** TBD
11:15AM—NOON	**KEYNOTE ADDRESS** TBD
NOON—1:00PM	**LUNCH** **FOLLOWED BY EXHIBITOR MEET & GREET**

Enjoy time to peruse the exhibit hall and meet the vendors.

DON'T FORGET TO GET STARTED ON YOUR PASSPORT PROGRAM ENTRY FORM!
DRAWING TO BE HELD DURING WEDNESDAY'S AFTERNOON BREAK IN THE EXHIBIT HALL.
PRIZES TO INCLUDE:

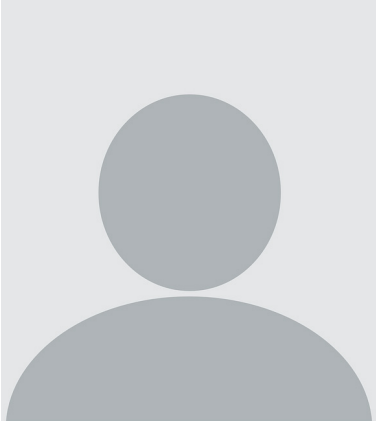
SAVE PROGRAM PRIZES
$250 AMAZON GIFT CARD
APPLE IPAD
SAMSUNG WATCH
APPLE AIRPOD PROS
RING VIDEO DOORBELL
DJI DRONE

VENDOR DONATED PRIZES
YETI MERCHANDISE
VARIOUS GIFT CARDS
MISC. ELECTRONICS
EXHIBITOR APPAREL & SWAG

EXHIBITORS LUNCHEON
(GENERAL SESSION I)
WITH KEYNOTE ADDRESS
11:00AM - 1:00PM

TUESDAY
SEPTEMBER 23

Meet the Speaker



TBD

SPEAKER INTRODUCTION AND BIO COMING SOON!

TUESDAY (SEPTEMBER 23)

	SESSION 1: **NEW ENGINEERS & ATTENDEES 101** 1:00-2:35PM / UNLIMITED DIST. A CHAIR(S): Shawn Czerniak (Hutchinson)	*SESSION 2:* **AERIAL DELIVERY METHODOLOGIES, TECHNOLOGIES AND SOLUTIONS** 1:00-3:00PM / UNLIMITED DIST. A CHAIR(S): Dr. Daryoush Allaei (QRDC, Inc)	*SESSION 3:* **MUNITIONS FOCUSED MATERIAL TESTING AND MODELING** 1:00-3:00PM / LIMITED DIST. D CHAIR(S): Dr. Matthew Neidigk (AFRL) Bruce Patterson (AFRL)
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
	(##) following each paper title indicates associated page number in the abstract book appendix.		
1:00	**What is MIL-DTL-901E and Why Is It Important?** *Kurt Hartsough (901E&T)*	**Update on Development and Use of RUSB** *Dr. Daryoush Allaei (QRDC, Inc.), Prof. Arezoo Emdadi (Missouri University of Science and Technology)*	**Shell Element Performance in Predicting Projectile Exit Velocity** *Adam Polakowski & Dr. Jarius Bernard (Torch Technologies), Dr. Matthew Neidigk (AFRL)*
1:25	**Shock-Proof: Navigating MIL-DTL-901E Testing (An Explosively Entertaining Intro to MIL-DTL-901E Test Methods)** *Jeff Morris (HI-TEST Laboratories)*	**Update on Development and Use of REAL** *Dr. Daryoush Allaei (QRDC, Inc.), Prof. Arezoo Emdadi (Missouri University of Science and Technology)*	**Development of High Temperature Survivable Electronics Potting** *Dr. Matthew Neidigk (AFRL) & Dalton Gavin (Torch Technologies)*
1:50	**What Is An Isolator?** *Shawn Czerniak (Hutchinson)*	**TOPIC TITLE TBD** *Presenter TBD*	**Modeling Polymer-Bonded Explosive Damage in Detonator Geometry** *Dalton Gavin & Dr. Michael Nixon (Torch Technologies), Dr. Matthew Neidigk (AFRL)*
2:15	**Vibration Test Systems in the Lab** *Jade Vande Kamp (Vibration Research Corp)*	**TOPIC TITLE TBD** *Presenter TBD*	**Virtual Arena Test for the 155mm M795 Artillery Shell** *Dr. Jarius Bernard & Brandon Nesbitt (Torch Technologies), Dr. Matthew Neidigk (AFRL)*
2:40	**Sampling & Spectral Analysis: From FFT to SRS (A Practical Overview for Engineers)** *Dr. Ted Diehl (Bodie Technology, Inc.)*	**TOPIC TITLE TBD** *Presenter TBD*	

3:00 - 3:40

ENIDINE

Ice Cream Social

NAPOLEON BALLROOM (EXHIBIT HALL)

E-LABS FREDERICKSBURG, VIRGINIA - USA

	SESSION 4: **DYSMAS I** 1:00-3:00PM / LIMITED DIST. D CHAIR(S): Roger Ilamni (NSWC Indian Head)	*VENDOR SESSION A:* **EXHIBITOR PRESENTATIONS INCLUDING CASE STUDIES, NEW DEVELOPMENTS, TESTING & PRODUCTS** 1:00-3:00PM / UNLIMITED DIST. A CHAIR(S): Dr. Kyle Gilroy (Vision Research)	*TRAINING I:* **MIL-STD-167 QUALIFICATION AND BEST PRACTICES** 1:00-2:00PM / UNLIMITED DIST. A **TBD** 2:00-3:00PM / UNLIMITED DIST. A 
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
	(##) following each paper title indicates associated page number in the abstract book appendix.		
1:00	**TOPIC TITLE TBD** *Presenter TBD*	**Phantom Cine Analyzer – A Python Based Open-source Platform** *Dr. Kyle Gilroy (Vision Research)*	**MIL-STD-167 Qualification and Best Practices** *Thomas Borawski* *(NSWC Philadelphia)* 1:00-2:00PM
1:25	**TOPIC TITLE TBD** *Presenter TBD*	**What Should a Resonant Plate Shock Test Sound Like?** *Dr. Carl Sisemore (ShockMec Engineering)*	
1:50	**TOPIC TITLE TBD** *Presenter TBD*	**Viper::Blast for Advanced Airblast Simulations** *Dr. Peter McDonald (Viper Applied Science)*	
2:15	**TOPIC TITLE TBD** *Presenter TBD*	**Innovative Approaches to Transient Shock Data Acquisition and Analysis** *Jim Churchill (m+p International)*	**Title TBD** *Presenter Name* *(Organization)* 2:00-3:00PM
2:40	**TOPIC TITLE TBD** *Presenter TBD*	**Experimental characterization of nonlinear stiffness and damping in Taylor Devices' Pumpkin isolators in shear, roll, and angled installations** *Gordon Fox (Taylor Devices)*	

3:00 - 3:40

ENIDINE

Ice Cream Social

NAPOLEON BALLROOM (EXHIBIT HALL)

E-LABS FREDERICKSBURG, VIRGINIA - USA

TUESDAY (SEPTEMBER 23)

	SESSION 5: **UNDEX** 3:45-5:45PM / UNLIMITED DIST. A CHAIR(S): Dr. Cameron Stewart (NSWC Indian Head) Greg Budriss (NSWC Philadelphia)	*SESSION 6:* **PRACTICAL VIBRATION MODELING** 3:45-5:45PM / UNLIMITED DIST. A CHAIR(S): Dr. Ricky Stanfield (Corvid Technologies)	*SESSION 7:* **MUNITIONS FOCUSED MATERIAL TESTING AND MODELING** 3:45-4:55PM / LIMITED DIST. D **STRUCTURAL RESPONSE: ROCKETS** 5:00-5:45PM / LIMITED DIST. D CHAIR(S): Dr. Matthew Neidigk (AFRL)
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
3:45	**Recent Improvements in DSTL's Capability for Modeling UNDEX and Associated Structural Response** *Elliot Tam, Mark Whittaker, Dan Pope & Ajen Limbu (DSTL), Arno Klomfass (EMI), Andrew Tyas (Blastech)*	**Virtual shaker testing by combining system substructures** *Dr. Mattia Dal Borgo, Umberto Musella, Dr. Silvia Vettori, Dr. Alberto Garcia de Miguel, Dr. Emilio Di Lorenzo, & Dr. Bart Peeters (Siemens Digital Industries Software), Thade Kilian Pfluger (University of Trento)*	**Shock-Specimen for Evaluating Shock Hardening and Anisotropy** *Brandon Nesbitt & Dr. Jairus Bernard (Torch Technologies), Dr. Matthew Neidigk & Christopher Neel (AFRL)*
4:10	**Accessible Coupled UNDEX-FSI: A First Look at High-Fidelity Blast-Structure Interaction using GPUs and OpenRadioss** *Andrew Nicholson, Dr. James Wurster, & Dr. Peter McDonald (Viper Applied Science)*	**Virtual shaker testing: simulate and emulate spacecraft responses for notch predictions** *Umberto Musella, Dr. Mattia Dal Borgo, Dr. Silvia Vettori, Dr. Roland Pastorino, Laurane Thielemans, Dr. Emilio Di Lorenzo & Dr. Bart Peeters (Siemens Digital Industries Software)*	**Evaluation of the Dynamic Tensile Failure in Pressed Energetic Materials** *Dr. Adrianne Moura, Zach Jowers & Dr. Alain Beliveau (ARA), Dr. Jacob Dodson (AFRL)*
4:35	**Underwater Shock and Whipping Analysis of Composite Naval Ship Structure using Trident DAA Software** *Dr. Sergio Arias, Dr. Lei Jiang, Dr. T.S. Koko, & T. MacAdam (Lloyd's Register Advisory)*	**Sounding Rocket Flight Vibration NTL Composite Spectrogram** *Dr. Ricky Stanfield (Corvid Technologies)*	**Shock Survivability Testing of Exploding Foil Initiators** *Fahad Abumohaimed (AFRL)*
5:00	**Effective Use of Parameterized Ship Models in Underwater Explosion Shock Analyses** *Juha Virtanen & Roope Kotiranta (Nesti Ltd)*	**Introduction to Genetic Algorithms for Vibration and Shock Design** *Dr. Charles Hull (Lockheed Martin)*	**Design, Characterization, and Instrumentation of Experimental Tests to Simulate Full-Scale Rocket Environments** *Dr. Jason Foley (presenting); full list of contributors can be found in the Symposium Abstract Book*
5:25	**The Analysis of Interaction between Bubble and Double-layer Structure with Hole** *Dr. Yuanxiang Sun (Beijing Institute of Technology)*	**Limits of Vibration Response in Aircraft: A Challenge to Current Standard in Avionics Vibration Testing** *Marc Heffes (Northrop Grumman)*	**Material Evolution and Damage Phenomenology of Infrastructure Under Direct Rocket Plume Impingement** *Dr. Jason Foley (presenting); full list of contributors can be found in the Symposium Abstract Book*

Thank you for participating at the 95th Shock & Vibration Symposium!

	SESSION 8: **DYSMAS II** 3:45-5:45PM / LIMITED DIST. D+ CHAIR(S): Roger Ilamni (NSWC Indian Head)	*VENDOR SESSION B:* **EXHIBITOR PRESENTATIONS INCLUDING CASE STUDIES, NEW DEVELOPMENTS, TESTING & PRODUCTS** 3:45-5:45PM / UNLIMITED DIST. A CHAIR(S): Lauren Yancey (HI-TEST) Jennifer MacDonell (PCB Piezotronics)	*TRAINING II:* **INTRODUCTION TO UERDTOOLS** 3:45-5:45PM / LIMITED DIST. D 
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
3:45	**TOPIC TITLE TBD** *Presenter TBD*	**Kornucopia's Ability to Synthesize Realistic Oscillatory Transient Shock Including Statistical Considerations** *Dr. Ted Diehl (Bodie Technology, Inc.)*	**Introduction to UERDTools** *Rachel McIntyre* *Brian Lang, & Ari Bard* *(NSWC Carderock)* 3:45 - 5:45pm
4:10	**TOPIC TITLE TBD** *Presenter TBD*	**MIL-DTL-901E Discussion** *Kurt Hartsough (901E&T)*	
4:35	**TOPIC TITLE TBD** *Presenter TBD*	**Piezoresistive Accelerometers with Amplification and Temperature Compensation** *Jennifer MacDonell (PCB/Endevco)*	
5:00	**Parametric study of UNDEX cavity interaction** *James Davis & Dr. Brian Taylor (AFRL/ RWTCS)*	**Impact Tests According to MIL-883H: A New Shock Exciter** *Michael Mende (SPEKTRA/APS Dynamics)*	
5:25	**Dynamic Effects on Underwater Explosions** *Dr. Brian Taylor (AFRL/RWTCS)*	**Comparison of New Advanced Control and Acquisition Methods to Traditional Vibration Testing for a Single MISO Application** *Stewart Slykhous (Spectral Dynamics)*	

Visit our staff in the Southdown Room with any questions!

TUESDAY
SEPTEMBER 23

Young Engineer & New Attendee Networking Hour

6:00 - 7:00PM
NAPOLEON BALLROOM (EXHIBIT HALL)

Kick off your conference experience with a special event just for young engineers and new attendees! Join us for an hour of light refreshments, casual conversation, and meaningful connections.

Whether you're looking to meet peers, ask questions about the conference, or just break the ice on the opening day of sessions... this is the place to be.

Come say hello! We can't wait to meet you!

WEDNESDAY (SEPTEMBER 24)

BREAKFAST WITH THE EXHIBITORS
NAPOLEON BALLROOM | 7:00-8:00AM

	SESSION 9: **SHOCK TESTING & QUALIFICATIONS** 8:00-9:35AM / UNLIMITED DIST. A CHAIR(S): Anna Mason (NSWC Carderock)	*SESSION 10:* **VIBRATION MODELING: NONLINEAR & DAMPING** 8:00-9:35AM / UNLIMITED DIST. A CHAIR(S): Dr. Luke Martin (NSWC Dahlgren) Dr. Peter Vo (Raytheon)	*SESSION 11:* **CHARACTERIZATION OF SHOCK AND VIBRATION RESPONSE OF ISOLATED SYSTEMS** 8:00-9:35AM / UNLIMITED DIST. A CHAIR(S): TBD
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
8:00	**Remain Safe Shock Qualification of Live Ordnance** *Liam Rayner, Gavin Colliar, Callum Norris, & Brian Ferguson (Thornton Tomasetti)*	**Reduced Order Model of a Gap-Contact Nonlinearity using a Generalized Nonlinear Modal Basis Formulation** *Dr. Deborah Fowler, Dr. Robert J. Kuether, & Dr. Eric Robbins (Sandia National Laboratories)*	**Shipboard Equipment Vibration Mitigation with Semi-Active Control of Smart Dampers** *Maxim Veilleux, Dr. Richard Christenson & Dr. Jiong Tang (University of Connecticut)*
8:25	**Determination of Fundamental Deck Frequency to Meet Requirements for MIL-DTL-901E** *Calvin Milam (Element US Space & Defense)*	**Powdered Metal Damping in Cantilever beams** *Cory Puckett, Dr. Eric Schmierer, & Dr. Sandra Zimmerman (Los Alamos National Laboratories)*	**Inclusion of Simple Optimal Hybrid Dampers into Shock and Vibration Isolation Systems for US Navy shipboard equipment to minimize excursions of, and transmitted accelerations to isolated equipment** *Dr. Christopher Merrill (CM&A Engineering)*
8:50	**For LWSM Owners: Changes to Shock Test Facility Certification and Inspection Process** *Dan Provenzano (NSWC Philadephia)*	**Resonant Characteristics of the Mullins Effect** *Noah Zimmerman, Teri Stoner, Jay Paz & Dr. Peter Vo (Raytheon)*	**Final Selected Design: Shock and Vibration Response of Isolated Rigid Body to US Navy transient shock base excitation and vibration excitation with fixed ratio of CG elevation to horizontal separation of base isolators; and fixed isolation system isolator** *Dr. Christopher Merrill (CM&A Engineering)*
9:15	**How to Fail a Shock Test** *Dan Moran (Maritime Technology Group)*	**OPEN**	**OPEN**

9:35 - 10:00

COFFEE BREAK
with the Exhibitors

EXHIBIT HALL / NAPOLEON BALLROOM

BREAKFAST WITH THE EXHIBITORS
NAPOLEON BALLROOM | 7:00-8:00AM

	SESSION 12: **STRUCTURAL RESPONSE** 8:00-8:45AM / LIMITED DIST. D **VULNERABILITY ASSESSMENTS** 8:50-9:35AM / LIMITED DIST. D CHAIR(S): Adam Hapij (Thornton Tomasetti)	*VENDOR SESSION C:* **EXHIBITOR PRESENTATIONS INCLUDING CASE STUDIES, NEW DEVELOPMENTS, TESTING & PRODUCTS** 8:00-9:35AM / UNLIMITED DIST. A CHAIR(S): TBD	*TRAINING III:* **MIL-DTL-901E:** **TEST IT RIGHT THE FIRST TIME** 8:00-9:00AM / UNLIMITED DIST. A 
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
8:00	**Domino – Automated Prediction of Progressive Structural Collapse from Initial Dynamic Damage** *Duncan McGeehan & Dr. Jeffrey Honig (Protection Engineering Consultants), Dr. Bryan Bewick, Air Force Research Lab*	**Integrating Physics-Based Modeling and AI for Scalable, Real-Time Digital Twin Solutions** *Kory Soukup (Altair Engineering)*	**MIL-DTL-901E:** **Test it Right the First Time - Avoid Over-Testing & Under-Testing** *Kurt Hartsough (901E&T)* 8:00 - 9:00AM
8:25	**VERIFICATION OF MODELING BEARINGS OF UNKNOWN STIFFNESS USING CONNECTORS AND HERTZIAN CONTACT DURING DESIGN DEVELOPMENT** *Sierra Staunton & Ify Amene (HII Newport News Shipbuilding)*	**An Electrodynamic Method for MIL-STD-810 Acoustic Testing** *Dale Schick (Acoustic Research Systems) and Ed Kinsella(EM Acoustics)*	
8:50	**TITLE TBD** *(Thornton Tomasetti)*	**Optimization of Performance and Mechanical Design of Wire Rope Isolators** *Robert Filec & Ali Shehadeh (Socitec)*	
9:15	**TITLE TBD** *(Thornton Tomasetti)*	**Shock and Vibration Solutions** *Neil Donovan (Hutchinson)*	

9:35 - 10:00

COFFEE BREAK
with the Exhibitors
EXHIBIT HALL / NAPOLEON BALLROOM

WEDNESDAY (SEPTEMBER 24)

	SESSION 13: **PYROSHOCK** 10:00-NOON / UNLIMITED DIST. A CHAIR(S): TBD	*SESSION 14:* **VIBRATION TEST METHODS** 10:00-11:10AM / UNLIMITED DIST. A **MIMO VIBRATION** 11:15-NOON / UNLIMITED DIST. A CHAIR(S): Matt Forman (NSWC Dahlgren)	*SESSION 15:* **UNDEX/SHOCK ANALYSIS PROCESS AND APPLICATIONS** 10:00-NOON / LIMITED DIST. D CHAIR(S): Brian Lang (NSWC Carderock) Serena Sauers (NSWC Carderock)
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
10:00	**Rifle Optics Shock Testing on High-Frequency Resonant Plates** *Dr. Carl Sisemore (ShockMec Engineering)*	**Accelerated Test Development Techniques Using Field Data** *Jade Vande Kamp (Vibration Research Corporation)*	**Transient Shock Analysis Qualification Process** *Rebecca Grisso & Matt Stevens (NSWC Carderock)*
10:25	**Estimation of Impact Duration on a Resonant Plate Using Occupied Bandwidth** *Trevor Turner, William C. Rogers & Dr. Pablo A. Tarazaga (Texas A&M University), Chase Zion & Dr. Washington DeLima (Honeywell Federal Manufacturing & Technologies)*	**Development of combined vibration and shock testing for component flight environments** *David Soine, Dr. Jelena Paripovic-Stevens, & Dr. Ryan Schultz (Sandia National Laboratories)*	**Transient Shock Analysis Qualification Example and Common Errors** *Rebecca Grisso & Matt Stevens (NSWC Carderock)*
10:50	**Shock Response Spectrum (SRS) Validation Using Discrete Dynamic Analytical Methods** *Darko Gjoreski, Shane Jansen, & Richard Rakowski (Shock Tech, Inc)*	**OPEN**	**Design and Simulation of a Naval Radar System to Pass MIL-STD-901E Heavyweight Shock Testing Through Implementation of a Lightweight Precision Centered Isolation System** *Brandon Flood, Ryan Gaylo, Stewart Skiles, Jeffrey McMichael, & Nathan Compton (Georgia Tech Research Institute)*
11:15	**Resonant Plate Anvil Design and The Affect on the Shock Pulse Energy Content** *Dr. Carl Sisemore (ShockMec Engineering)*	**Methods to Envelope Multiple Random Vibration Environments into a Single MIMO Environment** *Randy Mayes (Sandia National Laboratories)*	**Phalanx Shipboard Equipment Grade B Shock Qualification** *Helen Huang, Jim Landry, Fred Folch-Pi, & Wen-Te Wu (Raytheon - RTX)*
11:40	**Mechanical Impact Pyroshock Simulator: An Investigation of Dual Cannon Performance** *Thomas Smith & Claudia Northrup (Element US Space & Defense)*	**Mission synthesis formulation for multi-axial durability testing** *Dr. Alberto Garcia de Miguel, Umberto Musella, Ruben Araujo, Dr. Mattia Dal Borgo, & Dr. Emilio Di Lorenzo (Siemens Digital Industries Software)*	**Modeling and Simulation of Bursting Pressure Vessels due to Thermal Runaway Events of Internal Lithium-Ion Batteries** *Ben Medina (NSWC Carderock)*

tip

DON'T FORGET TO VISIT THE EXHIBIT HALL AND COMPLETE YOUR "PASSPORT" FOR A CHANCE TO WIN GIFT CARDS, GADGETS, & MORE!

	SESSION 16: **STRUCTURAL RESPONSE: WEAPONS EFFECTS** 10:00-NOON / LIMITED DIST. D CHAIR(S): Roosevelt Davis (AFRL) Ernest Staubs (AFRL)	*VENDOR SESSION D:* **EXHIBITOR PRESENTATIONS INCLUDING CASE STUDIES, NEW DEVELOPMENTS, TESTING & PRODUCTS** 10:00-NOON / UNLIMITED DIST. A CHAIR(S): TBD	*WORKING GROUP:* **MIL-DTL-901 WORKING GROUP** 10:00-NOON / UNLIMITED DIST. A 
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
10:00	**Evaluation of analytical equations for fragment effects to targets** *David Lichlyter, Dr. T. Neil Williams, & Mr. Christopher M. Shackelford (US Army Corps of Engineers ERDC)*	**Stainless Steel High Damping Wire Rope Isolators** *Tyler Feingold & Alex Jason (VMC Group)*	**MIL-DTL-901E Working Group** *The working group will consist of a series of preselected discussion topics in common areas of concern (e.g. fastener tightening, mass ratios, SRF calculation, etc.) and then an open floor for Q&A.* Moderators: *Thomas Brodrick, NAVSEA 05P1* *Ryan Shorts, NSWC Carderock* *Kervin Michaud, NSWC Philadelphia* 10:00 - NOON
10:25	**Fragmentation of a Facade Structure at Full-Scale Using the Large Blast/ Thermal Simulator** *Sheera Lum, Joe Crepeau, Jakob Brisby, Mohsen Sanai, Damian Cano, Waylon Weber, & Sean P. Cooper (Applied Research Associates)*	**OPEN**	
10:50	**Investigating the Effects of Breach Area Representation on Internal Blast Pressure Predictions** *Christopher Shackelford, Dr. T. Neil Williams & John Q. Ehrgott, Jr. (US Army Corps of Engineers ERDC)*	**OPEN**	
11:15	**Analysis of Penetrator Failure Modes with Hybrid Finite Element Model** *Logan Rice, Dr. Mark Adley, David Lichlyter, & Ernesto G. Cruz (US Army Corps of Engineers ERDC)*	**OPEN**	
11:40	**OPEN**	**OPEN**	

SEE A PRESENTATION WORTHY OF OUR HENRY C. PUSEY AWARD?
REMEMBER TO NOMINATE THAT PAPER USING THE PROVIDED QR CODE!

WEDNESDAY
SEPTEMBER 24

AWARDS LUNCHEON (GENERAL SESSION II) NOON - 1:30PM

NAPOLEON BALLROOM

NOON—12:05PM	**CALL TO ORDER**	
	Mr. Drew Perkins (SAVE / HI-TEST Laboratories)	
12:05PM—12:15PM	**HENRY PUSEY BEST PAPER AWARD**	
	PRESENTED TO:	Dr. Ricky Stanfield (Corvid Technologies)
12:15PM—12:20PM	**AWARD FOR EXCELLENCE IN INSTRUCTION AWARD**	
	PRESENTED TO:	Denis Rickman (USACE ERDC)
12:20PM—12:40PM	**LIFETIME ACHIEVEMENT AWARD**	
	PRESENTED TO:	COMING SOON!
	PRESENTED TO:	COMING SOON!

Henry Pusey Best Paper Award

PRESENTED TO:

"Sounding Rocket Flight Vibration versus Reynold's and Strouhal Numbers"
Dr. Ricky Stanfield (Corvid Technologies)

The flight vibration environment for sounding rocket class vehicles has been characterized using several approaches through the years. From the mid 1970's to early 2000's, the environments were based on NASA hand-calculated power spectral density data on a limited set of flight vibration measurements. Between 2002 to 2019, work was performed over a much wider set of data to trend flight vibration environments against common flight analysis parameters such as flight dynamic pressure and Reynold's number. More recently, an exploration was started with several new sounding rockets data sets to determine the extent to which the vector components of flow velocity across the diameter of the rocket generate certain spectral features. This crossflow is caused by small airframe flight path angles of attack relative to the vehicle velocity vector and it contributes to vibration features that do not otherwise follow the larger trend with Reynold's number. In this paper, we discuss the empirical correlation between flight vibration magnitude and spectral content to Reynold's Number and Dynamic Pressure; the correlation of some vibration features with airframe angle of attack, crossflow velocity, and Strouhal number; and how other interactions between structural frequencies and aerodynamically driven vortex shedding frequencies generate transient vibratory features.

Award for Excellence in Instruction

PRESENTED TO:

Denis Rickman (US Army Corps of Engineers Engineering Research & Development Center)
for his tutorial "Air Blast and Cratering: An Introduction to the ABC's of Explosion Effects in Air and on Land"

This three-hour course introduces the effects of explosions in air and on land. Topics covered include airblast, soil/rock/pavement cratering, and ground shock phenomena produced by explosive detonations. There is a little math, but for the most part, the focus is on aspects and principles that are of practical use to those conducting (and utilizing) blast-related research. Most researchers in the blast arena have some grasp of explosion effects fundamentals, but very few have a good, broad-based understanding of how it all works. The goal is to provide the participants with enough of an understanding that they can appreciate the various explosion phenomena and those parameters that affect blast propagation and blast loading of objects in a terrestrial setting.

AWARDS LUNCHEON
(GENERAL SESSION II)
NOON - 1:30PM

Coming Soon!

2025 LIFETIME ACHIEVEMENT AWARD WINNER

Lifetime Achievement Award

PRESENTED TO:
COMING SOON!

BIO COMING SOON!

Coming Soon!

2025 LIFETIME ACHIEVEMENT AWARD WINNER

Lifetime Achievement Award

PRESENTED TO:
COMING SOON!

BIO COMING SOON!

Congratulations to our Award Winners!

WEDNESDAY (SEPTEMBER 24)

	SESSION 17: **SHOCK & VIBRATION MOUNT DESIGN & ANALYSIS** 1:30-1:50PM / LIMITED DIST. D 1:55-3:05PM / UNLIMITED DIST. A CHAIR(S): Alan Klembczyk (Taylor Devices) Shawn Czerniak (Hutchinson)	*SESSION 18:* **INSTRUMENTATION DATA ANALYSIS** 1:30-3:05PM / UNLIMITED DIST. A CHAIR(S): Dr. Ted Diehl (Bodie Technology)	*SESSION 19:* **MECHANICAL SHOCK & VIBRATION TEST METHODS AND EVALUATION** 1:30-3:05PM / UNLIMITED DIST. A CHAIR(S): TBD
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
1:30	**Analysis of Snubbed Mount Dynamics** *Jordan Poehler & Matt Stevens (NSWC Carderok*	**Perspective on Structural Response in Shaker Testing** *Sean Hollands & Dr. Jeff Hay (RDI Technologies)*	**Advancing System and Subsystem Shock Experimental Capabilities with Rebounding Sled for Velocity Shocks** *Joshua Nowlin, Dr. Nancy Winfree, & Adam Slavin (Sandia National Labs)*
1:55	**Highly Damped Shipboard Shock Mounts: A Review of Design Parameters & Analytical Predictions (Part 1)** *Shawn Czerniak & Grete Bressner (Hutchinson Aerospace & Industry)*	**Understanding and Preventing Shock Waveform Distortion Caused by Measurement System Limitations** *Dr. Thomas Gerber, Alan Szary, & Douglas Firth (Precision Filters, Inc.)*	**Five Methods to Create a Single-Axis Shock Environment from a Multi-Axis Shock Response** *Dr. Brian Evan Saunders, Dr. Vit Babuska, & Douglas Coombs (Sandia National Laboratories)*
2:20	**Highly Damped Shipboard Shock Mounts: A Review of Test Validation on Elastomer Samples & Full-Scale Mounts (Part 2)** *Grete Bressner & Shawn Czerniak (Hutchinson Aerospace & Industry)*	**Improving FFT-based Filtering of Transient Shock Data by Plausibly Honoring the Periodicity Requirement** *Dr. Ted Diehl (Bodie Technology)*	**Energy based severity comparison of multi-DOF transient environments** *Dr. Mattia Dal Borgo, Dr. Alberto Garcia de Miguel, Umberto Musella, Dr. Emilio di Lorenzo (Siemens Digital Industries Software), Roberto Fagioli (Politecnico di Milano)*
2:45	**Comparison of experimental characterization of nonlinear stiffness and damping between wire rope isolators and Taylor Devices' Pumpkin isolators in shear, roll, and angled installations** *Gordon Fox (Taylor Devices)*	**Improving High-G Shock Measurements: A Practical Case Study for Physical Testing and/or Numerical Simulation** *Dr. Ted Diehl (Bodie Technology)*	**Integrating Dynamic Design Analysis Methods (DDAM) with Operational Simulations for Shipboard Performance Optimization** *Kory Soukup (Altair Engineering)*

3:05 - 3:40

Dessert Break & Passport Program Drawing

NAPOLEON BALLROOM/EXHIBIT HALL

SPECTRAL DYNAMICS

SOCITEC

Join us for a sweet afternoon treat and the announcement of prize winners for the Passport Program.

This is also the last opportunity to visit with our exhibitors!

Participants do not need to be present to win.

	SESSION 20: **NAVY ENHANCED SIERRA MECHANICS (NESM)** 1:30-3:05PM / LIMITED DIST. D CHAIR(S): Dr. Nicholas Reynolds (NSWC Carderock)	*TRAINING V:* **PHANTOM CINE ANALYZER** 1:30-2:30PM / UNLIMITED DIST. A 	*TRAINING VI:* **INTRODUCTION TO HEAVYWEIGHT SHOCK TESTING** 1:30-3:00PM / UNLIMITED DIST. A 
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
1:30	**Perks and Pitfalls of Band Damping** *Dr. Nicholas Reynolds (NSWC Carderock)*	**Phantom Cine Analyzer – A Python Based Open-source Platform for Advanced Image-based Motion Analysis** *Dr. Kyle Gilroy* *(Vision Research)* 1:30 - 2:30PM	**Introduction to Heavyweight Shock Testing** *Travis Kerr* *(HI-TEST Laboratories)* 1:30 - 3:05PM
1:55	**Effect of Shell t/L Ratios on Structural Response in Sierra/SM** *Keenan Powers, Ari Bard, Rohan Bardhan, Michael Miraglia, & Dr. Nicholas Reynolds (NSWC Carderock)*		
2:20	**GPU Enabled Speedups for Modal Analyses in Sierra/SD** *Rohan Bardhan, Ari Bard, Michael Miraglia, Keenan Powers, & Dr. Nicholas Reynolds (NSWC Carderock)*		
2:45	**Navy Enhanced Sierra Mechanics (NESM) Dynamic Design Analysis Method (DDAM) Study** *Ian Larson (NSWC Carderock)*		

3:05 - 3:40

Dessert Break & Passport Program Drawing

NAPOLEON BALLROOM/EXHIBIT HALL

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WEDNESDAY
SEPTEMBER 24

TUTORIAL SESSION VII
3:30 - 6:30PM

OPTIONAL THREE HOUR COURSES. ATTENDEES WILL RECEIVE A CERTIFICATE OF COMPLETION AND MAY RECEIVE CEUs/PDHs (VARIES BY STATE). ADDITIONAL FEES APPLY TO ATTEND.

SHOCK TEST FAILURE MODES
Kurt Hartsough (901 E&T)

MEETING ROOM TBD

This tutorial will cover examples of shock test failures typically experienced by equipment exposed to MIL-DTL-901E shock levels. MIL-DTL-901E provides guidance for designers responsible for meeting the requirements of MIL-DTL-901E. This tutorial will show how and why equipment failures occur and show how minor design changes can prevent shock failures. Hands on demonstrations, real time high speed video and analysis will be used to demonstrate both failures and corrective actions.

QUANTITATIVE METHODS FOR SURVIVABLE ELECTRONICS PACKAGING FOR COMBINED LOADING OF THERMAL AND HIGH AMPLITUDE MECHANICAL SHOCK
NOTE: LIMITED DISTRIBUTION D (SECURITY PAPERWORK REQUIRED)
Dr. Matthew Neidigk (AFRL)
Zachary Jowers (Applied Research Associates)

MEETING ROOM TBD

Fuze electronics intended for hard target defeat must survive both MIL-STD thermal cycle environments and extreme mechanical shock. Fuzes are often potted to prevent printed circuit board (PCB) flexure associated with component failure during impact. Potting techniques, or packaging strategies, may vary significantly by vendor and are often developed through trial and error. In many cases they are proprietary. Some packaging strategies include the application of elastomeric coatings to PCBs and components, or the use of epoxy underfills beneath components. Because most packaging materials are polymers, the disparity in thermal expansion between them and other fuze materials leads to a whole new series of problems during thermal cycling. As such, the DoD and the DOE have devoted considerable effort in the areas of material characterization, model development, and experimental validation, all with the goal of identifying survivable packaging strategies for use in both conventional and nuclear weapon stockpiles. Upon completion of this course, the user should have a basic understanding of the properties of common packaging materials, modeling and simulation tips and tricks, and latest developments in the design and evaluation of survivable packaging strategies for high-g electronics.

MISSION SYNTHESIS FROM FIELD DATA TO SHAKER REFERENCE PROFILES
Umberto Musella (Siemens)
Alberto Garcia De Miguel (Siemens)

MEETING ROOM TBD

Vibration control tests are performed to verify that an aerospace system and all its sub-components can withstand the vibration environment during the operational life. These tests aim to accurately replicate the in-service environment that a Device Under Test (DUT) will experience in-service via controlled shaker excitation. For aerospace systems and subsystems, random and/or sine vibration tests are required for all the main mechanical and electrical components. These types of tests are performed to replicate in the laboratory the response of the DUT to the broadband random inputs (e.g. transportation or in-flight environments) or responses to sweeping tonal phenomena. Many manufacturers rely upon ASTM, IEEE, MIL or ISO standard to define the vibration profiles. These profiles are typically the results of enveloping a very large set of possible in-service events and also include conservative safety margins. Some events used for standard profiles may not be representative for a specific DUT and yet drive the design leading to potentially unacceptable and costly overdesign. More dangerously, events that may be critical for a specific DUT may not be well-captured by the legacy standardized profiles. This could lead to product field failures, consumer dissatisfaction and warranty/recall costs. In this tutorial we describe a robust methodology to derive shaker test specification directly from field data.

INTRODUCTION TO WEAPONS EFFECTS AND SHIP COMBAT SURVIVABILITY ANALYSIS
MEETING ROOM TBD
Jan Czaban (Zenginworks Limited)

This short course provides a practical understanding of naval ship combat survivability and methods to assess the effects of various weapons. The introduction will review terminology, concepts and current practice involved in setting, achieving and verifying survivability requirements. Naval threats and weapon types will be reviewed and methods for predicting their resultant loads and damage mechanisms explained. Primary weapons effects will include attacks from underwater explosions, above water explosions, internal blast, fragments and ballistic projectiles. Sample problems will be provided to demonstrate how to estimate the extent of damage sustained by ship structures and how to apply and interpret damage using standard terms of capability degradation. Methods for hardening ship systems and structures will be reviewed with an introduction provided to explain dynamic load effects tolerance, armour systems and simplified pass/fail global design assessment techniques. The course material will be entirely based on public domain sources and includes a comprehensive list of references and applicable military standards.

MIL-DTL-901E ENGINEERING TOPICS
MEETING ROOM TBD
Domenic Urzillo (NSWC Carderock)

MIL-DTL-901E Engineering topics is a follow-on course to the MIL-DTL-901E Test and Extension training courses and is aimed at providing the NAVSEA acquisition and engineering communities with a more in-depth review of engineering mathematics routinely used in equipment shock qualification. Topics covered include shock spectrum as it relates to MIL-DTL-901E testing, digital data filtering, shock response frequency, shock test fixture design fundamentals and FSP deck simulation fixtures.

WEDNESDAY NIGHT SOCIAL

SEPTEMBER 24

7:00-10:00 PM

ALL ATTENDEES & GUESTS WELCOME

DINNER & DRINKS PROVIDED TO ALL SAVE ATTENDEES AND GUESTS.

BRING YOUR CONFERENCE BADGE FOR ENTRY.

ALL FOOD, DRINKS, AND ACTIVITIES ARE SPONSORED IN FULL BY OUR COMMERCIAL SPONSOR.

HI-TEST Laboratories, Inc.

Transportation not provided.

THURSDAY (SEPTEMBER 25)

ATTENDEE BREAKFAST
NAPOLEON BALLROOM | 7:00-8:00AM

	SESSION 21: **SHOCK AND VIBRATION ISOLATION** 8:00-10:00AM / UNLIMITED DIST. A CHAIR(S): TBD	*SESSION 22:* **BLAST DAMAGE** 8:00-9:10AM / UNLIMITED DIST. A **BALLISTICS** 9:15-10:00AM / UNLIMITED DIST. A CHAIR(S): TBD	*SESSION 23:* **NOVEL UNDEX & MECHANICAL SHOCK INVESTIGATIONS** 8:00-10:00AM / LIMITED DIST. D CHAIR(S): Austin Glenwright (NSWC Philadelphia)
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
8:00	**Shock Performance Comparison of Arch Mounts™ and Industry Standard Wire Rope Mounts** *Andrew Liberatore, Darko Gjoreski, & Richard Rakowski (Shock Tech, Inc.)*	**Damage Effects of Surface Charges on Massive Concrete Mixture Specimens** *Gabriel Riveros (US Army Corps of Engineers ERDC)*	**Influence of Boundary Conditions on Underwater Explosions - Examples Tying Theory to Test Data** *Mr. Brian Lang (NSWC Carderock)*
8:25	**Improving Modeling of Height-Dependent Lateral Performance of Wire Rope Isolators for Enhanced Simulation of Shock and Vibration Systems** *Joshua Partyka (Isolation Dynamics Corporation)*	**Use of LIDAR Point Clouds and Finite Element Modeling to Assess Residual Capacity of Blast-Damaged Infrastructure** *Cadet Samuel Benson, Cadet Samuel Keys, & Prof. Eric Williamson (United States Military Academy)*	**Enhanced Testing Guided by Modeling and Simulation Overview** *Dr. Timothy McGee, Jacob Mason, Matthew Stevens, & Rachel McIntyre (NSWC Carderock)*
8:50	**Design and Qualification of a Passive Dynamic Vibration Absorber for Ariane 6 Using Wire Rope Isolators** *Jean-Pierre Tartary & Osadolo Irowa (Socitec US)*	**Higher-Order Beam Elements for Explicit Methods in Nonlinear Dynamics** *William Furr, Atharva Kulkarni, Dr. J.N. Reddy, Dr. Arun Srinivasa, & Dr. Kent T. Danielson (US Army Corps of Engineers ERDC)*	**OPEN**
9:15	**OPEN**	**Gun Barrel Beam Vibrations and Accuracy** *Dr. Jon Yagla (Dynamics, Thermodynamics, and Ballistics LLC)*	**Underwater Explosion Performance Characterization** *Noah Moffeit, Dr. Brian Taylor, Daniel Vu, & Samuel Schemmer (AFRL), Kent Rye & Brian Mills (NSWC Carderock), Dominic Farole (US Army)*
9:40	**OPEN**	**Gun Barrel Dynamics via High Speed Motion Amplification** *Sean Hollands & Dr. Jeff Hay (RDI Technologies)*	**Shock Qualification of Additively Manufactured Metal Parts for US Navy Applications** *Jacob Mason (NSWC Carderock)*

ATTENDEE BREAKFAST
NAPOLEON BALLROOM | 7:00-8:00AM

	SESSION 24: **MECHANICAL SHOCK TESTING AND ANALYSIS** 8:00-10:00AM / LIMITED DIST. D CHAIR(S): Ryan Powers (NSWC Philadelphia) Kaitlyn Riggs (NSWC Philadelphia)	*SESSION 25/PANEL:* **AUKUS: COMPARISON OF SHIPBOARD QUALIFICATION TESTING SPECIFICATIONS** 8:00-10:00AM / LIMITED DIST. D+ (ACCESS CONTROLLED BY PRESENTERS)	*TRAINING VII:* **Advanced 3D Modeling of High-Frequency Problems Using Statistical Energy Analysis (SEA) Methods** 8:00-9:00AM / UNLIMITED DIST. A
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
8:00	**Applications for Printed Hybrid Electronic (PHE) Assemblies Subject to Extreme Mechanical Shock at Multiple Temperatures** *Maj. Hayden Richards & Dr. Abhijit Dasgupta (University of Maryland), Andres Bujanda, Matthew Bowman, & Dr. Harvey Tsang (DEVCOM Army Research Lab*	**AUKUS: Comparison of Shipboard Qualification Testing Specifications** *The session will consist of a series of presentations introducing the topic prior to a panel-moderated open discussion .* Presenters/Moderators: *Nick Misselbrook (Thornton Tomasetti)* *Helen Peterson (UK Sub.Delivery Agency)* *Additional Members TBD* 8:00-10:00AM	**Advanced 3D Modeling of High-Frequency Problems Using Statistical Energy Analysis (SEA) Methods** *Kory Soukup* *(Altair)* 8:00-9:00AM
8:25	**Attenuation in Resonant Fixture Shock Tests with a Transmissibility-Informed Case Study** *Brian Saunders, Dr. Vit Babuska, & Gabrielle Graves (Sandia National Laboratories)*		
8:50	**Comparative Analysis of Conventional and Head-Weak Fasteners: Shock Survivability** *Andrew Cunningham, John-David Houchins, LeeYung Chang, Ian Larson, & Jacob Mason (NSWC Carderock)*		
9:15	**Comparative Shock Testing of Conventional and Head-Weak Fasteners** *LeeYung Chang, John-David Houchins, Joshua Yates, Ian Larson, & Jacob Mason (NSWC Carderock)*		
9:40	**OPEN**		

THURSDAY (SEPTEMBER 25)

	SESSION 26: **SHOCK & VIBRATION MODELING & SIMULATION** 10:00-NOON / UNLIMITED DIST. A CHAIR(S): Justin Caruana (Cardinal Engineering)	*SESSION 27:* **INSTRUMENTATION APPLICATION** 10:00-NOON / UNLIMITED DIST. A CHAIR(S): TBD	*SESSION 28:* **ELECTRONICS SURVIVABILITY** 10:00-10:45AM / UNLIMITED DIST. A **MECHANICAL SHOCK AND VIBRATION TEST APPLICATIONS** 10:50-NOON / UNLIMITED DIST. A CHAIR(S): TBD
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
10:00	**Design Exploration for Shock-Resistant Shipbuilding** *Kory Soukup (Altair Engineering)*	**Cryogenic Performance of High-G Damped Accelerometers: Further Testing** *James Nelson (PCB Piezotronics)* **A New**	**Thermal Vulnerability of Potted Surface Mount Resistors and What to Do About It** *Dr. Joel Limmer (Sandia National Laboratories)*
10:25	**Accelerating Shock-Qualified Casting Design in Shipbuilding with AI-Based Reduced-Order Models** *Kory Soukup (Altair Engineering)*	**Securing Accelerometers Under Extreme Conditions: A Review of Adhesives and Installation Practices** *Samuel Stone (Lawrence Livermore National Laboratory)*	**Electronics Fixturing for Microbead Potting as Shock Mitigation** *Natasha Wilson & Cayden Boll (Sandia National Laboratories)*
10:50	**Modernizing the Exodus Profile for Streamlined Shipboard Shock Analysis** *Kory Soukup (Altair Engineering)*	**OPEN**	**Shock and Vibration Properties of Additively Manufactured Stainless Steel** *Troy Pacheco, Dr. Sandra Zimmerman, & Ryan Hemphill (Los Alamos National Laboratory)*
11:15	**Evaluation of Transportation Shock and Testing for Failure and Damage** *Dr. Arup Maji (Sandia National Laboratories)*	**Data Recorder Survivability in High Shock Environments** *Victor Nevarez (Sandia National Laboratories)*	**Shock Induced Cavitation in a Hydraulic Cylinder** *Dr. Jon Yagla (Dynamics, Thermodynamics, and Ballistics LLC)*
11:40	**OPEN**	**Enhancing Hardware Testing with High-Speed Imaging** *Kory Soukup (Altair Enginering)*	**OPEN**

1:00 - 2:00

SAVE TECHNICAL ADVISORY GROUP (TAG) MEETING

ROOM TBD

The annual meeting of the members of the SAVE Technical Advisory Group (TAG) will convene to review the 94th Shock & Vibration Symposium and discuss plans for 2025.

	SESSION 29: **RESERVED** 10:00-NOON / LIMITED DIST. D CHAIR(S): TBD	*DISCUSSION GROUP:* **DYNAMIC ENVIRONMENTS QUALIFICATION WORKING GROUP** 10:00-NOON / UNLIMITED DIST. A	*TRAINING VIII:* **SHOCK RESPONSE SPECTRUM PRIMER** 10:00AM - NOON / UNLIMITED DIST. A
	MEETING ROOM TBD	MEETING ROOM TBD	MEETING ROOM TBD
10:00	**RESERVED**	**DYNAMIC ENVIRONMENTS QUALIFICATION WORKING GROUP** *Troy Skousen & David Soine* *(Sandia National Laboratories)* 10:00AM - NOON *The goal of dynamic environments qualification is to demonstrate that designs can withstand vibration inducing in-service loads while performing as required. Qualification evidence is often collected through laboratory testing intended to mimic field environment conditions with some conservatism. The objective of the Dynamic Environments Qualification Working Group is to shepherd the advancement of ideas and methods for shock and vibration environments qualification through test and analysis in the Shock & Vibration Symposium community. It is a forum to bring together the people that will lead the community to advance the state of the art in dynamic environments qualification. Collaborative discussion will include:* *• Discuss and evaluate effectiveness of sessions, tutorials, trainings, and discussion groups held at the symposium this year.* *• Identify thoughts, traditions, and standard practices that may be holding us back.* *• Sharing thoughts on the research needed to advance the state of the art.* *• What actions should the working group take within and external to the Shock and Vibration Symposium?*	**SHOCK RESPONSE SPECTRUM PRIMER** *Dr. Carl Sisemore* *(ShockMec Engineering)* 10:00 - 11:30AM
10:25	**RESERVED**		
10:50	**RESERVED**		
11:15	**RESERVED**		
11:40	**RESERVED**		

1:00 - 2:00

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ROOM TBD

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Exhibitor List

101 OPEN
102 IX CAMERAS
103 OPEN
104 OPEN

201 PCB PIEZOTRONICS
202 PCB PIEZOTRONICS
203 E-LABS
204 TAYLOR DEVICES
205 SIEMENS
206 SOCITEC
207 DEWESOFT
208 HBK
209 SPECTRAL DYNAMICS
210 ITT ENIDINE
211 PHOTRON
212 CORRELATED SOLUTIONS

301 BODIE TECHNOLOGY
302 KISTLER INSTRUMENT CORP
303 PRECISION FILTERS
304 SHOCK TECH
305 SHOCK TECH
306 HI-TECHNIQUES
307 M+P INTERNATIONAL
308 CRYSTAL INSTRUMENTS
309 ELEMENT US SPACE & DEF.
310 DATA PHYSICS/TEAM CORP.
311 ACOUSTIC RESEARCH SYS.
312 SPEKTRA

401 VIBRATION RESEARCH
402 VIPER APPLIED SCIENCE
403 DAYTON T. BROWN
404 ALTAIR
405 DEWETRON
406 ACUTRONIC USA
407 ACUTRONIC USA
408 ADV TEST EQUIP RENTALS
409 VISION RESEARCH
410 POLYTEC

501 HI-TEST LABORATORIES
502 SHOCKMEC ENGINEERING
503 X-SIGHT
504 ISOLATION DYNAMICS CORP
505 HUNTINGTON INGALLS IND.
506 SOC. OF EXP. MECHANICS
507 CLARK TESTING

601 THORNTON TOMASETTI
602 COMPUTER METHODS
603 COMPUTER METHODS
604 ETS SOLUTION NA
605 HUTCHINSON/MIDE
606 HUTCHINSON/MIDE
607 901E&T
608 OPEN

Exhibit Hall Layout